



Microeconomic Reform and the Environment

Workshop
Proceedings

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The Productivity Commission

The Productivity Commission, an independent Commonwealth agency, is the Government's principal review and advisory body on microeconomic policy and regulation. It conducts public inquiries and research into a broad range of economic and social issues affecting the welfare of Australians.

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

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Foreword

The Productivity Commission has a continuing close interest in environmental issues and sustainable development — both in their own right and as part of the broader microeconomic reform process.

The Commission and its predecessors have conducted some major public inquiries in this area, including an early review of the costs and benefits of reducing greenhouse gas emissions, and more recent reports on Ecologically Sustainable Land Management and the Implementation of Ecologically Sustainable Development by Commonwealth Departments and Agencies. In addition, the Commission's research program has traversed a variety of related issues, including the role of economic instruments in managing the environment, emissions trading, environmental labelling and the environmental performance of commercial buildings.

In September 2000, the Commission convened a workshop on 'Microeconomic reform and the environment' to explore the links between economic and environmental policy objectives and outcomes. It drew together researchers, policy makers and practitioners with knowledge and experience encompassing a number of disciplines and sectors. The workshop participants explored a broad range of issues, including identifying policy links and frameworks, and priorities for research and policy action. Sessions considered issues arising in four sectors — water, electricity, transport and forestry — and some common themes among them.

The presentations and contributed papers stimulated a robust and productive discussion. This volume ensures that the information and ideas generated by the workshop are available to a wider audience. It brings together the contributed papers as well as summaries of the presentations and discussions in each session.

The Commission is grateful to everyone who participated in the workshop, particularly those who prepared papers or acted as discussants.

Gary Banks
Chairman

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PART I

INTRODUCTION

Introduction

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Microeconomic reform and the environment have been central issues in policy making for some time. Successive Australian governments have pursued microeconomic reform in their efforts to improve living standards for Australians through improvements in productivity. And, over the past decade or so, Australia's productivity performance has surged, with microeconomic reform being linked to this improved performance (Productivity Commission 1999a).

Unfortunately, the environmental picture is not so positive, and in some areas it is disturbing. Australia's most comprehensive environmental audit (undertaken for the 1996 State of the Environment Report), for example, identified some positive findings but highlighted that Australia faces several serious environmental problems that need to be dealt with as a matter of priority (SEAC 1996). Priority issues identified in the report include loss of biodiversity, deterioration of inland waters, soil erosion and salinisation. The report also highlighted that a lack of information means it is not possible to decide in many areas whether our environmental management is adequate. A more recent report by the National Farmers' Federation and Australian Conservation Foundation estimated that the current cost of land and river degradation is around \$2 billion a year, and that the bill to repair land and river systems could run to \$60 billion (NFF/ACF 2000, Virtual Consulting Group and Griffin nrm, 2000). The magnitude of the estimates may be debatable, but they indicate the seriousness of the issues.

Maintaining a healthy and sustainable environment is important for Australia for several reasons. Not least of all, our environment plays an important role in contributing to our standard of living — a role it will play for future generations too. The productivity of our agricultural, aquaculture and forestry industries, for example, depends on the quality of the environment. The degradation of our land and water systems, a reduction in the biodiversity of our flora and fauna, and

¹ The author thanks Andrew Dolling and Deborah Peterson for their contribution to the preparation of this paper.

damage to the ecosystems that create, repair and sustain life and absorb waste material fundamentally reduce our capacity to produce and sustain our standard of living. Many farmers and rural towns are already facing enormous difficulties as a result of environmental decline, especially from reduced water flows and dryland salinity. Global environmental issues such as climate change, and how Australia responds to them, also pose potential threats to our future living standards.

Maintaining a healthy environment — locally, nationally and globally — is clearly also important for healthy living. Polluted water and air quality can directly affect the health of Australians, as can the effect of increased exposure to ultraviolet radiation as a result of a deteriorating ozone layer. Australians also benefit enormously from being able to enjoy our natural environment as an amenity and for its cultural and intrinsic value.

Can microeconomic reform play a role in meeting our environmental challenges, or is it part of the problem? This workshop explored the links between microeconomic reform and the environment, along with the policy frameworks that have been used to date, including ones that have been successful and why. It also discussed the focus of future policy and research effort.

Linking microeconomic reform, the economy and the environment

Microeconomic reform and the environment are linked in many ways. These linkages occur both through the possible impacts of microeconomic reform on the environment, and through the possible impacts of changes in the environment and associated environmental policies on economic activity, productivity and the microeconomic reform agenda.

In terms of the potential impacts of microeconomic reforms on the environment, it can be useful to distinguish between microeconomic reforms that are directly aimed at environmental or natural resource use, and microeconomic reforms that are not, yet may still have significant impacts on the environment (anticipated or unanticipated).

Microeconomic reforms that are specifically aimed at improving the use of our nation's environmental and natural resources are perhaps the most obvious reforms to consider in looking at links between microeconomic reform and the environment. Water and forest industry reforms are examples of such reforms.

The use of microeconomic reform to target resource management issues directly seems to offer significant potential gains for Australia and the environment.

Microeconomic reforms may assist natural resource management through, for example:

- greater use of economic principles such as cost recovery and project feasibility based on communitywide cost–benefit analysis;
- greater use of market-based instruments such as taxes, charges and tradeable permits; and
- institutional changes to improve practical partnerships and communication between business, government and the wider community.

The Industry Commission’s report on ecologically sustainable land management (Industry Commission 1998), for example, argued for a package of reforms to improve the regulation of natural resources and environmental protection (including a statutory duty of care for the environment); to improve the markets for natural resources; and to expand nature conservation on private land.

In addition to microeconomic reforms aimed at environmental and resource management issues, other microeconomic reforms — including reforms to competition policy, trade policy, utilities such as electricity and gas, agriculture and transport — can have significant impacts on the environment. Because many of the links between these types of microeconomic reform and the environment are often indirect and complex, they can be difficult for policy makers and the general public to understand. It is therefore important that debate on these issues is well informed.

Microeconomic reform and the environment — seeking ‘win–win’ outcomes

Four important ways in which microeconomic reforms in general can affect the environment include:

- impacts on economic growth;
- impacts on the level of competition;
- impacts on the creation and diffusion of new production technologies; and
- general allocative efficiency, with impacts on the structure, composition and location of economic activity.

First, by enhancing productivity, microeconomic reform can increase and facilitate economic growth. On the one hand, economic growth can place more pressure on our environment as more natural resources are used to provide more goods and services. More waste is also likely to be generated. On the other hand, rising income levels can increase a nation’s capacity to provide more environmental protection

and enhancement. Higher incomes may also open markets for green production techniques and products that otherwise may have been outside the budget of consumers. Community demand for policy measures to protect and enhance the environment may also build as living standards increase. The likely net effects of economic growth on environmental performance is the subject of well known debates surrounding the environmental Kuznets curve, which suggests that increased economic growth increases environmental performance above some (undefined) threshold of income.

Second, microeconomic reforms may have an impact on environmental outcomes through their effect on competition. Again, the effects on the environment are not all 'positive' or 'negative'.

On the one hand, fears have been raised that microeconomic reforms that increase competition may reduce firms' inclination to fulfil environmental management tasks as they try to reduce costs. Similar concerns have been raised about the effects of privatisation, where it is feared that reducing government control through reduced ownership implies less control over environmental outcomes. Increased competition has also been perceived to increase the political pressure on governments to ease environmental regulation, encouraging the so-called 'race to the bottom' for environmental standards. However, these arguments require critical examination and are rarely as simple as they first seem, and the empirical evidence is mixed. The issues have been reviewed in the World Trade Organization's recent report on trade and the environment (World Trade Organization 1999).

On the other hand, competition can increase the search for innovative products and niche markets, for which environmentally 'friendly' products and services may offer firms a competitive advantage. Competition can also increase the search for economies in production that may reduce the production process inputs and wastes, or 'unsaleable production' (Hawken, Lovins and Lovins 1999).

Microeconomic reform can also impact on the environment by changing the incentives and capacities for the research, development and diffusion of new production technologies. Reforms may directly affect the search for, and production and use of, new technologies, for example, by:

- raising the private returns to research and development activities;
- increasing international trade, which has been shown to facilitate the transfer of technological knowledge across borders; and
- generally increasing competitive pressures on firms to innovate to increase their productivity and maintain or increase their competitive position in the marketplace (Industry Commission 1997).

Finally, it is important to emphasise that a key element of microeconomic reform is to improve the way in which resources (including natural resources) are used and allocated for current and future purposes. By encouraging more efficient use of scarce resources and minimising waste, microeconomic reform can play a role in reducing environmental damage and sustaining our natural resources — an important point in a growing global economy with a growing population.

In encouraging allocative efficiency across the economy, microeconomic reform often involves changes in the structure, composition and location of economic activity, thus encouraging resources to move to areas where they are most valued. These changes can effect the use of natural resources and the resulting pollution and waste.

Other reforms can have more direct implications for the environment. Examples include removing perverse incentives for resource use, as in the case of reducing production subsidies for agriculture and input subsidies such as for water use. Relative prices are a critically important signal for resource allocation and use, so getting these prices right, and fully incorporating all associated costs to the community, can go a long way to improving the efficient allocation of resources, including our natural resources.

These links between microeconomic reform and the environment are numerous and complex. In many cases, microeconomic reform will help improve the health and sustainability of our environment. Seeking such ‘win–win’ outcomes, and facilitating and empowering market responses that complement other government and community measures, can play a central role in achieving a sustainable and prosperous future.

Potential trade-offs between social, economic and environmental goals

However, in other cases, microeconomic reforms may aggravate environmental pressures. This is not necessarily a problem for society. It is conceivable that society will proceed with some reforms even if they are likely to lead to a deterioration in some aspects of environmental quality where the community judges such trade-offs between social, economic and environmental goals are in the community’s best interests. The important point is that environmental issues need to have been appropriately considered in decision making. Further, by thinking through environmental issues early in the policy making process, and correcting significant externalities as part of microeconomic reform wherever appropriate, we may more effectively manage environmental concerns and make better policy decisions.

The consideration of a range of social, economic and environmental issues was one of the key principles of the National Strategy for Ecologically Sustainable Development, on which Australian governments agreed in 1992. It also underpins several policy making frameworks at the Commonwealth level, including regulation impact statements and the legislation review program under the National Competition Policy.

However, there are several limitations in existing policy making processes and institutional arrangements that constrain the implementation of ecologically sustainable development (Productivity Commission 1999b). There are also informational constraints in terms of understanding environmental and ecosystem impacts, and analytical difficulties in terms of balancing competing objectives. Policy making cannot always be assumed to have integrated environmental issues effectively, and several concerns have been expressed in terms of the development of microeconomic reforms — a point made in some of the papers presented. Another issue relates to the order of reforms, and whether this matters either in theory or in practice — a point considered in some detail by workshop participants in the context of electricity reforms.

However, the relationship between microeconomic reform and the environment is not one way. Environmental change and environmental policies can also impinge on our nation's ability to progress economic and social development. This means policies directed primarily at the environment need to incorporate economic, social and cultural considerations, just as economic and social policy making needs to incorporate environmental issues.

Perhaps the best example is in relation to the greenhouse issue, whereby developed countries (including Australia) have agreed under the Kyoto Protocol to take measures to either reduce or slow the growth in greenhouse gas emissions. While the economic and social impacts of potential measures to achieve Australia's commitments are still being debated, few commentators consider them to be negligible. How Australia develops and implements its responses clearly needs to account for economic, social and cultural implications.

Institutions, policy making and information

The wide range of direct and indirect links between microeconomic reform and the environment, along with the need to balance economic, social and environmental objectives that do not always coincide, clearly raises significant challenges for policy makers.

These challenges are often made more difficult as a result of:

- scientific uncertainties surrounding many environmental impacts, and a general lack of information and data on environmental conditions and problems;
- difficulties in valuing environmental protection and environmental services, and accounting for inter- and intra-generational equity; and
- environmental impacts and problems cutting across portfolios, and occurring along geographical lines rather than jurisdictional boundaries.

These challenges highlight the need for more effective institutions, policy making frameworks and processes, analytical tools and information, and policy instruments for achieving long term communitywide welfare improvements. There is a need, for example, for:

- better communication, coordination and accountability across portfolios and jurisdictions;
- rigorous, transparent and consultative processes for policy making;
- policy advisors who are equipped with appropriate analytical tools to assess information and undertake best practice policy development; and
- comprehensive, coordinated and integrated systems of information collection, monitoring and analysis of environmental conditions and impacts (see, for example, Industry Commission 1998; Productivity Commission 1999b; SEAC 1996).

The Productivity Commission and others have already suggested actions that may help. These include a statutory duty of care for the environment, a non-governmental national council or commission for sustainable development, and improved information and monitoring systems by organisations such as the Australian Bureau of Statistics. An essential part of any action is to continue to explain to the community why economic, social and environmental reforms are necessary, and to seek community input into policy making.

People concerned about the environment, both inside and outside of government, have developed increasing knowledge and expertise in economics, just as those in industry and commerce have had to start thinking more about, and better understanding, environmental issues. Such cross-disciplinary thinking is going to be essential for progressing policy in this area.

Contribution of this workshop

Identifying the conceptual links between microeconomic reform and the environment, and broad areas for progress, is only the beginning. This workshop presented an opportunity to review these issues.

The workshop was convened and structured around a series of questions, which are also reflected in these proceedings. The questions included the following.

- How significant are the interactions between microeconomic reform and the environment in the nominated sectors?
- Have environmental issues been integrated or addressed in reform policy in these areas? How? What are the options for institutional change?
- What are the broad policy implications or lessons that can be learnt from each of the four sectors? Which aspects have worked well and which could have been improved?
- What lessons are there for those undertaking reforms in other policy areas? Can the experiences of one sector be transferred to others?
- What are the priorities for research or policy directions for the future?

The speakers and participants were chosen to provide a cross-section of experience and opinions, and were encouraged to be provocative, think laterally and ask tough questions. Speakers were limited to a ten minute presentation, drawing from a paper prepared and distributed among participants before the workshop. The presentations were followed by general discussion about some of the issues raised.

This publication brings together summaries of the presentations, the supporting contributed papers and summaries of discussions in each session. Parts II–V consider issues related to particular sectors — water, electricity, transport and forestry. Part VI provides an overview of the points raised during the panel discussion, and focuses on options for institutional and policy reform and further research priorities. Part VII is a summary of the day. Appendix A contains the workshop program, and Appendix B lists the conference participants.

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PART II

THE WATER SECTOR

1 Lessons from Australia's first practical experiment in integrated microeconomic and environmental reform

Tim Fisher¹
Australian Conservation Foundation

The Council of Australian Governments' (COAG) Water Resources Policy (February 1994) probably represents Australia's first attempt at integrating a microeconomic reform agenda with an environmental one. Clear statements on river flows and water quality sit alongside policy statements on cost recovery, financial accountability, and institutional reform. And as environmentalists were quick to realise, many economic objectives in this policy can also assist in the management of environmental pressures.

Without doubt, the incorporation of the water resources policy into the compendium of National Competition Policy agreements (1995) has provided much of the impetus for progress in water reforms.

But the job is far from complete. As we approach the end of the water reform timeframe, one wonders if the momentum for reform will continue. With this in mind, this paper asks:

- *How well have States and Territories implemented the COAG water reforms?*
- *What challenges — new and outstanding — remain?*
- *What new mechanisms should be put in place to drive reform into the future?*

1.1 The evolution of an integrated water policy

Even before the Industry Commission's 1992 report on water resources and wastewater disposal, microeconomic reform in the water industry was underway.

¹ The views expressed in this paper are not necessarily those of the Australian Conservation Foundation.

Policy in urban water and wastewater was starting to move in the direction of pay-for-use and full cost recovery. At the same time, excessive capital investment by some big urban — and rural — water utilities was being reined in. And in Victoria at least, the process of reforming rural water prices had begun.

According to the Industry Commission (1992):

Reform is urgent. The problems now confronting Australia in the water area demand an end to the political expediency which has so often thwarted worthwhile reforms in the past. ... Undercharging for water and wastewater disposal has been a major contributor to many water-related environmental problems. But policies of cost recovery need to be tied in with other policies to promote sustainable water use. The twin goals of efficiency and sustainability can be brought closer together.

While the Industry Commission knew that over \$50 billion (in 1992 dollars) was tied up in poorly performing water and wastewater capital, its knowledge of the state of degradation to our natural capital (for example, degradation to freshwater and estuarine ecosystems; declining water quality; declining aquifer yields; and trends in irrigation-induced salinity) was not quite so detailed.

More to the point, the political driver behind the development of the 1994 COAG water resources policy was much more to do with financial *efficiency* than with its twin goal of *sustainability*. This bias in the focus of water reform continues, but more about that later.

That did not prevent the inclusion of some quite significant environmental policy requirements in the COAG water resources policy. These included requirements that:

- formally allocate water to the environment, using the best scientific knowledge available;
- reduce consumptive use in stressed rivers and strike a better balance between consumptive and environmental needs;
- make water allocation decisions that are flexible and adaptable over time;
- improve management of water quality;
- protect rivers with high environmental values;
- undertake research into rivers and their requirements; and
- review the management of groundwater.

Not just these environmental policies attracted environmentalists to the COAG water resources policy, rather it was the whole package.

Surely a pricing policy of fully recovering your costs will lead to the more efficient use of water. Water trade, too, could assist in this outcome by tending to transfer water from inefficient, leaky and high runoff irrigators to more efficient and less polluting irrigators. In terms of institutional reform, we reckoned that many water authorities were overdue for some independent scrutiny and regulation of the way in which they manage the resource and operate water and wastewater systems. And we asked ourselves, how many dam and weir proposals could pass a twin-test of economic viability and ecological sustainability? Not many, we reckoned.

By strong implication, the COAG water resources policy recognises that markets, in water at least, are not perfect. And in relation to the environment in particular, market reforms cannot eliminate externalities on their own. It recognises that governments have a role in managing water resources and in protecting the range of market and non-market values that freshwater and estuarine systems sustain.

The incorporation of the COAG water resources policy into National Competition Policy added considerably to the process of water reform. As well as reinforcing some weaker aspects of the COAG water reforms (such as requirements for institutional reform), National Competition Policy :

- provides a financial incentive to undertake reforms, and a financial disincentive to those States and Territories who drag the chain;
- includes a non-binding requirement to consider independent prices regulation;
- requires that legislation and policies relating to ecologically sustainable development be taken into account;
- requires jurisdictions to review legislation pertaining to water for consistency with National Competition Policy and COAG water policy; and
- requires that the water industry be competitively neutral, and that no artificial barriers be placed in the way of ‘access’ to water resources.

While the COAG water resources policy is explicit in terms of ‘environmental flows’ and water quality, it does not cover the quality of riverine habitats. Nor does it specifically mention wetlands, floodplains, estuaries and groundwater-dependent ecosystems. And nor does it mention the damage that water can cause on a landscape, such as the impact of stock bores and bore drains in the Great Artesian Basin, or the effect of rising groundwater levels, waterlogging and salinisation.

So from this broader perspective, the COAG water resources policy falls some way short of being truly integrated.

Nevertheless, on paper at least, the COAG water resources policy represents a reasonably integrated agenda for microeconomic reform that the environment movement was happy to work with.

Six years on, how has this water reform commitment fared? To what extent has microeconomic reform taken place? How significant has microeconomic reform proven to be in helping to drive environmental outcomes? What about performance in environmental reforms? And has performance in environmental policy commitments been afforded the same level of scrutiny as performance in microeconomic reform?

1.2 Freshwater ecosystems — why are they important?

For non-government organisations in the environmental advocacy business, the bottom line in water reforms is biodiversity conservation: healthy rivers, wetlands, estuaries and groundwater-dependent ecosystems. The quality of freshwater resources for human — and animal — consumption is another consideration, but by and large we take ecologically healthy systems to mean acceptable water quality.

Ecological impacts of water management and use

Rivers are highly complex ecosystems, and no two are the same. They support, or rather they should support, numerous species of aquatic and semi-aquatic plants, fish, aquatic invertebrates, mammals, reptiles and birds. River frontage vegetation, floodplains, forests and woodlands, billabongs, lakes and many wetlands all depend on rivers and their natural flow regimes.

Further, rivers — and the life that abounds in and around them — are the engines that drive estuarine productivity. Rivers determine the fluctuations in salinity and nutrients that distinguishes estuaries as an ecological niche. They provide an environment that can efficiently process and use nutrients transported by rivers (C, P and N in particular) in ways that are critical to numerous commercial and recreational fisheries in coastal and marine environments. Commercial prawn catches in northern New South Wales estuarine waters, for example, are directly linked to river flows into those estuaries in a strong linear relationship.

Many of Australia's rivers and estuaries are in a degraded state. The use and management of water resources has been a dominant factor in this degradation in some river systems, such as the Murray Darling, but changed land use is another factor that cannot be discounted.

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- We have dammed many rivers to capture every drop of runoff we can, and turned some of our biggest rivers into pipes for delivering water. In the Murray Darling, over 4000 dams, weirs and barrages have been constructed, each one representing a barrier to fish passage and migration. Numerous other river systems have suffered a similar fate: the Burdekin, Mary, Williams, Hawkesbury, Snowy, Thomson, Latrobe, Yarra, Ord, Swan/Avon and Peel/Harvey, for instance.
 - Consumptive demands on scarce surface water resources continue to increase. Currently, demands on the Murray Darling system mean, in an ‘average’ year, that natural flows to the sea have been reduced to 20 per cent.
 - Small scale farm dams have their own cumulative impact on stream and river flows. For each megalitre of farm dam storage, evaporation and consumptive demands mean streamflows are typically reduced by 1–3 megalitres per year, even more during dry years (Victorian Farm Dams [Irrigation] Review Committee 2000).
 - All this means that natural flow regimes are considerably altered. The capture of flows during wet seasons delays natural high flow periods and suppresses flow peaks at the expense of floodplains, wetlands and lakes. Invariably, rivers are used to deliver high volumes of water during naturally low flow periods, again disrupting river ecology. The effect of large dams in suppressing water temperature — often by over 10°C — means that breeding triggers for many native fish are lost for hundreds of kilometres downstream.
 - Hydro-electricity schemes have also had a considerable impact. At Jindabyne Dam on the Snowy River, average flows have been reduced to a staggering 1 per cent, with the remaining 99 per cent having been diverted inland to fuel electricity generation and supply-irrigated agriculture. Rivers receiving this diverted water — such as the Tumut River — have suffered enormously both from high flows and changed seasonality and variability of flows. In many Tasmanian rivers, rapid rates of rise and fall resulting from switching hydro-electricity generators on and off can devastate both river ecology and bed and bank structure and stability.
 - Riverbank vegetation plays a number of roles. It protects against the erosion of banks. Vegetation regulates water temperature, provides a constant source of food and organic matter, as well as habitat for many species of birds mammals, insects and arthropods. Throughout much of the landscape, riverbanks have been cleared of native vegetation, leaving them vulnerable to grazing, trampling and erosion. Elsewhere, while some remnant vegetation may remain, pressures from grazing ensure a slow and steady decline. In many rivers, snags (fallen timber that provides critical habitat, as well as protecting river beds from erosion) have

been systematically removed for boat passage, to improve the delivery of irrigation water supplies, or simply to provide a source of firewood.

- In many rivers, introduced exotic fish (such as carp, mosquito fish, redfin, trout, goldfish, tench, tilapia and loach) now present a major problem. Some, like trout, which are voracious killers of coldwater fish and frog species, are deliberately stocked into the wild.
- Many rivers are now choked by literally hundreds of weed species, ranging from trees like willows, ash and camphor laurel to small plants like fog grass, blackberries, mimosa and Bathurst burr. Impacts of urbanisation, vegetation clearance and grazing have contributed to the spread and prevalence of most of these weed species.

Groundwater, too, has its ecological values and these can be seriously affected by groundwater use and aquifer pollution.

The first comprehensive attempt at documenting groundwater-dependent ecosystems in Australia was undertaken by Hatton and Evans (1998). Despite an overwhelming lack of data and research, Hatton and Evans described a number of ecosystem types that are wholly or partly dependent on groundwater for their continued survival. These include:

- *river base flows* (where they exist), which are by and large wholly dependent on groundwater discharge;
- *terrestrial vegetation areas*, which are wholly or partly dependent on groundwater availability. These include some tropical paperbark forests, jarrah forests, swamp sclerophyll forests, some coastal banksia and casuarina woodlands, coastal heathland communities, saline discharge samphire shrublands, and a unique inland stand of coastal mangroves at Mandora Soak, south of Broome in Western Australia;
- *wetland communities*, including numerous coastal wetland, mangrove and saltmarsh communities, arid-region waterholes, and some swamp sedgeland and grasslands;
- *karstic cave* and sinkhole ecosystems, including their 'troglodyte' fauna; and
- *aquifer ecosystems*, in which poorly-known communities of bacteria and primitive invertebrates live between wetted subsoil particles.

In addition, research around the world is beginning to pick up other types of ecosystems that depend on groundwater. Seagrass decline in Florida, for example, appears to be strongly linked to the cessation of groundwater discharge into coastal waters.

So in this context aquifer draw-down and depletion can be a significant factor. Base flows have disappeared from some Australian rivers and streams as a direct result of groundwater depletion. Many wetlands — such as wetlands in the limestone region of south-east South Australia — now only rarely see water as a result of aquifer depletion. And while research data are yet to be collected, proposals for groundwater-based cotton development near Broome, Western Australia, could threaten the viability of Ramsar-listed wetlands at Roebuck Bay and 80-Mile Beach.

Land use and its impacts on freshwater and estuarine ecosystems

Land use and management can have a profound impact on rivers and estuaries in particular, as exemplified by the following.

- Historic (and ongoing) clearance of native vegetation leads to rising groundwater levels and increased aquifer recharge. In areas with a saline sub-soil, increased discharge results in the proliferation of saline seeps and, and elevated salt levels in rivers and streams. In some locations, high groundwater levels that saturate valley floors means there is less scope for rainwater to infiltrate, so the incidence of flooding (and flood damage) increases accordingly.
- Erosion of stream banks (due to clearing and grazing) and their subsequent deepening and/or widening leads to an increasing proportion of flows travelling down river channels (rather than across floodplains), which in turn leads to increased energy dissipation (and erosion) within river channels. This causes in-channel scouring and/or widening, reduced flooding (as required for fertile floodplains and healthy billabongs), reduced in-stream biota and their habitats, an increased ratio of erosion to deposition on floodplain farms, and ongoing growth in expensive river management works.
- As native vegetation cover (and a deep, friable root zone) acts as a ‘sponge’ in rainfall events, clearance and associated soil compaction increase runoff during rainfall events and can be seen particularly in a higher, briefer flood hydrograph. This ‘peakier’ hydrograph (now a common feature of many agricultural catchments) means increased flood energy, increased erosion (particularly in-stream), reduced in-stream biota and reduced river channel stability. Similarly, in urban catchments, large areas of artificially drained hard surfaces ensure low levels of rainwater infiltration and rapid runoff, turning natural creeks into deeply incised, sterile and polluted drains.
- Groundwater use, or perhaps surface drainage systems, can reduce or even cease discharge from aquifers into, for example, coastal ecosystems (such as seagrass beds) — a fact that has not been well researched, but which nonetheless may have a considerable impact.

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- Levee construction (which has been largely unregulated to date) for flood mitigation simply moves the flooding elsewhere, and in the process, concentrates the energy associated with flood flows into a more confined space, thereby increasing erosion and other damage. Similarly, some rivers have been re-engineered through misguided attempts to improve drainage, resulting in higher flow velocities, destruction of habitat and, in an attempt to undo the damage, some streams have been converted into concrete or rock-lined canals.
 - Accelerated rates of soil erosion, leading to increased sediment loads in rivers, can have a profound impact. This can cause siltation of rivers, in-filling of once-diverse pool and riffle zones, increased turbidity, increased nutrient loads, increased loadings of toxicants (especially from urban centres), and a reduction in the ‘photic’ zone in which in-stream photosynthesis can occur. Moreover, increased sediment loads contribute to the degradation of coastal seagrass beds and coral reefs.
 - Pollution of aquifers is another common phenomenon. One obvious example is where urban landfill dumps, particularly those sited within porous substrates, contribute not only to pollution of freshwater and estuarine ecosystems, but also to sources of groundwater resources.
 - Forestry management — both in public native forests and in the form of plantations — can also affect surface water runoff. A 30-year-old stand of *Eucalyptus regnans*, for example, will yield only half the surface runoff of that from a mature stand (Read Sturgess and Associates 1993, p. 17).

And from another perspective, too much water in a landscape can have devastating ecological consequences. The terrestrial environments overlying much of the Great Artesian Basin, for instance, once supported diverse vegetation and faunal communities that partly depended on a lack of water and thus a lack of both grazing/browsing pressure and predator animals. The installation of some 7000 free-flowing bores, together with tens of thousands of kilometres of open bore drains, led to unsustainable grazing pressure, habitat destruction and a proliferation of predators. This sort of process has been a key factor in the high level of mammal extinctions in Australia’s arid and semi-arid rangelands.

Why are freshwater and estuarine ecosystems so important?

At this point it is worth asking why freshwater and estuarine systems are so important. First and foremost, biodiversity conservation is important in its own right. The conservation of biological diversity and ecological integrity is a fundamental tenet of ecologically sustainable development.

Given that Australia is signatory to a number of international conventions and agreements, such as the Biodiversity Convention (1991) and the Ramsar Convention (1973), Australia is bound to take action necessary to protect freshwater ecosystems. Similarly, national agreements on the environment, combined with Commonwealth and State legislation pertaining to water and rivers, wetlands, endangered species and public lands (for example), share a common objective of conserving biodiversity values in freshwater ecosystems.

More generally, freshwater ecosystems provide a wide range of social and economic services, including the following.

- Commercial and recreational fisheries in rivers and estuaries, plus fish production values in groundwater-dependent coastal mangroves and saltmarshes. The Moreton Bay estuary, for example, supports about 10 per cent of the total value of eastern Australia's entire commercial fisheries, employing about 1000 full-time fishers. The bay's recreational catch is also of impressive proportions (Department of Environment, Sport and Territories 1996, chapter 8, p. 9).
- Supplies of fresh water resources to an acceptable quality for human consumption, industry, stock and irrigated agriculture.
- Residential and commercial property values, such as those of holiday settlements around coastal estuaries (for example, the Gippsland Lakes).
- Agricultural pest management services provided by ibis and other wetland-dependent bird life.
- Recreation and tourism values, such as swimming, boating, camping, bushwalking and passive recreation.
- Aesthetic and amenity values.

Work in progress by the Commonwealth Scientific and Industry Research Organisation (CSIRO) promises to dramatically improve our knowledge of the economic value of ecological services such as those listed here.

Inappropriate management of both land and water resources can not only affect the values discussed above, but also can incur additional costs, such as:

- increased water treatment costs (from the removal of nutrients, pathogens and toxic blue-green algae);
- the effects of salinisation of water supplies — for example, desalination costs, increased corrosion of water pipes appliances, crop damage and (potentially) making irrigated agriculture non-viable;
- the increased risk of flood damage, resulting from a number of possible factors (see above);

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- the increased costs of erosion control and river management and rehabilitation works; and
 - the increased bore drilling and water pumping costs associated with aquifer depletion.

1.3 Implementation of COAG water reforms — an environmental critique

As argued above, there are many very good reasons for sustaining healthy freshwater and estuarine ecosystems and the range of values that they support. And also as discussed above, it is important that we recognise the broader interactions and inter-relations between land and water resources.

Using a series of case studies and examples, this section attempts to put performance to date into perspective. Without taking away from what has been achieved, it is argued that a great deal more still needs to be done.

Note here that this paper focuses on rural (irrigation) price reform. By and large the task of microeconomic reform in urban water and wastewater utilities is considerably more advanced than it is in rural (irrigation) water and bulk water allocations to water corporations.

Cost reform and pricing

To date, much of the focus of price reforms in the water sector has been on urban water and wastewater services; a fact acknowledged by National Competition Council (NCC) in its second tranche assessment report (NCC 1999). As such the council has not focused on progress to date in rural (irrigation) water price reform.

Perhaps the focus of the NCC's second tranche assessments represents an acknowledgment that progress in reforming rural water prices has been slow. Certainly it is my contention that price reform in rural (irrigation) water has lagged well behind urban water and wastewater. While performance has varied considerably from State to State, I argue that there is still a considerable way to go in all jurisdictions.

There are a number of economic reasons for supporting COAG water resources policy requirements on full cost pricing, economic viability and a fair return on assets. Such requirements serve:

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- as a financial discipline to prevent uneconomic investments by commercial water resource management agencies;
 - to maintain a competitively neutral position in relation to water technology and engineering industries, the private water infrastructure industry, and indeed any other industry related to water-efficient agricultural production which could compete in some way with State and Territory agencies in the provision of water, wastewater and water efficiency services;
 - to provide for a fair return to the public for use of the resource, both because access to the resource relies on capital infrastructure, and in recognition of the private benefits gained from access to a scarce public resource (resource rent);
 - to minimise the potential for market distortion and market failure (areas include land-use and related issues; windfall gains from trade in entitlements; water use efficiency and investment in water technology; the costs of the over-allocation of irrigation entitlements; salinity; water quality; freshwater and estuarine ecosystems and related values); and
 - to pre-empt the possibility of future GATT requirements regarding natural resource pricing and agricultural input subsidies.

Environmental reasons for water price reform also exist.

- Fundamentally, subsidised water encourages both the overuse of water and its inappropriate (or inefficient) use.
- Similarly, subsidies for water infrastructure (and, in the process, for water access entitlements) encourages a far greater proliferation of water infrastructure than would otherwise be the case, causing the sorts of environmental damage that is referred to above.
- However, the reverse — that higher water prices reduce environmental impacts — is not always the case. Given that we are in an era of tradeable water entitlements and (in some systems) capped diversions, higher prices do not necessarily mean lower consumptive demands on the system in question. Rather, higher prices will see only a tendency to trade water towards higher value and/or more efficient uses, along with a tendency to spend more on water-efficient technology. Insofar as this trend can have environmental benefits (for example, reduced groundwater accessions to saline aquifers), then some environmental benefits can flow.
- Environmentally, the benefits of water price reform are far more apparent in as yet un-stressed river systems than in stressed river systems.

A number of areas need to be considered when pricing rural (irrigation) water. What follows is a discussion of the different categories of pricing and/or cost recovery, and the extent to which progress has (or has not) been achieved.

Recovery of water management and operational costs

This area of water price reform is invariably the first to be tackled. It first requires that government agencies and rural water corporations improve their financial accounting and reporting mechanisms so that the level at which prices need to be set can be ascertained. This exercise has also served to highlight those areas deemed to be either inefficient or ‘non-core’ so the extent to which prices must rise is kept to a minimum.

While this might appear to be a simple exercise, experience shows that it is not. Government water agencies tend to want to keep price rises to a minimum, and hence contain the extent to which the level of service provided is contingent on recovery of costs via water prices and charges. While difficult to document, any qualitative analysis of the history of the debate on rural water price reform in New South Wales and Queensland, for instance, will show this to be the case. Several reasons are offered here.

First, management in some government rural water agencies have tended to adopt an advocacy role for their customer base — irrigators; people with whom many have close personal relations. Furthermore, is it arguably a habit in government agencies that changes that attract public controversy ought to be avoided; senior bureaucrats are adept at second guessing the political sensitivities of their ministers.

Second, there exists in some quarters a philosophical opposition to what is perceived as ‘economic rationalism’. For instance, recent debate in Queensland over a proposed timeframe for price reform centred on whether the task of planning for new water infrastructure developments was a business activity or a community service obligation. The fact that water infrastructure survey and planning is invariably carried out in response to an expressed demand by irrigator clients is not always accepted as being relevant to the debate.

These two factors are generic — they apply to a greater or lesser extent across the full range of areas where water price rises can be justified.

The pace of price reform towards cost recovery has been another issue of debate. It is my view that the reasons for a staggered phase-in of price rises are much more based on political considerations than anything else. While arguments about water users needing time to adapt are often used, the specific reasons for *why* they need

this time, and whether or not they would be less able to adapt under a more sudden change, have never been fully articulated.

One perennial debate concerns ‘non-viable’ schemes. Specifically, what constitutes a non-viable scheme? Should there be an upper limit on subsidies provided? And should there be a sunset clause (such as subsidies cease on transfer of water entitlement) on subsidy arrangements? Again, debate on this point also relates to many other categories of water price reform (see below).

Maintenance and refurbishment of infrastructure

COAG water resources policy requires that water prices factor-in an annual payment to cover the cost of maintaining and refurbishing infrastructure. In rural water resource management, there are few instances where this requirement has been even partially implemented.

One example concerns the Murray, Murrumbidgee and lower Darling river regulatory structures owned by the Murray Darling Basin Commission (MDBC), including Hume and Dartmouth dams through to weirs (such as Yarrawonga, Torrumbarry, Redbank and Euston), Menindee Lakes, Lake Victoria, locks and the barrages at Lake Victoria.

While most of these structures are ageing rapidly, virtually no arrangements are in place at present to recover the costs of their upkeep and (eventually) refurbishment through any annual charge. When the Torrumbarry Weir was replaced, water users only paid for a small proportion of the capital cost of its construction. And when the Hume Dam required major repairs in the late 1990s, it was paid for by the public sector, including \$12 million that was misappropriated from the Natural Heritage Trust.

Another example concerns the Snowy hydro-electricity scheme, which is infrastructure that also serves to deliver water to irrigators in the Murray and Murrumbidgee valleys. At present these water users do not pay for any of the operational, maintenance or refurbishment costs of this infrastructure.

Economic viability (and ecological sustainability) of new infrastructure

The development of water resources in Australia is littered with examples where infrastructure was planned and constructed with the aid of considerable public subsidies. In the past fifty years or so, this government largesse funded large dam projects such as the Ord, Burdekin, Snowy, Eildon and Dartmouth, as well as the

development of extensive gravity distribution systems such as the Riverina in New South Wales and the Goulburn Valley in Victoria.

It is worthwhile breaking down subsidies to the individual enterprise level to get them into perspective. The Australian Conservation Foundation's assessment of the Teemburra Creek Dam near Mackay, (now complete) is that combined State and Commonwealth subsidies for the scheme represent capital subsidies which equate to \$250 000 (1995 dollars) to *each* of sixty canegrowers downstream from the dam. Similarly, a proposed (but never constructed) off-river storage near St George in Queensland would have provided a capital subsidy to around three dozen irrigators equivalent to between \$300 000 and \$500 000 each (Fisher 1997). That's a lot of money for an individual or modest farming enterprise.

Similar spending has taken place under Queensland's 'Development Incentive Scheme' to promote private off-river storages. It's worth noting that this has contributed substantially to the rapid growth in irrigated development in the northern Murray Darling Basin, flying in the face of commitments to 'Cap' diversions to 1993-94 levels elsewhere in the Basin.

You don't have to look far to see the environmental downsides of these subsidies. And economically, it clearly ranks as a substantial input subsidy into agricultural production. These points were not lost on the NCC (1999) which, in its June 1999 Assessment report, noted:

The Council has significant concerns regarding appraisals of economic viability and ecological sustainability of new rural schemes [in Queensland]. ... The Council is of the view that it may be appropriate to recommend a significant financial penalty in respect of some projects.

Clearly, this decision has had a big impact, and in relation to new dams and weirs, capital subsidies appear to have dried-up for the time being.

Nevertheless, debate continues on what 'economic viability' actually means with respect of new water infrastructure. Does it mean, for instance, that a regional economic benefit constitutes 'economic viability', despite a subsidy?

During 2000, the Commonwealth Department of Agriculture, Forestry and Fisheries released its report — *Large Water Resource Developments — An Integrated Assessment Process*, which purported to set a policy framework for Commonwealth capital subsidies for new water infrastructure. This document included the following:

- On page 9 (3.1.2), dot points on 'Community Economic Benefits' refer to 'employment generated, additional agricultural/industrial activity generated' as examples of valid arguments re economic viability.

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- On page 13 (4.3), similar dot points add ‘employment generated during project construction stage, flood mitigation benefits, improved public health due to better water quality’ to the list of arguments re economic viability. Furthermore under 4.3.1 (p. 13), dot points re financial implications refer to ‘likely CSOs [community service obligations] relevant to the project location (that is, those benefits that are unable to be attributed and charged to specific beneficiaries)’. In so doing the document re-defines community service obligations well beyond accepted definitions covering legitimate social welfare subsidies.
 - Appendix 1 (p. 23) lists criteria relevant to economic viability. These include:
 - Criterion 1: economic benefits accruing during construction phase (for example, economic flow-on effects such as new employment and multiplier effects on regional businesses). Similarly, Criterion 2 discusses annual benefits, which should extend from the local or scheme level through to the bio-regional level.
 - Criterion 4 states that a basic characteristic of any proposal is the proportion of total project funding that is requested from the public sector [ranging from] varying proportions of public to private investment through to a complete dependence on public sector support. Furthermore, it is suggested that COAG water resources policy would be complied with provided that these subsidies are ‘noted accordingly’.
 - Criterion 5 states that ‘all projects employing public investment should identify those various benefits of flow-on effects for which charges cannot reasonably be applied. These community service obligations are, in effect, one form of return to the public investment involved in the project, and if met by the Commonwealth, will become part of the financial cash flow involved.’

In all other industry sectors, economic viability means commercial viability. Is there some reason why irrigated agriculture developments are different? If not, why shouldn’t infrastructure subsidies be provided to new commercial or manufacturing capital works proposals in regional Australia? Whilst the Report *Large Water Resource Developments — An Integrated Assessment Process* was subsequently withdrawn for peer review, considerable uncertainty remains in the public policy arena about what constitutes *economic viability*.

Meanwhile, the Commonwealth is currently considering what form a financial assistance package to the sugar industry should take, including subsidies for new water infrastructure and new irrigation drainage infrastructure. Similarly, during the 2000-01 financial year, \$6 million in Commonwealth Natural Heritage Funds, and \$1 million in Victorian Government funds, is being directed towards capital investment in on-farm water efficiency savings for no identified public benefit. And

it is not yet clear whether the Queensland Government will once again fund irrigation dam proposals such as Nathan and Paradise dams.

Despite progress in this area of reform to date, pressure to continue capital subsidies for new works remains.

Positive real rate of return on assets (and historic debt)

As part of water reforms aimed at corporatising — or privatising — much of the ‘business’ of managing irrigation headworks and operating irrigation delivery systems, literally hundreds of millions of dollars (possibly billions) were written-off. By and large this took place in years past. But why?

For the most part, urban water utilities such as Melbourne Water and Sydney Water corporations were required to fully account for their accrued debts and pay them off themselves over time, as well as realising a positive real rate of return on assets. Why were irrigation ‘utilities’ treated any differently?

For a couple of reasons a decision was made to write-off historic debt in the irrigation sector. Firstly came the question of capacity to pay. While some groups of irrigators might, arguably, be able to cover this historic debt, by and large this capacity to pay was not there. Secondly, whilst it was politically acceptable to require urban water utilities to cover their accrued debts, doing the same in irrigated agriculture was not.

Which brings us to a rate of return on the *written-down* value of assets.

Recommendation 5.4 of the New South Wales Independent Pricing and Regulatory Tribunal’s Interim Report, Bulk (Rural) Water Pricing stated ‘Where existing assets have no opportunity cost, no rate of return element is warranted in water charges’. In other words, as there is no alternate use for these assets there is a zero opportunity cost to their remaining. Thus, in New South Wales (and elsewhere), no attempts should be made to realise a positive rate of return on the written-down value of assets.

And using another argument, as irrigators did not make these investment decisions in the first place, why should they be expected to pay a rate of return?

These assumptions are open to challenge.

In past reviews of the urban water and energy sectors, the Independent Pricing and Regulatory Tribunal has seen fit to recommend a positive real rate of return on the assessed value of existing assets. It should be recognised here that in both the urban

water and energy sectors, existing assets share similar characteristics to rural water assets, and hence could equally be deemed to have no opportunity cost. In other words, existing urban water and energy assets have no alternate use. Similarly, past investments in urban water and power assets were sunk without consumers having any expectation that they would have to pay for them.

While accepting that there is no alternate use to irrigation infrastructure, this does not in itself establish an argument that no positive real rate of return is either possible or desirable. Similarly, it does not establish that the public cannot reasonably ask for some economic rent on this infrastructure.

It can be argued that the economic value of existing infrastructure to irrigators exceeds zero by a considerable margin, particularly as market prices for water trades have risen considerably over recent years.

Hypothetically, water infrastructure could be auctioned, and the public would realise some return on the sale of water assets for spending elsewhere on government expenditure priorities. The purchaser would obviously bid at a price that was assessed as being recoverable via irrigators' willingness to pay. Hence a real market value (and rate of return) on existing water infrastructure could be determined.

Certainly the capacity of existing users to pay a positive rate of return on infrastructure (that is, the economic viability of the scheme in question), is one consideration, but is not by any means the only consideration. Of those who could not afford to pay, time would tell as to whether other potential water users would be prepared to purchase water entitlements under such a scenario. One could reasonably expect that some growers in some commodities (for example, grapes) could well afford to pay higher water and infrastructure costs than those that could be afforded by other growers in different commodities (for example, sheep). Requiring a positive rate of return on existing infrastructure could potentially accelerate the speed of structural reform in the irrigation sector by encouraging a more rapid transition to high-value uses for water.

So in my opinion, questions of the merits or otherwise of requiring a positive real rate of return from rural water assets has not been satisfactorily resolved.

Imposing dividend payments and a 'tax equivalent' regime

As is the case re positive real rates of return on irrigation water assets, similar arguments apply to the failure of State and Territory governments to consider imposition of both dividend payments (based on government equity in water businesses), and a tax equivalent regime in the rural water sector.

However in relation to taxation, one exception has unintentionally emerged — privatised irrigation districts in New South Wales — where the Commonwealth is arguing that much of their income is taxable.

It is worthy of note, however, that the Commonwealth decided that the Goods and Services Tax (GST) ought not to apply to water, including irrigation water supplies. I am not aware of any arguments why irrigation water ought not to attract GST just as other inputs to production do.

In a quite different sphere, Melbourne Water Corporation's urban stormwater — or 'drainage' — division, is subjected both to a dividend payment requirement and a tax equivalent regime, despite the fact that it does not qualify under any accepted definition of a Government Business Enterprise. And while other regions of Victoria collect river management levies from ratepayers on an almost identical basis to Melbourne Water, none of these Catchment Management Authorities are expected to pay these tax equivalent or dividend charges.

In the financial management of water assets, inconsistency rules.

Polluter or impactor pays

Without doubt, rural water users contribute to a range of environmental and economic costs that are not currently factored into the price of water. These costs can be considerable.

There is considerable evidence of 'polluters' in urban environments contributing at least partially to the cost of reducing that polluting impact on the one hand, and (less commonly) redressing the damage that pollution causes. For example, most urban dwellers now pay for the full cost of wastewater treatment, and in some instances (for example, Melbourne) contribute to the cost of rehabilitating urban creeks and constructing wetlands, etc, to reduce urban stormwater pollution.

This same principle, however, is rarely applied in the rural water sector, and in the few instances where it is partially applied, (for example, irrigation drainage schemes), considerable private benefits apply in the form of improved farm productivity and land values.

The New South Wales Independent Pricing and Regulatory Council (1996) noted that:

... consideration should be given to 'polluter pays' before 'beneficiary pays', indicating that those responsible for activities which cause measurable impacts on the resource should be required to pay for the remediation of those impacts.

However, as IPART (1996) also noted:

These so-called ‘external’ costs are very difficult to attribute to users with any precision. ... There are several obstacles to achieving a practical and or polluter pays approach to allocating cost shares. One obstacle is the difficulty of isolating the damage done by extractive users from other threats to waterways. Another obstacle is the problem of clearly identifying expenditure on environmental management, both the quantum and where it is spent. ... In such situations the ‘beneficiary pays’ principle may be easier to implement and provide a more robust solution.

In my view this was a cop-out. Despite rather obvious difficulties in attributing precisely who causes what, this hasn’t stopped the application of charges and levies in other areas.

The costs of urban stormwater management, for example, are levied as part of local government rates and, in some cases, as a specific charge on water utility bills or catchment management trusts. Similarly, road transport users all contribute to the costs of roads on the one hand (via fuel excises and licensing fees), and to the costs of motor vehicle personal injury claims and associated costs (including road safety communications programs) via compulsory third party insurance.

Ensuring that external environmental — and economic — costs are at least partially factored into the price of water clearly stands as a continuing challenge in the microeconomic reform of the rural water sector.

Institutional reform

In water, both COAG water resources policy and National Competition Policy require institutional reform in a number of ways:

- Separation, institutionally, of different functions re:
 - management of water resources;
 - operation of water infrastructure and services; and
 - regulation, including environmental regulation.
- Corporatisation of ‘operators’.
- Separation of potentially competitive activities.
- Placing irrigators in a more direct relationship with the operation of water delivery (and irrigation wastewater) services.
- Consideration of independent sources of prices regulation and oversight.

Each of these — depending on whether, and how, they are implemented — can have some bearing on the environment.

Separation of management, operational and regulatory functions

The major issue for the environment here is environmental regulation and management that, by and large, remains lacking in the rural water sector. But in many ways this is as much an issue of process as it is of environmental regulation.

The primary environmental concern here is the lack of independence, transparency and accountability in the processes of determining, and implementing, the needs of freshwater and estuarine ecosystems.

Quite clearly, no two jurisdictions share the same approach to determining the environmental needs of rivers, and to ensuring these needs and management arrangements (once determined) are met.

New South Wales, with its water management plan approach backed up by proposed new legislation, has demonstrated a willingness to put in place institutional arrangements that address the environmental needs of rivers and aquifers. Queensland, with its Water Allocation and Management Plans also backed up by proposed new legislation, has what on paper at least looks like good process. In relation to both sets of legislation, discussion continues on the role that Operating Licences will have in ensuring compliance with new water and river plans. Whilst these arrangements are not without their drawbacks, they are the best we have to date.

Victoria, on the other hand, suffers from severe institutional deficiencies in relation to managing, and meeting, the environmental needs of rivers and streams (refer to section below on environment and water quality). For instance, Rural Water Authorities themselves have control over Streamflow Management Plans for unregulated rivers; a clear conflict of interest given the Rural Water Authorities' commercial interests in water resources. Similarly, almost all Bulk Water Entitlement arrangements negotiated for regulated rivers have virtually ignored the environment altogether. And Victoria's Stressed Rivers Program, which is managed by Catchment Management Committees that have no expertise or statutory powers relevant to this task, is going nowhere.

It is somewhat concerning, therefore, that the NCC (1999) made the following comments in relation to Victoria:

As regards Rural Water Authorities (RWAs), the Council is satisfied with arrangements for separation of service provision functions from standard setting, resource management and regulatory matters.

As national arbiters on the implementation of environmental policy commitments in water, the NCC make great economists!

Separation of potentially competitive activities

In water it is clearly difficult to define what competition is or might be. Water depends on water storage and delivery infrastructure that is not easily broken-up. It is a service that is not readily differentiated in a market sense in the same way that, for example, telecommunications is. And while competition via a benchmarking approach might work in theory, complex sets of differences in (for example) the age and type of delivery infrastructure, types of customer base, topography and geology, etc, make meaningful comparisons difficult. And finally, short of opting-out of existing reticulated supplies, consumers don't have a great deal of choice.

Hence not much of this sort of institutional reform has taken place, at least not for the specific reason of separating potential competitors from each other.

One instance where it has happened, however, is in the supply of *retail* water and wastewater services to Melbourne. Here, three discrete retailers are supposedly competing with each other on the quality and price of their services.

In Melbourne, these retailers are obliged under their operating licences to each prepare a water conservation plan for approval by the Minister. Notwithstanding the merits or otherwise of this rather vague licence condition, the practical wisdom of having three separate water conservation strategies in one city is, to say the least, baffling.

Firstly, retailers are not actually required to achieve any specific water conservation targets, so in essence, why should they seriously engage in promoting less use? Bear in mind here that they make more money by selling more water, not less.

Secondly, having three competing retailers each undertake their own strategy essentially rules-out any city-wide advertising and information strategies. If one retailer were to go down this route, the others would effectively be free-riding.

Thirdly, three separate strategies for the same goal is without doubt a highly inefficient way of conserving water.

From a quite different perspective, it is not necessarily at this institutional level that barriers to competition exist. For instance, Rotaloo, a small composting toilet and 'grey water' treatment technology company recently lodged a series of complaints against a non-metropolitan urban water and wastewater corporation over alleged unfair competition.

Here, Rotaloo alleged that the form and process of tendering for the supply of wastewater services to a low-density semi-urban region effectively shut Rotaloo out from the bidding process. This is because the water utility in question had a

preference for installing a reticulated system that it would operate itself. Rotaloo, on the other hand, argue that their service is both cheaper to install and operate, and involves much less negative impact on the environment.

Relationship of irrigators to water service agencies/corporations

For some unknown reason, COAG water resources policy, as compared to other sectors, requires that irrigators be granted much greater control over the management and operation of the water delivery agencies that service them; a requirement that to my knowledge has no parallel in the electricity, gas, transport or waste management sectors (for example).

In Victoria, for instance, this has meant that the boards of directors of rural water corporations include many irrigators. In the view of environmentalists, this tends to mean that rural water authorities are much more sympathetic to the needs of their irrigator ‘constituents’ than they are of the needs of the rivers and streams that they have a large role in looking after.

A quite distinct example concerns the method in which irrigation delivery districts were privatised in New South Wales. Here, districts were literally given away for free, and in the absence of any competitive auction or tendering process. It is also worth noting here that these privatised water companies are anything but silent when it comes to the political and commercial interests of their constituents.

Independent Prices Regulation

New South Wales is the only jurisdiction in Australia that has applied an independent prices regulation model to the pricing of rural water services.

Accordingly, in States other than New South Wales, obtaining information on the basis for setting water prices and determining staged programs of price reform is a very difficult task.

Perhaps more importantly, the mechanisms for ensuring that programs of price reform are complied with remain unclear in most jurisdictions.

At issue here are two points:

- The need for independence in setting and reviewing prices in a monopoly operating environment where criteria for setting prices are not always commercial; and
- The need for transparency.

Water allocations and trading

The COAG water resources policy devoted considerable attention to the need to establish individually tradeable, and clearly defined, *consumptive* water allocations or entitlements. Generally speaking, considerable progress has been achieved by the various jurisdictions in implementing these reforms.

The difficulties, however, arise in the interface between consumptive water entitlements and the environment. This is not a simple relationship.

Water access rights

Defining entitlements to water is all about defining an access regime; access for consumptive economic uses, access for non-consumptive economic uses, and access for the environment.

The word ‘access’ is significant here. Access for consumptive use ought not to be granted in ways that incur undue costs to other uses and values. And given the high levels of uncertainty in our knowledge of what is needed to meet non-consumptive uses and values, any access regime that precludes future review and amendment is highly questionable.

As a group, irrigators invariably argue that water entitlements ought to take the form of a secure, permanent property right. Supportive arguments focus on the need for certainty, both in terms of making investment decisions, and in relation to maintaining the capital value of water assets.

The statutory framework that comes closest to delivering this is Victoria, with its water right arrangements applying mainly (although not exclusively) to gravity and pumped irrigation districts. Conversely, water legislation currently before both New South Wales and Queensland parliaments requires periodic review of the balance between consumptive and environmental needs.

From an environmental perspective, there are several reasons why permanent property rights to water are highly inappropriate:

- A universal feature of water law is that consumptive rights to water are clearly defined and secure; much more so than environmental and other non-consumptive rights to water. As consumptive rights to water become even stronger, non-consumptive rights to water are, by definition, further weakened. For instance, global climate change may well reduce average surface runoff in the Murray Darling Basin by 20 per cent. Attempting to maintain consumptive

use under these circumstances can only come at the expense of eroding environmental rights to water.

- Knowledge about the water resource and flow management requirements of freshwater and estuarine ecosystems is far from perfect. This lack of scientific certainty demands a precautionary, or *adaptive*, approach to water allocation frameworks. In other words, owners of the resource (governments) must ensure that access rights can be varied from time to time.
- Legislated rights to water can create expectations of ownership. This fosters expectations of financial compensation when the consumptive share requires reduction. Given governments actually own water resources, why should they give away a compensatable right unnecessarily, when the market has already shown that it is prepared to invest in licences that are annually renewable?

Arguments on the need for investment security are valid to a point, but this does not mean that the duration of, and conditions over, water access rights must be perpetual. Rather, it is reasonable to demand periodic review of consumptive and non-consumptive shares in timeframes that provide a commercially acceptable level of investment security.

Non-consumptive users of water, such as the tourism industry, or commercial and recreational fishing in rivers and estuaries, currently have no access rights. And while certain commercial fisheries (such as the Lakes and Coorong fishery at the Murray River estuary) own certain legal rights, or licences, to flow-dependent fisheries, it would take an extraordinary legal case to enshrine any rights that these fishermen have both to water and a healthy estuarine environment.

My point here is that allocating consumptive rights to water for a commercial use can impact on the rights of non-consumptive commercial interests.

So in developing a water allocation framework, one needs to understand that we are talking about a much broader access regime than just consumptive use. If a dam were ever approved for Western Australia's Fitzroy River at Dimond Gorge, for instance, tourism operators in several locations on the river would stand to lose their livelihoods. Similarly, the prawn fishery in the Gulf of Carpentaria, combined with the tourism potential of two or three Kakadu National Parks, might suffer enormously if the water resources of the Gulf's catchments are developed to the extent that some envisage.

Limits to an allocation system can also be justified in other ways. For example, there is a strong push in Victoria to convert the 'Sales Pool' of lower security water into individually tradeable entitlements. Similarly, New South Wales is pushing to convert 'off-allocation' water to individually tradeable low security entitlements.

Given this lower security water would be more likely to be targeted for environmental uses than high security water, why should governments limit their options at the expense of the future needs of the environment?

Having established the need for both caution and flexibility in water access regimes, this then raises the need for ‘clawback’ mechanisms required to redress imbalances in stressed systems between consumptive and non-consumptive uses.

Several clawback mechanisms exist.

- **Purchase or compensation at market value.** Given the relatively small volume of permanent trade between different users, the purchase option would inflate prices, increasing costs to Governments and disenfranchising other market participants. Whilst keeping irrigators happy, these options create a dangerous precedent that:
 - adjustments require financial compensation; and
 - improving environmental health is contingent on scarce public funds, and thus is unlikely to take place all that often.
- **Public investment in water savings,** both in storage and delivery systems and on-farm. Again, a costly option, although one that is perhaps more likely to be employed as a cost sharing exercise rather than a compensatory one.
- **A ‘tax’ on permanent water trades** where a percentage of water traded is returned to the environment. This option is unlikely to work, because:
 - it discriminates against a small group of water users;
 - it will favour temporary trade at the expense of permanent trades; and
 - low volumes of trade would mean relatively small increases to environmental flows may take several decades to achieve.
- **A levy on water users** to fund (or help fund) any or all of the above.
- **Reducing reliability of supply.** This option is the only one that has been employed to date. To a point, this is a very effective claw-back mechanism that is relatively easy to implement and does not depend on government funding. However, irrigators will only accept this option up to a point, as in dry years the impacts of reduced reliability can be severe. Furthermore, high security irrigators are shielded from impact, with lower security entitlement holders bearing the full brunt. As such it is probably an option that can only be used once or twice in any given system.
- **A flat percentage reduction in all water entitlements.** Here, impacts would be flattened-out over all years, rather than falling hardest during dry years.

Similarly, this option offers the advantage of impacting on high and low security users equally.

One gap in formal allocation systems is farm dams, which can — and do — accumulate to the point where they have a serious impact on river health (refer to section above on the ecological impacts of water management and use). At present, no State has arrived at a satisfactory approach to licensing farm dam usage. While New South Wales licences all usage above 10 per cent of runoff, and Victoria licences dams constructed on a ‘waterway’, considerable scope exists for farmers to capture and harvest surface water at the expense of both other water users and the environment.

Another gap is the lack of metering in many instances. This lack of accountability and control over consumptive use again comes at the expense of the environment.

Trade in water entitlements

Water trade is the object of considerable unease within the environment movement, and there are several good reasons why.

Firstly, trade in water up or downstream can have a range of environmental consequences, both positive and negative. For example, transferring water from an *unstressed* region upstream into a *stressed* sub-catchment will inevitably add to environmental stress. A reverse trade would, conversely, have a positive environmental outcome.

Secondly, failure to have an appropriate exchange rate for trade can effectively steal water from the environment’s share. For example, until recently, Murrumbidgee valley irrigators could purchase general security water and convert it to high security water whilst losing only 20 per cent by volume. Given that at least 2 megalitres of general security water is required to deliver 1 megalitre of high security, the environment’s share was compromised. Similarly, a farm dam-based irrigator can currently purchase medium security water on a megalitre-for-megalitre basis, when a suitable exchange rate is probably in the order of 1–3. Given different water ‘products’ in different States, interstate trade raises similar concerns.

For these and other reasons, water trade must be constrained by environmental rules and caveats on the one hand, and hydrologically-sound exchange rates on the other. This is an area of water reform that has yet to be addressed.

Trade has also been mooted as being desirable for environmental water. Without getting too much into the detail of this very complex debate, there are a number of

compelling reasons why it is not desirable to conduct trades in environmental water. For example:

- Real-time and event-based rules for environmental flows can be designed in ways that minimise impacts on irrigator reliability *much more efficiently* than trades. Buying water on temporary markets for environmental purposes is impractical because of:
 - unavailability of water for sale;
 - inflationary/deflationary effect of swamping the market; and
 - high transaction costs that are less efficient than event based rules for release and/or loan and payback arrangements.
- Selling environmental allocations for consumptive use:
 - presupposes that the environment doesn't actually need it; and
 - creates an expectation that the environment can raise its own funds for environmental works, etc.
- Assigning environmental 'trusts' ownership and decision making powers over environmental water raises concerns re:
 - accountability for decisions on whether to buy or sell water, and whether or not to use it for environmental purposes; and
 - ongoing security of environmental allocations should environmental 'trusts' go bankrupt through poor market decisions.

Environment and water quality

Since the COAG water resources policy came about, the major focus of the environment movement has been 'environmental flows'. This reflects the primacy that flow stress has earned in the degradation of riverine ecosystems. But it also reflects some inherent problems in progressing some of the key water quality issues, particularly in rural environments.

Water for the environment

In my experience within the environment movement, only one State — New South Wales — has demonstrated much more than lip service to the environmental flow policy requirements in the COAG water resources policy. In inland New South Wales, five major river systems now have formal environmental flow regimes in place — the Murrumbidgee, Lachlan, Macquarie, Namoi and Gwydir. In each of these rivers irrigator access to water resources was reduced. Planned legislation will

give them statutory force. Environmental monitoring programs are underway, and each is scheduled for review after five years of operation.

Progress by other jurisdictions, however, is very patchy indeed.

Queensland has made some progress on selected river systems towards limiting development and addressing the flow needs of rivers. However, results from (for example) the Fitzroy Water Allocation and Management Plan (WAMP), and from the Draft WAMP for the Condamine Balonne system, suggest that the process is far from being open and transparent.

Western Australia probably leads the pack on protection of wetlands and vegetation communities that depend on groundwater availability in and around Perth. And as a result of environmental lobbying, Western Australia is also requiring studies on groundwater-dependent ecosystems as a precondition to a proposed cotton development near Broome.

South Australia has made no progress on these issues, other than taking steps to contain further growth in development in some areas. Despite having the most severely stressed sections of the Murray River, South Australia is a long way away from any formal position on environmental flows. And in systems over-stressed as a result of over-development (for example, Clare Valley, or over-allocation of groundwater in the Coonawarra/Mount Gambier region), no action has been taken towards striking a better balance for the environment.

Victoria is a useful case study to consider in some detail. In Victoria, there are three discrete processes through which environmental flows can be arrived at:

- the Bulk Water Entitlement program;
- streamflow management plans; and
- the Stressed Rivers program.

Firstly, Victoria's Bulk Water Entitlement program, which aims to determine bulk entitlements in regulated water supply systems, including consideration of the rules and principles on which a bulk water entitlement is arrived at. While environmental flow needs of rivers are a consideration, bulk water entitlement processes have a stated aim of maintaining the status quo in water diversions. Where environmental flow issues are given serious consideration, this has only ever resulted in minor adjustments to the security of water supplies that have never been explicitly quantified in bulk water entitlement documentation.

The planned Wimmera bulk water entitlement highlights the inadequacy of the 'status quo' approach. Here, a Ramsar-listed wetland (Lake Albacutya) and

Wyperfeld National Park's outlet creek, lakes, and redgum and black box floodplains could not possibly receive an adequate allocation of water without a significant claw-back from existing diversions. While the Wimmera River clearly qualifies as a 'stressed' river, it has not been incorporated into the stressed rivers program.

Where environmental flow allocations are incorporated into bulk water entitlements, the following generalised criticisms invariably apply:

- environmental allocations sometimes appear to be a token re-labelling of passing flows (rather than flows for any specific ecological purpose), and are seriously deficient in meeting real ecological needs;
- environmental allocations are often made available for consumptive use;
- minimum flow rules are arbitrary, often far lower than levels recommended by independent scientific advice;
- roles and responsibilities of water authorities and the Department of Natural Resources and the Environment are confused re the development of an operational plan for the use of environmental water;
- monitoring of compliance is minimal, and measurement points are sometimes highly inappropriate;
- no mechanisms or triggers for enforcement of environmental flow arrangements exist;
- clear ecological objectives are only rarely articulated;
- monitoring of ecological trends (including those in response to changed flow regimes) is minimal or non-existent; and
- provision for periodic review applies only in two cases in the State.

Victoria's second program of concern are streamflow management plans, which apply to unregulated rivers. This process, currently under review, suffers from a series of major handicaps. Specifically:

- Streamflow management plans are coordinated by Rural Water Corporations — a clear conflict of interest given the commercial interests of these same corporations in the sale of water for irrigated agriculture.
- Only a handful of streamflow management plans have either been completed or are in train since the program was introduced several years ago.
- More generally, streamflow management plans suffer from:
 - a lack of input from freshwater ecology expertise;
 - consultative processes that are 'stacked' with water users;

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- are not formally linked to the Stressed Rivers program and bulk water entitlement processes in the same river systems (for example, the Ovens River);
 - focus on a single environmental flow objective of ‘minimum flows’, at the expense of numerous additional flow objectives that might conceivably deliver desirable environmental outcomes; and
 - a lack of metering and monitoring required to enforce streamflow management plans.

The third program is Victoria’s Stressed Rivers program, a program limited to only five of the several dozen stressed rivers that were initially shortlisted for inclusion. In terms of shortcomings, the Stressed Rivers program:

- is limited in its scope — only a handful of ‘stressed rivers’ were included;
- is the management responsibility of Catchment Management Authorities, which:
 - suffer from a lack of expertise re freshwater ecology, hydrology, flow management, and public consultation;
 - have no powers or responsibilities under the Water Act;
- requires consent of Rural Water Authorities for flow issues to be considered; and
- lacks input from environment non-government organisations.

More general concerns also apply to Victoria and its *lack* of procedural commitment to river health.

- In effect, environmental flows have no workable recognition in legislation:
 - their purpose is not stated;
 - obligations re environmental flows are not stated, and are not included in the charters or operating licences of water authorities and corporations;
 - existing environmental flows can be amended administratively;
 - effective mechanisms for enforcement of flow rules (such as operating licences) are lacking, and no audit or licensing arrangements exist to ensure compliance; and
 - no-one is responsible for monitoring the environmental condition of rivers.
- Flow needs of estuaries (for example, the Gippsland Lakes) have not been considered to date.
- Minimum flow rules don't hold in practice, and breaches have never been enforced or prosecuted.

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- The ecological justification of existing ‘environmental flows’ is highly questionable (for example, Wimmera, where the quality of water supplies to consumptive users is the main objective).
 - There is no monitoring of environmental outcomes in rivers with flow regimes.
 - No review provisions exist either in practice or in legislation. For example, recent formal correspondence from Victoria’s Department of Natural Resources and Environment states that existing environmental flow arrangements in the Goulburn River would not be subject to review.
 - Re streamflow management plans, the level of support from, and supervision of, the streamflow management processes by the Department of Natural Rescues is generally poor. There is an urgent need for a boost to department resources in this area.
 - While Victoria’s key environmental regulator — the Environment Protection Authority — has a mandate on water quality, it is not resourced to be involved and represent the *flow* needs of rivers.
 - Capacity for informed environment NGO participation is limited, and resourcing (including sitting fees) to support effective NGO participation is inadequate.

As was the case in relation to institutional reform, the NCC (1999) again gave Victoria a clean (if qualified) bill of health:

Victoria has in place detailed procedures and policies that will permit allocations to be developed for the environment. The Council is also satisfied that the policies have regard to relevant scientific information. The Council will monitor the continued implementation of processes to provide water to the environment prior to the third tranche assessment. The Council will carefully assess environmental outcomes including in particular the creation of water rights to satisfy the needs of the environment. Where outcomes do not satisfy environmental requirements the Council would look to evidence that mechanisms (such as trading rules and the environment manager entering the water market) are used to improve environmental outcomes.

As is clearly the case in Victoria, commitment to process alone is not sufficient. Also at issue here is:

- Who controls the process? (poacher or gamekeeper?)
- How well is it resourced? (including money and science)
- What monitoring and reporting arrangements exist?
- How are flow rules enforced?
- What are the ecological outcomes?

Another area worth discussing concerns managing rivers, aquifers and water resources where those impacts cross jurisdictional borders:

The Murray River is a case in point, being a river where three States access water resources, and jointly manage the River (with the Commonwealth) through the MDBC. While each State is independently responsible for developing its negotiating position to bring to the MDBC forum, no one State is responsible for progressing the issue. And meanwhile, the MDBC itself, not being directly accountable under National Competition Policy for implementation of water reforms, has pursued other priorities. These reasons largely explain why it has taken many years of delay and obfuscation for these three States and the MDBC to even agree on a process to advance the issue.

So where no single jurisdiction is directly or fully responsible, direct scrutiny of progress by the NCC is not possible.

Also well worth discussing are the areas of flow and water management, as well as wetland and riparian zone management, that are *not* covered in the COAG water resources policy. For instance:

- flow requirements of estuaries;
- barriers to fish passage and migration — weirs, locks, dams and barrages;
- the cumulative impact of farm dams, both for irrigation and for stock and domestic purposes;
- inappropriate floodplain and wetland works — levees, drains, etc;
- land uses that directly impact on wetland and riparian ecosystems such as land clearing, draining wetlands, riverbank grazing, weed invasion, and wetland and lake bed cropping;
- high evaporative losses from inefficient water storages (for example, Menindee Lakes) and delivery systems;
- groundwater dependence in ecosystems;
- impacts of water use on the receiving environment. (for example, the variety of negative impacts from the nature and extent of water use in the Great Artesian Basin); and
- the protection of rivers and streams with high conservation values (that is, the need to extend the Comprehensive, Adequate and Representative (CAR) reserve system to incorporate rivers).

All of these areas are highly significant for river health, yet lack coverage under any national policy framework.

Water quality

COAG water resources policy is not very articulate when it comes to water quality. Aside from issues of sewage treatment and urban stormwater pollution, COAG (1994) agreed:

... to support ARMCANZ and ANZECC in their development of the National Water Quality Management Strategy, through the adoption of a package of market-based and regulatory measures, appropriate water quality monitoring and catchment management policies and community consultation and awareness; [and]

... to support consideration being given to establishment of landcare practices that protect areas of river which have a high environmental value or are sensitive for other reasons.

In practice, none of this is too onerous, unless of course, actually improving water quality is the objective.

With the exception of sewage and industrial waste treatment and discharge points, water pollution is almost universally branded as 'diffuse source'. In reality, we are actually talking about shades of grey. Agricultural feedlot facilities (piggeries, cattle, poultry), for instance, or irrigation drainage canals, cannot be wholly described as 'diffuse source'.

Water quality is a broad field, embracing many specific areas that the COAG water resources policy has not specifically picked-up. These include:

- salinity;
- water temperature — *thermal pollution* — from large dams and weirs;
- toxic blue-green algae;
- irrigation drainage systems;
- feedlot and dairy effluent;
- salinisation;
- leaching from acid sulfate soils resulting from inappropriate clearing and/or draining of wetlands;
- management of stream and river frontages;
- land management — erosion, fertiliser management, groundwater management; and
- groundwater pollution — landfill leachate, agricultural chemicals, etc.

For the most part, the approach of State Environmental Protection Agencies to these *largely rural* water quality problems is to try to wrap them all up under instruments

such as ‘State Environment Protection Policies’. Apart from setting vague and general targets re the chemical composition of river water, it is my view that these policies achieve very little.

Similarly, undue faith is placed on concepts such as *integrated catchment management* and *improved Landcare practices* as actual delivery mechanisms for water quality improvements.

Water quality monitoring is generally inadequate, and incapable of guiding any strategic process of reducing pollution.

What COAG failed to do was to articulate clear objectives and responsibilities in what is a field of public policy endeavour where responsibilities, and accountabilities, have never been clearly articulated.

Public consultation and education

COAG water resources policy requires public consultation be undertaken in relation to its key policy directions, particularly with respect to water pricing, water entitlements and water trade (Council of Australian Governments 1994).

For environmentalists, two questions arise:

- Are the States and Territories consulting with stakeholders re water reforms and the environment? and
- If so, how robust, consultative and transparent are these processes?

The first of these two questions relates to the issues covered in the section below outlining an environmental critique of the implementation of COAG water reforms. As is suggested above, performance by jurisdictions is mixed.

The second question has not been answered. As is discussed in the section on environment and water quality, in particular, the existence of a consultative process does not, in itself, prove anything.

Perhaps it would be unrealistic to seek a method for evaluating consultative process. Nevertheless, I would like to pose a few questions, (rhetorical as they may be), re the validity of consultative processes:

- Do consultative processes involve all stakeholders?
- Is representation biased towards, or against, any particular group(s)?
- How much is the consultative process directed towards designing, and owning, an outcome, rather than simply towards informing or engaging in debate?

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- To what extent do final decisions depart from any consensus reached via consultative process?

It would be nice to think that there were clear, agreed guidelines that define good, or bad, consultative process, particularly as each State tends to spend a great deal of time on inventing, and re-inventing, their own state-specific processes.

Perhaps this is a challenge for the future.

Legislation review

Review of water legislation for compliance with National Competition Policy is an area of performance scheduled for assessment by the NCC as part of its third tranche assessment in June 2001.

At this point in time it is difficult to gauge progress in this area.

However it is fair to say that the prime focus of these legislation reviews to date has been on consistency with National Competition Policy 's microeconomic reform objectives, rather than on the extent to which microeconomic and environmental policy commitments are delivering environmental outcomes.

1.4 Where to from here? A case for renewed commitment to national water reforms

Under existing policy arrangements, scrutiny of, and commitment to, water policy reforms conclude in 2002-03 at the conclusion of the third tranche assessments under National Competition Policy .

Does this mean that progress in water policy reforms stops there? Or are we to rely on the individual commitments by States and Territories to continue the momentum for reform?

Clearly there are many areas where microeconomic and environmental objectives mesh very well. This is not always the case, (and nor does it have to be), but by and large the “twin goals of efficiency an sustainability” can, and should, be advanced in an integrated fashion.

It is an overwhelming fact that too many of our rivers, wetlands, floodplains and estuaries remain in a seriously degraded state. And in most of these cases, the environment is continuing to deteriorate. For water reforms, the proof of the pudding is in the eating.

Mapping an agenda for continued water reform — a summary of outstanding, new and emerging issues.

From an environmental perspective, the task of integrated water reform is not over by a long shot. Hopefully we will have learnt enough from the past five or six years to do a much better job of policy development, integration and implementation.

The first question we must ask is *what are the areas of existing water reform commitments where performance has been poor, slow or incomplete?* The short answer is that there are very few areas under current water reform commitments that can be judged as being complete.

The second question is *what are the new and emerging issues that are not picked-up in existing water reform commitments?*

What follows is a recap of issues raised in this paper; a shopping-list for a COAG Water Resources Policy Mark II, if you like.

Cost reform and pricing

- Generally speaking the pace of reform has been slow.
- Transparency re the basis for water pricing has been lacking.
- Recovery of maintenance and refurbishment costs has in many instances been ignored.
- While the subsidisation of new schemes appears to have stopped for the time being, major doubts remain as to whether governments (including the Commonwealth) will continue with this resolve beyond National Competition Policy 's third tranche assessment.
- Requirements to achieve a positive real rate of return on the written-down value of water assets, and to require dividend and tax equivalent payments, appear to have been abandoned altogether.
- 'Polluter pays': For the most part water users continue to avoid financial contributions towards the costs of environmental damage that, collectively, they incur.

Institutional reform

- Most States lack an institutional framework for determining and implementing the needs of freshwater and estuarine ecosystems.

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- Some water corporations are responsible for setting their own environmental standards, raising serious questions about potential for conflict of interest.
 - Very little is understood about the institutional barriers to competition in the water industry.
 - Most jurisdictions lack independent sources of prices oversight re rural water prices.

Water allocations and trading

- Generally speaking, consumptive users have a far higher quality of water access rights and entitlements than does either the environment or non-consumptive users. Both environmental and non-consumptive users warrant stronger definitions of their rights in law.
- Some moves aimed at strengthening consumptive water entitlements (such as Victoria's 'sales' water and New South Wales's 'off-allocation' water) may compromise environmental requirements.
- In some instances consumptive water entitlements are insufficiently flexible or adaptable to meet the changing needs of the environment.
- More work needs to be done on clawback mechanisms that, as far as is possible, combine meeting the needs of the environment whilst addressing the concerns of water users.
- Water entitlements via farm dams (both for commercial and stock & domestic purposes) are at present very poorly defined.
- Metering of surface and groundwater use remains as a gap in the management of both consumptive and environmental water.
- There is a pressing need for rules governing water trade that recognise environmental constraints to trade.
- Inappropriate exchange rates for water trades (for example, between high and low security' across State borders, or from regulated to unregulated streams) threatens security of supplies for both consumptive and environmental purposes.
- For a number of reasons, trade in environmental water is nearly always an inappropriate, or sub-optimal option.

Water for the environment

- For the most part, progress has been very slow, hampered by a combination of factors including a lack of resources and political commitment.

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- While most jurisdictions have processes in train, outcomes are often tokenistic and without sound ecological foundation.
 - Few jurisdictions provide a statutory framework covering such things as:
 - environmental objectives;
 - process and consultative requirements;
 - articulation of roles and responsibilities;
 - operating licences and licence audit and compliance;
 - monitoring and periodic review; and
 - articulating responsibilities and accountabilities
 - Responsibilities re rivers and aquifers are unclear where responsibilities are shared across two or more jurisdictions.

Furthermore, the existing COAG framework is inadequate in terms of the following:

- Flow requirements of estuaries.
- Barriers to fish passage and migration — weirs, locks, dams and barrages.
- The cumulative impact of farm dams, both for irrigation and for stock and domestic purposes.
- Inappropriate floodplain and wetland works — levees, drains, etc.
- Improved land use and management of wetland and riparian ecosystems such as land clearing, draining wetlands, riverbank grazing, weed invasion, and wetland and lake bed cropping.
- High evaporative losses from inefficient water storages (for example, Menindee Lakes) and delivery systems.
- Groundwater dependence in ecosystems.
- Allocation, licensing, metering and information systems in groundwater management need substantial improvement across the board.
- Impacts of water use on the receiving environment. (for example, the variety of negative impacts from the nature and extent of water use in the Great Artesian Basin).
- Protection of rivers and streams with high conservation values (that is, the need to extend the CAR reserve system to incorporate rivers).

Water quality

- With the exception of urban sewage and industrial waste, responsibilities, accountability mechanisms in delivering water quality improvements have yet to be clearly articulated in any jurisdiction. The National Water Quality Management Strategy has so far failed to deliver in this regard.
- Undue faith has been placed on *integrated catchment management* as a key delivery mechanism for water quality improvements.
- Whilst State Environment Protection Policies for waterways do articulate water quality targets, strategies for achieving them are largely non-existent.
- Specific water quality objectives that need clearer articulation include:
 - salinity;
 - water temperature — *thermal pollution* — from large dams and weirs;
 - toxic blue-green algae;
 - irrigation drainage systems;
 - feedlot and dairy effluent;
 - salinisation;
 - leaching from acid sulfate soils;
 - management of stream and river frontages;
 - land management — erosion, fertiliser management, groundwater management; and
 - groundwater pollution — landfill leachate; agricultural chemicals; etc.
- water quality monitoring is generally inadequate, and incapable of guiding any strategic process of reducing pollution.

Public consultation

Clear, nationally agreed objectives and guidelines for good public consultation process would be useful.

Legislation review

It is likely that processes of reviewing water legislation for consistency with National Competition Policy objectives will focus on microeconomic reform rather than on consistency with environmental policy commitments. This bias ought to be avoided.

A national policy and compliance framework — what models exist?

To a large extent, the ‘glue’ that holds COAG water resources policy together is National Competition Policy . In particular, the incentive of cash payments from the Commonwealth promote at least the appearance of reform, as States and Territories are subject to periodic review and assessment by the NCC. Progress in water reforms would be unlikely to have progressed as far as it has without it fitting into National Competition Policy framework.

To what extent, then, is this National Competition Policy /NCC model working? And what other models exist?

If the momentum for water reform is to continue, we must look at what options exist to take it further.

This section:

- discusses some of the strengths and weaknesses of the National Competition Policy /NCC approach;
- examines the model provided by the Murray Darling Basin Agreement; and
- Examines national policy-making potential of COAG, Agriculture and Resource Management Council of Australia and New Zealand (ARMCANZ) and Australian and New Zealand Environment and Conservation Council (ANZECC).

Strengths and weaknesses of the National Competition Policy /NCC approach

National Competition Policy stands as a unique achievement in Australian federal politics. Here the Commonwealth proposed a quite detailed reform agenda with a series of carrots (National Competition Policy tranche payments to States and Territories), and sticks (assessments by an independent arbiter on performance in implementation of the reforms).

Without question this model has achieved more and faster change than would otherwise have been the case.

My assessment of the NCC is that its success has been much more about the *potential* for monies to be withheld than the reality. The NCC has prodded and pushed jurisdictions via correspondence and reports (including draft reports) and jurisdictions have invariably responded, sometimes very quickly indeed.

Queensland’s second tranche penalty of \$15 million, withheld for six months until certain reform commitments were made, has from an environmental point of view

been a great success, virtually bringing progress new water infrastructure projects to a halt.

However, as is discussed above, implementation of the COAG water reform agenda has in many instances fallen well short the policy's timeframe for progress. Nor has progress been as comprehensive as could have been hoped. Nowhere is this more the case than in implementation of environmental reforms.

At this point it is worth noting that the NCC has been reluctant to recommend penalties for slow progress or non-compliance. The reasons for this warrant further discussion, but are not pursued here.

One also has to query the capacity of the NCC to serve as an arbiter on environmental policy reform and performance, particularly in the absence of in-house expertise. From an environmental perspective this is the most serious deficiency in the NCC model, as:

- Without doubt, much more emphasis has been placed on progress in microeconomic reforms in water than on environmental reforms; and
- Capacity for an informed assessment of progress in implementing environmental reforms is compromised.

One would of course expect that external consultancies might help in informing NCC's processes here. However I contend that it is easy for States to *safely* respond to concerns or criticisms re environmental performance in the absence of in-house expertise within the NCC. In my view, this expertise is urgently needed.

Perhaps the biggest flaw with the National Competition Policy /NCC model is that it has a limited life. That raises the possibility, or even likelihood, that momentum in water reforms will disappear.

The Murray Darling Basin Agreement/Commission Model

In the management of natural resources and the environment, the only other model of *binding* agreements between different States and the Commonwealth is the Murray Darling Basin Agreement.

The Murray Darling Basin Initiative comprises reciprocal legislation in four States and the Commonwealth, plus the Murray Darling Ministerial Council, Commissioners (senior officials) from each State, and the Office of the MDBC. Its focus is water resources, particularly in the Murray and Lower Darling rivers. The scope of the initiative extends further than this, (again, by agreement), to cover a

range of other issues, objectives, funding and management arrangements for the Murray Darling Basin.

The major plank of the Agreement is to guarantee set minimum flows into South Australia. A more recent achievement has been the ‘Cap’ on diversions of water from each river in the Basin; a commitment that, in three States at least, has been remarkably successful.

The next major challenge for the Agreement is salinity, with a proposal to set *non-binding* targets for in-stream salinity concentrations in each of 21 rivers in the Basin.

The legal principle underpinning the agreement is *comity*; a principle that requires any one party to notify and consult with other parties if it is considering an action that may affect those other parties.

The Murray Darling initiative has a number of strengths including:

- Once an agreement is reached, political pressure is brought to bear if any party appears to be departing from that agreement.
- In some instances, a legal recourse may also apply to breaches of an agreement.
- Interstate tensions have a forum for resolution.
- The Commission and Ministerial Council provide forums for discussion, information exchange and debate.
- The Ministerial Council’s Community Advisory Committee provides a quality forum for community consultation, and a generator of community-driven initiatives.
- Information, planning, and policy and strategy development can take place at a Basin scale.

There are, however, numerous weaknesses. For example:

- To date, no part of the Agreement specifically addresses ecological issues.
- Funding prioritised through the initiative is heavily weighted towards agricultural production and productivity.
- Both Ministers and Commissioners tend to represent their own State interests, rather than the interests of the Basin and its community as a whole.
- A constant underlying tension exists between those who regard water resource management and irrigated agriculture as ‘core business’, and those seeking to broaden the agenda towards genuinely integrated catchment management.

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- Resources available to the initiative for Basin-wide initiatives fall well short of what is required to do the job.
 - Performance by States in implementing Basin objectives is not monitored or assessed in any way, and funding is not conditional on performance.

Other national policy-making entities (ARMCANZ, ANZECC and COAG)

In environmental and natural resource management, the two most established forums for inter-governmental discussion and policy-making are ARMCANZ and ANZECC.

As councils of State and Commonwealth ministers, these forums rarely meet. Activity is mainly at the senior official level.

Apart from any assessment of policy outcomes and initiatives, it is difficult to make any assessment of these processes because they remain so closed to external scrutiny and input. However in terms of outcomes, the record is fairly unspectacular.

By way of general criticisms;

- Policy statements tend to be unambitious, non-controversial and non-binding. They tend to reflect the lowest common denominator in State and Commonwealth thinking.
- Monitoring of policy implementation is totally non-existent.
- Dialogue between ARMCANZ and ANZECC is virtually non-existent, and at the Commonwealth level, are represented by two different portfolios.
- Consultation with external stakeholders is non-existent.
- On the positive side, useful research is sometimes commissioned on their behalf.

To summarise, ARMCANZ and ANZECC are almost totally ineffectual.

It must be noted at this point that, as part of the national water reform commitment, the COAG Task Force on Water was established. Perhaps the Task Force overstepped the mark in some instances in attempting to force the pace and direction of reform. Perhaps its knowledge of water issues in the States was lacking. And perhaps the States felt uncomfortable with an overseer that they weren't actually obliged to continue supporting. For whatever reasons it didn't last the distance.

The other national forum is, of course, the Council of Australian Governments. As a forum, COAG suffers from many of the problems that beset both ARMCANZ and ANZECC. In particular, COAG rarely embarks on any process of stakeholder

consultation, (note that limited consultation was undertaken by the Committee established to draft the Water resources policy).

However, COAG's biggest advantage is that it takes place at the Head of Government level. This has a number of potential benefits:

- discussion at the Head of Government level can leave behind much of the 'baggage' that besets ARMCANZ and ANZECC;
- agreements can be more binding in nature;
- agreements on Commonwealth (and, potentially, State) funding can be incorporated (for example, the National Competition Policy payments schedule);
- agreements on inter-governmental monitoring and assessment arrangements can be struck (for example, the NCC); and
- the potential scope of discussions is not limited, and can embrace both environmental and microeconomic reform issues.

Early in 2000 the Commonwealth's discussion paper on Natural Resource Management was referred to COAG for discussion. This is potentially a very significant move. The difficulty is, however, that it is very difficult indeed to ascertain what is on the agenda for discussion, and to provide any input into the process.

Conclusion — options for continued reform

In sharing the vision for integrating the "twin goals of efficiency and sustainability" via integrated water reforms, two facts leap out:

- the task is far from complete; and
- no mechanisms exist to continue the momentum for reform beyond 2002-03.

I've attempted to establish that progress under existing water reform commitments has fallen short of the mark; well short in some important instances. These 'shortfallings' were not always picked-up by the NCC in its second tranche assessment reports.

In terms of current COAG and National Competition Policy commitments to water reforms, the capacity of the NCC to scrutinise State and Territory performance — especially in relation to environmental reforms — needs to be enhanced.

I've also attempted to describe those areas of both microeconomic and environmental reform that were not adequately covered, or not covered at all, in the COAG water resources policy.

Hence there is a pressing need to revise and update the national water policy agenda. Given that COAG is the appropriate forum to raise these issues, **we need a COAG Water Policy Mark II** to take over when the existing policy commitments expire.

This raises a number of serious questions:

1. What should a new water policy cover, and how?
2. How can we ensure that water policy fits within, and complies with, the principles of ecologically sustainable development?
3. What is the process by which a new water policy ought to be developed? To what extent can stakeholders be involved in this process, and how?
4. Who should do what? How should the roles and responsibilities of the myriad of State, Territory and Commonwealth agencies and authorities be clarified to ensure that important issues do not fall through the cracks?
5. Where does water fit in relation to other natural resource and environmental management issues currently on COAG's agenda? Should a new COAG water policy comprise part of a broader policy development process on environmental and natural resource management, or should it stand alone?
6. How should future performance by States and Territories in implementing water reform commitments be independently monitored and assessed? What powers, resources and responsibilities should this independent assessment body possess?
7. What mix of incentives and disincentives should apply to generate sufficient momentum in reform? What modes of intervention (for example, Contracts? Legislation?) are possible and appropriate?
8. Can, or should, the Commonwealth be held accountable for its actions and responsibilities in the management of water resources and freshwater and coastal ecosystems (including the Great Barrier Reef)?
9. What compliance mechanisms ought to apply to inter-jurisdictional bodies such as the Murray Darling Basin initiative, or the Great Artesian Basin Management Authority?
10. What expectations might be placed on public corporations, private companies, industry organisations and individual water users re managing their environmental impacts? How might the pursuit of environmental codes and management systems assist in the implementation of water industry reforms?
11. What public and private (for example, polluter/impactor pays) resources are required to do the job, and how might these resources be mobilised?

12. Should Australia pursue a water reform agenda through the World Trade Organisation?

These questions are, in my view, fundamental to the future of integrated water reforms in Australia. Debate on these issues is both timely and necessary.

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1.A Presentation summary

Water storage and diversion systems have important environmental consequences, and thus so can water policy reform. The COAG Water Resources Policy is a major driver of water policy reform, and has led to some improvements in economic and environmental performance, particularly in the urban water sector. However, rural water policy reform has been slow, with a number of important economic and regulatory reforms being neglected.

Water policy affects the environment

Fisher argued that water policy can have significant direct environmental impacts. Policies that influence the storage and/or diversion of water for consumptive use, for example, can change the seasonality and variability of flow patterns, which can have important impacts on aquatic life:

When we build dams and weirs — and there are over 4000 of them in the Murray Darling Basin — we’re basically building obstacles to fish passage and we create conditions for algal blooms. Also, with larger dams, we release waters that are too cold to provide triggers for fish breeding.

Changes in river systems can also generate significant flow-on effects in other ecosystems, and can influence biological diversity and broader ecological integrity.

Fisher noted that environmental impacts are important both because water resources are valuable and because river systems support rich ecosystems often of high economic value. In addition, inappropriate land and water resource management can impose significant costs; for example, degraded ecosystems such as the Murray Darling ‘cost more to manage.’

Fisher also noted that Australia has international obligations to the environment such as the Biodiversity and Ramsar conventions.

COAG is a major reform driver but rural water reform has been slow

The COAG water policy has been a major driver of water reform. According to Fisher this policy represents the first effort to integrate economic efficiency and sustainability principles. He suggested that important issues include how well the COAG policies have been implemented, and what opportunities may exist for future progress in water reform.

Fisher focused his assessment on the progress that has been made in the rural water sector, given that the rural sector accounts for over 70 per cent of water use. He contended that rural water policy reform has been slow.

Some reforms have been neglected

Fisher claimed that some reforms that have been taken for granted in other areas of the economy have been largely neglected by the rural water sector. The sector as a whole failed, for example, to achieve positive rates of return despite being required to do so by COAG. In addition, the sector has neglected the opportunity to use polluter pays mechanisms.

Fisher also highlighted that institutional reform has been slow. He observed that there were no independent auditors or regulators for environmental flows. Fisher considered that responsibilities and accountabilities for environmental management remain poorly defined.

Fisher concluded that there is a need for a new water policy. He claimed that without a new policy framework, the momentum for economic and environmental reforms in the rural water sector will slow.

2 Microeconomic reform and the environment: a view from the water sector

David Evans
Hunter Water Corporation

Australia's water sector faces huge and complex environmental problems. The largest scale problems are generally found outside the urban areas. Microeconomic reform is providing benefits to the water sector and the environment but, on its own, cannot be expected to deliver all the desired outcomes, particularly in non-urban areas.

Urban water utilities have much in common with other utilities and lend themselves to microeconomic reform. Reform of urban utilities is delivering demonstrable efficiency and environmental gains. Environmental issues outside urban areas involve more than the water sector. Many water-related problems are generated externally to the water sector. This suggests a role for a mix of strategies such as better water pricing, resource tax solutions and public funding.

Even though a range of strategies is needed, microeconomic reform offers efficiency and environmental gains to all parts of the water sector through:

- the separation of regulators and operators;*
- improvements in environmental regulations and standard setting;*
- pricing to signal true resource-use costs; and*
- the use of market mechanisms and incentives such as trading schemes.*

2.1 Context

At first glance, the theme of the workshop seems fairly straightforward — to explore the interactions between microeconomic reform and the environment as it applies to the water sector. When you say it quickly, ‘the water sector’ sounds compact and homogeneous, so it may seem that the interactions can be packaged fairly neatly.

I do not believe that this is the case. Thus, the first thing to explore briefly in this paper is the nature of the sector, the issues it faces and where microeconomic reform offers parallel benefits to the efficiency of the sector and the environment.

First, a few observations. Water agencies are in the environment business and they all know it. Urban agencies, for example, have to provide clean drinking water to the majority of the Australian population, and that task requires them to be involved in the good management of catchments. Similarly, on the wastewater side, our ever-increasing urban consolidation places enormous pressures on the environment in terms of waste disposal. While there are advances in on-site waste systems, widespread use of on-site systems is still a major source of water quality problems throughout Australia. Urban wastewater, generally, is most efficiently managed (from both an economic and environmental view) by reticulated sewerage. As well as meeting these improved environmental objectives, water agencies are expected by the community to deliver higher standards of service with greater efficiency.

Water agencies have a definite role in improving environmental performance because they have close interactions with the water environment. Increasingly, as an outcome of the reform process, the agencies are no longer expected to set the objectives and standards for their environmental performance.

One of the most important aspects of microeconomic reform over the past decade has been role separation in the water sector, so agencies play a smaller role in setting these objectives. Role separation is about separating the processes of standard setting and operation, and this is principally being addressed across Australia by external regulation. The form of external regulation takes a different guise in each State. However, the theme is generally the same, and external regulation is replacing the old subjective assessment by statutory authorities (and, at times, their political masters) of what is 'best for the community' and, to a lesser extent, best for the environment. It also places the standard setting in the hands of specialists in areas such as environmental management (for example, the environment protection authorities) and health.

In Hunter Water Corporation's case, the following external regulation now exists.

- Customer service standards, including standards for drinking water quality. These are regulated through a New South Wales Government-issued operating licence, with the standard-setting process to be enhanced in the coming months by a review by the New South Wales Independent Pricing and Regulatory Tribunal.
- The control of access to natural water sources via licences issued under new provisions of the State's water legislation.

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- Regulation of the performance of wastewater systems (transport and treatment) via licences issued by the Environment Protection Authority.

While external regulation is the basis of a more rigorous and transparent approach to improving environmental performance, there is one note of caution. In setting environmental standards (and, similarly, customer service standards), we need to be aware of the tradeoffs involved and to ensure the investments required to meet the standards are the best way of meeting the desired outcomes. It can be tempting for regulators to overlook diminishing returns from continually increasing investments to meet higher standards in one area, thus missing opportunities to achieve a better set of social and environmental outcomes by investment of those resources elsewhere.

It is not surprising that much of the microeconomic reform in the water sector to date has been spearheaded by the urban agencies. The structure of urban agencies lends itself to the microeconomic reforms that are being applied to the power and telecommunications utilities, for example. Similarly, their interaction with the environment is far less complex than that of the water managers and supply agencies operating outside the urban areas. Urban agencies basically intervene in the water cycle by taking water out of the cycle at some point and returning at another point. As our knowledge and technology improves, this process will be changed to reduce impacts on the environment. Today, such change is occurring through higher standards of sewage treatment, greater reuse of wastewater and biosolids, and, as indicated above, the involvement of external, specialist regulators (who make the process more consistent).

However, across the entire ‘water sector’ there are many difficulties, of which some are daunting in size (particularly water sector issues confronting the non-urban agencies). The Australian environment and climate are characterised by huge variations and extremes that create difficulties in environmental monitoring, particularly in the short term. We also still lack base data about our environments and the knowledge to assess subtle environmental changes.

When it comes to the non-urban areas, there is a huge social and economic fabric now dependent on water, mainly for irrigation. Community concern about population and service decline in rural areas adds a further impediment to water management strategies that appear to target a reduction in the productive capacity of rural producers or adding to their production costs.

Water infrastructure, rural and urban, comprises long-life assets. Regardless of the merits or otherwise of the initial decision to construct these assets, they provide service over many decades. This too can be an impediment to scaling back use or even increasing the price of services they provide. While the focus is often on issues

of overallocation of water resources, some irrigation dams are underused. Better microeconomic solutions to allocating water from these dams may entail a closer look at their short-run operating costs.

Many of the environmental problems affecting our non-urban water systems are not directly the problems of the so-called water sector or directly attributable to our use of water. Rather, they are common property issues that, among others, manifest themselves as water problems. Typically, problems such as water quality in rivers and salinity are land use and catchment problems with causes quite unrelated to water management and the activities of the agencies that make up the non-urban part of the water sector. However, in many cases, water management also contributes to these problems, and water managers are now aware of the interrelationships between water *quantity* and water *quality*. In response, we see new strategies that involve capping water extractions, revisiting allocations for rivers such as the Snowy, and making explicit environmental flow provisions for both contingencies and the maintenance of water-dependent ecosystems.

Land use issues, such as dryland salinity and its impact on water resources, are enormous and complex. The scale of the issues alone is daunting. In some parts of Australia, notably Western Australia, their impact has been evident for decades. In other areas, emergence has been slower and perhaps masked by the more obvious irrigation-related salinity issues caused by rising watertables.

With the emergence of new dimensions to these problems has come a need to move on from traditional solutions. Irrigation salinity was first tackled with engineering ‘technical fixes’ such as drainage and interception schemes. While these schemes may still have a place where they are installed, further technical fixes are not always appropriate to the broad range of quality and salinity issues we face today. These problems are not water sector problems but land use problems and, as such, they are best addressed by land use management and ‘big picture’ policy strategies.

2.2 Microeconomic reform and the environment

In looking in more detail at the interactions between microeconomic reform and the environment, we first have to recognise, as I have outlined above, that the ‘water sector’ is very diverse. Consequently, there is no ‘one size fits all’ strategy that will address all its problems.

The urban component of the water sector has much in common with other utility industries — power, natural gas and telecommunications. In terms of water use, it is also relatively small. Urban use in New South Wales comprises only about 25 per

cent of water use. Its interaction with the water environment largely occurs at single points where water is extracted and wastewater is returned.

In this context, much of the microeconomic reform promoted for the utility sector generally can be picked up relatively easily by urban water agencies. The identifiable nature of its interaction with the water cycle also makes it relatively easy to identify, regulate and control its impacts on the environment.

In the management of the non-urban sector, land use and external influences play a huge part and make it difficult, if not impossible, to achieve the same level of gains from the microeconomic reform and environmental strategies that are delivering benefits to the urban sector. But this does not mean that microeconomic reform does not have a place in the non-urban agencies. On the contrary, there are common areas where microeconomic reform provides both efficiency and environmental gains across the whole of the water sector — both urban and non-urban agencies.

A good start to this process was made in the National Competition Policy-related reforms agreed to by the Council of Australian Governments (COAG 1994). At a broad level, this process has promoted role separation, regulation and micro-level strategies such as demand management through more cost-reflective ‘user pays’ pricing and other measures such as volumetric allocation, water reuse, etc.

The 1994 agreement has helped to cement in place the essential precursors to microeconomic reform in the non-urban sector. These include better costing of water, better pricing, the specifying of property rights through allocation processes for both extractive use and the environment, and the introduction of trading arrangements. While these may seem simple applications of textbook economics, allocation arrangements, particularly for unregulated rivers (those without dams and thus without some certainty to the resource to be allocated), can be complex in the face of nature’s variability, extremes and our limited knowledge of relevant ecological implications.

The financial resources available to urban and non-urban water sector agencies to fund environmental programs are also very different. Urban agencies have a capacity to fund improvements to their own operations directly from their larger revenue bases and from the productivity improvements brought about by microeconomic reform. Given that many problems in non-urban areas are huge in scale, diverse and often external to the operations of the water agencies, non-urban agencies often have much less capacity to fund wide-ranging environmental restoration programs from water sales revenue. With an estimated \$60 billion to address salinity and land degradation over the next 10 years, non-urban water agencies have little chance to contribute significantly to this cost.

Urban agencies have been able to direct some of the productivity ‘dividends’ from their comprehensive microeconomic reform to their environmental programs. Again, this highlights that the urban sector has much in common with utilities in other sectors that have also benefited from productivity gains over the past decade or so. Much of this productivity gain comes from technological advancement in the operation distribution networks. The urban water sector, with its huge water and sewer networks and complexes of treatment plants, provides much scope for technology and productivity improvement. The non-urban agencies, while supplying much larger volumes of water, often do so with fewer assets and less scope for productivity gain. In regulated river systems, for example, the only operational asset may be a dam, with little complexity in its operations and little scope for productivity gains.

While productivity improvements have yielded ‘efficiency dividends’, there is also competition for their distribution, particularly to consumers and governments as the utility owners. While some may choose to characterise the payment of dividends to government as removing funds from the utility that could otherwise be directed to the environment, dividend payments do become funds that governments can direct to priority areas of spending, including environmental priorities.

So what broad conclusions can we draw? From this brief snapshot, I believe we can make the following observations.

- The so-called water sector is made up of agencies with vastly different responsibilities, issues and structures. It is therefore not possible to universally apply the microeconomic reform agenda and expect the same outcomes.
- The urban water utilities have much in common with other utilities, and lend themselves to microeconomic reform. The evolving regulatory agenda can deliver, and is delivering, demonstrable efficiency and environmental gains in this sector.
- The productivity improvements in the urban utilities are a source of dividends to government, and these can be directed to various areas of priority spending (including diverse degradation issues such as salinity and water quality problems affecting the non-urban areas).
- Overall, the environmental problems faced by the ‘water sector’ are huge and complex, and they largely affect the sector outside the urban areas. Microeconomic reform is providing benefits to the water sector and the environment but, on its own, cannot be expected to deliver all the desired outcomes, particularly in non-urban areas.
- Water-related environmental issues outside urban areas involve more than just the water sector. Many water-related problems, particularly those relating to

water quality and salinity, are generated externally to the water sector and water users. Other interests, such as agricultural industries and rural communities, also have roles in addressing these issues.

- The external nature of many non-rural water environment issues flags the need for a public agenda in addressing the issues. There is a strong role for governments and intergovernmental agreements. The funding of strategies, therefore, could reasonably comprise a mix of water user funding, resource tax solutions and public funding.
- Even with greater public sector involvement in non-urban water issues, some areas of microeconomic reform offer efficiency and environmental gains. These include:
 - the role separation of regulators and operators;
 - improvements in environmental regulations and standard setting;
 - pricing to signal true resource-use costs; and
 - the use of market mechanisms and incentives such as salinity trading schemes, water trading, carbon credit schemes and quality accreditation.

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2.A Presentation summary

*Paper presented by Andrew Amos
Hunter Water Corporation*

Microeconomic reform and greater community environmental awareness have been important drivers of water reform. However, there are constraints to further water reform (such as complex information requirements) which will make gains from reform more difficult to achieve. However, innovative policy design may provide opportunities to pursue further reform.

Microeconomic reform and environmental awareness are important

Amos observed that water agencies are in the environment business and have a role to play in improving environmental performance. Two main drivers of water policy are microeconomic reform and greater community environmental awareness.

Although the pace of microeconomic reform in the water sector has varied across jurisdictions, it has generally led to better pricing, role separation and increased external regulation. For example, the introduction of user pays pricing and the constant upward pressure on use prices has maintained a low level of water consumption.

There are constraints to water reform

Amos believes there are constraints on the extent to which microeconomic reform can deliver further benefits to the water sector. A major constraint is the highly variable and erratic nature of Australia's climatic systems — which leads to difficulties in assessing short term environmental outcomes. The vast information requirements to identify, measure and assess complex environmental and ecosystem impacts are also likely to act as constraints. For example, understanding salinity and blue green algae requires large amounts of information — often there are measurement and valuation difficulties associated with these assessments.

Urban and nonurban issues

Amos noted that the structure of urban water utilities is similar to other urban utilities and that it can readily adapt many of the benefits from general utility

reform. He also noted that the urban water sector is ‘fairly narrow and definable’, with point-source extraction and point-source returns.

In contrast, Amos suggested that the scale and breadth of issues related to nonurban water management are ‘much larger and harder to define’ and that more complex social, land use and environmental decisions are required. Catchment issues can be a particular concern — for example, nonurban water infrastructure is geographically isolated which limits the opportunity to open it to competitive forces.

Amos suggested that these differences mean that care must be taken with ‘promoting just the one-size-fits-all approach to water sector reform.’

But innovative policy can provide opportunities

Despite these challenges there are opportunities to jointly achieve economic and environmental improvements. Some progress is already occurring. For example, in the Williams River Valley in New South Wales, an accreditation program which links environmental standards to water access is being trialed — only accredited irrigators have access to river flows at certain times and accreditation requires achievement of environmental management. Other innovative environmental programs using market based mechanisms such as salinity trading and carbon credits systems may also offer opportunities for improved economic and environmental outcomes.

3 Discussion: the water sector

The presentations and contributed papers on the water sector highlighted the role water policy reform can play in achieving desirable economic and environmental outcomes. There was general agreement that progress in microeconomic reform had been greater in the urban water sector than in the rural water sector.

While the opportunities for further microeconomic reform appear to be greatest in the rural water sector, achieving them is likely to be more difficult than in the urban water sector. There appear to be more complex environmental relationships to consider in the rural water sector, leading to greater information requirements. Moreover, the regional adjustments associated with further rural water reform may have high political costs. Consequently, innovative policy design may be needed to achieve further rural water sector reform.

Economic instruments

Fisher suggested ‘polluter pays’ may be one mechanism that could be used to address environmental outcomes. However, Slatyer questioned how this may be achieved when pollution impacts may be indirect — either felt a long way away or not observed for some time. He contended that science may not be sufficiently advanced to be able to confidently price pollution impacts. Fisher agreed that pricing pollution is difficult. He commented that there appears to be an expectation that those who benefit from protection of the environment should pay for it, and that there is a lack of clarity on who is counted as a beneficiary for this purpose. He suggested applying polluter pays together with more strategic public investment. He noted that public investment can be used to leverage private investment. He also suggested that establishing catchment levies that could fund environmental works may be one alternative to achieve similar outcomes.

When focusing on the cost of environmental outcomes Freebairn questioned whether the correct economic questions are being asked. Past decisions cannot be changed. He said the real economic question is to determine the payoffs from alternative policy decisions — the marginal social benefits and costs.

Fisher responded that there must be some consistency between the treatment of costs for rural water and urban utilities; urban utilities have not adopted the

marginal cost framework. He also noted that some costs are not one-off costs, but are ongoing and intergenerational.

Freebairn observed that marginal costing rather than cost recovery is a more appropriate economic framework for water pricing. Marginal costs include variable operating and maintenance costs, marginal spillover costs and capacity/congestion costs. He noted there is no economic reason to try to recover past capital costs:

What we want are the marginal costs ... It has got nothing to do with recovering past capital; that's there, it's gone and it's gone.

Goss noted the usefulness of ecological audits, and the importance of them being 'very well designed (and) very patiently implemented' to provide a sound basis for negotiation, engagement and decision making.

The importance of adjustments costs

Samuel observed that the achievement of economic and environmental goals and objectives can have an impact on the whole nation, but they can also have high social and economic costs and therefore potentially high political costs in particular localities.

Samuel noted that social debate over some of these reform issues was occurring, yet they remain difficult to resolve because water policy affects the livelihoods that some people have had for generations. Fisher agreed, noting that the slow pace of rural water reform probably reflects some of these social concerns. However, he observed that there is a 'growing cultural change' — one which is increasingly acknowledging the importance of the environment.

Marsden noted that some environmental outcomes have occurred through policy tradeoffs. For example, some rural water systems were 'given away' and deferred maintenance costs were used as 'sweeteners' to avoid longer term costs. However, he noted that this had also provided government with the opportunity to establish stringent environmental licensing systems tied in with land and water management plans.

Future directions

Amos emphasised that problems faced by the water sector have complex causes and are not just related to water users or water industries, but are related to Australia's broad history of land use. He highlighted the need to look beyond the water sector for solutions.

Wills claimed that rural areas have the greatest need for further water reform, yet most of the resources are in urban areas. Some redistribution of resources to rural areas for water reform may be needed. Innovative institutional design is needed to recognise the property rights of the broader population to the rural environment, while sharing the cost burden:

... there is a need for some innovative institutional design ... to get the urban population to say “Yes, I am willing to pay a levy towards environmental improvements in rural areas” and get the rural areas to accept that “Yes, we are getting compensation”.

Butcher suggested that withholding state funding (for example, tranche payments available through National Competition Policy) could be an effective way to encourage the achievement of desirable environmental outcomes, under certain circumstances. He questioned why the National Competition Council has not used its power to recommend withholding tranche payments more frequently.

Fisher asserted that there is a need to improve accountability of public spending in environmental management generally — to have better mechanisms for ensuring targets are set and to provide imperatives to reach those targets. He suggested that the National Competition Council model has been effective in some instances (where only limited change would have happened ‘without the incentive of money’). However, he also noted ‘the need for a renewed commitment to water policy reforms and to renewed or new methods of applying those reforms.’ In particular, he reiterated that a new water reform framework was needed to take over from the existing Council of Australian Governments (COAG) water policy to achieve rural water reform.

Fisher also claimed there is need for more public debate over the future of water reform, such as discussing the benefits and costs of developing further water infrastructure in rural areas. Fisher highlighted the role that industry associations could play in contributing to a responsible social debate.

PART III

THE ELECTRICITY SECTOR

4 Impact of microeconomic reform on greenhouse gas emissions from the electricity sector

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This paper argues that the implementation of competition policy in the electricity sector has resulted in a substantial increase in Australia's greenhouse gas emissions.

Competition policy has been introduced at a time of considerable excess generating capacity, and this fact has underpinned the adverse effects of the National Electricity Market. The rapid growth in emissions can be attributed to continued strong economic growth, the fall in the price of wholesale electricity and the rising carbon dioxide intensity of electricity generation.

The magnitude of the increased greenhouse emissions that have resulted from the introduction of National Competition Policy in the electricity industry is substantial. If Australia's 8 per cent Kyoto target were applied equally across emitting sectors, then the electricity sector's net emissions could increase by only 10.3 megatonnes. Yet, we estimate that competition policy was responsible for an increase in emissions of 11 megatonnes in one year alone, 1998.

One analysis indicates that competition policy in the electricity sector will cost Australia almost \$1.5 billion in environmental damage over the period 1998–2005. This policy failure can be attributed to the fact that National Competition Policy has promoted short-term cost minimisation instead of economic efficiency. Where significant negative externalities are associated with the production of a good then it cannot be assumed that price reductions will result in a more efficient allocation of resources. National Competition Policy has thus been based on the conflation of microeconomic reform and competition policy.

4.1 Introduction

The Commonwealth Government has argued that energy market reform will have an environmental benefit. In his November 1997 statement, the Prime Minister said

that ‘The possibilities for fuel substitution and innovation will be enhanced as we continue and accelerate the process of energy market reform’.¹

Prior to the Kyoto conference the Commonwealth Government forecast that there would be greenhouse emissions savings of 14 megatonnes (Mt) per year from energy market reform (Commonwealth of Australia 1997).

This paper argues that the implementation of competition policy in the electricity market, rather than contributing to reducing Australia’s greenhouse gas emissions, has made our emissions substantially higher than they would have been. At the general level, this policy failure can be attributed to the fact that National Competition Policy has promoted short-term cost minimisation instead of economic efficiency. It will be argued that existing arrangements in the electricity industry actually reduce efficiency via the provision of implicit subsidies to greenhouse-intensive generators of electricity.

The paper is organised as follows. This section considers the distinction between efficiency and competition. The second section outlines the recent trends in greenhouse emissions in the electricity sector and the causes behind them, including the effect of competition policy. The third section describes how the structure of the National Electricity Market leads to adverse outcomes. The fourth section discusses the failings of the public benefit test in principle and in application. The fifth section comments on the problems associated with relying on competition to improve efficiency and the sixth section provides some policy recommendations and conclusions.

In principle, there should be no distinction between microeconomic reform and the protection of the natural environment because both projects are concerned with the efficient use of scarce resources. However, in practice, the opposite has tended to be the case. Microeconomic reform has tended to be interpreted as ‘competition policy’ with a focus on the minimisation of a particular subset of production costs — the subset contained in standard business accounting. This pursuit has led to the creation of a tension that need not exist if microeconomic reform was being properly implemented.

Efficiency is not always about cost minimisation and competition. Efficiency can be defined in several ways, such as allocative efficiency or dynamic efficiency, but it is never defined solely in terms of short-term financial cost minimisation, even in the most orthodox of economic texts. Samuelson and Nordhaus (1987, p. 678), for example, state:

¹ ‘Safeguarding the Future: Australia’s Response to Climate Change’, Statement by the Prime Minister, John Howard, 20 November 1997.

Under perfect competition — with all goods' prices equal to marginal costs, with all factor prices equal to the value of their marginal products, with no spillovers or external effects — a market does lead to *allocative efficiency*. (emphasis in original)

Cost minimisation may be allocatively efficient when markets are complete, information is perfect and externalities are absent, but outside of such a system the same cannot be said. The natural environment is, and will remain, to a large extent outside of such a system. The absence of markets for fresh air, fresh water, biodiversity and peace and quiet ensure that appropriate price signals are absent when supply is reduced or preferences shift. In these circumstances, the pursuit of competition in existing markets will mean that these environmental services will not be supplied in 'efficient' quantities.²

Debate about what is 'efficient' in Australia has been confused by discussion of what is competitive, and when market failure exists this will result in bad policy. The recent comments by the Secretary of the Commonwealth Department of Treasury, Mr Ted Evans (cited by Allard 2000) suggest senior policy makers may finally be changing the weighting that they give to the importance of the environment. However, such a change in view is unlikely to be sufficient to remove the tension between 'cost savings' and environmental protection. What is still needed is acceptance of the need to rely less heavily on simple interpretations of orthodox economic theory and its willingness to treat as 'outside the system' anything for which market values are not readily available.

The erroneous assumption that competition always leads to more efficiency has been especially dominant in the process that resulted in the National Electricity Market. As this paper will show, competition policy in the electricity market has been associated with a loss of efficiency because it has imposed large additional costs on the community in the form of increased greenhouse pollution.³ Unfortunately, this simple point, powerful as it is, appears to have failed so far to dent the faith of reformers in the benefits of competition.

² The analysis of environmental effects in conventional economic terms in this paper should not be taken to imply that the authors accept this as the appropriate framework for values that are not economic in nature.

³ Some commentators expressed concern early. In a paper delivered in 1994 (and published in 1996), Saddler argued that 'implementation of the competitive national market in electricity, in the form presently envisaged, will make it more difficult for Australia to reduce greenhouse gas emissions'.

4.2 Recent trends in the electricity sector and emissions

In 1998, electricity generation resulted in the release of 168.6 Mt of greenhouse gases (CO₂-e), which accounted for 37 per cent of national emissions (excluding land use change) (Australian Greenhouse Office 2000, table 1-5). Emissions from this sector are therefore of foremost importance in Australia's attempts to meet its Kyoto Protocol target of limiting emissions to 8 per cent above 1990 levels in the commitment period 2008–12. If microeconomic reform in the electricity sector has a significant effect on the growth of emissions in the sector, then it is of major environmental significance.

Greenhouse gas emissions from electricity generation have been rising since 1994 and increased sharply by 10.3 per cent in 1998,⁴ which is the latest year for which official data are available (table 4.1). It is important to stress that this is an extraordinarily large increase by any standard. The year 1997-98 was the first full year of operation of the National Electricity Market, and the two are closely related. As the Australian Greenhouse Office (2000, p. 35) observes:

The rise in electricity demand, due to declining wholesale prices, and the rising share of brown coal, were both associated with the introduction of the national electricity market.

Table 4.1 Greenhouse gas emissions from electricity generation

<i>Year</i>	<i>Net CO₂-e emissions</i>	<i>Annual change</i>
	Mt	%
1990	129.1	na
1991	131.6	1.9
1992	134.7	2.3
1993	135.1	0.3
1994	136.2	0.9
1995	141.6	3.9
1996	147.3	4.1
1997	152.9	3.8
1998	168.6	10.3
Change from 1990	39.5	30.6

na Not available.

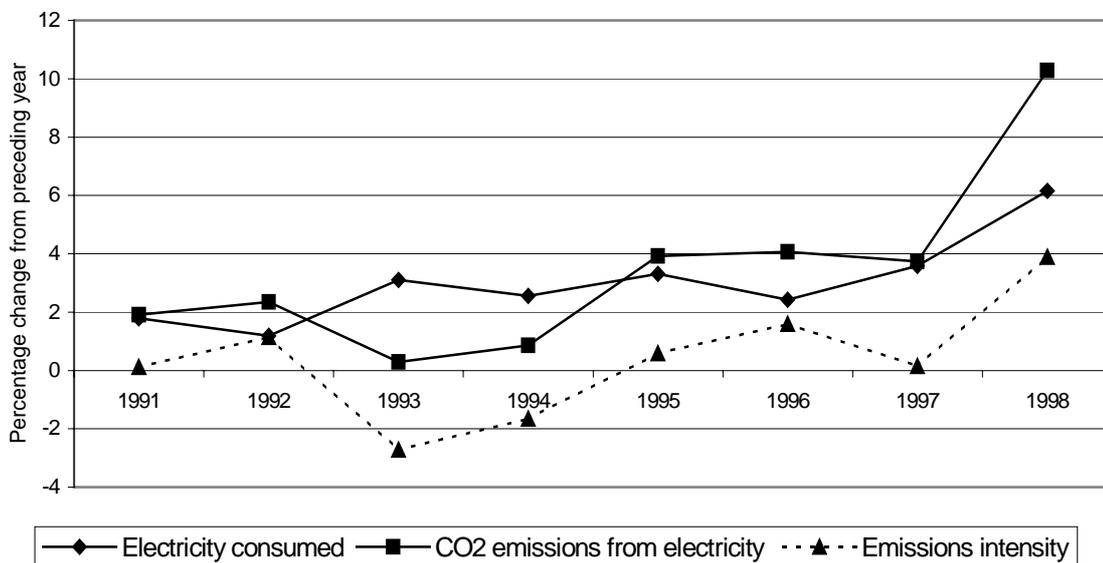
Source: Australian Greenhouse Office (2000, table 1-5).

Competition policy has been introduced into the electricity market at a time of considerable excess generating capacity, and this fact has underpinned the adverse

⁴ In the inventory '1998' means the financial year 1997-98.

effects of the National Electricity Market. The rapid growth in emissions from the electricity sector can be attributed to three factors: continued strong economic growth; the fall in the price of wholesale electricity; and the rising carbon dioxide intensity of electricity generation. Annual changes in emissions intensity, the amount of electricity consumed, and the consequent changes in carbon dioxide emissions from electricity are plotted in figure 4.1 (reproduced from Australian Greenhouse Office 2000). Each of the factors affecting the growth in emissions deserves some comment.

Figure 4.1 Annual change in electricity consumption, intensity and emissions



Source: Australian Greenhouse Office (2000, figure 33).

Strong economic growth

Strong economic growth will be associated with a rapid increase in greenhouse gas emissions unless it is offset by changes in technology and consumption patterns. A decomposition analysis of the sources of growth in emissions from all sectors in Australia and other Organisation for Economic Cooperation and Development (OECD) countries concluded as follows.

In most countries economic growth is the main factor driving higher energy-related greenhouse gas emissions. However, in most cases these countries have managed to offset the impact of economic growth by reducing energy intensity and changing the fuel mix (Hamilton and Turton 2000).

The momentum of income growth must be constantly offset by falling energy intensity and by shifts to energy sources with lower emissions per unit energy. However, it will be suggested below that National Competition Policy in the electricity sector has reversed the factors that have worked to offset the effect of economic growth in other countries.

The Commonwealth Government has used unexpectedly high economic growth to ‘explain’ rapid increases in emissions. The purpose of National Competition Policy has been to increase the growth rate; at the same time, its application in the electricity market has accelerated increases in emissions.

Some have argued that higher incomes will allow consumers to express better their preferences for environmental protection — the so-called environmental Kuznets curve (see Roberts and Grimes 1997) — and this argument has been used in the context of microeconomic reform. However, there is little empirical support or persuasive theoretical argument to justify the belief that consumers will spontaneously switch to cleaner forms of energy (Denniss 2000).

Another way of viewing the ‘growth dividend’ is as an opportunity to pay the costs of better protection of the environment that have been said to be too high. That is, if gross domestic product has been growing at more than 1 per cent faster than expected, then this is sufficient to offset the ‘costs’ associated with most of the major environmental strategies that have been proposed in recent years.

Falling electricity prices

Prior to the National Electricity Market, the excess of generating capacity did not lead to price cutting because the pressures to run power stations at maximum capacity were not as great. However, the introduction of the competitive market led to large price cuts. Average prices charged to industrial and commercial users, which account for around 70 per cent of total electricity consumption, fell by nearly 22 per cent between 1991-92 and 1997-98 (Saddler 2000, p. 3). The price elasticity of demand for contestable customers has been estimated at -0.35 (NIEIR 1997, cited in Allen Consulting Group and McLennan Magasanik Associates 1999). These numbers alone suggest an increase in electricity consumption and associated emissions of around 5 per cent in recent years. The fall in the price of electricity to contestable customers has been the principal measure of the success of competition policy in the sector, and perhaps the ‘jewel in the crown’ of microeconomic reform in Australia, yet it has been very damaging for the environment. The contradiction between this achievement and the objective of increased efficiency will be discussed below.

Rising carbon dioxide intensity of electricity consumption

The rising carbon dioxide intensity evident from figure 4.1 is due to both an increasing share of coal-fired power in total generation and the increasing share of brown coal within coal. This has been at the expense of the expansion of gas-fired generation.

Brown coal is the most greenhouse gas-intensive fossil fuel used to generate electricity in Australia. Table 4.2 provides data on the emissions intensity of various fuels. A shift to coal (or a failure to shift to gas), and a shift to brown coal in particular, will worsen greenhouse gas emissions.

Table 4.2 **Typical carbon dioxide emissions from fuel sources**

<i>Fuel</i>	<i>Typical CO₂</i>	<i>Efficiency of conversion</i>	<i>CO₂ produced by a 100 megawatt plant operating at 90% load factor</i>
	Kt/PJ	%	Mt/year
Brown coal	94	31	0.861
Black coal	92	36	0.725
Base load gas	51	51	0.283
Renewables	0	na	0

na Not applicable.

Source: Allen Consulting Group and McLennan Magasanik Associates (1999, p. 91).

The shift towards increased reliance on coal, and brown coal in particular, has followed from the introduction of competition in an oversupplied market. Excess generating capacity has induced generators to price electricity on the basis of short-run marginal costs. As existing generators pursue market share they have been willing to price at or only slightly above operating costs, hoping for a return on capital in due course. The cost of brown coal is especially low and has enabled the Victorian generators to undercut all other suppliers. This is a severe deterrent to any company planning to build new generating capacity, including gas-fired co-generation.

It is possible to estimate the contribution of each of these three factors to the sharp increase of 10.3 per cent in 1998 (the first year in which the National Electricity Market was fully operational). Drawing on the breakdown in figure 4.1, the increase was made up of a 6.3 per cent increase in electricity consumption and a 4 per cent increase in emissions intensity. Most of the increase in emissions can be attributed to the effects of competition policy, as follows. The 6.3 per cent increase in demand was well above the long-term average of around 2.5 per cent, and is attributable to mainly the large fall in the price of electricity into the pool.

The fall in price was due to attempts by Victoria's privatised brown coal generators to maximise their revenue by winning market share at the expense of gas generators in Victoria and black coal generators in New South Wales. In that year around 3500 gigawatt hours (GWh) were exported from Victoria into New South Wales, with about 600 GWh in the other direction (excluding Snowy Mountains Hydro-Electric Authority flows). This net energy transfer of 2900 GWh northward contrasts with nearly equal northward and southward energy transfers in the preceding year (ESAA 1999). Similarly, net exports from Victoria to South Australia in 1998 were 4056 GWh, largely displacing output from existing gas-fired generation.

The 4 per cent increase in intensity was due to three factors: approximately 1 per cent from a decline in electricity generated from the Snowy Hydro Scheme; 1 per cent from a decline in the thermal efficiency of Queensland power stations; and 2 per cent from an increased share of brown coal.⁵ The decline in electricity from the Snowy was partly due to lower water levels and partly due to decisions to store capacity until prices recovered. The increased share of brown coal was due to the aggressive pursuit of markets through price cutting. While the latter was certainly due to the effects of competition policy, some part of the changes in behaviour of the Snowy Mountain Hydro-Electric Authority and the Queensland generators could also be attributed to the commercial incentives offered by the new market.

The effect of competition policy on emissions

We can estimate the effect of competition policy on emissions from the electricity sector. In 1998 perhaps 7 per cent of the 10.3 per cent increase in emissions — accounting for around 11 Mt of carbon dioxide — was due to the introduction of the competitive market. Subsequent years are expected to show a return to a more normal rate of emissions growth (perhaps around 4 to 5 per cent), but even this rate is high. While the growth rates may revert to 'trend', it is important to note that the level of emissions may stay permanently higher. That is, it is not clear that there is a built-in adjustment mechanism that will prevent the short-term burst of emissions growth from having a long-run impact on the level of emissions.

The magnitude of the increased greenhouse emissions that have resulted from the introduction of National Competition Policy in the electricity industry is thus substantial. If Australia's 8 per cent Kyoto target were applied equally across emitting sectors, then the electricity sector's net emissions of 129.1 Mt in 1990 would be restricted to an average of 139.4 Mt over the commitment period 2008–12 — an increase of 10.3 Mt. Yet, we have estimated that competition policy was responsible for an increase in emissions of 11 Mt in one year alone.

⁵ Most of this is explicit or implicit in Australian Greenhouse Office (2000, pp. 33–5).

In a more systematic but conservative analysis, the Allen Consulting Group and McLennan Magasanik Associates (1999) estimate that the introduction of energy market reforms led to an increase in emissions of over 8 Mt of carbon dioxide in 1998. Over the period 1998–2005 it is expected that carbon dioxide emissions will be around 6 Mt per year above their pre-reform levels. This amounts to 48 Mt of additional carbon dioxide over the seven-year period. When valued at \$30 a tonne (the Australian Greenhouse Office’s best estimate), the increase in emissions due to the effects of competition policy has cost Australia almost \$1.5 billion in environmental damage. Over the commitment period 2008–12 this will translate directly into a financial cost because emissions will be substantially higher than they would have been in the absence of competition policy.

The Allen Consulting Group and McLennan Magasanik Associates (1999) findings, like all estimations, are sensitive to the assumptions made. If the introduction of electricity market reforms discourages the construction of gas pipelines from Papua New Guinea and the Timor Sea, then the increase in greenhouse emissions that is attributable to National Competition Policy would be over 10 million tonnes in 2004 (Allen Consulting Group and McLennan Magasanik Associates 1999, p. 107).

After estimating the direct effects of competition policy on emissions, the Allen Group report makes a rather bizarre argument to suggest that the effect of competition policy will be neutral in the longer term. As demand grows, the supply overhang will be absorbed and the growth effect will be enough to offset the price effect of decreased wholesale prices as the market recovers from its present state. Beyond 2006, new gas-fired generators (which would not proceed in the absence of competition policy) will meet excess demand, and the initial effects of the policy will be offset. As a result, in the long run emissions will be lower than they would have been without the implementation of electricity market reform (Allen Consulting Group and McLennan Magasanik Associates 1999, pp. 106–7).

However, for this to occur, the price of electricity must first rise substantially. Thus, to achieve the environmental benefits of market reform, we must first dissipate the ‘economic benefits’. In other words, electricity prices are currently artificially low due to the introduction of electricity market reforms. We must, therefore, increase demand and emissions to absorb existing coal-fired capacity before we can begin the process of installing more ‘greenhouse-friendly’ capacity. The current low prices are a one-off windfall to large users of electricity, and rather than implement demand reduction strategies, they should expand consumption to restore ‘normality’ to the industry.

A serious attempt to tackle emissions from the sector would involve scrapping some existing generating capacity rather than using it up fully, so more greenhouse-friendly generators can take up the subsequent excess demand. In fact, competition

policy has induced an expansion of coal-fired generation capacity in Queensland and New South Wales with emissions consequences that will last for decades, making it much more difficult for gas to expand at the rate required by the Allen Group's projections in the period 2006–10.

4.3 Adverse consequences of the current regulatory structure

A key structural problem with the design of the National Electricity Market has been the assumption that the delivery of energy services in the future will be done as it has been in the past — that is, through a system based on large-scale, homogeneous, remote generation connected to the grid. By locking in the past, the National Electricity Market failed to recognise that the trend in the future, especially given international moves to reduce greenhouse gas emissions, will be away from such a system towards smaller scale, diverse and more localised sources of energy, including energy efficiency. This is the perennial problem of allowing the existing players to determine new regulatory systems and market structures.

Transmission charges

Apart from the failure to consider explicitly the differential greenhouse emissions of various forms of emission, one of the most damaging manifestations to this backward-looking regulatory structure has been the continuing subsidisation of the transmission of electricity. That is, the current regulatory arrangements do not allocate the full costs of transmission according to the location of generators and users. Rather, transmission losses are averaged, to the advantage of remote generators (and remote consumers) and to the detriment of co-generators. Such an approach prevents market pressures from ensuring electricity generators are located near to their markets, which would reduce both the total cost of generation as well as carbon dioxide emissions (because we need to burn less fuel to deliver the same amount of energy to end users). It also fails to signal to remote users the economic value of more efficient energy use, or of switching from grid supply to alternatives such as renewables-based remote area power supply systems.

The Australian Cogeneration Association (2000, p. 35) has called on the National Electricity Code Administrator to ensure '(a)ll transmission costs avoided by the operation of the embedded generator must be passed through to the generator and its customers'. Not only would such an approach provide incentives to reduce transmission costs, and in turn carbon dioxide emissions, but it would seem that the request is for the implementation of exactly the kind of regulation envisioned in the

objectives of National Competition Policy. That is, the removal of an explicit cross-subsidy between the transmission/distribution system could result in an improvement in allocative efficiency. The only beneficiary of the current arrangements are the existing generators whose ‘transport costs’ for their ‘product’ are charged below the real cost of delivery.

Energy efficiency

Another detrimental impact of the current regime on greenhouse gas emissions has been the reduction in the viability of installing energy saving measures. By reducing the cost of electricity to industrial users, electricity market reforms have lengthened the payback period and reduced the net present value of new investments designed to save on the consumption of electricity.

Further, while existing firms may be discouraged from investing in energy saving techniques, new firms and new investments by existing firms are likely to be designed from the ground up, with built-in low electricity prices. Thus, reforms in the electricity industry are the greatest impediment to the kind of demand-side management that could deliver ‘no regrets’ savings to the Australian economy. It has been estimated that the potential savings of electricity from increased efficiency are around 20–30 per cent (Wilkenfeld 1996).

4.4 The public benefit test

Why did the introduction of competition to the electricity market have such untoward effects on its level of emissions when National Competition Policy was meant to take explicit account of the potential environmental impacts of competition? According to the National Competition Council (2000):

When Governments are reviewing laws that restrict competition National Competition Policy requires them to consider a number of factors to determine what is in the public interest. These factors include:

- Laws and policies relating to ecologically sustainable development.
- Social welfare and equity, including community service obligations.
- Laws and policies relating to matters such as occupational health and safety, industrial relations, access and equity.
- Economic and regional development, including employment and investment growth.
- The interests of consumers generally or of a class of consumers.
- The competitiveness of Australian businesses.

-
- The efficient allocation of resources.

The list is open ended, meaning that governments must also take into account any other matter relevant to determining the merits of the reform being examined.

While this list encompasses a broad range of issues, a recent Senate inquiry found that the role of the treasury and premier's departments in the implementation of National Competition Policy has 'led to a predominantly economic rather than multi-disciplinary approach involved in the implementation of [National Competition Policy] and in particular the "public interest" test' (Senate Select Committee on the Socio-Economic Consequences of National Competition Policy 1999, p. xii).

The list of factors to be considered when assessing the public interest is provided in clause 1(3) of the Competition Principles Agreement. The National Competition Council (1996, p. 4) states that:

In this respect, subclause 1(3) provides governments with a consistent approach to assessing whether the commitments to reform contained in the intergovernmental agreements threaten desired social objectives. The inclusion of the subclause in the [Competition Principles Agreement] reflects the desire of governments to make clear their view that competition policy is not about maximising competition per se, but about using competition to improve the community's living standards and employment opportunities.

That is, the council states explicitly that improved living standards, not competition, are desired. Given the substantial market failure in the electricity industry (in the form of massive negative externalities), it is difficult to see how the introduction of increased competition, along with the subsequent reductions in the price of Australia's largest polluting activity, was considered to be in 'the public interest' without major changes to the market structure.

While scope for incorporating environmental objectives into the implementation of National Competition Policy is clearly evident in the objectives outlined above, such an approach reinforces the artificial dichotomy between 'the economy' and 'the environment'. A much more productive approach, and one that is consistent with the underlying theoretical basis of National Competition Policy, would be to rely on the requirement of 'efficient allocation of resources' mentioned as the last factor in the test. If it is apparent that significant negative externalities are associated with the production of a good, then it cannot be assumed that price reductions will result in a more efficient allocation of resources. Reliance on the precautionary principle, for example, would force those advocating the introduction of increased competition to show that the expected benefits arising from greater consumption are greater than the expected increase in damage from pollution. If a

convincing case cannot be made, then it should be assumed that welfare is enhanced by the avoidance of increased consumption. Alternatively, the externalities in the market need first to be fixed by suitable policy intervention (such as a carbon tax or emissions permits) and then the market needs to be opened to competition. In general, competition policy will be beneficial only if introduced into a market in which we have adequately dealt with major externalities. In this respect, competition policy in the electricity market has failed.

At present the Australian Competition and Consumer Commission's approach is the opposite. It argues, in what looks like a bureaucrat's escape clause, that 'the public benefits test can only include known environmental costs arising from government legislation' (Australian Greenhouse Office 1999, p. 2). This is despite the clear statement by the Commonwealth Government that it expected the National Electricity Market to result in reduced emissions and the Government's international obligations under the Kyoto Protocol. Such a state of affairs led the Australian Greenhouse Office (1999, p. 2) to argue:

... that if externalities were not to be included then to avoid confusion the test should be called something other than a 'public benefit test'.

4.5 Competition and efficiency

This section outlines the specific causes of the apparent tension between the current implementation of National Competition Policy in Australia and the protection of the natural environment. It is argued that not just market failure but also regulatory failure has resulted in the current state of affairs. While successive governments have made considerable efforts to implement National Competition Policy, the predictability of some of the adverse environmental outcomes is evidence of a flawed policy formation process. It is this process, as much as any particular industry, that will need to be reformed if environmental outcomes are to be improved and if microeconomic reform is to live up to its name.

Cost saving in the presence of externalities

One of the major objectives of National Competition Policy is to reduce the cost of production of goods and services in Australia, particularly goods and services that have been delivered by government departments or government trading enterprises. The rationale for such an approach is that allocative efficiency in the macro economy can be improved if inputs such as electricity, water and transport can be produced at lower cost. Lower input costs, it is argued, will result in lower prices for final goods and services, increased exports and increased employment.

Governments have expressed a clear preference for the use of ‘economic instruments’ to rectify environmental problems; for the most part this means increasing the prices of environmentally damaging goods. Cost cutting through competition policy runs counter to this.

The notion that reduced production costs lead to an increase in allocative efficiency, and in turn welfare, is explicitly based on the assumptions of the perfectly competitive model, including the assumption that there are no externalities present in either the production or consumption of goods and services.

The focus of National Competition Policy on cost reduction has resulted, intentionally or otherwise, in a situation where ‘efficiency’ is now confused with ‘competition’ and ‘reduced financial cost’. Only when all factors of production are accurately priced and no market failure exists can it be maintained that competition is efficient. The presence of such substantial negative externalities as greenhouse gases suggests that a focus on cost reduction implies nothing about the level of ‘efficiency’ as it is understood in the economics discipline.

The theory of second best

Estimated benefits of National Competition Policy have been based on the artificial conflation of partial and general equilibrium analysis. The possibility of achieving gains in allocative efficiency in one industry is based on the assumption that perfect competition does not currently exist in that industry. The potential for ‘efficiency gains’ in one industry is then incorporated into a general equilibrium model. Such models typically assume that all industries are already competitive and that factors of production are highly mobile between industries. The macroeconomic effects of microeconomic reform are then estimated. In addition to the inherent contradiction between the assumptions at the micro and macro levels, a range of other problems exist.

The theory of second best was generalised by Lipsey and Lancaster (1956, p. 11), who stated:

The general theorem for the second best optimum states that if there is introduced into a general equilibrium system a constraint which prevents the attainment of one of the Paretian conditions, the other Paretian conditions, though still achievable, are, in general, no longer desirable. In other words, given that one of the Paretian optimum conditions cannot be fulfilled, then an optimum situation can only be achieved by departing from all the other Paretian conditions.

While it should not be interpreted as an invitation to do nothing, the theory of the second best makes it quite clear that there is no theoretical justification for the

underlying assumption of National Competition policy, namely that greater competition is necessarily welfare-improving. The theory suggests that while greater competition may be welfare improving, its benefits must be demonstrated in each case. It alerts us to the fact that attempts to enhance competition in one sector may result in an overall reduction in welfare if there are structural problems either in the market in question or in related markets. The present paper argues that the existence of a major externality in the electricity market rebuts the presumption that competition is welfare-improving in that market. A recent example of the effects of structural problems in related markets arises in the proposed reforms to the rail industry.

The Productivity Commission's (1999) recent report *Progress in Rail Reform* recommends that freight rail services be privatised (1999, p. 3, especially recommendations 7.1 and 7.2). (The report notes that it does not consider the environmental costs of rail reform yet, in the very next paragraph, claims that in formulating its recommendations it had regard to the overall performance of the economy including the environmental objectives of government). It also recommends that a new inquiry into road pricing be set up to determine an appropriate full cost pricing regime for road freight. The Productivity Commission does not suggest that increased reliance on market mechanisms in rail freight should be contingent on increased reliance on market mechanisms in road transport. Further, the Commonwealth Government has subsequently rejected proposals to apply full cost pricing to road users (Anderson 2000). In such a situation, if the Productivity Commission were concerned with microeconomic reform in its broad sense, then the 'efficient' course of action would be to withdraw the advice to the Commonwealth Government to proceed with privatisation in the rail industry.

The likely outcome of the current round of 'reforms' is that privatisation of rail will be followed by an increase in rail freight charges and a reduction in freight services. An increase in rail freight charges would lead to greater reliance on subsidised road transport and a subsequent increase in depreciation of roads and bridges, increased road injuries, increased carbon dioxide emissions and urban air pollution, increased road congestion and greater noise pollution. None of these costs will be captured by any subsequent analysis of the 'efficiency' of the rail system after reform.

4.6 Lessons and recommendations

The electricity market in Australia is suffering from both regulatory and market failure. The increase in emissions over the past five years is the direct result of these problems. While the market failures should be obvious, especially the existence of

negative externalities, the regulatory failure is more subtle and thus more difficult to rectify.

There is no theoretical basis for the decision to implement policies of increased reliance on market forces in markets where major market failures remain. The term ‘increased competition’ is regularly conflated with ‘increased efficiency’ when the two are fundamentally different concepts. The necessary conditions for symmetry between increased competition and increased efficiency are well known, but virtually absent in both the design of National Competition Policy and its subsequent evaluation. The National Competition Council (1999, p. 29) notes:

The [National Competition Policy] energy reforms are the furthest advanced. They seek to improve the efficiency of the electricity and gas industries, open these industries up to new businesses and cut costs to energy users.

This demonstrates the complete absence of a commitment to achieve ‘efficient’ (in the economic sense of the word) allocation of resources. The objective of National Competition Policy has been to lower prices and increase output, regardless of the environmental consequences. Protecting the environment is considered to be a separate, non-economic objective, which when attempted is criticised for having ‘adverse effects’ on the economy.

National Competition Policy has been designed and implemented in such a way as to provide primacy to a small subset of the factors that have the capacity to affect the welfare of society. There is no theoretical justification for this primacy, and if the public benefit is to be honestly pursued, then it must be removed.

On a more specific level, a number of regulations governing the operation of the National Electricity Market have diminished the incentive to invest in low-emitting sources of electricity, especially gas co-generation. These regulations may have been an unforeseen outcome of the market creation process. If so, then it is essential that they be rectified in the near future, because a market that relies on price signals cannot expect efficient outcomes as long as implicit subsidies favour those generators whose negative externalities are the largest.

In conclusion, the introduction of National Competition Policy in the electricity industry has resulted in a sharp reduction in allocative efficiency. This finding has been concealed by the continual focus on reductions in user charges as the ‘performance indicator’ of the reform process. Such a focus has no theoretical foundation. As long as impacts of economic activity on the environment are excluded from the definition of ‘economic efficiency’, then competition policy will continue to reduce welfare.

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4.A Presentation summary

*Paper presented by Clive Hamilton
The Australia Institute*

Hamilton argued that National Competition Policy has failed in the electricity sector. Although the policy is touted as a success for having promoted competition and lower prices in the electricity sector, Hamilton argued that these indicators have been incorrectly equated with improved economic efficiency, and that National Competition Policy has had a destructive impact on the natural environment:

The object of National Competition Policy has been to lower prices and increase output, regardless of the environmental consequences, at least in the electricity sector ... So the introduction of [the policy] to the electricity sector has resulted in a sharp reduction in allocative efficiency ... As long as impacts of economic activity on the environment are excluded from the definition of economic efficiency, then competition policy will continue to reduce welfare ...

Hamilton believes that National Competition Policy has promoted short-term cost minimisation instead of economic efficiency. In economic theory, allocative efficiency is only ever equated with cost minimisation under conditions of perfect information, complete markets and no externalities — conditions that do not hold in the market for environmental goods and services. He felt that the reforms in the National Electricity Market have reduced efficiency by imposing large environmental costs on the community.

Greenhouse emissions

An ongoing theme in the presentation was that the implementation of National Competition Policy has led to an increase in Australia's greenhouse gas emissions, far in excess of what they would have been in the absence of electricity market reform. The higher pollution levels may be attributed to three key factors:

- strong economic growth;
- increasing electricity demand that arose from falling wholesale prices; and
- an increasing share of brown coal being used in electricity generation, which resulted from firms competing on price in the new highly competitive market.

Hamilton noted that structural failure in the market by way of transmission cost subsidisation had favoured remote generators that raise generation costs and increase greenhouse emissions.

Further, he observed that the National Electricity Market has:

... locked in the structure of the industry that has prevailed in the past, without recognising that the future is going to be different.

Failure of the public benefit test

In implementing microeconomic reform, the National Competition Council is required to consider a number of factors that affect the public interest, including laws and policies relating to ecologically sustainable development and social welfare and equity. Hamilton argued that the introduction of National Competition Policy has led to an overemphasis on the economic aspects of public benefit, rather than a multidisciplinary analysis that incorporates environmental and social objectives.

In its recommendations, the National Competition Council gives primacy to the goal of improving living standards and invokes competition only as a means to this end. While there have been improvements in the competitiveness of the electricity market as a result of National Competition Policy, these gains have been eroded by welfare-reducing externalities — namely, higher levels of greenhouse gas pollution.

Long-term effects of National Competition Policy

Hamilton questioned the conclusions by the Allen Consulting Group that implied the long-term effects of National Competition Policy are neutral. Hamilton noted that the Allen Consulting Group posited that increasing demand will result in absorption of oversupply in the electricity market. When capacity is reached, prices will be driven up, driving investment in cleaner technologies and consequently reducing emissions. Hamilton claims that this implies we must first pollute more to reduce long run pollution, because the Allen Group's argument would entail the expansion of polluting activities to arrive at a situation where cleaner energy may eventually be introduced to reduce pollution.

Hamilton estimated the increase in emissions as a result of National Competition Policy would cost Australia almost \$1.5 billion in environmental damage between 1998 and 2005 (based on 48 Mt of additional carbon dioxide over the seven-year period, valued at \$30 a tonne).

5 Microeconomic reform and the environment: the electricity sector

Margaret Beardow
Benchmark Economics

Harry Schaap
Electricity Supply Association of Australia

Electricity underpins modern society by directly providing energy services and by enabling electronic communication, controls, and commerce. Structural reform of electricity supply has contributed to advancing these activities and, in turn, has been driven by them.

This paper examines the supply and use of electricity in the Australian economy, the microeconomic reform processes of the electricity supply industry and the environmental issues affecting electricity supply and use.

Microeconomic reform of electricity supply is delivering better environmental outcomes in terms of environmental management within business, use of natural resources, and environment protection. It has not yet been effective in addressing wider environmental issues such as greenhouse gas emissions abatement or demand-side management. More focused attention in the initial reform design processes will assist in dealing more effectively with a range of environmental externalities.

5.1 Introduction

Electricity underpins modern society. It does so in two ways: directly, by providing lighting, heating, and motive power and, indirectly, by enabling electronic communication, controls and commerce. The penetration of electronics into the wider economy has brought substantial gains in productive efficiency, but it has done so at the cost of increasing our dependence on electricity. This has been done at a pace that has to some extent gone unnoticed and at the same time as the electricity supply industry is undergoing radical change.

Structural reforms introduced over the past decade have contributed to these changes and, in turn, have been driven by them. To date, the effect on the environment has been mixed. While falling wholesale prices have driven out gas-fired generation for now, open markets are encouraging the development of new technologies that have yet to penetrate the market.

In less time than it has taken to complete the microeconomic reform agenda, electricity has been transformed from just another input to business to a critical determinant of whether many businesses actually operate. Systems are now operated by sophisticated controls; suppliers may be online for just-in-time deliveries, or the market itself may be online; stock markets, energy markets, business-to-business commerce, etc. Essential community services, including water and sewerage, telephones, policing and medical support, increasingly share this dependence on electricity as communication and control systems evolve. Whatever the link, the changes have been far reaching. The convergence with telecommunications and the internet can only accentuate this growing dependence on electricity.

Microeconomic reform has hastened the introduction of the new technologies by opening the market to new entrants and concepts. By providing such opportunities, the reforms will contribute benefits to the environment. In turn, the new technologies have facilitated the evolution of the competitive market. The competitive wholesale and retail markets would not be feasible without modern data handling and communication systems.

In the United States it has been estimated that electricity powers more than half of business capital investment currently going into equipment. Consequently, up to 8 per cent of the US national grid is now linked directly to providing power to desktops, servers and routers. Not surprisingly, quality of supply has become as important as price, if not more so. Australia's electricity businesses, which began the decade of reform focusing on productive efficiency and lower prices, are now developing strategies to meet the quality of supply demands of the new markets. Not to do so would be just as detrimental to Australia's economy as uncompetitive prices would be.

These developments merit note because they highlight the multifaceted nature of change within the industry during the period under review for this paper. Microeconomic reform has deregulated the industry and its market participants but the outcome is still uncertain as the industry undergoes a lengthy period of transition. Reform and its implications for the environment should be viewed within the context of this transition and the broader technological changes that are reshaping the industry's operating environment

5.2 Electricity in the Australian economy

By whatever measure, the electricity supply industry is a key sector of the Australian economy. It directly contributes 1.4 per cent to gross domestic product

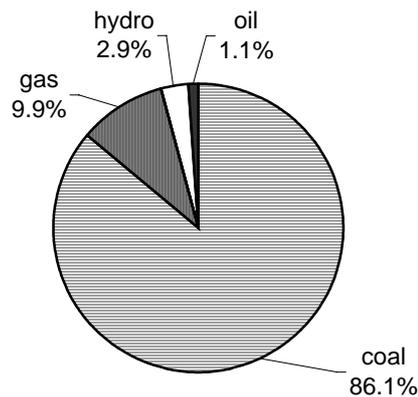
and employs some 33 000 people. It is a vital input to a wide range of domestic and export industries, and in 1998-99 provided an essential service to 8.5 million customers. Total revenue in that year was \$13.7 billion, corresponding to an average price of 8.9 cents per kilowatt hour.

Australian electricity prices have been among the lowest in the world for many years and underpin its energy-intensive export base.

Electricity supply

Electricity provides around 19 per cent of the total energy available for final consumption. Figure 5.1 details primary energy use in electricity production for 1998-99.

Figure 5.1 Primary energy use in electricity, 1998-99^a



^a Primary energy: 1990.4 petajoules. Electricity for final consumption: 624.8 petajoules (173.5 tetravatt hours).

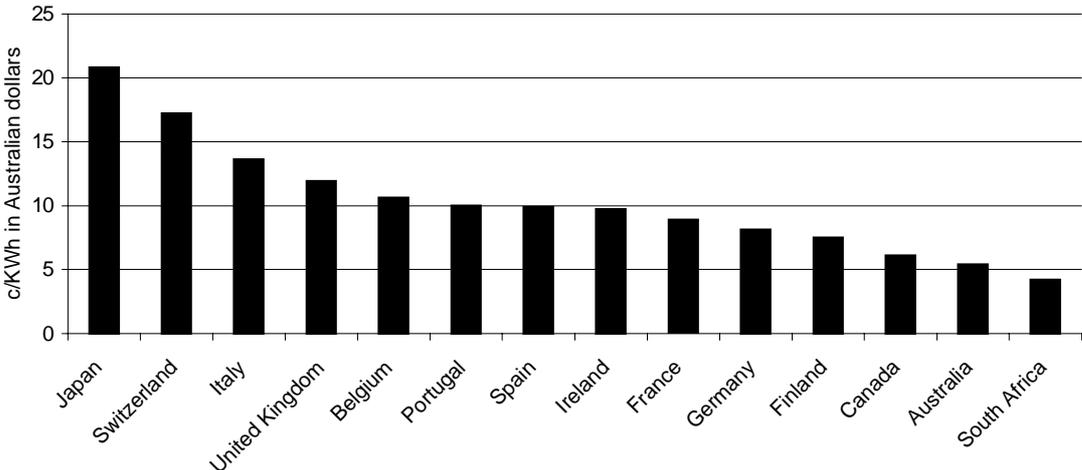
Source: Electricity Supply Association of Australia.

Primary energy amounted to 1990.4 petajoules (PJ), delivering 624.8 PJ (173.5 tetravatt hours) of electricity for final consumption. Coal made up 86.1 per cent of total primary energy used for electricity production, and gas made up 9.9 per cent. These values are a little distorted in terms of final energy because the 2.9 per cent hydro is converted at essentially 100 per cent efficiency.

Australia has an abundance of competitively priced black coal and an almost infinite supply of brown coal, which due to its high moisture content has no intrinsic export value.

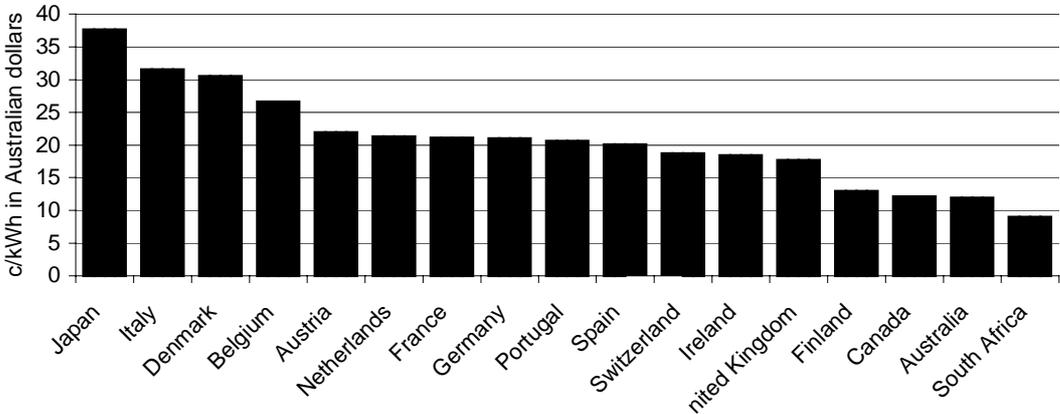
The coal base of electricity supply is fundamental to the Australian economy because it provides some of the lowest electricity prices in the world for both industrial/commercial and residential customers (figures 5.2 and 5.3).

Figure 5.2 International industrial electricity prices, January 2000



Source: Electricity Supply Association of Australia.

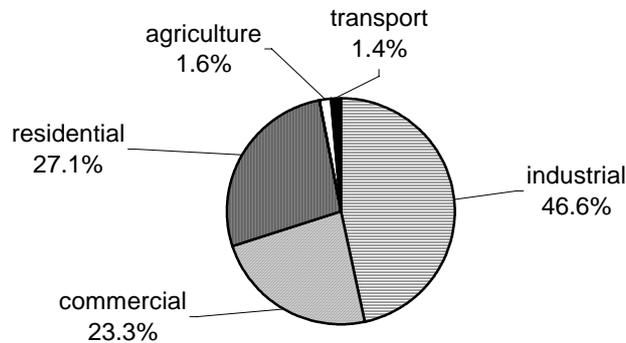
Figure 5.3 International residential electricity prices, January 2000



Source: Electricity Supply Association of Australia.

Of the 173.5 terawatt hours of total consumption, 6.7 per cent related to private generation and consumption by businesses mostly requiring combined heat and power in off-grid locations. Public end-use consumption was 161.8 terawatt hours in 1998-99, with the consumption breakdown shown in figure 5.4.

Figure 5.4 Public end-use consumption, 1998-99^a



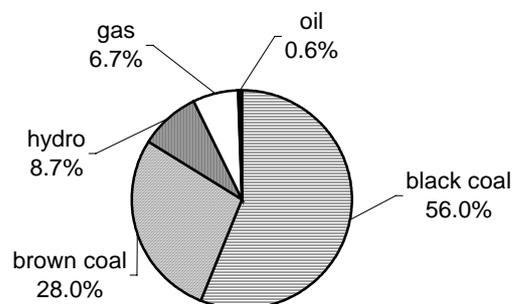
^a Total public consumption: 161 762 gigawatt hours.

Source: Electricity Supply Association of Australia.

Australia has a much higher than average industrial consumption, reflecting high levels of energy-intensive industries, including metal refining (mostly aluminium). Australia is unique in having its coal-based generation provide competitively priced electricity for energy-intensive industries. Elsewhere, this industry sector is supplied by nuclear or hydro generated electricity.

In 1998-99 public electricity generation amounted to 186.3 terawatt hours, of which 5.6 per cent was used within the power plant and 7.5 per cent was lost (mostly as heat) in the transmission and distribution system. Figure 5.5 details public electricity generation, with coal producing 84.0 per cent, hydro producing 8.7 per cent, gas producing 6.7 per cent and oil producing 0.6 per cent.

Figure 5.5 Public electricity generation, by fuel type, 1998-99^a



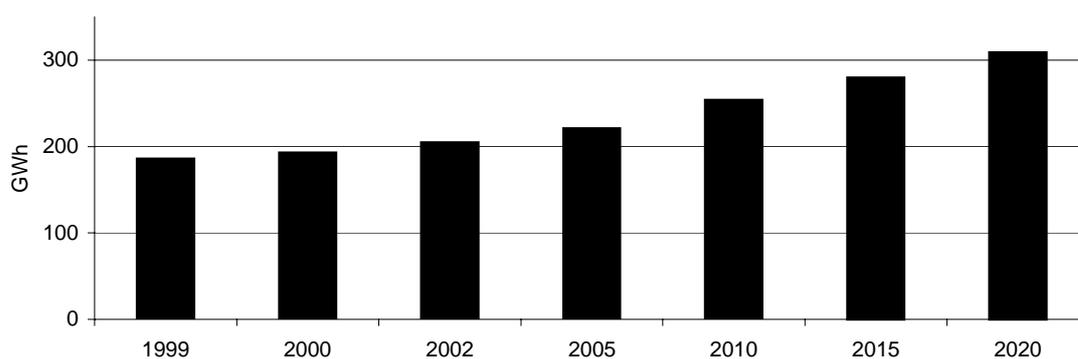
^a Total public generation: 186 252 gigawatt hours.

Source: Electricity Supply Association of Australia.

Demand

Average annual demand growth over the five years to June 1999 was 3.5 per cent. Projected public electricity growth to 2020 is shown in figure 5.6. Public electricity generation is projected to reach 254 terawatt hours by 2010 (range: 240–260 terawatt hours) and 290–315 terawatt hours by 2020.

Figure 5.6 Public electricity generation — projections

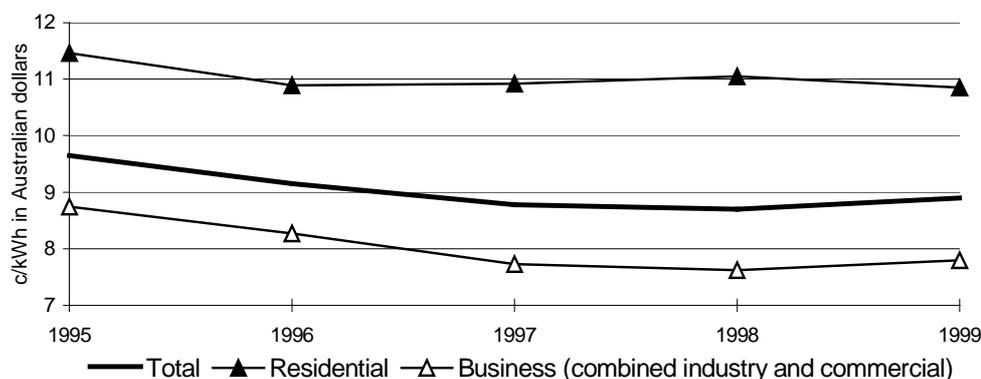


Source: Electricity Supply Association of Australia.

Price

Electricity prices in constant 1998-99 dollars are shown in figure 5.7. Total average prices declined from 9.65 cents per kilowatt hour (c/kWh) in 1995 to 8.9 c/kWh in 1999. This represents a drop of 7.8 per cent over the five-year period. Non-contestable residential prices dropped from 11.46 c/kWh to 10.85 c/kWh in the same period — a drop of 5.3 per cent. Combined prices to contestable industrial/commercial customers dropped from 8.74 c/kWh in 1995 to 7.80 c/kWh in 1999. This represents an average reduction of 10.8 per cent over the five-year period.

Figure 5.7 Electricity prices



Source: Electricity Supply Association of Australia.

5.3 Microeconomic reform in the electricity supply industry

With a State-based electricity industry, the Australian Government has only a restricted role in ownership, structure of the participants, or market structure and regulation of the networks. The State Governments, either as existing or former owners of the State-based utilities, still exert substantial influence on the developing industry.

Structural reform

Prior to 1990, vertically integrated state-based, state-owned utilities had total responsibility for generation, transmission and distribution of electricity and dominated the electricity industry. Since then a nationwide program of microeconomic reform to lift the efficiency of the economy to improve Australia's international trading position has generated substantial restructuring of the electricity industry.

Key reforms include:

- unbundling the vertically integrated utilities into separate generation, transmission, distribution corporations;
- disaggregating generator corporations into multiple companies to promote competition between generators and retail suppliers;
- setting up a National Electricity Market, including a wholesale power pool, system control and transmission third party access;
- establishing a management structure for the National Electricity Market, including the National Electricity Market Management Corporation (NEMMCO) responsible for market operations and system control and the National Electricity Code Administrator (NECA) responsible for administering the code that governs the market and system control;
- establishing economic regulation and independent economic regulators for monopoly networks;
- phasing in competitive retail markets; and
- privatising State-owned assets in Victoria (including transmission and distribution); effectively privatising South Australia through long term lease of assets; introducing privately owned additional assets in generation in most other States; and adding to transmission assets in Western Australia, New South Wales/Queensland and, shortly, Victoria and South Australia.

Corporatisation of the State-owned utilities was among the first reforms, and all States and Territories have introduced the necessary legislation. State-owned participants now operate within a commercial framework that provides ‘competitive neutrality’ as required by the Competition Principles Agreement. That is, management and financial structures have been brought into line with the private sector. Structured in this way, electricity businesses, private or publicly owned, are more commercially focused than in the past. This focus includes greater attention to the needs of the customer, stimulating interest in the provision of a growing range of services.

The process of separating the vertically integrated utilities into the functional areas for generation, transmission and distribution has been completed in all States. Retail supply largely remains within the distribution businesses as a separate ring-fenced entity. However, change is underway as the retail market moves towards full contestability. South Australia leased its retail supplier separately from the distribution business, while in Victoria, United Energy has sold its retail operation into a separate entity, and in the Australian Capital Territory, ACTEW Corporation is completing a partnership with AGL.

The national electricity market

A key focus of electricity reform has been the establishment of the National Electricity Market. It is a single wholesale market for electricity in Victoria, New South Wales, South Australia, Queensland and the Australian Capital Territory. The market was phased in beginning in May 1997, and full operation incorporating all jurisdictions commenced in December 1998.

Tasmania may join the National Electricity Market if the proposed Bass Link to Victoria is completed. Long transmission distances make participation by Western Australia and the Northern Territory unlikely, although industry reform is also being implemented in these jurisdictions.

The National Electricity Market is structured around a competitive power pool, or spot market, for wholesale trading of electricity. All electricity generated must be traded through the pool. The pool operator, NEMMCO, controls dispatch, and plant is loaded in merit order — that is, the generator with the lowest bid price runs first. The pool price is determined by the bid price of the last generator to load (the system marginal price), with all generators receiving the same system marginal price regardless of bid. Currently, there are around 20 generator companies bidding into the pool each day.

Unlike the National Electricity Market, which is a multi-jurisdiction market, the competitive retail markets are State based. Rather than a single set of rules for market operations, as in the wholesale market, each State has developed its own retail trading code. However, there is a degree of *de facto* integration of these retail markets as retailers seek customers across all markets and large customers with operations in all States demand a single retail supplier. The move to full retail contestability has placed pressure on the jurisdictions to facilitate this integration by adopting more consistent and uniform regulations.

Electricity networks, transmission and distribution, remain monopoly suppliers. Prices and quality of supply are regulated by independent regulators: the Australian Competition and Consumer Commission regulates transmission while jurisdiction regulators regulate distribution networks.

Although competition was intended to be the main driver for efficiency in the new market structure with ‘light handed’ regulation implemented only in those areas where competition was not feasible, the outcome has been otherwise. As an essential service, governments appear reluctant to reduce their claims on the industry and are imposing a growing regulatory burden to achieve economic, social and environmental outcomes.

5.4 Electricity supply and the environment

For the purpose of this paper, it is sensible to provide an overview of electricity supply and the environment in terms of electricity generation, networks (transmission/distribution) and supply and retailing. Further, it is helpful to discuss greenhouse gas emissions and abatement issues separately from other, and in terms of today’s world, more important environmental issues.

The overview then leads logically to a response to the key questions detailed in table 5.1 and a summary of the key issues facing electricity supply and use as they relate to microeconomic reform and the environment.

Table 5.1 Key questions for electricity supply

- How significant are the interactions between microeconomic reform and the environment in electricity supply?
 - What has been the framework for integrating or addressing environmental issues into reform policy in electricity supply?
 - Which aspects of the framework have worked well?
 - Which aspects of the framework could have been improved?
 - What lessons are there for those undertaking reform in other policy areas?
 - What are the broad lessons for the development of broad policies such as National Competition Policy and the National Strategy for Ecologically Sustainable Development?
-

Electricity generation

Public electricity generation of 186.3 terawatt hours in 1998-99 is based on black coal 56.0 per cent, brown coal 28.0 per cent, hydro 8.7 per cent, gas 6.7 per cent and oil 0.6 per cent. This supply mix sets in place the current and foreseeable future environmental issues facing the generation sector.

Power stations are prodigious users of natural resources, for example:

- land for power stations, dams (both hydro and thermal plant), associated mines and waste disposal areas (ash, solid waste, etc.);
- water and groundwater for energy (hydro), boiler make-up water, cooling, ashing and fire protection;
- air for the combustion and discharge of allowable pollutants, including greenhouse gas emissions;
- fossil fuels such as a black coal, brown coal, natural gas and oil.

In addition, power stations use significant amounts of other materials, such as chemicals, lubricants and other consumables.

All power stations, thermal and hydro, are licensed in Australia by State environmental regulators. In particular, thermal power plant is subjected to strict licence conditions covering discharges to air, land, and water/groundwater, and for noise. The competitive electricity market has put enormous pressures on electricity generators to use natural and human-made resources as efficiently as possible so as to reduce controllable input costs. The market has also put great pressure on electricity supply businesses to comply with, or exceed, environmental standards and public expectations for public standing and image.

The best integrated measure for improvements in environmental performance, all other things being equal, relates to overall efficiency of power plant. Highly efficient generation plant use fewer natural resources per unit of electricity

produced and consequently produce less pollution. Resource use efficiency depends on both energy conversion efficiency (thermal efficiency for coal and gas fired plant) and plant capacity use.

A detailed study by consultants to the Australian Greenhouse Office (1999a) concluded that only comparatively modest cost-effective thermal efficiency improvements are possible, amounting to an approximate 2.5 per cent improvement on current levels (up to 0.7 per cent in absolute efficiency terms) at a capital cost of around \$240 million.

Competition in the wholesale market and the privatisation of generation assets has encouraged substantial improvements in the efficiency of plant operation. In competitive markets, revenues are only earned for those plants actually generating; this places considerable pressure on lifting plant availability and capacity use. Previous monopoly arrangements provided little imperative for generators to run plant efficiently. Prices received were set by government, largely reflecting the return required to cover total costs. Generators could earn a return whether or not they were running.

Capacity use has risen sharply (table 5.2). Measured as the productivity of plant installed, the increase in plant use since the beginning of the competitive market has been 16 per cent in Victoria and 9 per cent in New South Wales. Since the beginning of the 1990s, when the first reforms were put in place, the gains have been even more substantial — 31 per cent in Victoria and 50 per cent in New South Wales.

Table 5.2 Capacity use (per cent of total plant)^a

<i>Years ending June</i>	<i>1990</i>	<i>1997</i>	<i>1999</i>
Victoria	55	62	72
New South Wales	42	55	60

^a The first phase of the National Electricity Market commenced in 1997.

Source: Electricity Supply Association of Australia.

The impact of these efficiency gains has been far reaching. First, as would be expected, wholesale electricity prices have declined substantially, often reaching levels below long-run costs. Second, investment in new plant has been deferred, prolonging the contribution of existing coal-fired plant. Gas-fired generators, unable to compete against the lower costs of the coal-fired generators, have not fared well in the new market. Gas generation in Victoria accounted for 832 gigawatt hours in 1991-92 but only 41 gigawatt hours in 1998-99.

These impacts should be considered largely transitional. While electricity prices should continue to benefit, there will be some offsetting effect as they increase sufficiently to cover the full costs of production, which is a necessary outcome if future investment is to be encouraged. As prices return to more realistic levels, gas-fired generators will be less disadvantaged. There are signs that this is already occurring. New investment cannot be deferred indefinitely, and new base load plant is expected to come on line in Victoria and New South Wales around 2003–05.

In South Australia and Queensland, where there has been less capacity overhang, investment in new capacity is already rising. During 2000, a total of 560 megawatts of gas-fired plant will be added to installed capacity in South Australia. In Queensland, both coal and gas fired plant are under construction.

Already at a very high level before competition reform, and virtually without exception, environmental licence compliance improved even further as businesses integrated environmental performance into most aspects of business decision making (ESAA 1999a).

Competition reform has increased the focus of sound environmental management within business as a result of greater management demand and staff incentives, better measurement and reporting tools, and prospects for incorporating lower cost environmental self-regulation rather than more costly command and control alternatives.

State environmental regulations have been drawn more and more to systems of self-regulation, through processes such as accredited licensing and industry codes of practice.

To assist members and improve the electricity supply industry's environmental effectiveness and image, the Electricity Supply Association of Australia (1997) developed a Code of Environmental Practice based on a series of related environmental policies and delivered through an environmental compliance guidebook. The Code of Environmental Practice sets expected standards of behaviour with respect to sustainable development, social responsibility, community participation, environmental management and resource management.

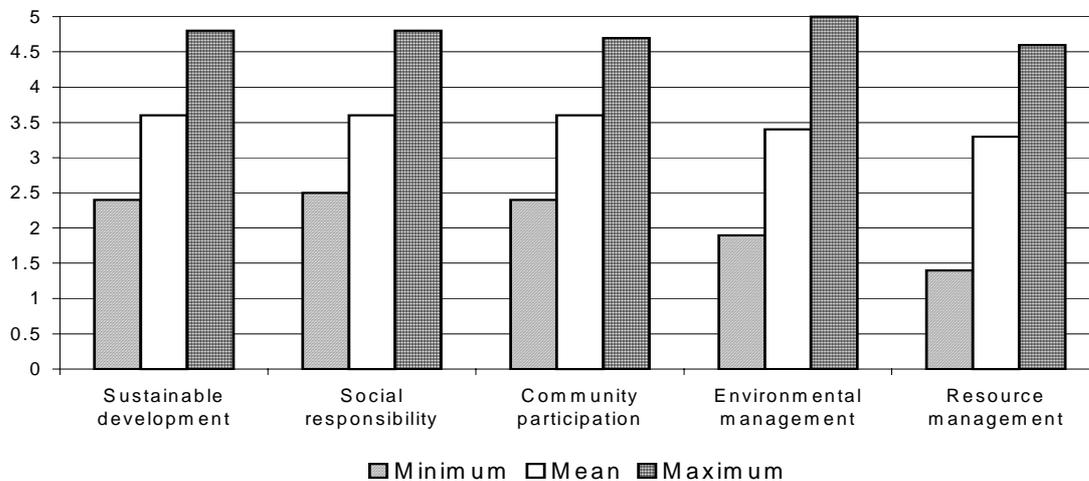
Signatories to the Code of Environmental Practice are required to abide by the code's principles and implement defined relevant actions. Compliance with the code is independently audited. Table 5.3 provides details of electricity supply businesses committed to the code, and figure 5.8 shows the aggregated results of the 1999 audit. Table 5.3 also lists businesses committed to the Greenhouse Challenge program and their status with respect to environmental management and public reporting.

Table 5.3 List of ESAA members committed to the ESAA Code of Environmental Management and other environmental agreements and reporting processes

<i>Member company (as of December 1999)</i>	<i>Greenhouse Challenger</i>	<i>ESAA Code of Environmental Practice</i>	<i>EMS certified to ISO 14001</i>	<i>Environmental report available</i>
AGL Electricity	✓			
Advance Energy	✓	✓		
Alcoa Australia (Anglesea PS)	✓			
Aurora Energy	✓	✓	✓	
Australian Inland Energy	✓			
CS Energy	✓	✓		✓
CitiPower				
Delta Electricity	✓	✓		✓
ENERGEX	✓	✓	✓	✓
ETSA Utilities		✓		
Ecogen Energy Corp	✓	✓	✓	
Edison Mission Energy Holdings	✓	✓	✓	✓
ElectraNet SA		✓		
Energy Brix Australia	✓			
EnergyAustralia	✓	✓	✓	
Ergon Energy Corp	✓	✓	✓	✓
Flinders Power	✓	✓		
GPU PowerNet	✓	✓	✓	
Great Southern Energy				
Hazelwood Power	✓	✓	✓	✓
Hydro-Electric Corporation	✓	✓	✓	✓
Integral Energy	✓	✓		
Loy Yang Power	✓	✓		✓
Macquarie Generation	✓	✓		
NRG Asia-Pacific (Gladstone PS)	✓	✓		
NT Power Transmission				
NorthPower	✓	✓	✓	
Optima Energy		✓		
Osborne Cogeneration Ltd				
Pacific Power	✓	✓		✓
Power and Water Authority (NT)	✓	✓		
Powercor Australia				
Powerlink Queensland				
Snowy Mountains	✓	✓		✓
Southern Hydro Partnership		✓		
Stanwell Corporation	✓	✓	✓	✓
Synergen		✓		
Tarong Energy Corporation	✓	✓		✓
TransGrid	✓			
Transend Networks	✓	✓	✓	
TXU Australia (Eastern Energy)	✓	✓	✓	✓
United Energy	✓	✓		
Western Power Corporation	✓	✓		✓
Yallourn Energy	✓	✓	✓	✓
TOTAL (number)	33	33	14	15
TOTAL (per cent)	73.3	73.3	31.1	33.3

Source: Electricity Supply Association of Australia.

Figure 5.8 ESAA Code of Environmental Practice — 1999 audit results^a



^a Maximum scoring value is 5.0.

Source: Electricity Supply Association of Australia.

Many businesses have their environmental management system certified to the international standard ISO 14001 or are in a position to do so.

Thermal electricity generators have adopted a similar cooperative approach to reporting requirements under the National Pollutant Inventory by developing their own handbook in partnership with the National Environment Protection Council (ESAA 1999b).

Overall, businesses embrace industry self-regulation in relation to environmental management because it can deliver superior business and environmental outcomes.

Electricity supply businesses are considering voluntary eco-efficiency agreements with government as a logical extension to their environmental management programs, with an even greater focus on resource use and waste minimisation.

In relation to resource use and environmental management, one clear downside of microeconomic reform is the amount of funding and effort committed to research, development and demonstration. Overall research spending has declined from \$30 million in 1995 to less than \$2 million today. Much of current funding relates to immediate needs such as acquiring resource data for project development or finding answers to a pressing technical problem.

Three industry-related Cooperative Research Centres — low rank coals, black coal technology and renewables — continue to be part funded, albeit at lower cash

levels, by the industry. Recent attempts to establish others have proven difficult, for example, a Cooperative Research Centre for Bushfires Mitigation.

The Electricity Supply Association of Australia has terminated its Australian Electricity Supply Industry Research Program, and the Commonwealth Government has abolished the popular and effective Energy Research and Development Corporation. Closure of both programs has virtually eliminated sources of research, development and demonstration funding related to longer term issues for electricity supply. The stock of historic knowledge due to long term environmental investment is being rapidly depleted with potential significant impact on the industry over the longer term.

Having large capital investments with high risk and low returns leaves electricity generators with little choice but to focus on reducing controllable expenditure with little money available for longer term resources and environmental studies. However, by integrating environmental management into business practices, the businesses are delivering more effective levels of cost-effective environmental care.

Electricity transmission and distribution

The environmental impact of transmission and distribution of electricity is different from, and at a much less resource-intensive level than, that of generation.

The principal environmental matters for network businesses are two-fold: line losses, which relate to energy transported, and those issues related to the physical structure of the networks. This latter category includes easements and easement practices, the visual impact of structures, some noise at substations close to residential areas, the management of polychlorinated biphenyls (PCBs) and other chemicals, and electric and magnetic fields.

Network businesses in Australia have line and transformer losses of around 7.5 per cent of all public electricity generated. Programs are in place to minimise such losses through the Greenhouse Challenge and transformer performance standards. Line losses are not dealt with efficiently in the provisions of the National Electricity Code, which contains the rules governing the operation of the National Electricity Market. At present, line losses are disregarded in estimating network costs of production, and therefore excluded from the network use of system charge. Instead, the costs are passed directly through to end-use customers who pay for the amount of energy actually consumed plus a mark-up to cover the cost of line losses.

Treating line losses as exogenous to network costs fails the test against the principles of both productive and allocative efficiency. The incomplete network cost

model precludes a choice of the least cost input mix because the efficiency of production cannot be assessed without a full cost model. Cost-effective loss reduction opportunities may exist, but networks are unlikely to take advantage of them if the associated costs cannot be offset by an increase in use of system charges. Authorities are aware of the perverse outcomes that may flow from this approach, and other options are under review (although no firm alternative has yet been put forward).

As monopolies with a tightly regulated return on assets, network businesses are under pressure to reduce operating and maintenance costs, as well as to optimise the use of capital for new infrastructure.

Many network businesses have established effective environmental management processes and integrated environmental management into their business decision making. Many are committed to the ESAA Code of Environmental Practice (table 5.3) and subscribe to the Greenhouse Challenge.

Use of established easements and fire protection for poles and wires are key issues considered as part of environmental management in network businesses. A challenge for easement practices, particularly in rural areas, is to maximise vegetation (given the conservation value), minimise operating and maintenance costs, and minimising fire risk. Stand-alone network businesses are using innovative approaches to minimising easement costs while maximising their value.

Network operators are subject to tight regulatory and government control, which can lead to inconsistent outcomes. Network businesses are sometimes required, for example, to provide uneconomical network extensions on social equity grounds when cheaper, more reliable alternative forms of supply are possible.

Network businesses have often little incentive to improve network efficiency because the benefits accrue to others and they (together with retailers) have little incentive to curb demand because most income is derived from volume flow through the network.

Regulations are placing more and more onerous conditions on network operators with respect to environmental and system requirements, without those operators having the ability to pass on costs to customers. In addition, network businesses are at risk from demands by embedded generators and others for lower network charges and from grid bypass.

Electricity supply and retailing

All electricity distributors hold retail licences, except in South Australia where the retail licence was on-sold to AGL. Currently, the businesses are ring-fenced and operate as separate entities, although complete separation cannot be ruled out as the market becomes more competitive. Electricity retailing is a high volume, low profit business with high financial risk. Strong competition has forced most retailers to sell electricity at the lowest price. Profitable retailing is expected to come from market rationalisation, which is expected to produce a few, large-scale suppliers, the addition of value-added service to existing services, or the provision of other utility services (including gas, telecommunications and water).

As a volume business there is little business incentive to reduce growth unless mandated by regulation, as is the case in New South Wales with revenue cap regulation. Consequently, electricity may be promoted for relatively 'crude' applications such as water and space heating.

As an end-use energy source, electricity is non-polluting at the point of use, versatile and able to be generated from a variety of fuels (both fossil and renewable) without the need to change appliances, plant and equipment. Used effectively, electricity can be the most efficient energy source for many applications, even accounting for the two-thirds energy loss in conversion from primary fuels. The Electricity Supply Association of Australia (2000) has produced a booklet dealing with electricity and sustainable energy use.

Demand-side management emerges as an interesting issue. While there is no direct incentive to reduce demand, the implication for retailer risk of fluctuating market prices is promoting greater interest in demand-side strategies. Volatile pool prices, which may swing from \$10 per megawatt hour to up to \$5000 per megawatt hour in a day, and the extreme prices prevailing during periods of peak demand or supply-side interruption, are driving retail suppliers to seek customers that may be suitable for demand management. The difficulty is that large energy-intensive businesses that present the most attractive targets for demand management are more likely to buy directly from the generators who have first option on interruptibility contracts.

Although demand management is in place for some mid-range consumers, the cost and technical feasibility of managing the demand of smaller consumers prevents widescale programs at this stage.

This said, the notion of industry responsibility for managing customer demand is largely a carryover from the previous industry structure. In competitive markets, customers will adjust their consumption in line with changing prices.

With the operation of the competitive market electricity is now priced at its cost of production. While off-peak prices have fallen, reflecting low cost base plant operating costs, peak prices have risen (sometimes quite sharply) as higher cost plant is brought on line. Provided pricing signals can be passed through to the customer directly, these fluctuations should be sufficient to change the overall pattern of demand. Anecdotal evidence suggests that some change is already taking place. Those customers with the flexibility to shift the timing of their operations to off-peak periods can make substantial savings.

Conservation or end-use efficiency should also benefit from competitive market pricing, but only over the longer term. In the short run the creation of commercial entities (whether private or publicly owned) operating within competitive markets has put an end to energy conservation programs funded from operating revenues. Eventually, customers can be expected to opt for more energy-efficient practices, appliances and technologies when they are confronted with the full costs of their consumption habits.

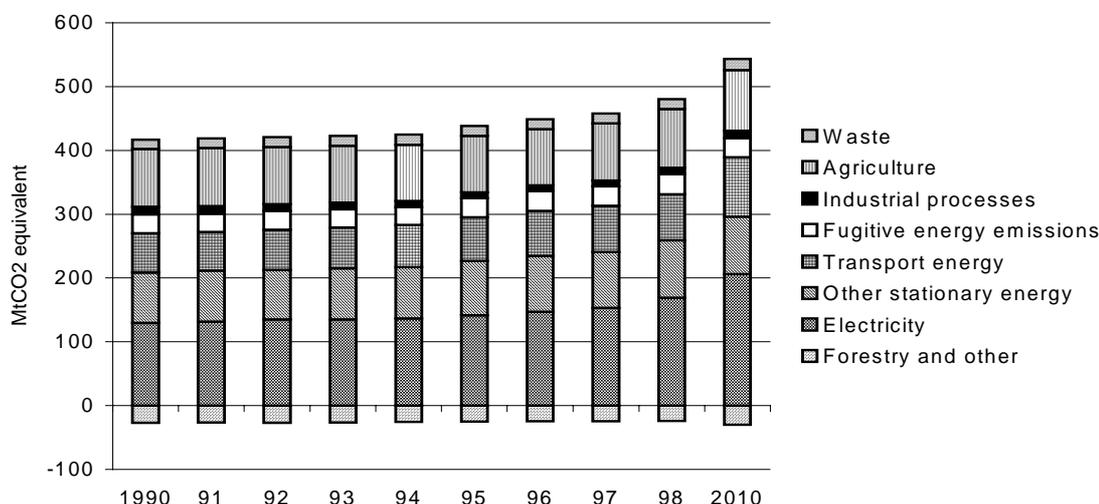
Achieving this outcome depends on the development of a fully contestable retail market and technologies that can pass real-time pricing through to consumers. By 2003 most States are expected to have full retail contestability. Timing on the delivery of the necessary technology (usually sophisticated meters with two-way communication) is less certain. A number of approaches are being developed, and several are already financially viable for large-scale end users. A financially viable device suitable for the residential and small commercial/industrial consumer is not yet available.

5.5 Electricity supply, greenhouse response and renewables

This section discusses aspects of microeconomic reform in relation to specific matters, including greenhouse issues, renewables, supply and demand efficiency and the internalisation of environmental externalities.

Figure 5.9 provides details of Australia's greenhouse gas emissions, excluding forestry and grassland conversion (so-called land clearing).

Figure 5.9 Greenhouse gas emissions, by sector — 1998 inventory (excluding land-use change)



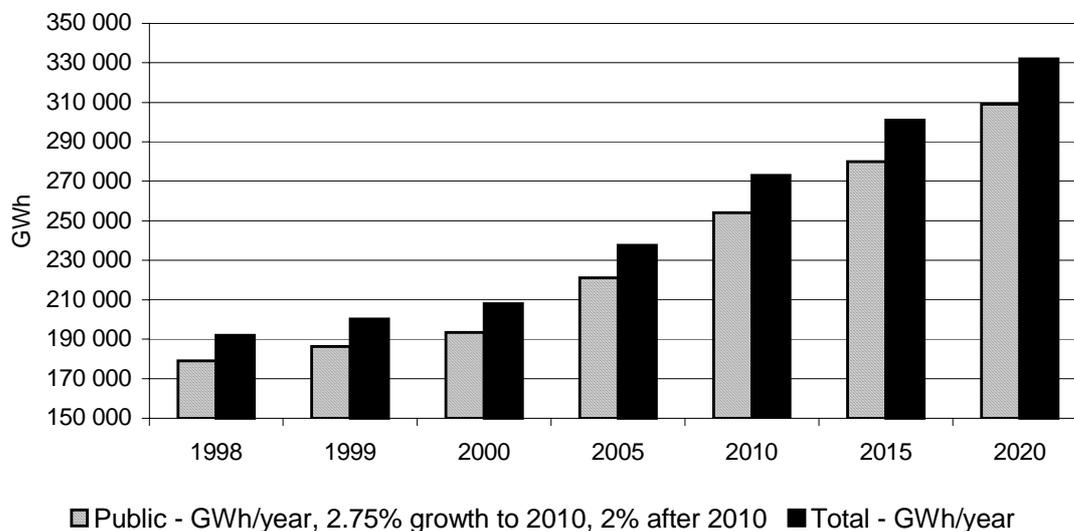
Source: Based on the Australian Greenhouse Office's (AGO) National Greenhouse Gas Inventory data, except for 2010 (for which data have been projected by Electricity Supply Association of Australia using National Greenhouse Gas Inventory data for 1998).

Total Australian emissions grew from 390 megatonnes (CO₂-e) in 1990 to 456 megatonnes in 1998 — an increase of approximately 16.9 per cent. Australia's assigned target under the Kyoto Protocol is 108 per cent of 1990 levels for the first commitment period, or 421 megatonnes (excluding land clearing).

Electricity-related emissions grew from 129 megatonnes in 1990 to 168.6 megatonnes in 1998 (which is 131 per cent of 1990 levels). Emissions from electricity supply make up 37 per cent of total (non-land clearing) emissions in 1998, compared with 34 per cent in 1990. Electricity related emissions will reach at least 206 megatonnes by 2010, and Australia's total emissions are likely to reach 515 megatonnes.

Figure 5.10 provides details of public and total electricity growth out to 2020, based on a 2.75 per cent growth scenario to 2010 and 2.0 per cent growth after 2010. Electricity generation will increase from approximately 200 terawatt hours in 1999 (186.2 terawatt hours of public generation) to 273 terawatt hours in 2010 (254 terawatt hours of public generation) and 332 terawatt hours in 2020 (309 terawatt hours public generation).

Figure 5.10 Public and total electricity generation growth



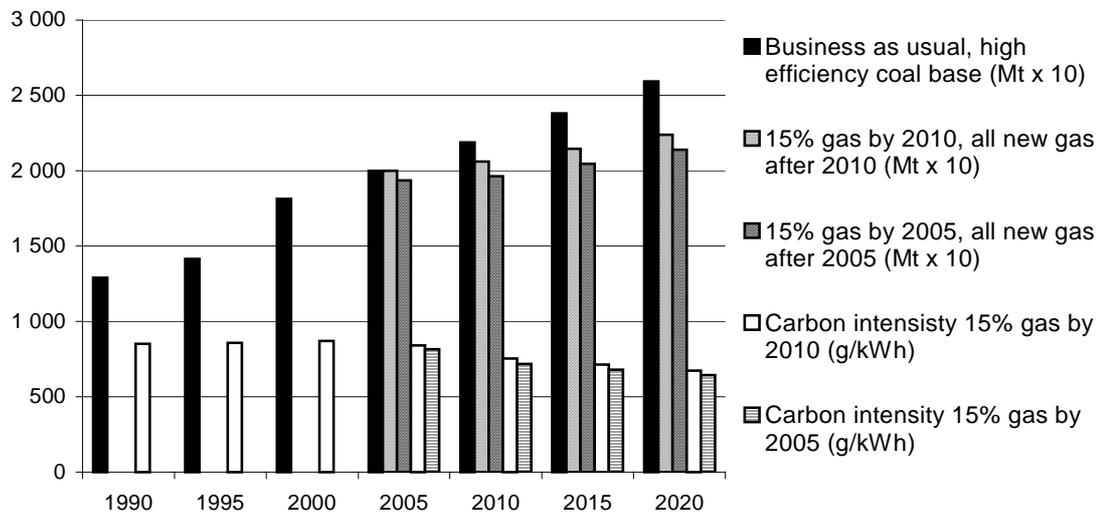
Source: Electricity Supply Association of Australia.

Figure 5.11 provides details of electricity-related emissions, projected out to 2020 based on the above growth scenario. The figure details three scenarios: a *business as usual* scenario; a *plausible gas-based* scenario, with 15 per cent gas-based generation by 2010 and all new plants being gas based after 2010; and an *unlikely gas-based* scenario, with 15 per cent gas-based generation by 2005 and all new plants being gas based after 2005. This last scenario will require the stranding of fairly modern coal-based assets. Other assumptions are listed in table 5.4.

Without stranding cost-effective coal-based assets, there is some (although little) scope to change the supply mix and emissions profile beyond 2005. For example, building up to a 15 per cent gas base by 2010 and assuming all new gas after 2010, emissions can be reduced to approximately 206 megatonnes and 224 megatonnes by 2010 and 2020 respectively. Forcing a 15 per cent gas policy by 2005 (as is a policy requirement in Queensland), with all new gas after this date, will lead to emissions of approximately 196 megatonnes and 214 megatonnes by 2010 and 2020 respectively. This will require the stranding of significant coal-based assets.

The most optimistically realistic assessment is to limit electricity-related greenhouse gas emissions to around 206 megatonnes by 2010, which is some 159 per cent of 1990 levels.

Figure 5.11 Greenhouse gas emissions for electricity supply



Source: Electricity Supply Association of Australia.

Table 5.4 Electricity and greenhouse gas emissions assumptions

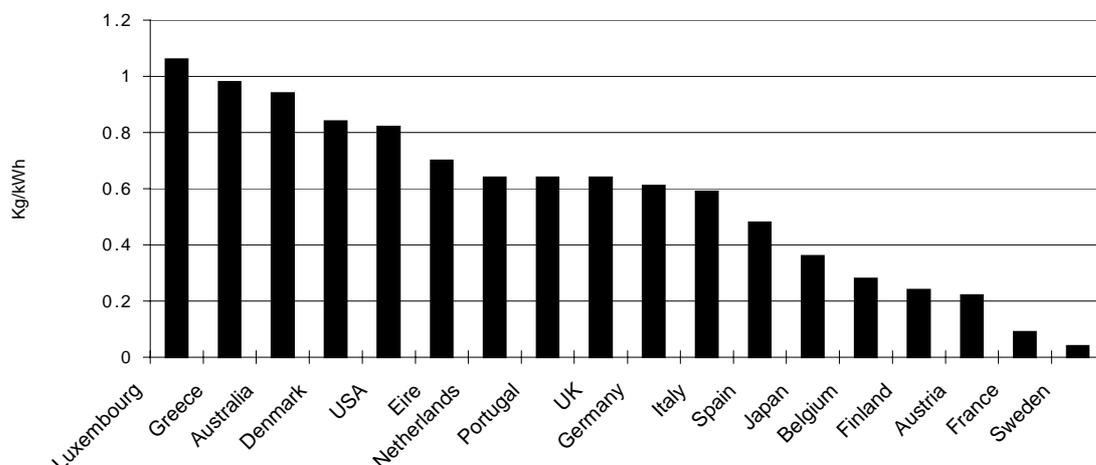
- Electricity growth: 2.75 per cent to 2010; 2.0 per cent after 2010
- Total generation (private and public)
- All private generation gas based
- Coal at 800 tonnes of carbon dioxide per gigawatt hour to 2010; 700 tonnes per gigawatt hour after 2010
- Gas at 500 tonnes of carbon dioxide per gigawatt hour to 2000; 300 tonnes per gigawatt hour after 2000
- Benefit from generation efficiency measure of 4 megatonnes per year by 2005; renewable generation benefit of 8 megatonnes per year by 2010 (9500 gigawatt hours)

Source: Electricity Supply Association of Australia.

The above emissions take into account up to 12 megatonnes of greenhouse gas savings due to mandated measures (4 megatonnes for the generation efficiency measure and up to 8 megatonnes from the 9500 gigawatt hour mandated renewables measure) (Australian Greenhouse Office 1998 and 1999b).

The gas-based scenarios will see a decline in electricity-related emissions intensity of around 871 tonnes per gigawatt hour in 2000, to 719–755 tonnes per gigawatt hour in 2010 and 645–674 tonnes per gigawatt hour in 2020. This shift to gas would lead to carbon intensities approaching current high-cost electricity countries such as the Netherlands, Portugal and the United Kingdom (figure 5.12), and would lead to a fundamental change to the Australian economy.

Figure 5.12 Electricity generation carbon intensity



Source: Electricity Supply Association of Australia.

Although microeconomic reform has delivered a range of effective environmental outcomes, it has not been successful so far in delivering outcomes that require some internalisation of environmental externalities, such as effective greenhouse gas abatement, sustained growth in renewables and efficiency in customer electricity use.

Expectations that greenhouse gas emissions would be some 14 megatonnes lower than business as usual by 2010 are unlikely to be correct. This is not surprising given robust economic growth, spare coal-based capacity (particularly in New South Wales), low pool prices, comparatively high cost gas and renewables, and of course, market competition

Figure 5.13 shows public electricity generation growth by State between 1994-95 and 1998-99, and figure 5.14 provides details of generation by fuel type over time.

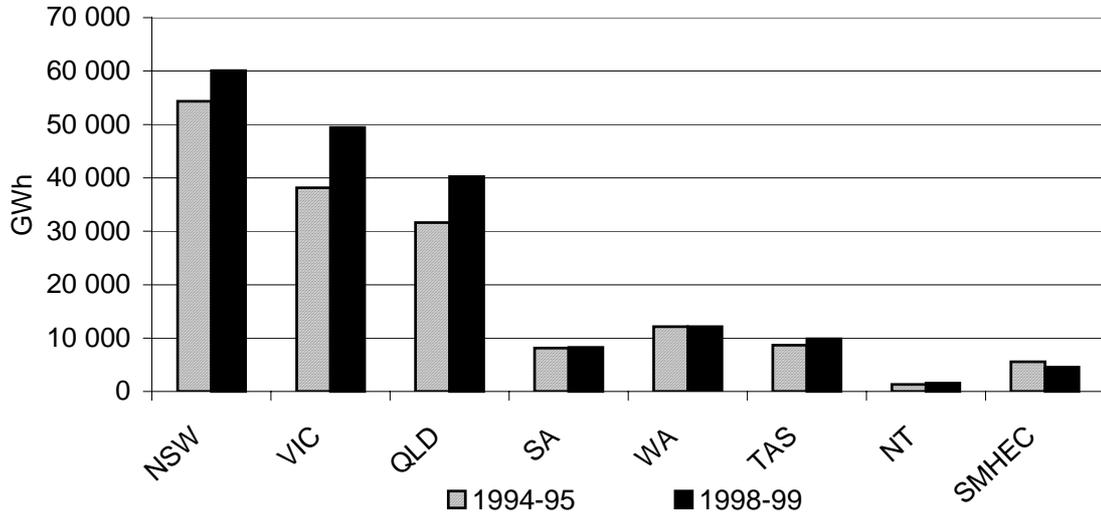
To date, the winner in gaining and expanding market share is coal-based generation in Queensland, New South Wales and Victoria, with Victorian brown coal being the clear overall winner. Over the five-year period, output from Victorian plant increased by 11 300 gigawatt hours, New South Wales plant increased by 2700 gigawatt hours and Queensland plant increased by 8600 gigawatt hours.

Growth in coal-based generation, particularly brown coal, is reflected in significant increases in greenhouse gas emissions, which increased by 16 megatonnes in 1998 alone.

The carbon intensity of electricity supply has also increased from 851 tonnes per gigawatt hour in 1990 to 871 tonnes per gigawatt hour in 1998. However, carbon

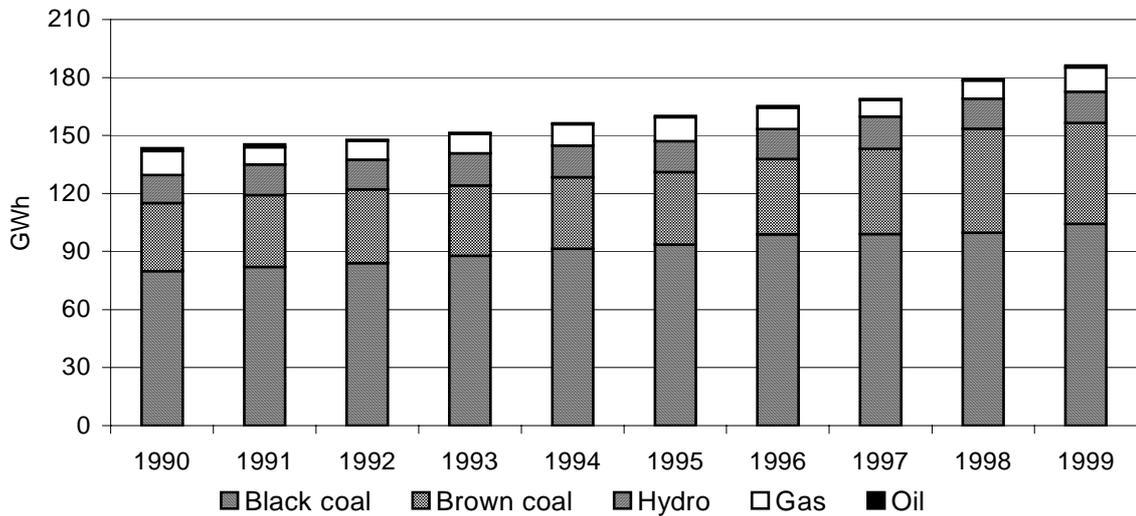
intensity is likely to decline as more efficient black coal-fired plant enters the electricity supply mix.

Figure 5.13 Public electricity generation



Source: Electricity Supply Association of Australia.

Figure 5.14 Public electricity generation, by fuel type



Source: Electricity Supply Association of Australia.

Table 5.5 lists greenhouse gas abatement opportunities for electricity supply and use. It is unlikely that any of the options listed will succeed in significantly reducing greenhouse gas emissions either directly or through market-based mechanisms (such as emissions or carbon credit trading), unless regulated by government.

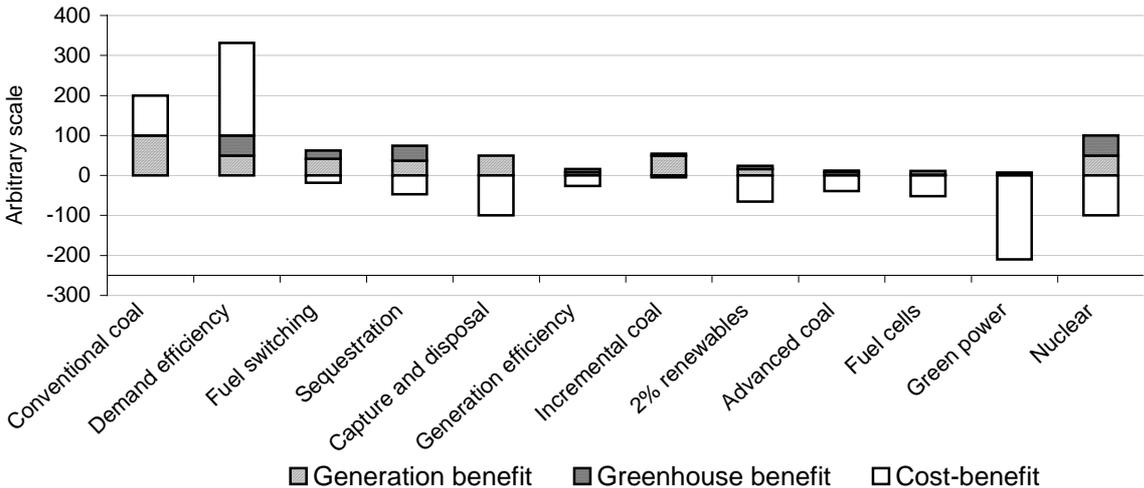
Table 5.5 Greenhouse gas abatement opportunities for electricity supply and use

- End-use efficiency
- Supply efficiency
- Fuel switching to lower carbon fuels
- Carbon dioxide capture and disposal
- Advanced generation technologies
- Sequestration (biological and geological)
- Renewables
- Nuclear

Source: Electricity Supply Association of Australia.

Figure 5.15 provides an indicative benefit analysis of implementing the opportunities listed in table 5.5 compared with the most cost-effective option (namely, electricity supply by coal). It is assumed that 60 000 gigawatt hours of new generation are needed between 2000 and 2010, or proportionately offset through demand-side efficiency.

Figure 5.15 Electricity, greenhouse and cost–benefit test in 2010



Source: Electricity Supply Association of Australia.

Clearly, **conventional coal** can deliver all of the 60 000 gigawatt hours at lowest cost, thus providing all cost and generation benefits, but with no greenhouse gas savings benefit.

Demand-side efficiency can reduce generation requirements by half, but still 30 000 gigawatt hours of additional generation is needed. Such a measure would ‘reduce’ the generation needs of coal-fired generation to 50 per cent and provide a greenhouse benefit of 50 per cent over the base case. More importantly, both electricity supply costs and demand costs would be reduced by an equivalent of 30 000 gigawatt hours, with positive cost benefits to suppliers and customers (as shown in figure 5.15).

Australia has only modest regulated demand-side efficiency requirements through activities such as minimum energy performance standards of appliances (with some plant and equipment, such as motors, to follow) and some mandated retail licence requirements in New South Wales. Even awareness activities, such as energy efficiency labelling of some domestic appliances, are only required or encouraged in some States.

As part of a greenhouse response measure, the Australian Greenhouse Office, the Electricity Supply Association of Australia, the Sustainable Energy Industry Association and the State-based sustainable energy bodies are examining programs to achieve a 30 000 gigawatt hour demand reduction by 2010. This will require a major coordinated national effort and significant funding.

Fuel switching from coal to gas (figure 5.11) is possible but unlikely to occur, given the high cost of gas for electricity generation. Fuel switching to gas is also very much an interim greenhouse response measure because gas supplies are significantly more limited than coal in Australia.

Supplying around 25 000 gigawatt hours of electricity from gas-based generation by 2010 will have an equivalent generation benefit but a relatively modest greenhouse benefit and a modest-to-significant cost penalty on electricity prices.

The competitive electricity market alone may not deliver this level of gas-based generation, unless it is regulated (as will be the case in Queensland) or the environmental cost of carbon dioxide emissions are ‘internalised’ through either carbon taxes or emissions trading. Both carbon taxes and emissions trading permits will have to be fairly high (\$20 to 30 per tonne of carbon dioxide) before coal-based generation is displaced by gas in the merit order dispatch of plant. Costs of this order will have a profound effect on Australian industrial competitiveness.

Sequestration through increasing vegetation cover and growth can reduce emissions by some 12 to 15 megatonnes by 2010, with commensurate greenhouse benefits offsetting emissions from generation. This is likely to require a doubling of the current forestry plantation objective of 3 million hectares by 2020 and will have a significant cost, proportionately (somewhat) greater than the greenhouse benefit.

Internationally, and to a lesser extent nationally, significant effort is being expended on **capturing carbon dioxide emissions and subsequent treatment and disposal**. In theory it is potentially possible to sequester some 15 megatonnes of carbon dioxide in geological deposits or under the sea by 2010, but at a cost of at least double the generation cost.

Modest gains in **thermal efficiency**, and thus reductions in greenhouse gas emissions, are possible through measures such as mandated generation efficiency standards for existing plant and incremental new coal plant and through advanced combustion technologies. As the mandated generation efficiency measure demonstrates, potential reductions are modest (4 megatonnes by 2005) and costs are high (\$240 million in capital cost for existing plant).

Advanced fossil fuel cycles, including coal gasification and fluidised-bed combustion, can make coal more greenhouse friendly but at significant cost. On all accounts, simple fuel switching from coal to gas will be more greenhouse and cost effective than advanced coal-based fuel cycles, at least in the coming decades.

Mandatory renewable energy in electricity supply (the so-called 2 per cent measure) and **voluntary 'green power' schemes** deliver modest amounts of electricity (the mandated measure of 9500 gigawatt hours by 2010 compared with projected growth of 60 000 gigawatt hours) with modest greenhouse gas savings (4 megatonnes if gas is displaced and around 8 megatonnes if coal is displaced) at a high cost (potentially up to \$5 billion for the mandated renewables measure). Measures of this kind are not greenhouse-effective or cost-effective in the short to intermediate period, but may deliver significant benefits over the longer term (although never at low cost).

As the mandated renewables measure indicates, a renewable energy premium of \$40 per megawatt hour (double the approximate pool prices) is unlikely to deliver 'innovative' renewable energy electricity or advanced Australian content (Senate Environment, Communications, Information Technology and the Arts Reference Committee 2000). Rather, it will deliver the basic renewables of biomass (mainly bagasse and some wood waste), some additional hydro, some low cost wind power, and subsidised solar water heaters.

Fuel cells are mostly experimental and high cost. Over time, reduction in capital cost, higher pool prices and better valuing distributed generation (if this proves to have real lasting value) will assist renewables, fuel cells and co-generation.

Nuclear-based electricity generation can provide 30 000 gigawatt hours of electricity by 2010, with commensurate greenhouse benefits, but at twice the price

of currently generated electricity. Social and environmental objections to nuclear power make electricity production from nuclear sources unlikely in Australia.

5.6 Focusing on some key questions

How significant are the interactions between microeconomic reform and the environment with respect to electricity supply and use?

Microeconomic reform has affected the structure of the electricity supply industry in a number of ways. Each has some implication for the environment.

- Corporatisation of public sector utilities, and in some cases, privatisation, has introduced a commercial focus for electricity market participants. Businesses now are expected to earn a commercial rate of return on funds invested. Programs that detract from revenue streams such as demand-side management and end-use efficiency and investment in research and development, in general, have ceased. At the same time, electricity supply involves the use of large quantities of natural and human-made resources. Businesses under pressure to reduce costs are lifting productivity by reducing their demand on resources per unit of output.
- Many new commercial entities are seeking to develop their role as ‘good corporate citizens’ by participating in a range of environment related projects. Like all energy businesses, electricity suppliers have adopted high levels of environmental care underpinned by environment and energy supply licence requirements, cost-effective industry self-regulation, stakeholder relations, and industry and international standards. The costs associated with intrusive regulation have encouraged commercially oriented businesses to pursue a number of self-regulated programs such as the Greenhouse Challenge.
- Freed of the constraining hand of government, many businesses, particularly those in the private sector, are adopting more innovative strategies and a higher financial risk profile. Businesses are more open to new concepts and new technologies. Generators are no longer obliged to choose the coal-based option and gas is emerging in a number of instances as a preferred fuel for mid-merit and peaking plants where flexibility is essential. Co-firing with renewable biomass and investment in bagasse co-generation are other options being pursued by generators. Risk management in volatile wholesale markets is prompting retail suppliers to investigate a range of new technologies that could provide peak supply for large customers.
- Competition in the wholesale markets of Victoria and New South Wales where excess base load supply exists has been robust and margins have collapsed. In

South Australia and Queensland, the shortage of supply has seen stronger margins and investment in new capacity; 560 megawatts of privately owned gas-fired plant will come on line in South Australia during 2000, raising the gas-fired component to 75 per cent of total capacity. Gas will also account for more than 30 per cent of the proposed capacity expansion in Queensland. Strong competition in retail markets as market participants strive for market share has only served to reinforce the focus on revenue streams and the withdrawal from demand-side and end-use efficiency initiatives. At this stage competition is largely price based, and development of energy services awaits the development of strong retail market participants. This cannot be expected until the market approaches full retail contestability.

- One of the major opportunities offered by the competitive market is that for investment in small generation sets. Previously, monopoly utilities had favoured large scale supply side investments either in generation or networks. Mandated access to the grid and the possibility of competitive supply have changed this preference. A range of investment proposals has emerged for distributed generation though few have progressed to the construction stage. Market rules, which impose substantial network charges on these smaller, localised plant present a significant hurdle to these proposals. Distributed generation may take the form of a number of technologies, including conventional gas and diesel generation, micro gas-fired turbines, fuel cells, biomass and renewables such as wind and solar. There has been a burst of development in these small sets as technology companies realise the potential offered by the new market environment or take advantage of incentives offered by government. The potential for increasing use of back-up sets that has been greatly expanded by the growth of the electronics sector where continuity and quality of supply are critical. Attention is required to amend the market rules to facilitate this investment. Discussions have been underway for some time in an endeavour to solve this problem.

What has been the framework for integrating or addressing environmental issues into reform policy in electricity supply and use?

Electricity is not one but three distinct sectors: generation, networks and retail supply. While they are subject to the same overall deregulation policy, at the sectoral level a number of different reform policies apply. The National Electricity Code regulates the wholesale pool, along with access to and pricing for transmission networks. Distribution networks and retail markets are regulated by the jurisdictions.

- A key motive for the introduction of the competitive market, apart from the drive for greater productive efficiency, was the belief that it would promote the

uptake of alternative fuel sources for generation, particularly gas. That is, the competitive market was part of the Commonwealth Government's environment policy. This was made clear from as early as 1992 with the release of the National Greenhouse Response Strategy. There was no direct provision for promoting gas, rather it was assumed that gas would be a preferred choice in an open market. It must be said that this was more an act of faith than a quantitative assessment of the relative cost advantage of gas. Gas penetration had followed deregulation in the United Kingdom and the United States where gas prices were very competitive with coal, but very low coal prices put gas at a greater disadvantage in Australia.

In the period since the first phase of the market commenced in 1997 the outcome has been mixed. Gas lost out to low cost coal in the fiercely competitive Victorian market as pool prices fell to short run marginal costs of the brown coal generators. This is transitional. Rising demand will eventually erode the excess capacity of the base load generators forcing average prices higher and providing opportunities for the return of gas. Despite this setback, investment in gas generation is taking place. In some instances this is a result of government intervention, for example in Queensland. But also in others where coal is less competitive, for example in South Australia and Western Australia. Or where smaller generators are required for energy supply to specific uses such as mining with the potential to sell excess energy into the grid. The flexibility of the competitive market has facilitated at least some of these developments.

There is another potential opening for gas. In a competitive power pool higher prices can often be obtained for flexible plant with minimum start-up times. Supply-side disruptions or rapid and unexpected increases in demand can cause sharp price increases. Fast-load generators such as gas can gain considerable advantage.

- NEMMCO now details the carbon intensity in electricity trading pools but the listing is so aggregated that it has no impact on pool decision making.
- The National Electricity Code has modest provisions for incorporating some environmental factors into market decision-making processes. Networks are required to consider demand-side options in plans for system augmentation. Provision is also made for demand-side bidding into the pool. To date neither option has been taken up. At the transmission level, augmentation tends to be larger than the potential demand-side options available. Demand-side bidding, while sensible, is more difficult to implement in practice. Internationally, this matter is receiving considerable attention and could emerge as a feasible alternative in the foreseeable future.

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- Integration of the environment into the market structure is underway in a number of States. Unable to implement measures affecting the generation sector, these policies have focused on the retail sector:
 - New South Wales has introduced licence conditions requiring retailers to source a proportion of their supply from renewables;
 - Queensland has a policy objective requiring retailers to source 15 per cent of their electricity from gas and renewables by 2005; and
 - Victoria has recently released its greenhouse strategy summarising State-based actions, but without mandated requirements (apart from providing billing information and some actions at government level).

Which aspects of the framework have worked well?

Whether the framework has worked well is difficult to judge while the market remains in transition. Fuel source, plant size and the location of existing generators were all chosen to meet conditions in a market that is different to the one that prevails today. Only time will tell what influence competitive market conditions will have on the generation sector.

- The single most effective aspect of the new market is its openness. The industry is now open to new supply side measures, network alternatives and retail strategies. These have already been touched on in the earlier segments.
- In the United Kingdom and particularly in the United States, competition and the demise of the vertically integrated monopoly have unleashed a wave of innovation and product development. In Australia the pace of change has been more muted as competition is phased in across the regional markets. Australia will be ready to benefit from these developments as they find their way on to the market. With a growing number of overseas companies participating in Australia's electricity industry the pass through could be quite rapid. Nonetheless, the opportunities offered are encouraging the development of several technologies, including PV, fuel cells and solar thermal applications. Supported by the prospect of a premium for renewable energy, there is also considerable activity in areas such as biomass, wind and waste coal mine gas-fired generation. No doubt, these technologies would at some stage make their way to the market without reform, but market access would be critical. The benefit of the open market provided by the reforms should not be underestimated.
- 'New strategies and technologies can take years to emerge'. In a review of innovation, Rosenberg (1995) observed that:

Major new technologies take many years to replace an established technology...in 1910, only 25 per cent of US factories used electric power. Twenty years later, the figure had risen to 75 per cent. It took some 40 years or so for electric power to assume a dominant role in manufacturing.

Though the pace of technology uptake is much greater today than in the early part of the 20th century, it is well to understand the time paths for innovation and development.

That the major parameters of the electricity industry have varied only at the margin since the introduction of competition in 1997 offers little evidence one way or the other on the efficacy of policy in addressing the environment.

- One aspect of the reform framework that has worked well is the voluntary partnership measure between industry and government — for example, the Greenhouse Challenge, industry self-regulation through Accredited Environmental Licensing (particularly in Victoria), and the industry's commitment to its own Code of Environmental Practice. Acting as individual businesses within commercial frameworks, the industry can see the obvious benefits of working in cooperation with government and among its members.
- Licence conditions such as those imposed on retailers in New South Wales to source a certain proportion of their energy from lower carbon intensity supplies (including renewables) have been less successful. Although the policy objectives have been clearly specified, the lack of an appropriate implementation and enforcement framework has meant that retailers find it difficult to fully comply with requirements in the tough business environment. There is little incentive to comply because the cost of non-compliance (that is, the penalty imposed) is less than the cost of compliance. Nevertheless, public sector retailers have made some commitments, although these are not being matched by retailers elsewhere, placing the New South Wales retailers at a competitive disadvantage.

Which aspects of the framework could be improved?

- When the market was being developed, consideration was given to incorporating environmental objectives more directly into its framework. This approach was dismissed on the grounds that it would be inefficient to target environmental objectives by introducing a bias to the operation of the market. A more appropriate response, it was believed, would be to implement specific environment measures — for example, a carbon or other tax — that would incorporate the cost of the externality into the pricing mechanism. If governments wish to impose environmental objectives on market outcomes then such market-based solutions remain the most cost-effective mechanism.
- Overall, the framework works as it was intended, with several notable exceptions. The slow uptake of gas-fired generation and co-generation are two

such exceptions. As assumed by the National Greenhouse Strategy, the market is transparent and open to all potential suppliers of energy services. Pricing regimes better reflect costs of supply, including the costs of a number of environmental aspects such as the use of a range of natural resources (but, notably, not the cost of greenhouse gas emissions).

- As previously discussed, the expectations for gas-fired generation were unrealistic. Australia's coal prices were simply too competitive for gas. Moreover, the 'dash for gas' in the United Kingdom was in part driven by the need to reduce sulphur emissions to meet stringent European Union targets coming into force around 2002. It was more economically viable to scrap obsolete coal plant and invest in gas than to retrofit flue gas desulphurisation equipment.
- The lack of progress in facilitating greater competition in the upstream gas and pipeline industries has possibly kept gas prices higher than might otherwise have been the case. If gas were intended to be the preferred generation fuel, then it would have been logical to deregulate the gas market before electricity. In the event, this was not the case.
- The difficulties facing co-generation and other distributed generation relate to the design of the market rules. These can be improved to make this segment of the market more competitive, and this matter is currently subject to review.

What lessons are there for those undertaking reforms in other policy areas?

- With the benefit of hindsight, it seems desirable to plan better the design of the market and its interactions with the areas in which particular outcomes are intended. Achieving policy objectives requires that policy makers pay as much attention to designing implementation measures as to initiating the policy. If co-generation was to be an outcome of the market, then the market should have been designed from the outset to achieve this objective.
- Assumptions underpinning the microeconomic reform model should be rigorously tested. It does not follow that what is appropriate in one country, jurisdiction or even industry is the best option in another place.
- Greater attention will be required to address environmental externality issues (some predictable and others not) in market design processes. If jurisdictions were genuine in wanting to implement the recommendations of the National Strategy for Ecologically Sustainable Development and the Greenhouse Response Strategy (both endorsed by all jurisdictions), for example, then market design processes should account for such requirements from the beginning and not address them almost exclusively retrospectively in a functioning market.

What are the broad lessons for the development of broad policies such as National Competition Policy and the National Strategy for Ecologically Sustainable Development?

- The main lesson for those undertaking reform in other policy areas is to ensure that environment-related issues are better understood and accommodated in market reform processes from the beginning, rather than left to the uncertainties and inconsistencies of State-based regulation after the market is established.
- It is not possible to appreciate fully the range of environmental issues at the beginning of a reform process. Further, as the market develops, new environmental issues will emerge or existing issues will change in significance. Ideally, the market design structure should be able to provide a cohesive framework for dealing with existing, changing or emerging environmental issues. The design structure should also recognise that not all environmental issues can be addressed through market-based solutions, and that a cohesive, integrated framework is needed to deal with those issues effectively through non-market mechanisms such as regulation and standards.
- When regulation and standards are used, market participants require consistency across jurisdictions, focusing on outcomes and not inputs. Prescriptive input focused regulation — as is the case in New South Wales with respect to retail licence conditions — leads to market distortions and nationally inefficient requirements.
- A scenario planning approach to examining environmental aspects of sectoral reform would be helpful in more fully appreciating the range of current and future issues, but also in devising market-based or regulatory approaches for dealing with the issues.
- Well-established regulatory processes, such as environmental licence compliance, do not require detailed design attention, although it would be productive to link licence requirements to more effective compliance outcomes using market-based approaches where possible.
- Resource allocation issues do require more up-front attention, as do issues related to sustainable (energy) development and the associated issues of greenhouse gas emissions, customer resource efficiency and conservation. Resource allocation not only relates to current needs but also to future requirements. Processes for accommodating access to future natural resources such as fossil fuels, land and water will need to be better understood in the reform process to enable efficient expansion.
- For utility and infrastructure deliverables, customers focus almost exclusively on price, particularly in the early phase of market reform, with added emphasis on reliability and quality. As such, suppliers focus on reducing capital and operating

costs, and cannot afford to invest in improving customer efficiency or provide more expensive services (such as gas and renewables in electricity supply) unless customers are prepared to pay for them. With the focus on the most cost-effective supply option, incorporating externality factors into business decision-making becomes more difficult, and focusing on sustainable development more fully becomes a luxury most businesses cannot afford.

- The efficient use of services by customers in a market-based environment will need to be driven by government through other activities, or prescribed by regulation, to have the potential to become effective. If regulation and standards are used, then they will need to be nationally consistent to avoid market distortions.

5.7 Concluding comments

Microeconomic reform of electricity supply is a continuing journey. Electricity supply is gradually being transformed from an essential community service based on safe, reliable and fixed price electricity into a cost-reflective, time-dependent commodity with high requirements for reliability and power quality.

This transformation is driven by changing customer needs and technology advances in electricity generation, transmission, distribution, supply and use. Microeconomic reform of electricity supply is providing better opportunities to accommodate these changing requirements and new technologies using innovative market-based tools.

Microeconomic reform of electricity supply has focused businesses to better manage their environmental impact using innovative management and technology processes such as environmental management standards, codes of industry practice, and accredited licensing.

A remaining challenge of the reform process is the better internalisation of environmental externalities that are not well covered by existing environment protection arrangements, including greenhouse gas emissions abatement. Progress in these areas depends on effective standards and regulations, of which the implementation must focus on market-based mechanisms to deliver cost-effective outcomes.

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5.A Presentation summary

*Paper presented by Margaret Beardow
Benchmark Economics*

Beardow noted that a necessary first step to determine the success of National Competition Policy is to establish the goals of microeconomic reform and the specific policies implemented. She indicated that electricity industry policy set out to improve competitiveness in wholesale and retail markets, remove regulated monopoly networks, unbundle vertically integrated utilities, and promote corporatised utilities resulting in cost-reflective pricing. The stated goals for environmental policy for microeconomic reform for the electricity industry were to improve the transparency of markets, promote cost-reflective pricing and energy efficiency, coordinate demand with supply side action, and develop cost-competitive alternative energy resources that would limit greenhouse gas emissions.

Adjudicating the success of National Competition Policy

Beardow suggested that it is still too early to judge the overall effectiveness of National Competition Policy, so it is unclear whether it has succeeded. The electricity industry is capital intensive with long lived assets, so adoption of new technology is slow. However, Beardow believes that competitive renewable energies will be introduced over time, in response to developments in the newly competitive market. While these alternative energies may potentially improve the environmental performance of the electricity sector, they may also threaten the successful outcomes achieved in the first instance under National Competition Policy. In the meantime, network access rules are seen to deter the distributed generation of gas and renewables.

Beardow highlighted that the sequencing of policy is important. She argued that deregulation of the gas industry should have occurred before deregulation in the electricity market, so as to facilitate inter-fuel competition and improved greenhouse outcomes.

Beardow considered that corporatisation was an important and successful aspect of microeconomic reform in the electricity market, and resulted in an increased focus on reducing costs and raising productivity. She noted in particular that it has created a place for the environmentally responsible 'corporate image'. The emergence of the competitive market in electricity has also promoted innovation and energy efficiency.

Beardow suggested that gas substitution, co-generation and cost-reflective pricing in rural areas were aspects of the reform that did not work well.

Broad lessons

Overall, Beardow considered that the broad lessons obtained from the reform process were that:

- policy design needs far better forethought, from objectives through to implementation;
- a practical understanding of the industry is essential, because theory does not necessarily reflect reality;
- assumptions should be based on rigorous empirical analysis, because it is difficult to achieve the desired outcomes if assumptions are incorrect; and
- timeframes and the political environment are important considerations in the implementation process

6 Discussion: the electricity sector

There are several strongly contrasting viewpoints regarding the success (or failure) of National Competition Policy reforms in the electricity sector. In many respects, these reflect the criteria used to assess the impact of reform — for example, whether reforms are assessed according to their economic, environmental and/or social impacts.

The presentations and papers generated considerable debate among participants. A key issue concerned the pace of reforms in the electricity sector, given uncertainties regarding the long term outcomes of these reforms. A particular concern related to the sequencing of reforms — in particular, whether further microeconomic reform in the electricity sector is appropriate when distortions in other parts of the economy exist and when directly related environmental issues remain unresolved.

Implications of National Competition Policy

Snape queried the impact of cheaper electricity on emissions, where the assessment was based on only the analysis of first round effects. He suggested that a more thorough analysis involving second and subsequent round effects is required to fully understand the impacts. He suggested that focusing on just emissions and discounting all other effects is an inadequate approach.

Hamilton responded that the Allen Consulting Group analysis to which he referred used a general equilibrium model. Hamilton also noted that the Allen Consulting Group analysis indicated the price reductions due to electricity market reforms would be a temporary phenomenon because increased demand would eventually absorb the excess supply. At such a time, the (beneficial) lower price effects would be eroded and consequently, the benefits of National Competition Policy (as currently judged) would also be eroded. Thus, the market benefits of the policy are short term in effect, and therefore not as great as commonly held.

Young also questioned the impacts of electricity reform, raising issues of health and water and air quality.

Beardow responded that if life expectancy is the chosen welfare indicator, then electricity consumption has a beneficial impact on welfare. She noted also that

electricity is central to the way that our society currently functions: ‘there is almost nothing in an industrial society that runs without electricity’. Andrews recommended avoiding a causal link between electricity consumption and life expectancy, because the relationship is unlikely to be direct.

Hamilton agreed that electricity was fundamental to society, clarifying that no one was advocating its elimination, merely cleaner generation. He indicated that cleaner electricity and economic growth were compatible outcomes, outlining evidence that the rate of economic growth in Europe has been higher than in Australia over the past 15 years yet actual emissions (from electricity generation) have declined in that region.

Full pricing

Hamilton proposed that policy instruments will not be effective unless full pricing is implemented. Paterson sought Hamilton’s opinion on the appropriate pricing of electricity. In response, Hamilton outlined the need for emissions trading for greenhouse gases, or at least carbon dioxide. He indicated that the (full cost) price of electricity would then be established in the market, and that this price would almost certainly be lower than that indicated by relevant modelling exercises.

Particular mention was given to ABARE’s estimates of the cost of introducing an emissions trading system. Hamilton said this model exaggerated the cost of abatement because it failed to incorporate revenue recycling and technological advancements that allow for improvements in energy efficiency. He also noted that ABARE’s model imposed all of the cost of reducing emissions directly on fossil fuels and took no account of land clearing.

Beardow observed that emissions trading would be expensive to implement, and that competition policy was a necessary precursor to the introduction of an emissions trading system. She indicated that Australia could not rush the implementation of a high cost emissions trading system without expecting a backlash (in terms of restricting economic growth).

Fisher claimed that the (under) pricing of coal was the real policy failure in terms of creating environmental damage. He referred to land subsidence and groundwater contamination associated with coal mining. Fisher also suggested that full cost pricing should account for not only environmental impacts, but also finite resource erosion by way of resource rents. However, Beardow suggested that brown coal has no alternate resource use and, therefore, no resource rent is due in establishing its full price.

Theory of second best

Snape observed that the theory of second best does not state that reforms should not be undertaken when there are distortions present. He noted that the presence of externalities elsewhere in the economy does not mean that reform of a sector will necessarily reduce welfare.

Hamilton agreed, but noted they were approaching distortions from different sides of the same coin. He argued that while the presence of distortions does not necessarily mean reform will be welfare reducing, it may also not necessarily mean reform will be welfare improving either (as would be the case if no distortions were present).

Future directions

A key issue relates to appropriate sequencing in the reform process. Far greater forethought needs to be given to not only implementation of future policies and reforms in the electricity sector, but also the appropriate progression of intersectoral reform.

PART IV

THE TRANSPORT SECTOR

7 Microeconomic reform and the environment in the transport sector

Tony Slatyer¹

Bureau of Transport Economics

The Australian transport sector in its many manifestations has been exposed to most of the microeconomic reform policies of the Commonwealth Government and State governments aimed at productivity improvements. In many respects, reforms in this sector have been flagships of the microeconomic reform agenda of the 1980s and 1990s. This paper considers the environmental consequences of these reforms and the potential for future microeconomic reform to serve environmental objectives more directly.

7.1 Introduction

Consistent with microeconomic reforms in other sectors, reforms in Microeconomic reform and the environment in the transport sector have been aimed mostly at obtaining efficiency improvements in the supply of transport services. With the primary objectives of improved technical, allocative and dynamic efficiency, there has been little emphasis on directly pursuing environmental benefits. In the so-called microeconomic reform ‘agenda’ (which has been a very diverse agenda for the transport sector), the environment has generally been seen as a side effect rather than as a basis of policy design and implementation.

However, with better knowledge of environmental impacts, improvements in economic analysis techniques and a willingness to develop innovative policy instruments, there should be substantial scope for future microeconomic reform to deliver economic efficiency and environmental benefits.

¹ The views in this paper are the author’s own and do not necessarily reflect views of the Department of Transport and Regional Services or the Commonwealth Government. The author is indebted to Dr Mark Harvey, Mr Malcolm Thompson and Mr Richard Wood for their assistance and advice.

This paper explores opportunities to pursue such ‘win–win solutions’ in the planning and development of new transport infrastructure, in measures for addressing urban traffic congestion, and in policies for encouraging the use of cleaner fuels.

The transport sector is not homogenous or typical. It ranges from major transport service corporations to the millions of individual motorists. As well as providers and users of transport services, the transport sector can also be seen as including the governments, construction companies and finance companies which fund, build and maintain transport infrastructure.

7.2 Transport is a dirty business

The direct impacts of transport services and infrastructure are bad for the environment. The most pervasive of these are smog from particulate emissions of cars and trucks, noise from aeroplanes and trucks, and reduced amenity from the alienation of land by roads, railway tracks, ports and airports. Oil spills from ships, road crashes involving hazardous material, and curfew-breaking aircraft provide high-profile instances of transport-induced pollution. Less prominent effects that are likely to have high economic costs are greenhouse gas emissions, heavy metal contamination of soils and rivers as the result of run-off from roads, and marine pests from ship ballast water discharges.

Therefore, it can be (and often is) argued that it is good for the environment to constrain transport activity.

... but people will always need mobility

People expect to be able to move freely around. Personal mobility is a highly valued amenity in our society. Studies of the demand for urban travel in Australia provide evidence of this, with demand for private vehicle travel being very unresponsive to changes in travel costs. Estimated elasticities of demand are as low as 0.015 and not more than 0.10 (BTE 2000a). This implies that a 10 per cent increase in private vehicle travel costs can be expected to result in not more than a 1 per cent reduction in private vehicle travel demand, even where cheaper public transport options are available. This inelasticity is revealed intuitively by the fact that recent fuel price increases have not yet noticeably affected the amount of traffic, and by our willingness to tolerate high levels of congestion.

Therefore, environmental protection measures that would constrain the mobility of people and goods are unlikely to be effective. The challenge facing governments

and providers of transport services is how to satisfy this demand most efficiently and sustainably.

7.3 Transport investment can also be good for the environment

Without efficient transport services, Australia would have less economic activity and, at the extreme, suffer the worse state of environmental degradation characteristic of many less developed economies whose people live in poverty.

Most transport services are intermediate goods, of which the costs directly affect the efficiency of other sectors of the economy. Any reductions in these costs are potentially available for increased investment in new technologies that would allow cleaner production.

New transport investments can have environmental benefits in ameliorating some of the damage that transport services cause. Examples are more energy efficient vehicles (discussed below), highway bypasses of regional towns, new rail and road alignments which reduce transport energy requirements, improved air traffic control systems which allow better management of aircraft noise impacts, and so on.

It is also positive for the environment that all transport modes are likely to continue to become more energy efficient. The energy intensity of road, rail and sea freight transport has about halved in the past twenty years (BTE 1999a). This is broadly in line with global projections for industrialised countries, of improvements in energy intensity at the rate of 1.9 per cent per year for the foreseeable future (Nakicenovic, Gruber and McDonald 1998, p. 36).

7.4 Microeconomic reforms are good for productivity

Microeconomic reform in transport has been pursued mainly through the implementation of competition policy, regulatory reform and government business enterprise reforms. Notable reforms have included exposing most rail track and international and domestic aviation services to more competition; privatising Qantas, Australian National Line and many rail businesses and airports; and implementing a nationally uniform charging and regulatory regime for heavy trucks.

The efficiency benefits of these reforms have been well documented (Productivity Commission 1998, 1999a, 1999b). The Productivity Commission, for example, has concluded that microeconomic reform has hastened productivity improvements in the New South Wales rail industry, especially by providing better incentives for

investing in new equipment and organisational change (Productivity Commission 1999a, pp. 165–9). Recent reductions in airfares are clearly made possible by policies promoting competition. Port efficiency is at an all-time high, although this is for many reasons (BTE 2000b).

... but environmental results are not well understood

However, there appears to have been little analysis of the environmental consequences of these efficiency benefits. This leaves open the important question of whether we can assess the full impact of these reforms if we have not or cannot effectively measure their impact on environmental outcomes.

7.5 Economic and environmental objectives both need to be pursued

As alluded to already, improved environmental outcomes typically have been seen as a constraint on transport activity, or at best a positive but unimportant spin-off from reforms.² However, there is a case for promoting a new accommodation between economic and environmental outcomes.

For a start, environmental considerations and reforms will increasingly present, in their own right, large change agendas for governments and communities. Two examples are the need to reduce greenhouse gas emissions in response to the evidence of human-induced climate change, and the need to change land use in the face of increasing salinity and declining water quality. Both have the potential to lead to major structural adjustment in the Australian economy, including in the transport sector.

In addition, community aspirations about the environment (especially in a high growth phase of the economic cycle) will mean people will increasingly expect economic reform policies to also achieve environmental goals. Giving sufficient priority to environmental considerations will contribute to greater public acceptance of microeconomic reform and will affect how sectors and communities improve their efficiency.

This raises a real challenge for economists, particularly those who are advising governments on policy options. Economists need to question whether the

² There are some notable exceptions, such as the new regulatory arrangements for privatised Commonwealth airports, which were instituted partly to achieve better environmental outcomes on airport sites.

definitional framework supporting efficiency objectives is capable of addressing environmental objectives. There seems much scope to count the more efficient use of environmental resources that are a factor of production as contributing to economic efficiency. However, it is more difficult to assess the economic impact of environmental changes that may affect efficiency indirectly (for example, through a food chain or water cycle) or over a very long time frame.

The current discount rate method implies, for example, that costs and benefits occurring more than twenty or thirty years into the future have negligible present value. Yet, it seems obvious to non-economists that people are willing to pay a lot today for environmental (and other) benefits — of measures to preserve biodiversity and to prevent soil and water degradation — that will not arise until at least this long into the future.

In the case of indirect impacts, it would seem necessary to understand fully the scientific facts about cause and effect relationships to model accurately any economic consequences.

It will be desirable for economists to devise and introduce into mainstream thinking ways of measuring and incorporating these indirect and distant impacts into economic efficiency objectives. Usual methods of valuation are based on utilitarian concepts of rationality and consumer sovereignty, expressed usually as ‘willingness to pay’. If these are not able to address fully the indirect and long term consequences of today’s decisions, then economists may need to further develop ‘non-market’ approaches (Hanley, Shogren and White 1997, p. 356). In effect, this would mean incorporating judgments about the tradeoffs of different types of community value, generally made through the political process.

Otherwise, governments will not be able to take full advantage of the kind of empirical advice that should be available from economists. When considering policies and measures that will have broadly based and long term consequences, as is typical with transport infrastructure investment for example, governments will need to turn to other sources of insight for advice about what is in the interests of the community.

The case of fuel consumption and emissions

A clear example of the potential for marrying efficiency and environmental outcomes is fuel consumption and emissions. Transport uses about 25 per cent of Australia’s domestic energy consumption. About 84 per cent of this share is used by road-based transport modes, with 7 per cent used by aviation, 4 per cent used by rail and 3 per cent used by shipping (BTE 1999a). Therefore, the potential to improve

air quality and reduce greenhouse gases through reduced transport emissions is substantially dependent on the use and energy efficiency of road transport.

... and the 'rail versus road' debate

The main competitor for road freight transport is rail, although this effect can be overstated. Most freight is, and will be, carried within cities where there is no realistic alternative to road-based carriage. Even where other modes can provide inter-city carriage, road transport is still required in most cases for final delivery. Enhanced efficiency of rail services is likely to have the environmental benefit of making these 'cleaner' services relatively more attractive than road transport.

However, even though road freight growth may be offset to a small degree by rail services as these become more competitive, road transport is also increasing its efficiency all the time. Thus, while the rail sector has also benefited from the removal of fuel excise under the New Tax System, long-distance trucks have also benefited from excise reductions. Given the greater share of fuel in truck costs, road freight received a slight net competitive advantage over rail (BTE 1999b). Also, because new technologies and regulatory provisions are allowing heavier trucks, truck numbers have increased at a slower rate than freight tonnage (BTE 1999c). This trend can be expected to continue in the future.

The Commonwealth Government supports the principle of competitive neutrality among different modes of transport. In regard to rail and road freight transport, the Government supports 'a consistent, equitable approach to transport infrastructure charges' (Anderson 2000). In this policy environment, it can be expected that the highly efficient road freight industry will continue to grow.

7.6 There are opportunities for win-win solutions

The story so far is not entirely comforting for economic reformers. Yes, the transport sector is becoming cleaner and quieter, but little of this can be directly attributed to microeconomic reforms.

However, there are areas of transport that have been barely touched by any Government-sponsored pursuit of microeconomic reform goals. It is to these we can now turn for inspiration for the future.

Better planning

Given public and private sector investment in transport infrastructure nationally of at least \$6 billion per year,³ and given the potential for decisions today to influence land use, settlement and production patterns directly in the very long term, there would seem to be much to be gained from insisting on the highest standards of care in infrastructure decision making.

There is a clear technical and allocative efficiency opportunity from ensuring infrastructure is built and enlarged only when (and to the extent to which) there are offsetting benefits to users and the broader community. However, there has been much misuse of the evaluation techniques that can be employed for this purpose (BTE 1999d), and as discussed above, there should be scope to further improve the methodology.

Improved decision-making processes about the location, purpose and timing of new transport infrastructure could achieve real economic and environmental benefits. As discussed above, economists need to work with scientists and practitioners in other empirical disciplines to develop more sophisticated and better understood techniques for valuing environmental costs and benefits for use in benefit–cost analysis and other evaluation tools. Governments can then be better assisted to exercise judgments about the future development of transport infrastructure.

Less urban traffic congestion

Congestion in Australia's major cities has been projected to cost around \$30 billion per year by 2015 (BTE 1999e), mainly in people's lost productive time. This cost is built into all goods and services. Reducing it will create gains throughout the economy. This cost does not include the environmental and health damage associated with the higher emissions. It has been estimated, for example, that congestion will account for around 16 million tonnes of greenhouse gas emissions per year by 2015 (BTE 2000c). Implementation of measures to alleviate congestion should therefore produce substantial welfare benefits for society as a whole. It is necessary to go beyond any normal market responses because the individual road user does not bear the full costs incurred by their use of the road space.

Governments have generally adopted 'carrot' rather than 'stick' approaches of subsidising public transport and providing more road space. However, as discussed above, the demand for private mobility is such that these measures have not been

³ Based on unpublished Australian Bureau of Statistics working estimates of national accounts for 1998-99.

effective in controlling congestion. Even if the patronage share of the urban public transport system were doubled, private road vehicles would still constitute 86 per cent of the urban passenger transport task (BTE 1999e).

It is a policy challenge to develop ‘no regrets’ measures that could reduce emissions and improve economic efficiency by reducing the number of vehicles on congested roads. In some cities, initiatives are being taken to equip commuters with better information about the costs to them of driving in congested conditions. These may provide modest incentives for walking and bicycling, which also have health benefits for the individual (for example, TravelSmart in Perth), or may be coupled with public transport improvements (for example, the ‘All New Adelaide Metro Public Transport System’ promotion).

Other potential ‘no regrets’ measures may involve special parking charges which would add to the cost of arriving or leaving the congested area during peak hours (BTCE 1996, p. 107), and introducing better public transport services while reducing or even eliminating fares in peak hours (BTCE 1996:261).

The most welfare-enhancing approach may be to raise the price of using particular roads or whole road networks at the times of maximum congestion (BTCE 1996, p. 309). This would induce people who most value using a part of the road network at a particular time to continue to use it at that time. Those who value it least would have an incentive to make their trip at a less crowded time. Allocative efficiency gains would flow mainly from the time savings of those who would use the less congested roads. Environmental benefits would flow directly from reduced emissions. Such measures may also induce dynamic efficiencies in terms of innovative ways in which to make better use of the more valuable road space. Governments would also have flexibility to compensate those who may feel ‘priced out’ of access to the road space, using the revenue from any congestion pricing.

Whichever approach is adopted, there would appear to be considerable opportunities for the broader community to benefit from the application in major Australian cities of policies that would reduce the amount of traffic using the busiest parts of the road network at the busiest times.

Cleaner fuels

Similarly, reforms directed at encouraging the uptake of cleaner fuels can potentially achieve both efficiency and environmental objectives. Already, with its Measures for a Better Environment accompanying the New Tax System, the Commonwealth Government is providing incentives for using alternative cleaner fuels. It has also undertaken to introduce new arrangements from 2002 to further

support the uptake of cleaner fuels. It may be possible in the design of this new scheme to pursue economic efficiency, air quality and greenhouse emissions objectives in a manner that has not been possible with the current range of measures.

7.7 Conclusion

There would appear to be a number of transport reforms that could be introduced which could service both economic efficiency and environmental objectives. The three discussed above are better techniques for assisting decision making about new transport infrastructure, policies aimed at reducing urban traffic congestion, and incentives for cleaner fuels.

However, the more fundamental goal should be to work towards a better understanding of the interaction between economic efficiency and environmental objectives in transport and all other sectors of the economy. Policy informed by evidence about, and analysis of, the long term sustainability of different options is most likely to best serve Australia.

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7.A Presentation summary

Slatyer noted that economic efficiency appeared to have been the primary focus of microeconomic reform in the transport sector while environment objectives have been less visible. He observed that the extremely low demand elasticities for transport meant that substantial increases in the costs of vehicle use would reduce demand only marginally. Thus, to achieve environmental goals, the focus should not be on trying to reduce vehicle use, but rather on providing the incentives to induce better behaviour and to use the cleanest and most technologically advanced transport systems. He suggested that there were opportunities to achieve better environmental outcomes by improving planning, reducing urban traffic congestion and using cleaner fuels.

Better planning

Slatyer observed, given that transport infrastructure is highly durable, that there is a need to plan carefully where and when Australians built transport systems and what they should be. He considered that the economic techniques required to incorporate the difficult-to-measure factors were already available but that:

It just requires a lot of care and determination by experts to do this work well, to measure what can be measured, to look at the indirect consequences and evaluate them, and a lot of discipline by governments to rely on these sorts of analyses when they take the primary decisions.

Urban traffic congestion

Slatyer considered that tackling urban traffic congestion could have positive effects on the community and the environment. He observed that congestion currently generates an extra 16 million tonnes of greenhouse gas emissions per annum. He suggested that governments needed to develop urban road pricing systems that assign different values to different parts of the road system at different times of day, commenting:

Such systems which are now technologically available can be applied to system networks of roads rather than just individual toll roads ... and encourage people to travel at the sides of the rush hour and spread the load and in turn create very considerable economic and environmental savings for the whole community.

Cleaner fuels

Slatyer considered that cleaner fuels could be used to improve the impact of transport on the environment. He noted that the Commonwealth Government is developing an energy credit scheme that was designed to replace some of the fuel legislation currently in place.

8 Transport and global warming: catastrophe or concoction?

John Paterson

Former Secretary of the Department of Infrastructure

‘Well sor, if oi wuz goin’ t’Dublin oi wouldn’t be a’startin’ here’

Many elements of Australia’s transport systems work relatively well. However, the strategic disposition of our transport assets, the relative capabilities of different parts of our transport system, and our established patterns of movement still have one foot stuck in the past. A discrete ‘macro–micro’ step up is needed to move onto a benign adaptive trajectory.

8.1 Introduction

Australia’s pattern of settlement makes us unusually dependent on many very long, thin, low volume, inter-urban and inter-regional corridors. Inter-modal balance is badly prejudiced by the institutionalised incapacity of the long distance line-haul modes — rail and sea transport. They have surrendered much of their potential trade to road and air transport. A high level of private vehicle use is the founding premise of our low density cities and towns, and is engraved in both their fine grained and their larger structures.

Australia’s pattern of primary industries is intrinsically energy intensive, using labour inputs sparingly, in combination with extensive use of land, chemicals, and, large scale machinery. Australian mining, likewise, achieves world competitive results in large scale, highly mechanised, mainly open-cut mining operations, using dedicated oil-burning transport systems, and adding value through energy-intensive refining and smelting. We export congealed energy, which the world is happy to buy, while holding that energy use against us.

We have an intrinsically petroleum-dependent economy, grounded in continental geography such that a high cost of transport and communications is exacted on the national income. We are poorly placed to accommodate other than small and incremental climate change initiatives.

Transport infrastructure will always be slow to adapt, like any other capital intensive production system. Peculiar features of Australian history and politics have distorted our contemporary infrastructure and institutions, which are much further out of kilter than they should be.

Even in terms of *static* efficiency, there are many aspects of contemporary Australian transport that could be done better. Not all microeconomic improvements would automatically lead to *environmental* gains, and indeed the 1980s' liberalisation in the European Economic Community is generally held to have been at the expense of rail mode share. Nevertheless, there is everything to be said for getting transport 'right' in its own terms before introducing any radical new demands, including new environmental demands, on the transport system. Honest pricing regimes and competent institutions enhance legibility and responsiveness, both to market-driven and government-driven demands.

The subject of environmentally sustainable transport has attracted considerable effort throughout the Organisation for Economic Cooperation and Development (OECD) world in the three years since the Kyoto Protocol. The most ambitious synthesis of this thinking has been under the auspices of the OECD and the European Council of Ministers of Transport (ECMT). The results so far are less than convincing, and work so far in Australia is even less so.

8.2 Transport and the environment

The transport sector accounts for about 6 per cent of gross domestic product, and 'transport', like any high level aggregate, embraces an almost arbitrary collection of elements. In the transport sector these embrace technologies, service envelopes, and markets as similar (and as substitutable) as cabs and hire cars, and as disparate (and as non-substitutable) as international passenger jets and slurry pipelines. Transport is an economic good and an industry only in the loosest sense.

The OECD Environmentally Sustainable Transport (EST) project has adopted the criteria shown in figure 8.1 as a basis for evaluating planning scenarios against a 30-year time horizon. Most of these can be substantially achieved with emissions control measures that are already technically feasible at a reasonable cost, but regardless of the technical efficiency of energy conversion, carbon dioxide and carbon-based energy use go together. While substantial energy-efficiency gains are still possible in all modes, motor vehicles are subject to ultimate limits under available technologies. For all practical purposes then, the OECD criteria bear primarily on road transport, as illustrated in table 8.1, together with aviation, on which we are unusually heavily reliant.

Figure 8.1 **OECD EST project: criteria for 2030**

Carbon dioxide — stabilise at or below 1990 levels

Nitrous oxide — total emissions from transport to not exceed 10 per cent of total transport-related nitrous oxide emissions in 1990

Volatile Organic Compounds — not more than 10 per cent of 1990 transport-related emissions, with larger reductions for extremely toxic compounds

Particulates — a reduction of 55–95 per cent of fine particular (PM10) emissions, depending on local and regional conditions

Noise — no more than a maximum of 55–70 decibels (daytime) and 45 decibels at night and indoors

Land use — a reduction (in relative terms) of land used for movement maintenance and storage of transport vehicles

Source: OECD and EMCT (1995).

The relative emissions intensity of road transport is illustrated in table 8.1. Road transport emissions per tonne kilometre exceed those of rail, for example, by factors ranging from about 1.5 to about 30, according to the pollutant concerned.

Table 8.1 **Air emissions factor ranges for truck, rail and marine (g/t-km)**

<i>Pollutant</i>	<i>Truck</i>	<i>Rail</i>	<i>Marine</i>
Carbon monoxide	0.25–2.40	0.02–0.15	0.018–0.20
Carbon dioxide	127–451	41–102	30–40
Hydrocarbon	0.30–1.57	0.01–0.07	0.04–0.08
Nitrous oxide	1.85–5.65	0.20–1.01	0.26–0.58
Sulphur dioxide	0.10–0.43	0.07–0.18	0.02–0.05
Particulates	0.04–0.90	0.01–0.08	0.02–0.04
Volatile organic compounds	1.10	0.08	0.04–0.11

Source: OECD (1997b).

The modal distribution of Australian transport energy use in three emissions groups is shown in table 8.2. Road transport (passenger and freight), together with aviation, completely dominates the task in Australia, and thus the environmental impacts of transport are in reality the effects of road transport.

Table 8.2 **Transport energy use and greenhouse gas emissions, Australia, 1993**

	<i>Road</i>	<i>Rail</i>	<i>Sea</i>	<i>Air</i>	<i>Travel</i>
Energy consumption	87.80	3.10	2.20	6.90	100
Greenhouse gas emissions	78.20	2.40	6.50	11.10	100
Nitrous oxide	74.70	10.50	11.00	3.80	100
Carbon monoxide	99.30	0.50	0.10	0.10	100

Source: Cox (1997).

The other point worth making here is that overseas air travel is peculiarly important to Australia, as illustrated in table 8.3. Any major inhibitions to long distance air travel will not only affect Australian lifestyles and expectations significantly, but will increase Australia's relative cost as a tourism destination.

Table 8.3 **Passengers per kilometre of motorised travel, by mode, Australia, 1993 (per cent)**

	<i>Road</i>	<i>Rail</i>	<i>Sea Ferry</i>	<i>Air</i>	<i>Travel</i>
Urban travel	44.8	2.2	0.1		47.1
Non-urban travel	25.0	0.7	0.1	6.0	31.8
Total within Australia	68.1	2.8	0.2	6.0	78.9
International travel			0.1	21.0	21.1
Total passenger travel	68.1	2.8	27.1	27.1	100.0

Source: Cox (1997).

Australia's high dependence on road and air transport means the economic and social implications of any serious push for environmentally sustainable transport is likely to have a disproportionately large effect on Australia, relative to most other advanced countries. This is potentially a bad time for us to be carrying major hostages to the past.

8.3 Some unfortunate heritage

In the 'Overview' to the Productivity Commission (1999) report, *Progress in Road Reform*, the following observation was made:

The Commonwealth Government has a significant role in leading the reform process, both in areas where it has direct responsibility and where national approach is required. Priorities include:

- developing an overarching national transport policy framework ...

The question of a national transport strategy has led a fugitive existence in the operations of the Australian Transport Council since 1996 (if not before) but only in the past year has some action been taken. To date, as far as I understand, official action has been concerned with making administrative arrangements rather than dealing with content.

The following observations on history and current issues are offered in the absence of any known proposals from government at this time.

The tyranny of history has compounded and confounded the tyranny of distance in Australia, to distort Australia's contemporary endowment of transport infrastructure and practice.

- *Coastal shipping.* Coastal shipping was a lusty entrepreneurial development in nineteenth century Australia, and had a formative influence on settlement and economic growth from the commencement of regular trade between Sydney and Newcastle in 1823. Sydney had regular services to Melbourne and Moreton Bay from 1837. Coastal services connected the major centres around the entire Australian coast, and major centres with minor centres, throughout the second half of the nineteenth century and well into the twentieth.
- *Ports.* The early importance of the coastal trade left a persistent residue — a multitude of tiny ports. They played a vital role *before* the emergence of effective land transport, but generally they could not hold their own against rail. Many road and rail projects were designed to prop up failing ports, well after the original maritime functions had disappeared. This then undermined the strategic pattern of rail, and to a lesser extent road, development, and pre-empted the emergence of a nationally efficient disposition of ports, to the detriment of all modes.
- *Railways.* Railways developed rapidly from the mid-nineteenth century, for the most part radiating from the State capitals. Railway development was initially driven by a combination of public and private capital, public and private entrepreneurs, and mercantilist dreams of the contesting colonies before Federation. Famously, the respective colonies chose different rail gauges, at least in part to further their mercantilist aims States, and showed no interest in fast or efficient connections to adjacent colonial/State capitals.
- *Socialism at sea.* Despite its shortcomings, rail played a major role during the Second World War — there was no alternative. In the aftermath of war, maritime industrial militancy disabled the ports and coastal trade. The Australian Shipping Line was established in 1949 to nationalise the mess, and this was swiftly followed by the final collapse of coastal shipping in the 1950s.

The nineteenth century deployment of ports and rail facilities was driven substantially by economic considerations, coloured to some extent by short-sighted hegemonistic ambitions of colonial elites. During the second half of the nineteenth century, the separate colonies acquired representative assemblies, and a tradition of politicised direction of transport infrastructure investment became entrenched.

- *Road bilong cargo.* Until recently, roads, dams and water supply schemes were the coinage of rural politics. Road spending was entirely controlled by the States until the 1970s. Throughout the nation farm roads and local rural roads took precedence over regional and intercity roads. Underinvestment in what would

now be called national highways and roads of national importance balkanised the national economy and left line-haul rail without competition in many potentially contestable roles until the 1970s.

- *Line-haul freight.* The combined result of interState differences in rail gauges, and neglect of higher level roads meant that until the 1970s rail maintained a significant freight role despite its poor performance. State rail operators saw no urgency in rail gauge standardisation and rail system modernisation; on the contrary, they rejoiced in the opportunities that incompatible gauges offered for exclusion of interState rail competition from lucrative rural commodity freights within ‘their’ State markets. Poor quality track, archaic signalling and communications were simply accommodated as the natural order.
- *Intercity roads* (or ‘take me to your border’). In the 1950s the Hume Highway was still a two-lane road with poor surfaces and poor alignments over much of its length. The Hume achieved dual carriageway status over most of its length only in the 1980s. The Sydney-to-Brisbane road link, the Pacific Highway, was finally sealed over its entire length only in 1958. Even then the Clarence River continued to be crossed by ferry until it was bridged in 1966! The Newell Highway was not fully sealed until 1972 and the Eyre Highway across the Nullarbor was not fully sealed until 1976.

Road freight volumes took off with a vengeance from the 1970s, when continuously sealed roads were at last available between the Australian State capitals. Vehicle improvements, better roads, and better fleet management combined to revolutionise heavy road transport. Since the early 1970s, average annual use of the heaviest freight vehicles (articulated trucks) has increased by 50 per cent, economic vehicle life has doubled and maintenance costs have declined, while average operating speeds have increased from around 70 kilometres per hour to over 90 kilometres per hour (Cox 1997, pp. 74–7).

Since the 1970s the *general freight* role of sea and rail transport in Australia has almost disappeared. However, given that both rail and sea modes were in public ownership, they did not really need to respond to any significant degree to the competitive challenge of road. While minor improvements did occur, in the main they have consumed their own infrastructure and lived on with increasing public subsidy.

These, then, were the forces that shaped the domestic transport systems on which Australia, a nation peculiarly dependent on efficient transport, relies today. They have left Australia with a dependence on two energy-intensive modes — road and aviation — which now face restrictions on environmental grounds.

8.4 Overseas trading infrastructure

Each State helped some ports to survive that should have been allowed to fade away as rail and later road systems developed. Instead, rail systems were bent to support declining ports. This has left Australia with ill-adapted port *and* land side infrastructure, particularly too many ports and too many railways to nowhere (both of which are politically painful to close).

International cargo ships continue getting bigger and make fewer stops. The biggest and most efficient vessels, those in the post-panamax range, are likely to operate globally between a mere handful of regional hubs. In the longer term, one or two regional hubs will serve the whole of South East Asia, and none of the Australian container ports has the scale or location to make it a serious contender for regional hub status.

At subregional level Australia will probably retain no more than two or three significant container (that is, general cargo as opposed to bulk) ports. Perth and Brisbane are the most likely contenders, with either Sydney or Melbourne as a fallback. With decent metropolitan ports and good facilities for land bridging, this would not be a serious economic issue, and the extra concentration would tend to support rail over road.

Unfortunately, this issue is not as simple as it seems. While one subregional hub could serve the eastern seaboard of Australia, the quality of land side infrastructure and transport operations would impose heavy penalties on the larger national economy. This is due to the location and peculiarly difficult transport conditions that apply to all transport modes in and around Sydney.

8.5 The Sydney choke point

Sydney sits astride the spine of all the important Australian transport systems — those serving the Brisbane–Sydney–Melbourne corridor and the Perth-to-east coast rail. Sydney is central, but transport conditions in and around Sydney are the worst in the nation. Sydney constitutes a choke point on the national rail and road systems, and the international air travel and sea freight systems.

Port Botany land side operations are severely hampered by road and rail traffic conditions prevailing in the vicinity of the port and throughout most of Sydney. The Second Sydney Airport issue has now festered for at least three decades and ranks high among modern failures of Australian national leadership.

Rail freight into, or in transit through Sydney, shares tracks with Sydney's passenger rail commuter system. Freight trains must often wait many hours, and sometimes days for the few train paths available. The future lies with very large unit trains, yet these face the greatest difficulties moving in and out of, let alone through, the Sydney network.

It is impossible to even think about the strategic elements of the national transport system from either an economic or an environmental viewpoint, let alone an integrated planning viewpoint, without facing the problem of getting through or around Sydney by land, sea and air.

Bypassing Sydney presents its own problems. Not only is it Australia's largest single market, but also there is no high capacity, high speed inland corridor between Melbourne and Brisbane, and there is no high quality spur from the likely path of such a route into Sydney.

8.6 High speed passenger rail

High speed intercity rail has been much talked about in recent times, with a proposal currently on foot for a high speed Sydney–Canberra rail link. The shortage of train paths through Sydney narrows the range of choices, and limits the potential level of service for high speed intercity passenger rail.

The problems become greater if a technology is to be chosen now that would later permit a high speed Melbourne–Sydney–Brisbane passenger connection. This is not the time to make any irrevocable commitments on the choice of future intercity, high speed passenger technology, or even decisions about a standard on which to base such a system. The possibility that the choices will be determined by the trivial Sydney–Canberra link is shaping as a graphic example of the tyranny of small decisions.

It seems certain that during the next decade or so dramatically improved Very High-Speed Train technologies will come available. These will be likely to call for a high degree of vertical integration in operation and ownership. A mistake made now will almost certainly produce a lock-in effect. The vantage point of 2010–20 is likely to present us with a much better view of the options. A decision on Canberra–Sydney should be deferred now and reviewed in a decade.

It seems certain that a high speed rail spine will be warranted within the next twenty years. The choice of technology for a future high speed, south-eastern corridor rail link is intimately involved with the disposition of both international and domestic air terminals in Melbourne, Canberra, Sydney and Brisbane.

In the meantime there is plenty to be done in upgrading the capabilities of existing rail systems; intercity passenger rail operates well below the potential of existing rail technology. Integrated logistics is having a dramatic impact on the operations of freight rail, but there is a long way to go in getting the best out of the existing systems. The effort is worth making both for its direct economic payoff, and for the institutional health of the rail system.

The Commissioners in the Productivity Commission rail inquiry were right in saying a national transport strategy is needed. That has never been more the case than it is right now. However, the sheer scale, technical complexity and political sensitivity of the discrete choice issues at the heart of the strategic transport planning puzzle would call for political leadership of a high order.

8.7 From macro–micro to micro–micro measures

If Australian transport is to perform as it should, some threshold or discrete choices are inescapable. In the meantime there is much to be done within the less alarming realm of orthodox microeconomic reform. A move towards efficient prices, taxes and subsidies invariably produces both an overall welfare gain and an informational bonanza, even when some of the immediate partial effects appear perverse.

The introduction of an efficient pricing regime is not a static, mechanical or value-free exercise, because it is not fully defined in terms of measurable ‘spot’ variables. The efficient price structure at any time is the dual of the limiting variables at that time, but some of these require taking a position on the future. Expectational elements are as much present in utility pricing as they are in the pricing of financial instruments.

In utility systems and infrastructure networks the shoe will pinch — that is, capacity will always constrain — at different places from day to day and even minute to minute. Within the limits of practicality, an optimal pricing system should be equally dynamic, and this is now the case in some, such as bulk electricity markets. The limits of practicality are becoming less binding all the time, thanks to improvements in telemetry, measurement and control systems, and the contribution of information technology to lower transaction costs.

If a national or regional government decides that global or regional air sheds are or will become limiting on hydrocarbon burning transport systems, then efficient prices should bite on hydrocarbon inputs or emissions, or more likely both. If national governments were serious about the greenhouse issue, then vehicle taxes would be derived largely, or even entirely, from a fuel tax, possibly leveraged with

an efficiency bonus/penalty system. Such a transition could be made piece-wise, and could be revenue neutral, although there is no economic reason for this to be so.

Most economists can recall being instructed in their professional infancy on the virtues of peak load water and electricity pricing, and the desirability of road pricing. Tidal flows on the roads are a spectacular demonstration, provided on a daily basis in most cities, of a system in which the marginal user can have a great impact on the utility of many other people. Incremental social costs greatly exceed the private costs to the marginal user. Part of the cost of stop-start traffic is increased travel time with its attendant costs, but there is also a great increase in fuel use and emissions per vehicle kilometre relative to those under free flow conditions.

A strong case can be made on both general efficiency and environmental grounds for continually monitoring arterial routes, and posting real-time prices continuously along the route and at entry and exit points. The target would be to maintain a maximum volume capacity ratio below about 0.9, at which free flow is possible and lane capacity is maximised.

Less sophisticated forms of road pricing, in the form of tolls, have often been resisted politically on the grounds that they discriminate against the poor and improve traffic conditions for the rich. There are many ways in which these effects can be avoided. If, for example, a main road or an air shed is regarded as common property, then non-users and low level users can be paid a dividend or receive rebates. Techniques such as this would have been impractical until recently, but are now entirely feasible.

One could go on forever in this vein, but two other classes of measures demand to be noted: entitlements trading and gratuitous regulatory constraints.

Some schemes have been devised, and many more proposed, for various kinds of emission pricing. The endowment to be traded is usually created by regulation, making it a somewhat arbitrary creature of the highly specific regulatory framework and powers to which it owes its existence. A much less arbitrary and better grounded approach is to create a universal unit entitlement in a common property, thereby creating a primary market connecting those who need less with those who want more. Bid and offer prices are then grounded in the scarce resource, rather than merely traded among the regulated. In effect this relocates the status quo point to those who suffer the externalities, rather than locating it at the regulatory entitlement.

Many aspects of transport regulation are aimed at protecting provider interests, and are gratuitous from any other viewpoint. They impose terrible economic and

environmental penalties. Commonly, for example, private taxi, bus and hire car operators are licensed to operate and then quite explicitly protected from competition. The greatest untapped resource in most urban transport systems is the back seat of private vehicles. But there are many restrictions and inhibitions that prevent this resource from being made available for hire, because the regulator protects the regulated. Increasing vehicle occupancy is a mantra in EST circles, and allowing proper liability and safety arrangements to apply to private hiring (with safeguards) is the easiest way in which to achieve higher vehicle occupancy. Most cities waive the usual restrictions at times of transport strikes in any case, but they then reimpose them immediately the clash of industrial interests subsides. Why should this be?

There is no warrant for using restrictive measures or punitive taxes until all the routine opportunities for efficiency improvements have been fully exploited. Our transport systems, taken as a whole, offer a multitude of opportunities for efficiency gains based on classic optimal pricing techniques.

8.8 Does an environmentally sustainable transport solution exist?

The centrepiece of OECD investigations to date has been the development of a large scale model, embodying in principle 4290 relationships, to allow scenarios to be investigated against nominated targets (Rothengatter 1999). The OECD adopted, for the purpose of this exercise, the following definition:

An environmentally sustainable transport system is one where transportation does not endanger public health or ecosystems and meets need for access consistent with (a) use of renewable resources below their rates of regeneration, and (b) use of non-renewable resources below the rates of development of renewable substitutes.

This definition begs many questions, not the least being its total innocence of the idea of opportunity costs. The barefoot wanderings of the hunter-gatherer would fail to qualify — too much danger of stepping on something nasty, and worse, something that may just be endangered in that particular neck of the woods.

The structural relationships in the OECD model are based on expert assessments rather than reproducible estimation methods, and Rothengatter (1999) describes the structure of his model as Simplified Cybernetic Modelling. Those old enough to remember the Club of Rome Report will detect a sinister resonance. For reasons both of approach and method, Rothengatter's analysis will not sit comfortably with most economists, who will find their reservations well expressed by Levinson (1999).

The six OECD criteria for 2030, nominated in figure 8.1 above, were investigated against four scenarios:

- business as usual;
- a supply-side or technology-led solution;
- a demand-side or pricing and regulation-style solution; and
- a combined approach.

It appeared that a business-as-usual approach is capable of achieving, or nearly achieving, the five 2030 targets other than that for carbon dioxide. In other words, existing technologies and programs are capable of dealing with many environmental impacts other than those irreducibly related to hydrocarbon use. Carbon dioxide emissions would be moving away from the 2030 target rather than towards it.

The project developed a final scenario by combining some of the more promising technological features of the supply-side scenario, and the more politically acceptable features of the demand side management scenario (Wiederkehr 1999). Wiederkehr characterises the final environmentally sustainable transport scenario in the following terms:

- a significant decrease in car ownership and use, with many cars running on hybrid electric engines;
- a focus on reducing long distance passenger travel, and a much greater use of non-motorised means for short distance trips, together with supporting infrastructure;
- a significant decrease in long distance freight movements, with wide use of hydrogen as a fuel both directly and in fuel cells;
- all-electric rail, with increases in high speed modes, efficiency and capacity;
- more efficient and less polluting inland and purple coastal shipping vessels, perhaps using hydrogen as a fuel; and
- a substantial reduction in long-distance air travel, perhaps using more efficient conventional aircraft types and, for specific purposes, rigid airships.

The hypothetical context in which all this takes place is a 2030 world that generates its electricity substantially with renewable fuels; has stabilised the form of existing (year 2000) settlements; makes greater use of telecommunications as a substitute for passenger and freight movement; has regionalised production; has shifted towards weightless consumption, and employs extensive public education in favour of sustainable policies.

Table 8.4 OECD measures for ‘sustainable’ 2030 transport (per cent contributions)

	<i>Passenger</i>	<i>Freight</i>
Technology	41	47
Activity	26	19
Occupancy	15	10
Downsizing	11	0
Mode shifts	7	24
Totals	100	100

Source: Wiederkehr (1999).

The mix of contributions related to passenger and freight movement is shown in table 8.4. Technology or supply-side measures are to contribute less than 50 per cent in each case. Reduced travel (activity) accounts for 26 per cent of savings in passenger movement and almost 20 per cent of savings in freight movement. After technology, the biggest contribution to environmentally sustainable transport of freight is through a modal shift, mostly from road to rail.

Rothengatter (1999, p. 67–70) applied his analysis to the German economy, following through successive rounds of adjustment between initial policy measures and a system equilibrium. In the upshot the real generalised costs of car travel need to increase by at least 100 per cent, and the generalised cost of trucking may rise by about 175 per cent. (table 8.5) The generalised cost of air traffic needs to increase by out 400 per cent — five times the increase for aviation under business as usual.

Measured in passenger kilometres, relative to business as usual, the 2030 solution involves percentage changes in activity as follows (table 8.5).

Table 8.5 Activity changes

	Percentage change
<i>Rail freight</i>	+ 348
<i>Heavy rail — passenger</i>	+ 247
<i>Light rail and bus travel</i>	+ 170
<i>Non-motorised transport</i>	+ 78
<i>Inland waterway</i>	+ 24
<i>Cars, motorbikes</i>	– 69
<i>Trucking</i>	– 87
<i>Air traffic</i>	– 93

Source: Rothengatter (1999).

It is said that real gross domestic product would be down by about 5 per cent relative to business as usual in 2030, while private consumption would be down by about 6 per cent and total employment would be down by about 3 per cent.

Leaving aside questions about the validity of the model, and what one might expect to be powerful negative effects of massive changes in the overall shape of both production and consumption, the real question is whether such changes may be contemplated in real democratic society, subject to real politics.

At the Prague meeting of the European Conference of Ministers of Transport in May 2000, Ministers broadly committed themselves to pursuing sustainable transport policies. However, their communique (ECMT 2000) noted that:

Most member countries have still to identify, in quantitative terms, measures for the transport sector that will make a sufficient contribution to meeting the economy wide targets set under the 1997 UN Kyoto Protocol on reducing emissions of CO₂.

If and when the summers get much hotter, when floods and droughts replace 'normal' precipitation, when extreme events become commonplace, and when many everyday risks become uninsurable, democratic consent to the introduction of effective greenhouse control measures will quickly follow. Well *fairly* quickly — a war between the developed and the developing world may be necessary. Until that time, *transport and environment* will be a proper province only for elevated rhetoric and pusillanimous *no regrets* (or at least small regret) measures, which like pollution control, constitute a normal part of boring old public administration.

Perl (1999) aptly makes the point that a top-down technocratic vision, such as that inherent in the OECDs' environmentally sustainable transport scenario, suffers from identity and existence problems. It abstracts out of real politics and other concurrent trends in society.

8.9 A hand up on the bandwagon?

Perl frames his comments in relation to a commissioned paper by Adams (1999) but the Adams papers deserves attention in itself, rather than merely as a vehicle for commentary on the social implications of a technocratic scenario. Value assumptions which are kept very much in the background in most work produced under OECD auspices are made quite explicit in Adams' celebration of environmentally sustainable transport as an avenue for a social revolution.

Adams boldly re-positions the *status quo* point for his discussion far away from that which currently exists, the tangible reality that you, I and most other people in the

OECD world experience every day. He chooses to characterise the world as one beset by *hypermobility* — ‘too much of a good thing’.

According to Adams’ vision, there are great social advantages in an abrupt shift away from the evils of hypermobility, to live in a world of environmentally sustainable transport. Relative to a community that lives under environmentally sustainable transport policies, the future citizens of a business-as-usual society would be:

- more polarised by income disparities;
- more geographically dispersed by urban sprawl;
- more anonymous and less convivial, because people will not know the neighbours;
- less child friendly because children’s freedoms will be curtailed by parental fears;
- less culturally distinctive as a result of advances in the McCulture;
- more dangerous for those not in cars;
- fatter and less fit thanks to less exercise in the daily routine;
- more crime ridden thanks to lower social cohesion and more fear of crime;
- subject to a more Orwellian style of policing (more CCTV surveillance)’; and
- less democratic, with the majority having less influence over decisions of government.

According to Adams, the main winners in the business-as-usual society would be the mobility providers who build vehicles and transport infrastructure, the tourist industry, and ‘participants in the process of globalisation — especially those with the freedom to cross international boundaries’.

On the other hand, Adams believes that the main winners of environmentally sustainable transport will be ‘the many who get left behind by [business as usual]’, those who travel little, and ‘all who value a cleaner, safer, healthier, more peaceful, more convivial, sustainable society in which people know their neighbours and it is safe for children to play in the street’.

Adams is much less circumspect about his values and beliefs than are most people who participate in deliberations within the OECD and official circles elsewhere. He is probably not alone when he rejoices at the prospect that environmentally sustainable transport could be an avenue for advancing his own vision of the good society. At least he cannot be accused of a covert approach.

8.10 Curb the cars and trucks?

Private vehicle use in towns and cities seems to be tacitly regarded as the softest target for reducing energy consumption and various forms of emissions. Likewise, the impedances of road freight by various means are widely supported in railway circles. Table 8.6 presents forms of vehicle use for Australia in 1993-94.

Table 8.6 Road vehicle operations, Australia, 1993-94

	Travel (billion vehicle-km)			Estimated resource costs (\$b)	Resource costs (%)	
	Cities	Rural	Total			
Car — private travel	55.7	41.9	97.6	23.5	59	30
Light commercial vehicle — private	4.9	6.0	10.9	3.0	7	4
Car — business travel	14.9	11.2	26.1	19.5	16	25
Light commercial vehicle — bus	7.6	9.3	16.9	14.1	10	18
Rigid truck	3.5	3.3	6.8	9.6	4	12
Articulated truck	1.0	4.1	5.1	6.5	3	8
Bus	0.7	0.8	1.5	2.1	1	3
Totals	8.3	76.5	164.8	78.2	100	100

Source: Cox (1997).

Private vehicle use in cars and light commercial vehicles accounted for 66 per cent of all road vehicle kilometres performed in Australia in 1993-94. Per capita use is much greater in rural areas (including smaller urban centres) than in the big cities.

Private vehicle kilometres in cities accounted for only 37 per cent of total vehicle kilometres, but this element of road travel is often the major target for environmentally sustainable transport dreaming.

The OECD (1997) investigations on the environmental effects of freight found considerable scope for reducing the social impact of heavy vehicles. However, unlike with passenger vehicles and light trucks, for which considerable improvements in fuel efficiency remain possible, the overall efficiency of energy conversion by heavy trucks appeared to be relatively high, suggesting limited scope for reducing carbon dioxide emissions merely by supply-side or technological measures. This indirectly led to the OECD emphasis on change of mode (to rail or marine transport) as the most promising means of reducing the environmental effects of freight. *The way in which this is done is the crux of the matter.*

If rail is able to attract business from road by truly competitive means, then both environmental and welfare gains automatically follow. The Productivity

Commission (1999) found that significant gains have been achieved in competitiveness and return-on-assets by rail in recent times. This is an unambiguous welfare gain. On the other hand, artificial measures are often advocated as a means of diminishing the competitive strength of road transport, and to the extent this occurs, the result is an unambiguous welfare loss.

Despite a cherished belief to the contrary, which is widely held in railway circles, rail freight as a whole is heavily subsidised in Australian public railways, while road freight as a whole at the very least pays its way. There are grounds to believe that light commercial vehicles may be slightly overtaxed or overcharged, and that heavy road vehicles may be slightly undertaxed and undercharged, but the disparities are small. Road operations, taken as a whole, produce a fiscal surplus for governments, and rail operations, taken as a whole, create a substantial fiscal deficit. Any attempt to punish road freight operators for their competitive success would, in reality, punish the Australian economy.

Restrictions on investment in road space have been advocated as a means of curbing vehicle use, not only to improve urban environments, but also to shift freight business to rail. At least one State transport minister is on record as favouring deterrent measures on rural main roads and highways and underinvestment in bridges to curtail vehicle mass limits, so as to increase the relative attractiveness of freight movement by rail.

The bulk of resources consumed on the road are inputs to production and distribution. Trucks (rigid and articulated) accounted for only 7.2 per cent of all vehicle kilometres performed in Australia in 1992-93, but in terms of resource costs (including ownership, operations, maintenance and driver costs), heavy freight vehicles accounted for 20 per cent of the total resource costs of road vehicles.

Light commercial vehicles accounted for 10 per cent of vehicle kilometres performed, but 18 per cent of resource costs. Thus, taken as a whole, road freight operations accounted for about 38 per cent of the cost of all road vehicle operations. Passenger buses account for another 3 per cent. When passenger cars in business use (25 per cent of resource costs) are included, resource costs of vehicles in business use account for about two-thirds of resources consumed on the road, even though they account for only about one-third of vehicle kilometres performed.

Restrictions on road space, unnecessarily restrictive vehicle mass limits, and degraded traffic conditions represented very inefficient policy instruments, because they increase the local cost of transport inputs relative to those of our trading partners.

8.11 Urban transport and environmentally sustainable transport

The Australian National Greenhouse Strategy (Commonwealth of Australia 1998) bundles transport with urban planning, then quotes the Intergovernmental Panel on Climate Change in the following terms:

Changes in urban transport infrastructure to reduce the need for motorised transport and shift demand to less energy intensive transport modes, may be among the most important elements of a long-term strategy for greenhouse gas mitigation in the transport sector. In some circumstances, the resulting traffic reductions can result in greenhouse gas emission reductions of 10 per cent or more by 2020, while containing broad social and environmental benefits. (*Report on Technologies, Policies and Measures for Mitigating Climate Change*, quoted in Commonwealth of Australia 1998)

Most of what then follows in the module on *Efficient Transport and Sustainable Urban Planning* (Commonwealth of Australia 1998) would be regarded as motherhood material by most urban and transport planners, and I suspect would fall well within measures consistent with business as usual in OECD scenario planning.

Bicycle paths are nice, and most towns and cities already have substantial programs. Improved public transport obviously has a big part to play in any significant change in modal balance. However, on reading the following:

Attention will be given to developing efficient public transport systems which are responsive to customer demands, particularly through improvements to service reliability, comfort and personal safety; service frequency; vehicle mixes tailored to demands; fair payment options; and provision of clear and accurate cost, information; (Commonwealth of Australia 1998, p. 60)

I suspect that the leading elements of any public transport provider, public or private, in any significant town or city in Australia would respond, 'I thought that's what we were trying to do'.

Despite all efforts to change the situation, the role of public transport remains a small and specialised one, serving a mix of clientele travelling to and from inner-city areas or, to a lesser extent, major regional centres, and otherwise meeting the needs of public transport 'captives'. In most 'new world' cities, public transport typically carries less than 10 per cent of all mechanised trips, and often much less. There is always room for improvement, but the feasible range of improvement will make little impression on greenhouse gas accumulation.

The same can be said of virtually every one of the topics dealt with in the module on *Efficient Transport and Sustainable Urban Planning*. There is nothing *wrong* with any of it, which is why most of the Efficient Transport and Sustainable Urban

Planning program is already well within mainstream practice. Does this Commonwealth Government document carry the coded message that ‘climate change is a nasty bogeyman who will go away if we are all very, very good’?

The subject of energy use, urban structure and the changing global outlook deserves serious treatment. Australian cities, like all other cities, are congealed history. They represent a large part of the national capital stock. Each generation makes additions and alterations — big additions in times of rapid growth, and many alterations in times of major social and demographic change or economic upheaval. There is nothing gratuitous about city building or urban processes. They are anchored in the daily activity of the citizens.

At least one half of our contemporary urban fabric has been created since the Second World War. Its texture and density has been controlled by the simultaneous rise of the private motor vehicle, and the unprecedented post-war growth in personal disposable incomes, mass secondary and tertiary education, workforce participation rates, and a once in 200 000 year transition in human society — a revolutionary change in the role of women.

Over the years to about 1990, the process of growth of Australian cities had a consistent monotone quality. There were low density additions at the periphery, some hollowing out of the centre, a relative decline in central area employment, the emergence of sub-central retailing nodes, and the gradual development of largely invisible, extensive, low density suburban employment areas.

New suburbs were always built as dormitories, with little in the way of commercial facilities or employment opportunities. Only a small proportion of their residents worked in the urban centre, easily accessible by public transport; most worked in suburban locations at intermediate distances from the city centre, and travel to these almost invariably required private motor transport. There was a coherent rationale for every element of this process (Paterson 1970).

Then about a decade ago — say, 1990 — something happened which is still barely understood (Department of Infrastructure 1998). The monotone post-WW2 process came to an abrupt end. Central area populations began to increase for the first time in several generations. Quantitatively more significant, conversion of the fabric of ‘inner-middle’ suburbs took off, with a massive wave of additions and alterations to existing dwellings. Many concurrent social and economic phenomena were wholly consistent with the changing face of urban space. Anecdotally, the correlates were:

- the culmination of a long decline in completed fertility;
- a steady increase in two-income households, in which time is the scarcest resource;

-
- increased periods of life in education and in work as a single adult or a casually affiliated one; and
 - the re-orientation of lifestyles to experience from the collection of consumer durables and so on.

But big questions remain to be answered. How far will this run? Is inner-city life a transient phase? Will the middle suburb renovators win the battle with the ‘Save our Suburbs’ dogs in the manger? What will happen to outer suburban property values after the next economic downturn? These questions will probably not be answered conclusively for some time.

The point is not to speculate about just how long on the new ‘Doughnut City’ phenomena will prevail. Rather, it is to note that we are at this very moment in the box seat when urban fabric is potentially malleable. By this I mean *malleable*, not open to deterministic control. The opportunities to lead urban functioning in directions consistent with environmental contingencies are much greater than usual at this time.

A further set of prospective influences is now bearing down upon us. Aged dependency is trending up, the workforce is beginning to age rapidly, workforce participation will soon begin to decline, and depending on the economic fortunes of the older population, we could be facing a permanent shortage of many classes of labour. At least some of the forces that built the car-oriented outer suburban ring of 1950 to 1990 are in retreat.

On the other hand, the mass attachment to a high degree of personal mobility is unlikely to decline at all, unless real incomes decline sharply. John Adams, and perhaps other enthusiasts of environmentally sustainable transport, may visualise utopia as a country town or a working-class suburb, organised around a pub and a football team. The main reason most other people love their car or cars is that private mobility enables them to do many more things with their scarce allocation of time.

The OECD debate usually takes a pragmatic and realistic approach to urban issues, except when they are framed within the context of environmentally sustainable transport. The OECD (1999) acknowledges, for example, the step-wise inferiority of public transport for most purposes, with the discouragement effects being overshadowed by the time loss, vehicle cost and emissions-enhancing effects of traffic operating under critical conditions. Yet, it seems that on environmentally sustainable transport, the OECD discourse slips easily into an authoritarian cum counter-culture position, urging, for example, that the best way in which to discourage the use of motor cars is to restrict road space.

The fine grained relationship between motor car use, activity locations, complex family and household structures, and densely packed lives, right across society, scarcely needs to be demonstrated. Unquestionably, some activities can be choked off if access to them is made sufficiently difficult. But are the losers the hated vehicle manufacturers, oil-*men* and road construction contractors, or those whose choices are curtailed?

Public transport simply cannot match the activity fit so easily achieved by a dedicated private vehicle. My personal opinion is that before switching to reliance on public transport, most people would choose to drive light-weight vehicles, of which there are examples all over town right now — vehicles that carry four people in comfort, while achieving 5 to 6 litres per 100 kilometres and better.

The greatest beneficiaries of easy discretionary mobility are the people who have the busiest lives and the largest enthusiasms. Those who see the motor car as a political enemy should think about the following:

Most of the increased travel increase in the last two decades has been due to an increase in car ownership... Women have been responsible for much of this. Increasing car ownership amongst women, the young, and low income groups caused a significant democratisation of private road travel over this period.

Between 1971 and 1988, car travel *per vehicle* remained steady and increasing travel per capita closely followed increases in ownership of cars per capita. The dramatic rise in travel by women is the outstanding feature of changing Australian vehicle use.

Women were responsible for 76 per cent of all the increase in travel in the decade from 1985, and 97 per cent of all the increase over the decade since 1988. Women accounted for 40 per cent of all travel in 1995, up from just 18 per cent in 1971. (Paraphrasing Cox 1997, pp. 69 and 70)

The social considerations in framing a response to global warming are, unfortunately, far more complex than merely the punishment of motorists and the vanquishment of McCulture.

All public transport technologies presently in use have service envelopes that overlap private motor vehicles only at their margins (Meyer, Kain and Wohl 1965). That may change, but the change is still well ahead of us. Automatic, ubiquitous, small vehicle systems will probably do the job eventually, but way over the horizon. Currently available systems have no hope.

The structure of cities is slow to change, and subject to many concurrent processes — some obvious and some imponderable. This is not to say we should give up on public transport or urban change, but rather that our hopes in these areas should be realistic.

The vehicle fleet turns over relatively quickly, having a half-life of under ten years. Presently available automotive technology can radically reduce energy use and the emissions signature of private motor vehicles. All that is needed is an external driver or political will. Ten years out it seems likely that efficient hybrid and electrical fuel cell vehicles will begin to find a place in the vehicle fleet. The path to these environmentally friendly changes can be marked by hands-off market instruments and, if necessary, a regulatory push. In both cases a substantial area of freedom can be left for individual discretion.

Ultimately, the microeconomic adjustment path must be more appealing to most people than the totalitarian world of the OECD environmentally sustainable transport scenario, or the illiberal utopianism of John Adams and others who think little good has come out of the past sixty years of human endeavour.

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8.A Presentation summary

Paterson suggested that attempting to address environmental issues via marginal improvements through microeconomic reform is a mistake and unlikely to be effective. He argued that policy makers need to consider ‘threshold issues’ and to take the issue of environmental threats more seriously, if they are to successfully address environmental issues related to transport.

Threshold issues

Paterson observed that Australia is locked in to some of its technologies in such a way that limits the potential effectiveness of a number of potential policy options. He commented:

... for reasons largely of a long history of government intervention, well meaning but totally counterproductive, the role of sea and rail transport in Australia is far less than it needs to be from a technological point of view, and gas-guzzling modes, air and road transport, are larger than they need to be in terms of the capabilities of those technologies ... Basically the choke point in all Australian national transport systems, road, rail and air, and sea to a lesser extent, is Sydney. Sydney has some insurmountable problems that either have to be gone around or dealt with ...

Paterson proposed that large, existing problems in transport infrastructure (which he called ‘threshold issues’) need to be addressed before marginal processes such as pricing or incremental measures can be effective for the environment. He argued:

To suggest that a few dollars on the average cost of running your car is going to transform the world in a way that would make a material difference is simply dishonest and naive.

Paterson suggested that a national transport strategy or process is needed because the large thresholds in the transport sector require a top down initiative before market processes are likely to be effective.

Taking the environment seriously

Paterson suggested that some opportunities to relieve environmental problems exist, including improved vehicles and new transit technologies. He added that demographic change in the upcoming decades is also likely to provide some relief. Nevertheless, he cautioned:

... if it turns out at some moment in the future that we really *are* facing a catastrophe, we will need drastic measures, and they will be *very* unpleasant. I for one am agnostic, but if we’re not yet sure, or it turns out we’re *not* facing a catastrophe, then why are we fooling around with *trivial* measures, and at the same time frightening ourselves badly?

9 Discussion: the transport sector

The transport sector provides a challenging area for considering the relationship of microeconomic reform with the environment. The sector has been associated with environmental damage, yet it also supports much of the development on which modern economies rely. As a result, interest in the effects of reforming the transport sector has been considerable.

Markets

The relevance of markets to environmental problems was considered. Hamilton observed that energy subsidies to the aluminium industry resulted in large exports from Australia of ‘congealed energy’ in the form of aluminium.

Marsden noted the importance of emissions trading to achieve low abatement costs for Australia. At a domestic level, Slatyer remarked that it is not yet clear how any trading regime in Australia will operate, but that a domestic trading regime provides the opportunity to find the lowest cost ways of achieving targets. Paterson observed that market responses to abatement are limited by which countries signed onto the Kyoto Protocol, observing that the effectiveness of market solutions will be affected by other countries increasing their emissions.

Trucking sector

Williams observed that many of the negative effects associated with transport arise from trucking, despite it being a new sector with relatively clean and efficient vehicles. Slatyer commented that the trucking sector has opportunities to improve through innovation. He also noted proposed Commonwealth legislation to improve fuel quality and national fuel standards that override State fuel standards. Paterson observed that the Australian trucking sector is highly competitive and that disabling it would only impose substantial costs on the Australian economy.

National transport strategy

The benefits of developing a national transport strategy were considered. Slatyer suggested that a national strategy may be best focused on processes for national

decision making, to ensure national agreement on the development of transport. Paterson observed that the effectiveness of any process relies on the community being serious about the issue. He noted that strong political will is needed.

Future directions

To ensure the benefits of microeconomic reform of transport are realised, there is a need to also address some of the large 'threshold' problems affecting transport infrastructure. Paterson noted:

... there are some crucial bottlenecks that need to be broken before you can liberate the market to fill in all the pieces.

There was a call for a national transport strategy, and recognition that political will is needed to achieve nonmarginal change.

PART V

THE FOREST SECTOR

10 Australian forests: marching toward micro-efficiency, stumbling toward sustainability?

John Marsden
Marsden Jacob Associates

As a natural resource, forests present multiple challenges for policy and reform.

In contrast to the national reform agenda for water, the National Forest Policy Statement was not linked to National Competition Policy. As a result, the development and implementation of forest policy by the States has not been facilitated and supported to the same extent as for water.

However, microeconomic reform has begun to affect State forestry agencies and the use of Australia's forests, although there is still some way to go before all the provisions contained in the National Competition Policy agreement are fully realised.

The paper suggests that while National Competition Policy is only one of the policy approaches needed to ensure long term ecological sustainability (and thus the long term availability of the forests for various values and uses), its further application (if effective) can be a powerful tool in achieving this goal.

The reform of pricing mechanisms and the external independent monitoring and audit of forest practices are essential requirements that are still to be adequately implemented in key States.

10.1 Introduction

This paper provides an external perspective on the issues of microeconomic reform and the environment in the management of Australian forests. To this review we bring few preconceptions other than a background in utility and regulatory economics (and therefore competition policy) and natural resource issues, particularly in the area of water.

10.2 Market failures and market structure

Any consideration of forestry policy must begin with the basic features of the resource and associated markets. First, forests provide a renewable, easily exploited natural resource with a long renewal period. Some mistakes in policy or in practice cannot be remedied quickly.¹ Like fisheries, forests pose issues of sustainable yields and sustainability of the associated environment. But unlike fisheries, access to the forest resource can be reasonably well controlled.

Second, forests are seen to allow multiple uses. At low levels of use, selective logging, tourism, walking, other recreation, water production and carbon capture may arguably be complementary, and even consistent with species maintenance. However, other uses such as clear felling and wilderness preservation are directly competitive and mutually exclusive.² Indeed, most uses become competitive once the intensity of resource use rises above threshold levels.

Third, not only may the presence of logging (however selective) have an impact on the enjoyment of a wilderness now, but where it affects biodiversity, logging potentially threatens major benefits to future generations that the current generation of forest owners cannot readily capture. These impacts fall outside the market price mechanism because there are no private rights to the bio-diversity of a forest, the sanctity of a forest, and so on. These are, therefore, major externalities.

Fourth, there are substantial uncertainties and information asymmetries that affect the efficiency and predictability of the political processes in resolving conflicting objectives and uses. There appears, for example, to be a low — or, at best, uneven — level of shared and agreed information among the protagonists in the forestry debate.³ This information asymmetry is especially evident in the debate on royalties and charges and on compliance with management codes.

¹ Whereas a ‘mistake in practice’— for example an incursion into a stream — can be remedied quickly, a mistake that influences the age structure or species mix available in the future often cannot be fixed. Where the intensity of logging is low, a few years of overlogging in a large forest estate may be remedied by small corrections over the remaining 20, 50, 80 or 120 years of a full harvest rotation. This ability to correct mistakes is reduced when logging contracts are long term and inflexible, and when the intensity of logging is high.

² In single species forests, low intensity logging, clear felling and other uses/values, including biodiversity may not be mutually exclusive. In a large single species forest estate, each of the small areas clear felled in a given year may not provide amenity for tourism and other recreation for a few years. Over the whole estate, these activities can still be accommodated, with the reduced amenity in one area being offset by provision for the same activities elsewhere in the estate.

³ Compare, for example, the competing claims and counter-claims of environment groups and forestry agencies.

Fifth, there have been recent rapid shifts in supply technologies and industry structure. These include: the increase in the efficiency, ease and intensity of logging, which has increased commercial efficiency while exacerbating the adverse effects of logging on other forest uses;⁴ and the increase in the minimum efficient scale, capital requirements and, therefore, concentration in ownership of the mills.

Rather than a multitude of small local sawmills and low levels of processing and value adding, the efficient industry structure now comprises large scale, highly capital intensive mills with attendant drying and processing facilities. The new mills enjoy extensive regional monopolies limited only by transport costs.

In Victoria, for example, about 90 sawmills have sawlog allocations from the State Government; of these, 65 have log allocations of less than 500 m³ a year. While the industry is rationalising, native forest based hardwood sawmills are far smaller than plantation based sawmills. This structure also applies in other States.

The resulting concentration of ownership means that the State-based forest monopolies increasingly face a single buyer in many locations across Australia.

Sixth, there is a major and cumulative shift in consumer and community preferences. Over the past half century there has been a general rise in environmental concerns. In some forest areas, residents now live there because they enjoy the *beauty of the forest* rather than because they have employment in logging and timber production.⁵ A much wider group of the Australian community is able to enjoy the benefits and beauty of Australian forests as a result of improved access by road and visual communication. This improved access has also allowed a much wider proportion of the electorate to develop and express views on forest issues.

Consequently, the debate over forestry policy and practice now occurs as much in urban homes as in the forest regions and timber towns. Consultations and resolution mechanisms effective at the local level have been supplanted by widely based responses to the political marketplace.

Among natural resources, the forest resource is unique in the extremely wide range of its uses and competing demands. The hierarchy of values attached to these uses has shifted markedly in recent decades, with consequent shifts in the objectives of forest policy and reform. Part of this reassessment is due to the realisation that the

⁴ Nonetheless these adverse effects do not compare with the effects of bullock logging and hand felling, followed by ring-barking and conversion to farming, which occurred earlier last century.

⁵ In the social assessment for the *South West Forest Region Comprehensive Regional Assessment Report*, 76.8 per cent of persons surveyed agreed that 'one of the main reasons I live in this area is the natural beauty of the forest' whereas less than 30 per cent agreed that 'the area in which I live is very dependent upon the timber and logging industry.' (Department of Conservation and Land Management 1998, p. 115).

forest resource is not infinite, and that the arrival and practices of both Aborigines and Europeans have had major and irreversible impacts on Australia's forest resource.

Seventh, there is a major split in views and objectives for Australia's forests.

Ecologically sustainable development

Formally, Australia recognised the principles of ecological sustainable development in 1992. However:

- most relevant Australian legislation still lacks clear explicit objectives on ecologically sustainable development or other matters; and
- a significant part of the Australian community believes that the continued logging of old growth forests contravenes ecologically sustainable development principles.

Traditionally, the forestry community has seen itself as the manager and sensitive coordinator of forest use and conservation. However, the rapid shift in objectives has meant that traditional views on balanced use have been outflanked.

This situation is especially evident in Western Australia where neither the leadership of the Department of Conservation and Land Management nor the Commonwealth–State Regional Forest Agreement process was able to respond quickly enough to community views expressed through the political process.

The relevance of the Council of Australian Governments and National Competition Policy

Like the major national agreements on electricity, gas and water in the early 1990s, the National Forestry Policy Statement was signed by all governments within the Council of Australian Governments (COAG) process.⁶

However, neither the statement nor its successor agreements became part of National Competition Policy. As a result:

- forestry potentially enters the purview of the National Competition Council only through the generic requirements (for example, competitive neutrality, legislation reviews and independent prices oversight of government business

⁶ Tasmania did not initially sign the statement.

enterprises) or the general acknowledgment of ecologically sustainable development;

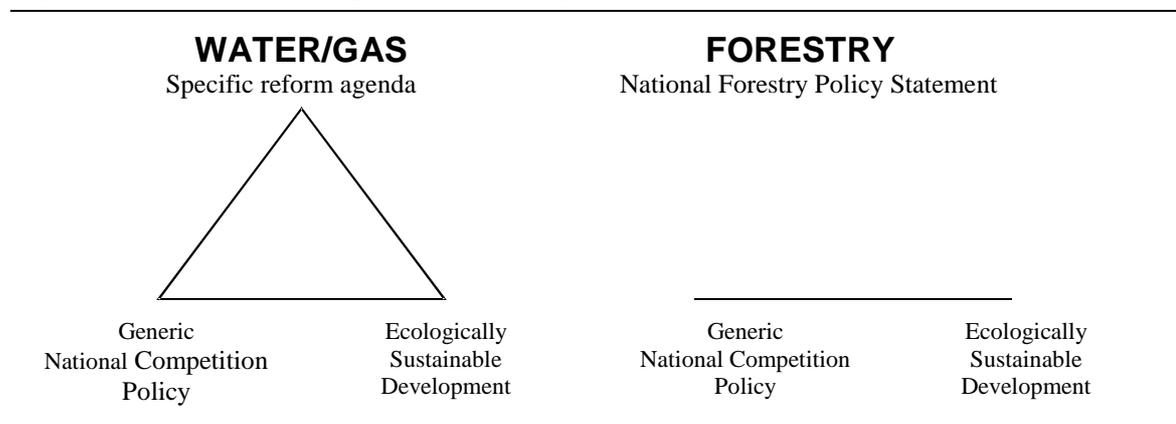
- there has been less support and momentum in developing policy frameworks or instruments, such as a national framework for pricing/royalty policy; and
- there has, been little or no reinforcement of the forestry reform agenda by the processes of external and independent review, audit and assessment. There has been no assessment by the National Competition Council and there are no counterpart mechanisms equivalent to the Murray Darling Basin Ministerial Council’s Independent Audit Group or recently announced Ecological Audits.

The forestry industry is now beginning to implement such processes. The Regional Forest Agreement monitoring unit will monitor performance against milestones outlined in each Regional Forest Agreement. They will also monitor the agreement sustainability indicators that all States must develop and on which they must report. The effectiveness and comprehensiveness of this new monitoring process is yet to be demonstrated.

In Tasmania, the Forest Practices Board is an independent authority that monitors performance against licence conditions and has the power to initiate action in the courts in case of any default. In Western Australia, under current Bills before Parliament, both a Conservation Commission and a Forests Products Commission have an audit role, and the Environmental Protection Authority and Department of Environmental Protection have an ongoing compliance audit role with respect to management plans.

Whereas the reform agendas for water, gas and electricity are directly integrated into the National Competition Policy reform agenda, the forestry reform agenda has tended to float separately, detached from the main policy framework (figure 10.1).

Figure 10.1 Reform agendas for key sectors



Forestry contrasts with, say, the water sector where:

- the original Strategic Framework for Water Reform has been regularly strengthened and extended by the ongoing activities of Standing Committee on Agriculture and Resource Management and Agriculture and Resource Management Council of Australia and New Zealand and their working groups; and
- the Strategic Framework for Water Reform was attached to and therefore comprises part of Competition Principles Agreements, and thus the National Competition Council's second tranche assessment includes an entire volume devoted to water.

In some important respects, therefore, the policy debate and policy frameworks for forestry appear to differ substantially from those for other sectors. Not surprisingly, then, the policy outcomes and results differ between forestry and other sectors.

Table 10.1 compares actions in microeconomic and environmental reform since 1990 in forestry and water. This 17-point comparison indicates many similarities but, importantly, also a number of differences.

The table format suffers from being unable to differentiate the situations in different States in either water or forestry. For example, Tasmania's Forest Practices Act provides a strong legal framework for environmental compliance by all logging operations on State forest and private property. If anything, this may be a stronger position than that which is described for water under the section on tightened licences and conditions.

10.3 Framework for forest policy

Forestry is a State responsibility. Nonetheless, the Commonwealth Government has played a major role over the past two decades. Despite the rejection of many of the recommendations, the Resource Assessment Commission's 1992 report on forestry represents a landmark report which brings together many of the ideas found in the policy framework later implemented.

National Forest Policy Statement

The statement was signed by all participating governments, except Tasmania at the COAG meeting in Perth in December 1992. Tasmania became a signatory in April 1995.

As a document, the statement is wordy and in some places lacks clarity and tight logic.⁷ On the other hand, the statement is significant and the main points should be noted.

Table 10.1 Comparative actions in micro and environmental economic reform since 1990 in forestry and water title

<i>Action</i>	<i>Forestry</i>	<i>Water</i>
Clarification of objectives	Clarification not yet achieved	Major advance by early COAG work
Clarification of concepts	Development of JANIS criteria, base surveys and fieldwork	Clarification of river flow objectives
Management plans	Additional reserves created but extent and make-up disputed Management plans in place in many States	River flow regimes mandated Land and water management plans Murray Darling Basin Commission cap in place.
Sustainable resource use	Little agreement on the sustainability of log yields or whether there should be logging in native forests at all Less information on the sustainability of environment. Shortening of rotation, increasing intensity of use	For example, water use in Basin is not environmentally sustainable, despite Murray Darling Basin Commission cap, yet work progressing to identify environmental flow requirements
Public consultation	Intensive consultation but stakeholders typically polarised, often Statewide	Extensive consultation with stakeholders, primarily local Lively debate reflecting greater plurality of views and interests
Tightened licences and conditions	Management and logging plans and codes of practice introduced but adherence disputed, (especially on private land) Requirement for added value Certification (for example, to the Forestry Stewardship Council) increasingly required by overseas retail chains. No Australian operations so certified yet, but an Australian Forestry Standard proposed	Licences increasingly dependent on environmental compliance and subject to regular review and audit No certification requirements for responsible irrigation as yet, although industry codes of practice in various States of development and implementation
Facilitation of trading in licences	Forestry licence/contract to specify log volumes in designated areas Over-allocation due to Regional Forest Agreement, need for buyback?	Water licences less tied to land; transfer within and between valleys Strongly promoted by COAG/Murray Darling Basin Commission and High Level Steering Group

(Continued next page)

⁷ See, for instance, chapter 2, 'Vision', and chapter 3, 'National goals'.

Table 10.1 (continued)

<i>Action</i>	<i>Forestry</i>	<i>Water</i>
Monitoring	In some States, self-regulation of compliance with codes of management In other States, independent monitoring (for example, the Forest Practices Board and Environment Protection Authority) Commonwealth Regional Forest Agreement Monitoring Unit to report on agreed milestones and indicators	Water businesses monitored against licence conditions and by the health and environmental regulators. Self regulation in some areas. Payments from State governments for land and water management plans, subject to conditionality and performance assessment
National Competition Policy	Covered by generic clauses of Competition Principles Agreement	Covered by generic clauses and a specific strategic framework for water reform
Industry restructuring	FISAP funding to ease acceptance, to promote major restructuring	Largely left to market processes or avoided (for example, Torrumbarry Weir) Target case-by-case restructuring via introduction of local management
Prices and prices oversight	Different interpretation of National Forest Policy Statement pricing principles Limited use of auctions as market test Charges still tailormade to preserve employment in some States	Strongly developed pricing principles Independent prices oversight in some States
Structural reform of government activities	Separation of regulatory and operational functions Reform typically centralised in each State Corporatisation commercialisation of forest business; Victorian plantations privatised; continuum between privatisation and corporatisation	Separation of regulatory and operational functions, with very limited competition Devolution to local management and control Corporatisation or privatisation
Competitive neutrality	Tax equivalent regimes (TER), dividends and community service obligations variously applicable Main concern: impact on private plantations	Tax equivalent regimes, dividends and community service obligations applicable in urban sectors, less so in rural areas
National Competition Policy legislation reviews	Underway; not publicly available, except Victoria	Underway Main issue: desirability of competition in a local natural monopoly industry

(Continued next page)

Table 10.1 (continued)

<i>Action</i>	<i>Forestry</i>	<i>Water</i>
Cross-subsidies	Not an issue in National Forest Policy Statement or Regional Forest Agreement framework	Desirably eliminated but guidelines not yet nationally accepted
Transparency	Promoted by Regional Forest Agreement but restricted by corporatisation and 'commercial-in-confidence' Uneven across States	Promoted by licensing, regulatory framework and independent prices oversight
Full cost recovery	Royalty increases above consumer price index; levels primarily set by negotiation outside Western Australia where cost of growth model (lower bound) applies Market value based royalties advocated Little or no guidance or uniformity nationally Strong forbearance (risk sharing) in royalty negotiations, including use of residual value No resource rents charged but licence fees able to include a licence fee, log royalty rate and roading charge	Substantial increases in water prices to at least lower bound levels Strong guidance on cost recovery and tariff structures via COAG/ARMCANZ process Independent prices oversight required by National Competition Policy in place in New South Wales A resource rent charged only in the Australian Capital Territory

The National Forest Policy Statement set out:

- the process for undertaking Comprehensive Regional Assessments of Australia's forests. The assessments are intended to provide a synthesis of relevant information on which the development of different land allocation, forest management and industry and community development scenarios (or options) can be developed;
- the basis of negotiation of Regional Forest Agreements between the Commonwealth and the particular State Government which encompass:
 - the establishment and management of a forest reserve system that is comprehensive, adequate and representative (CAR),
 - the ecologically sustainable management of forests outside the reserve system, and
 - the development of an efficient, internationally competitive timber industry; and
- a number of other issues of relevance to forest policy, including the need for an improved pricing and cost recovery.

The National Forest Policy Statement recognised that the objectives of biodiversity conservation for forests will be most efficiently and effectively achieved through the establishment and effective management of conservation reserves (the CAR reserve system) and the complementary management of adjoining areas (figure 10.2).

In addition, the statement specifically defines the need to protect old-growth forests and forested wilderness to reflect the significance of those areas to the Australian community, given their high aesthetic, cultural and nature conservation values and freedom from disturbance.

Subsequently, in 1996-97 Australian governments endorsed the Joint Australian and New Zealand Environment and Conservation Council/Ministerial Council on Forestry, Fisheries and Aquaculture/National Forest Policy Statement Implementation Sub-committee (JANIS) National Forest Reserve Criteria. The criteria stipulate that:

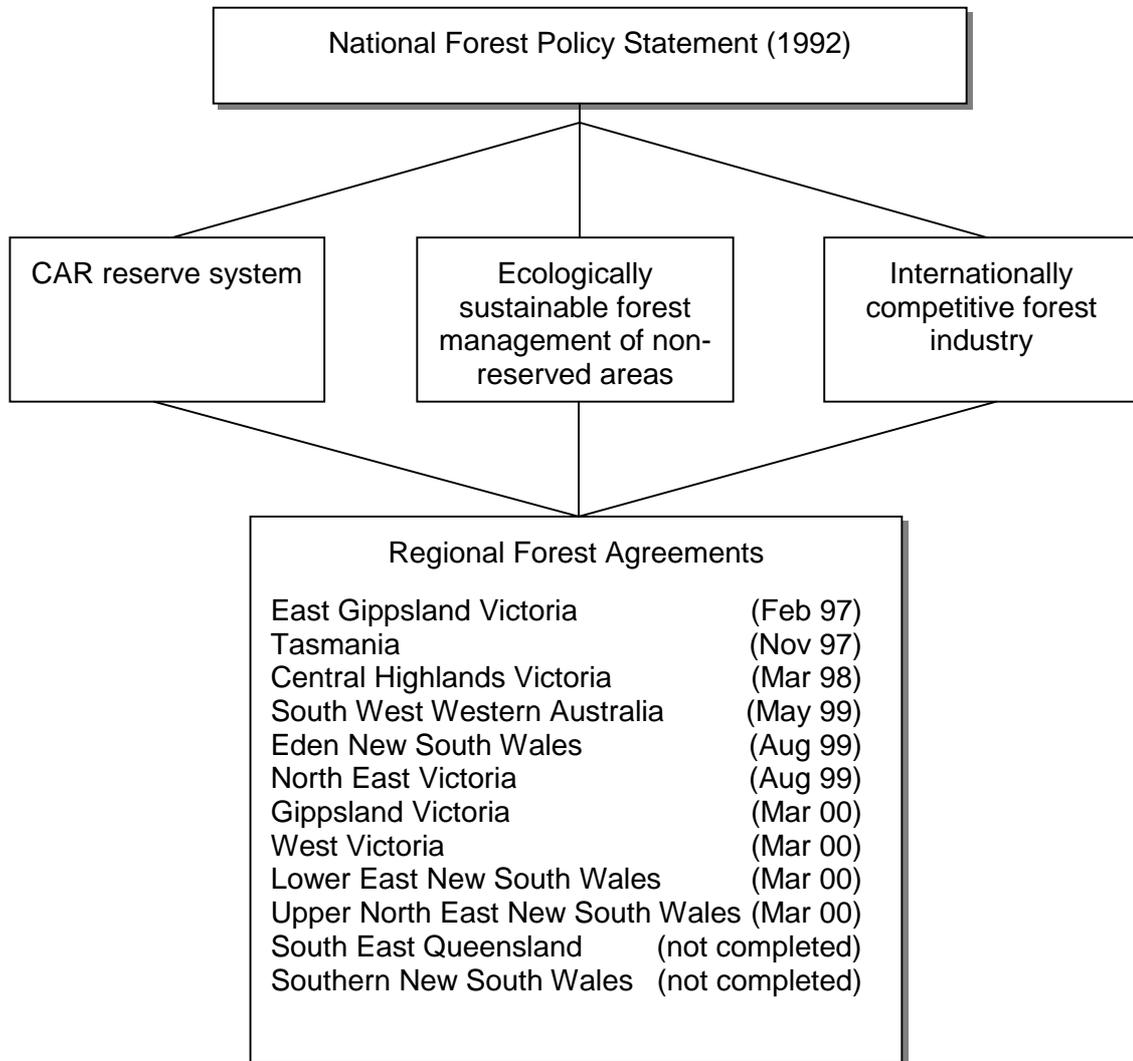
- 15 per cent of the pre-1750 distribution of each forest ecosystem should be protected in the CAR reserve system;
- where ecosystems are recognised as vulnerable, then at least 60 per cent of their remaining extent should be reserved;
- where old-growth forest (defined as ecologically mature forest where the effects of disturbances are now negligible) is rare or depleted (generally less than 10 per cent of the extant distribution) with a forest ecosystem, then all viable examples should be protected, wherever possible;
- for other forest ecosystems, at least 60 per cent of the old-growth forest identified at the time of assessment should be protected;
- 90 per cent, or more if practicable, of an area of high quality wilderness that meets minimum area requirements should be protected in reserves; and
- these criteria should be applied to achieve reserves at least cost, preferably on public rather than private land and with sensible flexibility.

The purpose of Regional Forest Agreements is to establish a framework for the management of forests in the relevant regions:

Parties are committed to ensuring the agreement is durable and that the obligations and commitments that it contains are delivered to ensure effective conservation, forest management and forest industry outcomes.

Figure 10.2 outlines the completion dates of the various Regional Forest Agreements.

Figure 10.2 **National framework for forestry**



Source: Based on information from the website: <http://www.rfa.gov.au>, (accessed August 2000).

Key features of the agreements are:

- the establishment of CAR reserve systems;
- agreement on harvesting yields;
- the provision of compensation for affected parties;
- their 20-year length; and
- the establishment of key milestones.

Industry policy

A striking feature of the National Forest Policy Statement and subsequent Regional Forest Agreements is the emphasis on industry development in an industry that employs only around 11 000 persons in forestry and logging and a further 19 000 in log sawmilling and timber dressing directly across Australia (National Forest Inventory 1998).

In a decade when industry assistance has been substantially dismantled, forestry is one of the few remaining industries where there is a strong commitment to the industry in its own right and where significant funds have been provided by the Commonwealth (table 10.2). This partly reflects the historical regional nature of the employment and the major structural pressures facing the industry.

Table 10.2 Industry assistance for selected Regional Forest Agreements

<i>Regional Forest Agreements</i>	<i>Funding program</i>	<i>Commonwealth contribution</i>	<i>State contribution</i>	<i>Total</i>
Tasmanian Regional Forest Agreements	One-off payment	\$110 million over three years		\$110 million
Victorian Regional Forest Agreements	Victorian Forest Industry Structural Adjustment Package	\$18.8 million	\$23.8 million	\$42.6 million
South-West Western Australia Regional Forest Agreements	WA Forest Industry Structural Adjustment Package	\$15 million (plus additional \$5 million tourism related exp.)	\$23.5 million	\$38.5 million \$5.0 million
New South Wales Regional Forest Agreements	NSW Forest Industry Structural Adjustment Package	\$60 million ^a	\$60 million	\$120 million

^a New South Wales Forest Industry Structural Adjustment Package funding currently suspended.

Source: Personal communication, Agriculture, Fisheries and Forestry – Australia, 28 August 2000. See also <http://www.rfa.gov.au>

The magnitude of the restructuring funds invites comparison with the dairy industry.⁸ However, the dairy industry deregulation will primarily change who produces a level of output that is relatively stable at the national level. In contrast, the significant increase in forest reserves should lead to a reduction in logging output.

⁸ In fact, the dairy industry package is equivalent to \$30 000 per employee and only around \$10 000 per employee in the forestry industry (calculations by author based on information sourced from <http://www.dairy.com.au/adic/new>).

10.4 Forestry and National Competition Policy

The Competition Principles Agreement contains several important generic commitments by signatory governments that are potentially applicable to forestry (COAG 1992). These include:

- prices oversight of government business enterprises (clause 2):
... it should apply to all significant government business enterprises that are monopoly, or near monopoly, suppliers of goods and services, or both.
- competitive neutrality policy and principles (clause 3):
... the objective of competitive neutrality policy is the elimination of resource allocation distortions arising out of the public ownership of entities engaged in significant business activities. Government businesses should not enjoy any net competitive advantage simply as a result of their public sector ownership. These principles only apply to the business activities of publicly owned entities, not to the non-business, non-profit activities of these entities.
- structural reform of public monopolies (clause 4):
For instance, ... it will remove from the public monopoly any responsibility for industry regulation...
- legislation review (clause 5):
... the guiding principle is that legislation ... should not restrict competition unless it can be demonstrated that: a) the benefits to the community as a whole outweigh the costs
- access to services provided (clause 6):
... a regime for third party access to services provided by means of significant infrastructure facilities.

It is beyond the scope of this paper to review the limited application of these generic commitments to forestry. However, we note that:

- despite their monopoly status and focus, none of the State forest businesses have been subject to independent prices oversight;⁹
- only one State (Victoria) has completed and publicly released a competition principles review of forestry legislation, although several States have undertaken legislation reviews and are acting on them and;¹⁰

⁹ The Carr Government had foreshadowed such a review by Independent Pricing and Regulatory Tribunal but has not proceeded with this proposal. In Victoria, the Bracks Government announced an independent forest produce pricing review.

¹⁰ For instance, a comprehensive internal review of Tasmania's forestry statutes resulted in the separation of regulatory functions and forest practices/standards from the forest agency.

- the meaning of prices oversight, competitive neutrality and, all the generic commitments, may need to be redefined in the context of a sustainable resource and a sustainable business.

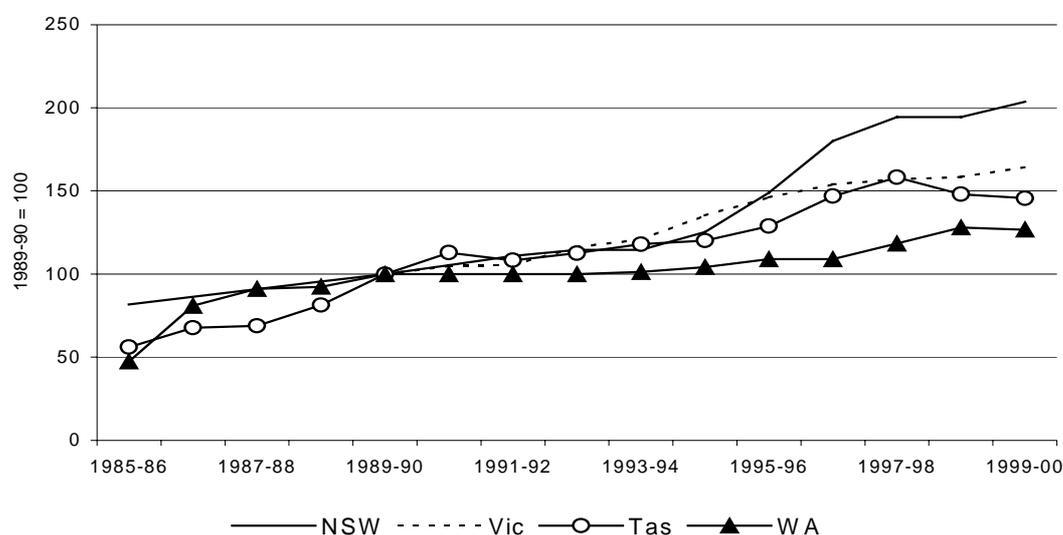
Some brief comments are warranted on royalties and pricing.

Pricing and royalties

Pricing and royalties are highly contentious issues. Environmental groups believe that royalties are set too low, encouraging overlogging of native forests and underdevelopment of plantations. Correspondingly, the millers and logging companies believe royalties are set too high.

Movements in prices charged over the past two decades are shown in figure 10.3. Care should be taken in comparing prices charged across States, given the species related differences in the end products and the States' different approaches to pricing. The Tasmanian stumpage price for eucalypt sawlogs, for example, excludes charges for the provision of road access, while these are included by some other States.

Figure 10.3 Index of prices paid for hardwood sawlogs (year average)



Sources: Personal communication, Department of Conservation and Land Management, August 2000; Personal communication, NSW State Forests, September 2000; Personal communication, Forestry Tasmania, August 2000; Personal communication, Department of Natural Resources and Environment, September 2000.

A first issue to be clarified is the purpose of royalties — for example, what are the millers and logging companies being asked to pay for? The dictionary definition of a royalty is ‘a payment made for royal right as over minerals given by a sovereign

to a person or company'. Based on this definition, the term 'royalty' would appear to be particularly inappropriate as a description of the payments for logging public forests.

There is a major contrast between, say, a minerals royalty and the charge made by a State forestry business for access to trees (Hardwood Log Royalty Methodology Review Panel 1998).

- In the case of minerals, the exploiting company has often discovered the resource, and is likely to be totally in control of it from the ground through to processing, through to end sale. To a large extent, government is merely allowing access to a common property resource and licensing the exploitation to ensure orderly development.
- In the case of public forests, the resource is in public ownership, managed by the State forest business on behalf of government, with substantial value adding and management activities, including maintaining a balance between conservation and commercial use. The State forest business is undertaking a major commercial activity over a full rotation cycle of 15–80 years.

The State forest business is, therefore, supplying substantial value added services, which are embodied in the logs finally extracted.¹¹ Moreover, the State forest business is essentially a monopolist.

The arguments for independent price regulation — or, alternatively, market tests through tenders and auction mechanisms — are therefore stronger than they may initially appear.

In the search for a better framework for pricing the services of the State forest businesses, the pricing principles set down in the National Forest Policy Statement will need to be reappraised and their interpretation clarified.

In terms of the pricing and allocation system, the National Forest Policy Statement advocated that prices should:¹²

- be market based;
- at least cover the full cost of efficient management (including regeneration) attributable to wood production;
- include a fair return on capital; and
- provide an adequate return to the community from the use of a public resource.

¹¹ For exactly these reasons, Forestry Tasmania no longer uses the term 'royalty' to describe its prices.

¹² National Forest Policy Statement (1992), p.17.

The internal consistency of the National Forest Policy Statement principles and their consistency with allocative efficiency and the general approach to price regulation in other government business enterprises would need to be addressed. These are major steps from the forestry industry's current position. However, similar steps have been taken over the past five or so years in the water industry, with strongly positive outcomes including for the environment.

For foresters and others committed to sustaining the available forest resource and running a commercial business, the alternatives of either independent prices oversight or auctions with a cost based reserve price should be attractive. They potentially offer the frameworks and disciplines that can assist in resolving increasing pressures and tensions including increasing conservation demands, a dwindling resource base for logging and exploitation, increasing constraints on management discretion, and the desire to sustain jobs in rural areas and electorates.

Such pressures threaten to squeeze both log prices and sustainability. Auctions with reserve prices established through independent prices oversight and independent monitoring of code compliance and certification are methods of combating these pressures. They also ensure that the community receives a return on the use of its forests, and that there is certainty that this use is sustainable.

10.5 Review of the past decade's changes and reforms

A perspective on changes and reform in forestry policy and practice needs to address:

- the major achievements and changes over the past decade;
- the notable weaknesses;
- the unresolved issues; and
- lessons for other areas of natural resource policy.

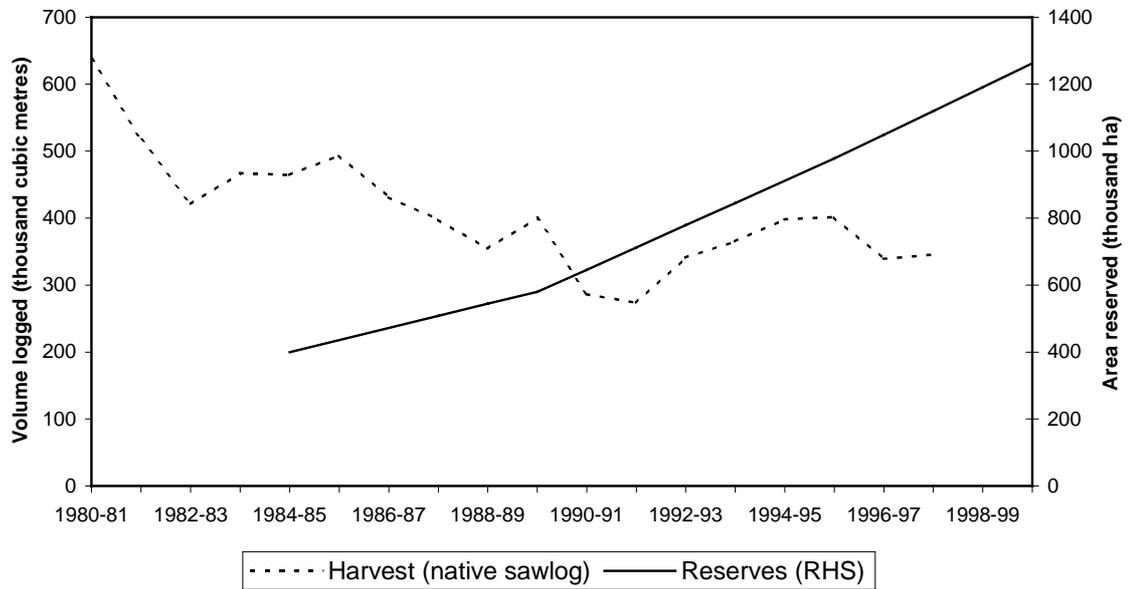
Achievements

In terms of the major achievements and changes over the decade, the first and most obvious achievement is the shift in the revealed preferences of the Australian community and the resulting shift in forestry objectives, areas reserved and allowable harvest (figure 10.4 and box 10.1).

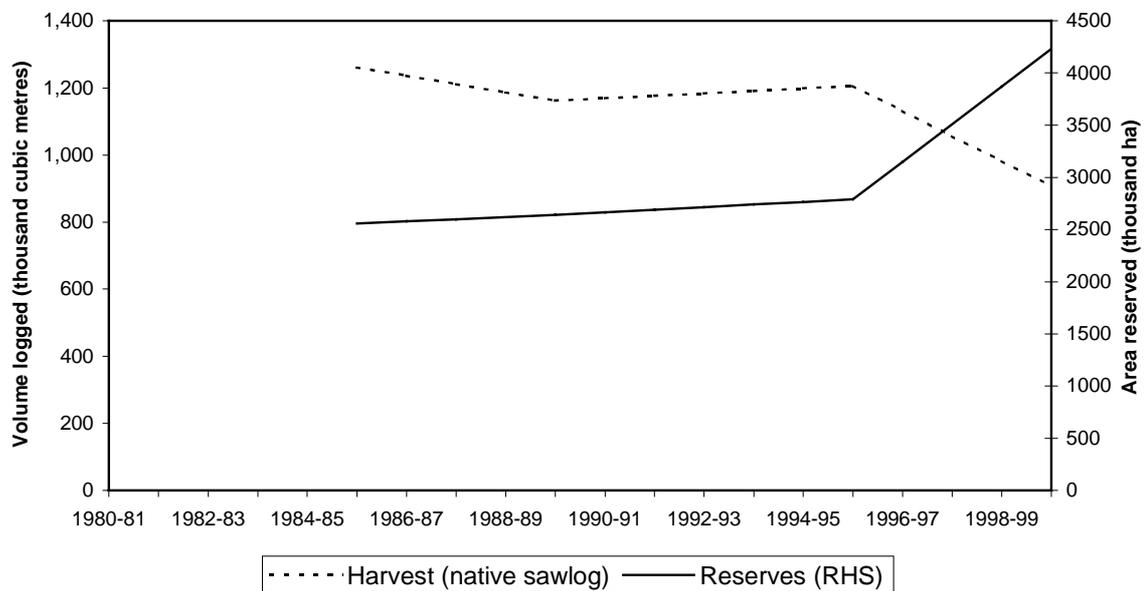
Although the National Forest Policy Statement attempted to resolve the competing demands of forest conservation and forest industry, the debate has continued vigorously.

Figure 10.4 Harvesting of native sawlogs and reserves

(a) – Tasmania



(b) – New South Wales



Sources: Personal communication Forestry Tasmania, August 2000; Personal communication, State Forests of NSW, September 2000.

Box 10.1 Changes in forest reserves and sustainable yields

The adequacy of forestry reserves and the level of sustainable yields remain disputed. Nonetheless, sustainable yields and the magnitude of reserve requirements have been dramatically reassessed, as exemplified in Tasmania.

- To bring the log harvest back to sustainable levels, Tasmania's hardwood sawmilling industry was forced to reduce its harvest of eucalypt sawlogs from public forest from 850 000 m³ to less than 400 000 m³ between 1977 and 1984. To give the timber industry some security, the *Forestry Act 1984* guaranteed a minimum output of 317 000 m³ of eucalypt sawlogs.
- During the latter part of the 1980s, additional reserves (including the Heritage listed Lemonthyme and Southern forests and the Douglas Apsley National Park) were created, further reducing available production areas.
- Sustainable yields for eucalypt sawlogs were further reduced to 300 000 m³ under the 1990 Forests and Forest Industry Strategy.
- Under the Tasmanian Regional Forest Agreement, the total area of reserves increased by a further 29 per cent to a total 1.262 million hectares.
- Subsequent to the Regional Forest Agreement, Forestry Tasmania has increased the level of intensive forestry management to boost the sustainable harvest of eucalypt saw and veneer logs from 300 000 m³ to 400 000 m³.

Source: Personal communication, Forestry Tasmania, August 2000.

In Western Australia, where in the late 1990s dispute over competing objectives was particularly strong, important parts of the political resolution on Karri forests occurred outside the Regional Forest Agreement framework, to the dismay of both the timber industry and the Commonwealth Government.

The experience in New South Wales, Western Australia and Tasmania illustrates several points:

- although all States are signatories to the National Forest Policy Statement and to the respective Commonwealth–State Regional Forest Agreements, the implementation of forestry policy remains a State matter;
- many of these changes occurred before the final endorsement of ecologically sustainable development principles and before the Regional Forest Agreements;
- none of these changes were prompted by the microeconomic reform agenda of COAG or National Competition Policy; and
- generally such changes are well beyond the magnitude recently introduced in the Murray Darling system to cap growth in water diversion.

Second, concepts and criteria have been clarified. The JANIS criteria are an important technical and policy development. The essential flexibility that such criteria must have is also a weakness, because it leads to claims that ‘the JANIS criteria have not been properly followed’.

Third, there has been some increase in value-adding of forest products, stimulated in part by contractual requirements. Whether these requirements overcame market failures or, resulted in unnecessary valueadding is unclear.

Finally, the competitive neutrality reforms required under the generic provisions of the National Competition Agreement have been, or are being implemented. All States have moved to separated forestry businesses subject to tax equivalent regimes, dividend requirements and, usually, community service obligations.

Weaknesses

There are at least four major weaknesses. First, there is a lack of clarity in and agreement on objectives. Forests, trees and ecosystems rank among the highest environmental concerns of the Australian populace (ABS, 1996). Simultaneously, forests provide services to bee keeping, tourism, water production and other ecosystem services, forestry and intergenerational concerns. Maximising the societal value of forests at any point in time, and across time requires a careful integration of these concerns. The present system provides no clear process for setting appropriate and practical objectives. Such objectives and objective setting processes are required to realise all the values of the forest.

Australian forests are managed resources. According to some authorities, natural forests and woodlands may have disappeared some fifty thousand years ago, and were changed again by European arrival (Jones 1969):

As a result of the extensive aboriginal use of fire, the plant communities seen and recorded by Banks were very different from those that exist at the same location today. (Flannery 1994, p. 218)

There is therefore a major debate about what form of management to use and for what purposes. These issues drive straight to the multiple use character of forests and diverse and shifting objectives.

Second, there has been a failure to close gaps in information and trust by using independent, strong, credible monitoring, audit and review processes. Where there is substantial distrust of forest agencies, reliance on self-assessment of compliance with codes of management and Regional Forest Agreement provisions is inadequate. This is especially the case because there appears to be large variation in

the level of transparency of key information across forest agencies. To date, there has been no independent audit of compliance as there has been on, say, the case of the cap on the growth of water diversions in the Murray Darling river system. As noted, this situation is now changing in the forest sector.

Third, there has been a failure to provide specific guidance on pricing and cost recovery principles and application. While there is increasing use of tender processes to allocate licenses, in States other than Western Australia, the bulk of licences are allocated and priced by negotiation. In Western Australia, the Department of Conservation and Land Management seeks to apply a ‘cost of growing’ model to estimate royalties. However, this essentially regulatory approach is hotly disputed by the industry, and the third review of method in four years is now being undertaken.

Finally, there are highly restrictive licences/entitlements to forest use. The forest managers issue licences to loggers and apiarists, but, they do not issue licences to use the forest generically. This is equivalent to issuing rights to use water for, say, rice only and not other purposes. More importantly, other values and uses do not appear to be adequately recognised in the licensing system. The licensing system does not, for example, facilitate a tradeoff between water production and clear felling of forest.

There are also important but lower priority issues, such as:

- the failure of the National Forest Policy Statement to acknowledge conflict and the need for resolution mechanism;
- the fact that the benefit of carbon capture is not explicitly foreshadowed in either the National Forest Policy Statement or in subsequent Regional Forest Agreements; and
- the failure by governments to systematically review and manage Australia’s environmental infrastructure as a whole.

Unresolved issues

While some changes in the objectives of the Australian community for forest use have been clearly signalled, the extent of these changes remains unclear. Major unresolved issues include:

- *Old growth forests.* Should these be logged at all? The Resource Assessment Commission (1992, p. xxxvi) concluded:
... logging of old-growth forests potentially violates the precautionary principle of sustainable development.

It offered two options:

... rapid cessation of all logging operations ...[or]... comprehensive management plans that identify and rank old-growth forests in terms of their full range of values.

Moreover, how should these forests be managed and sustained in the face of threats from fire and storm? And what proportion of regrowth forest or young virgin forest needs to be reserved to replenish existing old growth forest?

- *Regrowth forests.* Aside from the need to replenish old growth stocks, how should regrowth forests be managed in the face of demands for multiple uses? Is the core business still wood production, or is it now forest tourism?
- *Plantations.* How quickly and feasibly can they substitute for native hardwood for sawlogs or woodchipping. Are they a relevant substitute for native hardwoods for woodchipping?
- *Generic issues such as:*
 - the basis of royalties/cost recovery,
 - the role of fire in fire control and forest management,
 - the sustainability of existing harvest levels, and
 - the sustainability of the forest biota and environment.

Reform lessons for other natural resource policies

A first lesson from the recent experience with forestry reform is that resetting objectives has greater impact than increasing the efficiency of delivery of those objectives. Bluntly, the move towards ecologically sustainable development — however uncertain — has been more important for forestry than has the introduction of National Competition Policy.

A second lesson is that broad, reinforcing processes such as National Competition Policy, can potentially aid specific industry policy dramatically. This conclusion follows from comparing the weakness of forestry reforms with water reform in terms of achieving any certainty in the extent of full cost recovery for the community, compliance with codes of management and practice, and well defined property rights/entitlements for users of the resource.

In contrast to forestry, water reform in Australia has relied on the inclusion of the COAG strategic framework for water reform in National Competition Policy. Compared with even five years ago, we now have a much more competitive and efficient water industry with better property rights, new trading arrangements,

separation of functions, corporatisation and privatisation, competitive neutrality and tax equivalent regimes.

However, even the most successful and best publicised environmental initiative in water, the cap on diversions in the Murray Darling Basin, has not gone anywhere near close to ecologically sustainable use of water (box 10.2).

Box 10.2 Murray Darling Basin Commission cap and compliance with the principles of ecologically sustainable development

The impact of the cap on diversions in the basin has recently been assessed by the Ministerial Council.^a For the riverine and wetland environment, the implementation of the cap has merely acted to slow, but not halt, the degradation of those environments. The river system remains in terminal decay.

The cap is set at a level of diversions that contributed to the current degradation of the riverine environment, and while the cap is an essential step in slowing ongoing decline, there should be no expectation that the cap, at its current level, will improve the riverine environment.^b

Indications of continued decline in river health suggest that current land and water management practice will require that the cap allow significantly less extraction if the cap alone is expected to achieve environmental sustainability.^c

Alternatively expressed, current water use in the basin is not sustainable. The cap is not consistent with ecologically sustainable development objectives.

For the social and economic health of the basin and its communities, the impact of the cap has been primarily to underpin the security/reliability of existing users.

The prime benefit of the cap is the guaranteeing of security on a valley-by-valley basis. In the absence of the cap there would be substantial erosion of security of entitlements across the Basin, but particularly in the major southern systems. The magnitude of the erosion is not widely perceived.^d

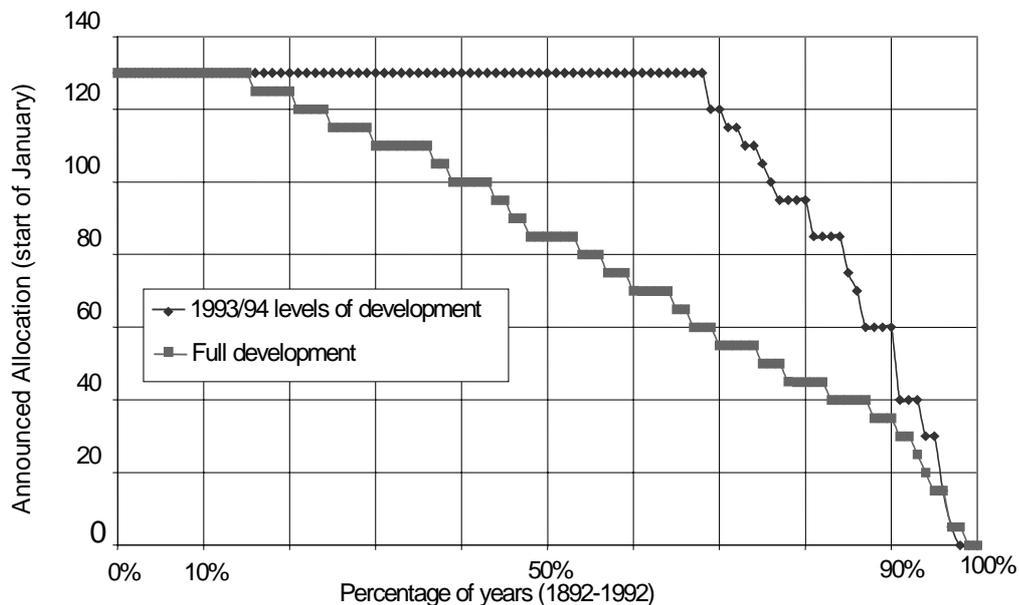
Regulated systems, particularly at the bottom of the River, are very positive about the cap in providing security of supply, encouraging irrigation efficiencies and ongoing reform to high value crops. It is also recognised that the cap will have positive economic and social impacts by providing great security for irrigation allocations.^e

The effect of the cap in underpinning the security of existing irrigators is clearly demonstrated by the comparison of the reliability curves for the 1993-94 levels of development and the full development scenario. This information is not currently available for Murrumbidgee irrigators, but the comparable data for the New South Wales Murray Valley is indicative.

(Continued next page)

Box 10.2 (continued)

NSW Murray Valley – Allocations under (a) 1993-94 levels of development and rules and (b) Full development of all valleys



^a MDBMC (2000); ^b Cooperative Research Centre for Freshwater Ecology (2000, p.3); ^c Cooperative Research Centre for Freshwater Ecology (2000 p. 4); ^d Marsden Jacob Associates (2000, p.iii); ^e Community Advisory Committee (1999) Submission, quoted in Marsden Jacob Associates (2000).

Source: Marsden Jacob Associates (2000).

Third, the redefinition and resetting of objectives can lead to rapid outflanking of key players. Today's responsible entrepreneur can rapidly become tomorrow's polluter or exploiter. Rules such as polluter pays are likely to be useful in indicating who is to blame and much less useful in gaining acceptance of important and desirable policy change. Consequently, structural adjustment assistance is likely to be a key, albeit selective, feature of major policy initiatives in forestry and other areas of natural resources and the environment.

Finally, comparison of ecologically sustainable development and National Competition Policy, the two major initiatives of the past decade — indicates the need to reinforce the objective continually through monitoring and ongoing development. While the achievements of National Competition Policy are tangible, ecologically sustainable development is still a set of principles and not yet observable in either forestry or water.

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10.A Presentation summary

Marsden compared and contrasted reforms in the forestry sector with those in water. He noted that microeconomic reform in the forestry sector has progressed slowly compared with the pace of reform in the water sector.

Marsden noted that the large division in views on the objectives of forest management has implications for public policy:

... we have to devise better institutional arrangements, property rights and so on to deal with the externalities ... but it's not quite clear for which objective, because the objectives have shifted quite recently.

He commented that while the principles of ecologically sustainable development were agreed nationally in 1992, most Australian legislation lacks clear explicit objectives in this area:

... a large part of the community believes that the continued logging of old-growth forest is in contravention of ecologically sustainable development, but the fact is that ecologically sustainable development has been fairly uneven in its application, at best.

Links with competition policy

According to Marsden, a key difference is that water reform in Australia has been explicitly tied to competition policy, while reform in the forestry sector has not. Marsden observed that the National Forest Policy Statement:

... did not get picked up in any way with National Competition Policy and was not attached to the agreement to implement and therefore the discipline and framework which has been available to the other sectors has not been available to the forestry industry.

Prices oversight

Marsden also noted that the forest sector, in contrast to the water sector, has not been subjected to independent prices oversight. Given that State government forestry agencies control significant amounts of forest production, he suggested that prices oversight is needed and that this should fall under the purview of the National Competition Council.

Public distrust

Marsden observed that there is substantial community distrust of the forestry reform process generally. He suggested that mechanisms are needed to ensure much greater

transparency and a higher level of credibility in the facts and the issues surrounding forestry reform.

Substantial rationalisation expected

Marsden commented that the forestry industry is overcapitalised and that it is likely to face substantial rationalisation under microeconomic reform. He noted that significant funding is being provided through Forest Industries Structural Adjustment Package to support rationalisation, but that it is uncertain whether the money will remove the transition problems, and what audit processes are in place.

11 Microeconomic reform and forest environments

Hans Drielsma
Forestry Tasmania

Microeconomic reform has had a profound impact on the forest industry in Australia. The focus of reform on redefining the role of government has been particularly relevant to forestry, in which government has evolved as a major commercial player, with State forest agencies historically controlling and managing the bulk of raw material supply to industry.

The reform of government business enterprises has involved commercialisation, corporatisation and privatisation, with a significant impact on public forestry enterprises around Australia. Policy focus has been on wood pricing and allocation, the identification and transparent funding of community service obligations, and the appropriate basis for commercial investment.

At the same time, the reform process has had implications for the environment, both positive and negative. On balance the positive benefits outweigh the negatives — the latter arguably resulting from a failure of implementation rather than any inherent weakness of the microeconomic reform agenda.

11.1 What do we mean by microeconomic reform?

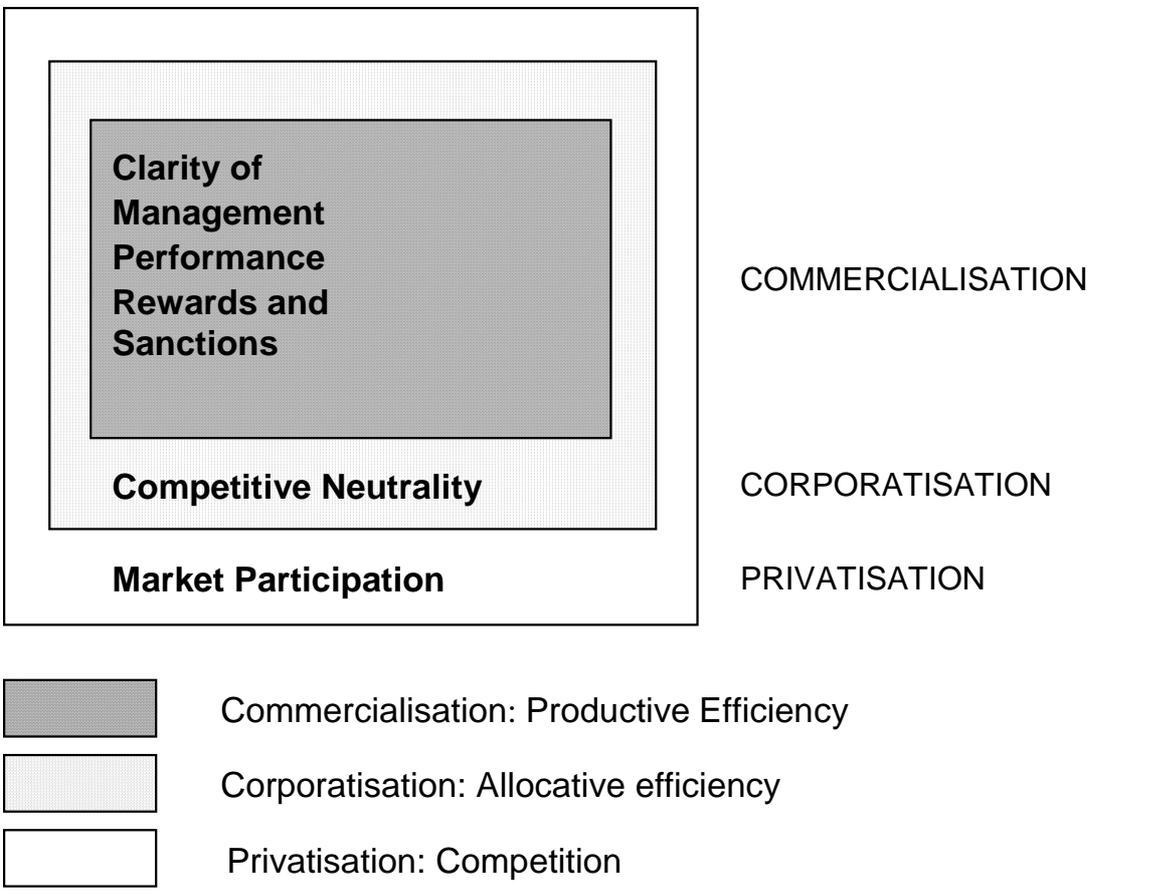
Microeconomic reform is a concept that encompasses a wide range of activities, and no doubt may mean different things to different people. It encompasses tariff reform, deregulation of financial markets, and the removal of anticompetitive governmental structures and policies.

Microeconomic reform has had a focus on the redefinition of the appropriate role of government. In this context, government's role is seen to be solely about income distribution and social policy, rather than the conduct of commercial business.

This has had particular relevance in the forestry sector, where government has evolved as a major commercial player, with State forest agencies historically controlling and managing the bulk of the raw material supply to industry.

During the late 1980s and early 1990s, the New South Wales Greiner Government became the leading proponent of this aspect of microeconomic reform, with an extensive program of government trading enterprise reform. The conceptual underpinning of this reform is captured in figure 11.1.

Figure 11.1 Framework for government trading enterprise reform in New South Wales



It summarises a process whereby government commercial undertakings were subjected to a regime of analysis and reform with three steps: commercialisation, corporatisation and finally privatisation. In this process, the governmental roles of income distribution and social policy (for example, industry regulation) were explicitly separated from purely commercial business — the latter being placed, where possible, on a competitive, commercial basis. The complexity of the social policy issues determined the rate and extent of the move sequentially through commercialisation, corporatisation and finally privatisation.

The objective of the first, commercialisation stage, was to improve productive efficiency in the utilisation of public assets by clarifying objectives, removing from commercial managers the often complex and diffuse objectives relating to social policy outcomes, including industry regulation; and giving managers authority to manage without day to day political direction and oversight. This would be achieved by a formal and explicit process of performance monitoring, and a regime of rewards and sanctions for managers more aligned to those prevailing in the private sector.

In the second stage, where this separation could be fully achieved and reflected in a legislative regime of competitive neutrality, an entity would be corporatised and formally removed from day-to-day political management. The objective was allocative efficiency in capital investment decision making.

The final stage of reform was seen to require the full discipline of the market, with the inherent sanctions of share market valuation and the threat and opportunity of merger and buy-out to achieve a fully competitive outcome. This would be achieved through privatisation.

11.2 Microeconomic reform in the forestry sector

The National Forest Policy Statement (Commonwealth of Australia 1992) implicitly adopted the framework of microeconomic reform. It identified that:

- wood pricing and allocation from public forests had a major bearing on the structure and efficiency of the forest products sector, and committed State governments to increasing the public accountability of their commercial forest operations with specific attention to competition policy and trade practice legislation. The objective was to ensure that prices were market based (covering the full costs of production), that allocation of supply rights or contracts was open and competitive, and that financial reporting was transparent;
- there should be no cross-subsidy between commercial and non-commercial products and services, and cost-recovery mechanisms for non-commercial users should be pursued where appropriate and feasible. Community service obligations should be clearly separated and transparently funded and reported; and
- investment decisions in wood production, particularly plantations, should rest on their economic viability and therefore be driven by market imperative rather than governmental policy dictate.

These policy positions have been implemented both through the general application of National Competition Policy and the specific focus of Regional Forest Agreements.

The implementation of reforms related to these policies has been varied, but widespread. It has seen the most extensive restructuring of government forest administrations since their establishment around the turn of the century. In every State there has been an attempt to both commercialise public forest management and separate out regulatory and non-commercial functions.

The purest expressions of this restructuring have been:

- the corporatisation and subsequent privatisation (trade sale) of the Victorian public softwood plantation estate;
- the corporatisation of the Tasmanian Forestry Commission, and the subsequent part-privatisation (joint venture sale) of Forestry Tasmania's softwood plantations; and
- the establishment of State Forests of NSW as a commercialised government trading enterprise, under a formal dividend and tax-equivalent regime.

Similar restructuring has occurred in other States, but to date is reflected by the establishment of commercial business units within larger departmental structures, where the nature of intradepartmental arrangements and relationships is more difficult to discern without more detailed analysis.

Financial reforms have been widespread, with a significant focus on the market pricing of forest wood products, commercial valuation and reporting of public forest assets, returns on asset, the introduction of commercial disciplines in the evaluation of capital investment decisions, and the explicit determination by government shareholders of financial distribution (dividend and tax equivalent payments) policy.

These reforms have led to a marked increase in the focus of public forest managers' on markets and customers and the creation of market value, as distinct from a traditional focus on the production process and related public policy outcomes.

To varying extents, it would seem that the objectives of microeconomic reform are being achieved. Commercial returns by public forest growers have improved, and at the least are more transparent and policy making and regulation, and the costs thereof, have become more transparent. In addition, participation in the forestry sector has diversified considerably, with a growing private sector investment in and ownership of forest assets as well a broadening of the products and services being traded in the market.

11.3 What are the implications for the environment?

It is difficult to be definitive in evaluating the implications of microeconomic reform on the environment, but a number of areas of interaction are worth analysis.

Integrated land management

One of the principles of modern environmental management has been the achievement of integrated land management — usually expressed as total or integrated catchment management, etc. In forest management, the concept of multiple-use management is related. While there is no necessary conflict between these principles and concepts and microeconomic reform, a faulty logic in implementation appears at times to have worked against this principle.

In seeking to clarify objectives and to separate commercial from regulatory functions, there has also been a tendency to seek to artificially separate out non-commercial services or functions, or even commercial wood production activities from other activities. This has led to a fragmentation of land management functions and the devaluation of the multiple use philosophy, and it will lead to suboptimal economic and environmental outcomes.

In Queensland, for example, forest management planning and recreational forest uses are controlled by a department separate from the commercialised forest manager, DPI Forestry. Similarly, in Western Australia, a new commercial Forest Products Commission is proposed, with responsibility for harvesting and sales but not land management. These structural options maintain the separation of market signals from on-ground activities, and limit the creative opportunities available to managers.

In contrast, under the New South Wales and Tasmanian options, the commercialised and corporatised entities have retained total land management control, but within a strong environmental regulatory framework. Within this scenario the commercial managers have full flexibility in terms of management regimes, product and service mix, and capital investment to explore all available options to maximise both environmental and economic outcomes. At the same time, their accountability for the ongoing maintenance and value of the forest asset is clear and undiluted. The latter structural options will ensure that market demands for alternative forest products and services (for example, tourism, biodiversity and carbon sequestration) are recognised and that they receive appropriate investment — trends that are apparent in both Tasmania (tourism) and New South Wales (carbon sequestration).

Environmental policy and regulation

There can be little doubt that the transparency of the regulatory regime for forestry has improved dramatically. In Tasmania, the corporatised Forestry Tasmania operates as a commercial timberlands manager with no regulatory functions or regulatory powers, essentially operating on a level playing field with other private forest growers, and subject to the same suite of environmental laws and regulations. The Forest Practices Board, an independent statutory authority, regulates forest practices across private and public land, and Private Forests Tasmania advises the State Government on private forest sector policy.

In New South Wales, State Forests of New South Wales is also subject to a complex array of external regulation and, more problematically, a regulatory regime not essentially shared equally across public and private tenures. This shortcoming is shared in more or less measure with other States. The question here is less about improved environmental outcomes, than about the efficiency with which these outcomes are being achieved.

Investment in wood production

There again seems little doubt that the commercial landscape has been transformed, aided by microeconomic reform, and that capital markets are increasingly recognising timberlands as a valid investment. This is demonstrated by overseas investment in existing forest assets (for example, Hancock's Victorian Plantations and GMO Renewable Resources' joint venture investment in Tasmanian softwoods) and the growth in prospectus-based investment in eucalypt plantations.

We have long identified the need for reforestation on a massive scale to combat environmental problems in our rural lands — salinity, rising watertables, erosion, etc. — so one presumes this is essentially good for the environment. However, negative social reactions in some regions have raised new environmental dimensions that need to be addressed.

On the other hand, increased financial accountability and transparency have introduced stronger disciplines on capital investment and overall financial performance, which have steered activity away from investments of marginal or perhaps even negative economic utility. This has distracted investment away from native forests into plantations, and from lower productivity forest to higher productivity forest. Whether this is perceived as having positive or negative environmental implications is problematic. While arguably environmental impacts may be seen to have reduced, so have management inputs, which rarely have been

replaced by increased funding for conservation reserve management or community service obligation funding to forest agencies.

Investment in non-wood products and services

Following from the previous point, public forest managers have conducted a more transparent identification of community service obligations. However, this has not led to improved or explicit funding of these activities, and instead has often led to a reduction in public investment.

Forestry Tasmania receives no government funding for community service obligations, despite its stewardship for nearly 200 000 hectares of conservation reserves, and public recreational visitation exceeding 400 000 hectares annually. Forestry Tasmania continues to maintain a strong program of expenditure in these areas, as do most commercial corporate private forest owners. While Forestry Tasmania's investment in these areas exceeds that of equivalent private forest owners, and public expectation of continuing investment are high, the level of investment has declined from pre-reform days. A similar situation has been apparent in New South Wales, where the Government still makes community service obligation grants, but at reduced levels from pre-commercialisation days.

The failure of government to back policy with funding creates tension and issues of cross-subsidy for public forest managers. On the other hand, the redefinition of commercial objectives, a focus on asset use, and attention to market signals has opened up a variety of new product and service opportunities for forest land managers, including commercial tourism, carbon sequestration, salinity control and biodiversity.

Forestry Tasmania has identified commercial tourism as a specific segment of its business and future strategy to use more fully its forest asset and to improve commercial return. State Forests of NSW has been a leader in developing the market for carbon and salinity credits, and thinking more broadly about the commercial value of environmental services from forests. This ability and incentive to respond to new market demands from forests should be seen as an environmental benefit.

11.4 Focus on markets

Attention to markets and commercial returns has brought with it an increased sensitivity to the markets' expectations of environmental outcomes. The Australian forest industry has become increasingly exposed to international markets, both directly for products and indirectly through capital investment. The sensitivity of these markets to environmental performance, expressed through demand for forest certification, has begun to influence forest managers in a way never previously experienced. Environmental performance is now moving beyond governmental regulation to voluntary adoption of environmental standards (for example, ISO 14000) and the pursuit of a voluntary forest certification standard through the joint initiative of public and private forest growers and industry.

11.5 Conclusion

Microeconomic reform has had a profound influence on the forest sector by restructuring public forestry, improving productivity and efficiency, and providing a significantly enhanced platform for the generation of wealth for Australians. At the same time, it has had implications for the environment — both positive and negative.

On the negative side, there has been a tendency to fragment integrated land management of public production forests, and government funding of non-commercial forest uses and services has declined.

On the positive side, microeconomic reform has assisted in creating a more healthy and diversified climate for private investment in forest timberlands, which has resulted in record levels of plantation expansion and the creation of new markets for forest services with a strong environmental value. It has also led to a strong and transparent regulatory framework, but not necessarily always the most efficient framework.

Further, microeconomic reform has led to more explicit and transparent valuation of public forest assets, and to disciplined investment decisions about better economic outcomes (and, arguably, more efficient environmental ones). The greater focus on markets has exposed public forests to the environmental expectations of international forest product and capital markets.

On balance, the positive benefits outweigh the negatives — the latter arguably resulting from a failure of implementation rather than any inherent weakness of the microeconomic reform agenda.

In a recent critique, the Australian Conservation Foundation (1998, p.10) argued that competition policy principles have not been well applied to forests:

State-owned native forests agencies are not required to cover all their costs, and nor are they required to pay dividends to tax equivalents to governments. Cross-subsidies are not only allowed; they are integral to their way of doing business. Despite significantly higher annual yields possible from hardwood plantations managed to best practice forestry and agronomic standards, unfair competition from these State agencies renders private hardwood plantation investments simply uneconomic.

Patently this critique, to the extent that it may have had some validity in the past, was well past its use-by date at the time it was made, and it has become only more so. Commercial State forest agencies are now generally fully covering costs, and usually are required to pay dividends and tax equivalents. Cross-subsidy, where it continues, favours the non-commercial forest user, while both private and public hardwood plantation investments are booming.

References

- Australian Conservation Foundation 1998, Submission to the Senate Select Committee on the Socio-Economic Consequences of National Competition Policy, Submission no. 88, Canberra.
- Commonwealth of Australia 1992, *National Forest Policy Statement — A New Focus for Australia's Forests*, AGPS, Canberra.

11.A Presentation summary

Drielsma suggested that microeconomic reform has profoundly influenced the forest sector in Australia, by restructuring public forestry and by forcing forestry managers to focus on markets and customers. He believed that this has generated mixed results for the environment and the sector, although the positive effects overall outweigh the negatives.

Integrated land management

On the negative side, Drielsma observed that integrated land management has suffered under reform in some States; the separation of commercial and regulatory functions has led to a fragmentation of land management functions. He suggested that this is not a fundamental flaw of microeconomic reform, but a result of how it has been applied.

Community service obligations

At the same time, government has wound down its funding of community service obligations. Drielsma commented:

So in Tasmania, while Forestry Tasmania, as a government-owned timberlands manager, still has very large expectations put on it in regard to investments in what we would call non-commercial services — community service obligations — we actually get no funding from the government to provide those services ... While we maintain a level of investment in those [community service obligations] which is certainly higher than a private sector manager would maintain, there is no doubt that we have wound back our investments and the government has not topped those up.

Prices oversight

Drielsma suggested that some parts of the forest products market are in highly 'exposed' markets in regard to competition and, consequently, that pricing oversight is unnecessary:

... the forest agencies tend not to be in monopoly positions. They're certainly in dominant positions in some local markets but when we look at the private sector, when we look at the import situation, they generally are in a very trade exposed position. So generally monopoly pricing is not really the issue and it was [on] that basis that New South Wales quite explicitly rejected government pricing tribunal oversight of forest product pricing.

Improved performance and investment

On the positive side, Drielsma observed that microeconomic reform has led to increased financial accountability and transparency, which have resulted in improved overall financial performance and increased capital investment. He commented:

Private sector investment both directly in purchasing government assets and directly in establishing new forests has grown tremendously ... this year we will establish something like 150 000 hectares of plantations across Australia, most of that coming from private sector investment, and that's an order of magnitude increase on what has been happening in previous years.

Development of environmental markets

Drielsma also noted that microeconomic reform has assisted in creating new markets for forest services with an environmental value. On the world market, the greater focus on competition has exposed public forests to the environmental expectations of international markets.

12 Discussion: the forest sector

There has been considerable interest in how the reform of government forest agencies has had an impact on the environment and the benefits derived from forests. Microeconomic reform in the forestry sector has had some positive environmental effects in some cases, but not always.

Developing a market focus

It was generally recognised that forestry management has become more market focused under microeconomic reform. The implementation of competitive neutrality and extensive reform of State forestry organisations — from commercialisation through to corporatisation and privatisation — have changed the forest grower/management organisations' focus from wood production to management of a commercial enterprise. Initially, reform was about clarifying objectives, giving management authority, setting clear performance requirements and performance monitoring, and giving managers rewards and sanctions akin to the private sector. The agenda of the (1992) National Forest Policy Statement was increased public accountability from government sector managers, the introduction of the principles of competition policy, and the achievement of a much more open and competitive sector. This reform has profoundly affected investment analysis in forestry (particularly hardwood plantation establishment), the intensity of management in native forests, log allocation and pricing processes, and overall market consciousness (including a focus on consumers and returns to shareholders (often taxpayers)).

Simultaneously, the wood-processing sectors underwent significant changes, including concentration of ownership, the amalgamation of processing units, and the introduction of new, more capital-intensive, technology requiring greater labour force skills. The speakers agreed that, along with microeconomic reform and industry change, a third parallel driver of change was a significant environmental reform agenda as public attitudes changed. This had two major offshoots: stronger environmental protection standards (for example, Codes of Forest Practice, reduced-impact logging techniques, buffer and retention areas) and changing consumer preferences, leading to interest in forest certification.

Drielsma observed that forest certification and labelling has provided the opportunity for consumers to express their preferences through the market. Marsden observed that the certification of forestry products as being ‘responsibly produced’ is likely to become an important issue for Australian foresters, particularly in winning exports for Europe. Drielsma indicated a number of certification processes exist or are being developed, including a proposed Australian Forestry Standard. Kanowski added that some preliminary scoping of certification of Australian forests by the (international) Forest Stewardship Council is underway.

Pricing of forest products

Fisher queried which factors should be incorporated into the prices, conditions and mechanisms (for example, long term contracts and auctions) of sales of timber, particularly given that the extent of available forest resources may be overestimated or that resource prices may be artificially low.

Drielsma suggested that pricing issues are not a relevant concern for the commercial forestry sector. He observed that Australian commercial forestry is a small player on the world market, and that competition for markets means it is not possible to protect the forestry sector. He suggested that log pricing is competitive, and that this obviates the need for pricing oversight in the sector.

Marsden claimed that log pricing in New South Wales and other jurisdictions, is essentially on a ‘residual value’ basis. He suggested that this results in a ‘tailormade charge, not unlike the tailormade tariff that we used to have in Australia.’ A government business, whether it is a pure monopoly or just dominant in the market, can misprice — either overprice and extract monopoly rents, or underprice the resource or the service.

Drielsma disagreed with Marsden’s characterisation, and noted that Tasmania does not apply residual pricing. Drielsma emphasised the importance of microeconomic reform in setting appropriate incentives for managers. He also noted that:

... if there is monopoly pricing, then there is an argument for government pricing regulation. In the absence of that, if the proper capital requirements are placed on a government trading enterprise — that is, the assets are valued appropriately, and there is an appropriate regime placed on the business enterprise to return dividends back to the shareholders based on an appropriate rate of return on that properly valued asset — then issues of how the prices are set fall away. There have been very positive moves towards proper valuation, and tax and dividend regimes being placed on those commercial managers.

There was further discussion about the extent to which those commercial disciplines are applied to State forestry agencies. Wholesale prices for sawn timber are

competitively determined at border-parity prices, which prevents forest owners and log sellers setting excessively high prices. However, it was argued that they may still charge much less for their logs than the market (sawmillers) would bear. This may result in a transfer of economic rent from forest owners to sawmill owners and employees, and arguably contribute to significant distortions in land use practices. The issue of whether microeconomic reforms have meant an end to ‘underpricing’ of logs was unresolved.

Marsden observed that full pricing of natural resources has still not been achieved in other sectors.

Potential conflicts with other resource uses

It was observed that commercialised forestry could conflict with other forms of natural resource use. Young noted that increased amounts of water will be needed to sustain the increasing area of land devoted to commercial plantation forestry, of which much appears to be driven by (primary producer) income tax concessions. Examples were noted of increased plantation establishment in Western Australia and South Australia, where water use by plantations is likely to become a major issue in the future and could divert scarce water supplies away from other uses. Butcher noted that the expansion of plantations could also have an impact on biodiversity, because many new plantations are not located on already cleared land.

The problem was recognised as one relevant to all environmental issues. Kanowski observed that enthusiasm for expanded forestation in *Plantations for Australia: The 2020 Vision* (prepared by representatives of Commonwealth and State governments, forest growers and wood processing industries) has been somewhat tempered by the realisation of the major potential tradeoffs in biodiversity and water. He suggested a landscape scale mechanism is required, to integrate those different components of land-use change, environment and economic outcomes in a way that maximises benefits. Goss suggested that the discussion of tradeoffs between forestry water use and other water uses has been oversimplified in general. He questioned the risks of having a common industry policy for forestry in this regard. Marsden emphasised the need to integrate policies to deal with the issue.

Future directions

Overall, it was observed that microeconomic reform in the forestry sector has resulted in positive and negative outcomes. Much of the failure to progress further with reform has resulted from the absence of links between forestry reform

generally and National Competition Policy. Reinforcing these links could aid policy change.

To ensure future policies generate positive outcomes, the workshop participants agreed that there is a need to integrate or coordinate forestry policies with the policies from other sectors such as water. And to ensure integrated land management is achieved, forestry managers also need the flexibility to bring together all the parameters of forest management.

PART VI

PANEL DISCUSSION

13 Panel discussion

For the panel session of the workshop, four speakers, representing a diverse range of backgrounds and expertise, drew together the threads of the day's discussions. This section provides an overview of each panel speaker's presentation and then summarises the ensuing discussion.

13.1 Presentations

Graeme Samuel **National Competition Council**

Water reform

Samuel considered that pricing reforms and water trading, while economic measures, have been undertaken with environmental objectives in mind. He described water reform as 'an environmental reform sheep dressed in economic reform wolf's clothing'.

This differs to the typical approach to economic reform, whereby environmental impacts are a secondary issue often requiring separate regulation at a cost to the economic imperatives. According to Samuel, significant progress has been made in the water sector but many substantial challenges remain.

Electricity

Samuel interpreted Hamilton's presentation as suggesting that the negative environmental impacts of efficiency gains in the electricity sector, brought about by microeconomic reform, should be mitigated by slowing, or even reversing, these reforms. This is an approach that Samuel does not support. Samuel suggested that consideration of electricity reform would benefit from reflection on how the economic goals of microeconomic reform may be achieved consistent with the goal of environmental sustainability.

Transport

Samuel considered that Slatyer had highlighted the ‘core of the solution’ to environmental sustainability by suggesting a need to develop technology to deal with environmental efficiency, rather than focusing on limiting the source of environmental impacts (such as the private motor car). For Samuel, the establishment of a stable and growth driven economy could be a way of achieving this, because it would provide gains that could fund various activities, including:

- broader community discussion, information and awareness of the issues, as suggested by Fisher;
- the development of technology to provide environmental sustainability consistent with economic efficiency, as highlighted by Slatyer; and
- structural adjustment assistance.

National competition policy

Samuel considered that the agenda set in 1995 was ambitious and, despite opposition to the program in some circles, that its achievements have been ‘remarkable’ and ‘commendable’ although ‘far from complete’. According to Samuel, completion of the program will require continuation of the vital ‘carrot and stick’ lever of the competition payments. This lever operates in the context of behind-the-scenes negotiations, which the National Competition Council finds effective. Samuel suggested that this approach may be usefully adopted in dealing with some of environmental issues raised during the workshop.

Samuel emphasised the importance of ensuring that governments remain committed to an ongoing reform process. In terms of competition policy, he considered that the signs are positive in this regard.

Anwen Lovett National Farmers’ Federation

According to Lovett, while the workshop focused on the environment and microeconomic reform, social aspects of reform cannot be ignored if sustainable solutions in natural resource management are to be achieved.

Lovett stated that issues such as dryland salinity have a significant impact on rural communities. She considered that strategic investment would be required to address these issues. Lovett was particularly concerned that the rural sector has been identified as a low cost sector for achieving reductions in greenhouse gas emissions.

For Lovett, the workshop discussions had highlighted that Australians, as a whole, poorly value natural resources and environmental assets, and that market signals on environmental values are weak. The joint National Farmers' Federation and Australian Conservation Foundation report (NFF/ACF 2000), referred to several times during workshop discussions, was an attempt to obtain public recognition of the magnitude of the issues involved and the order of investment required, and to emphasise the need for natural resource management to again become core business for government.

Lovett highlighted the significant gap between policy and implementation:

... in natural resource management ... we're very good at writing policy. There's an enormous number of strategies out there in natural resource management but we're really struggling to come to terms with how to implement those actions.

Lovett also emphasised the impact that environmental reforms will have on the structure of rural communities and the difficult task of dealing with cross-sector issues and tradeoffs such as the impact of revegetation on water use.

Suggested reference

NFF/ACF (National Farmers' Federation and Australian Conservation Foundation) 2000, *Repairing the Country: A National Scenario for Strategic Investment*, Canberra.

Stephen Dovers **Centre for Resource and Environmental Studies, Australian National University**

Dovers emphasised that it is important to consider issues related to microeconomic reform and the environment as part of a broader, complex political, social and policy phenomenon. He suggested that the context is important for understanding many issues and many sectors: 'we have to make sure we know the nature of the beast'.

However, he also suggested that there is a high degree of commonality and connection across environmental problems. In this context, treating ecologically sustainable development or the environment as a number of unrelated sectors is 'extremely dangerous':

We can't divorce water from biodiversity from forests from salinity and so on ... They cut across time and space ... There are possible limits, cumulative effects, very poorly defined policy and property rights and responsibilities ...

In comparing competition policy and ecologically sustainable development, Dovers noted that ‘competition policy is a lot more pervasive, strong and institutionally supported than ESD [ecologically sustainable development] policy has been’. However, both competition policy and ecologically sustainable development need to operate in the context of common features such as regional decline and the loss of political trust. Dovers suggested that the loss of political trust is felt most intensely in regional and rural Australia, which is precisely where environmental problems are greatest. Dovers considered that these contextual features cannot be ignored in policy development in either area.

Dovers considered that policy makers should not forget cross-sectional issues such as biodiversity and the legal framework. According to Dovers, it is necessary to re-examine the adequacy of statutory frameworks for institutional change. Ecologically sustainable development principles have now been incorporated in some legislation, but poorly. Dovers noted that if we can review thousands of statutes for anticompetitive effects as part of competition policy, we could conduct an equivalent process of legislative review for unsustainable elements.

In addition to reconsidering the role of law, Dovers identified a need for empirical investigation of rights markets. Rights markets are increasingly promoted (and used) in natural resource management but have not been adequately analysed in terms of how they are performing in environmental, social and economic terms.

A readily actionable item, according to Dovers, is to consider the impacts of microeconomic reform and public sector change on basic long term environmental research and on environmental monitoring capacities, especially on monitoring that is useful for policy making:

The data underpinning much of what we do is appalling and we are watching a decline in those capacities.

Suggested reference

Dovers, S. and Gullett, W. 1999, ‘Policy choice for sustainability: marketization, law and institutions’ in Bosselman, K. and Richardson, B. (eds), *Environmental Justice and Market Mechanisms*, Kluwer Law International, London.

Molly Harriss Olson **Eco Futures**

For Harriss Olson, the issues examined during the course of the workshop highlighted that there have been major failures in the market, competition policy, regulatory policy and in internalising externalities:

... with our best intentions we seem to develop our economic and institutional structures with the most astonishing imperfections.

According to Harriss Olson, these failures are highlighted by various examples, such as the fact that technology that produces environmental gains is often available, yet is not used because a lack of market demand and a lack of supporting infrastructure mean it is not commercially viable.

Harriss Olson pointed out that the changes occurring at a macroeconomic level will affect the way in which we deal with issues such as the environment, as exemplified by the significant growth in socially responsible investments by companies and managed funds. She also pointed out that a small segment of innovative business is way ahead of both the market and regulatory arrangements in the way in which it operates.

13.2 Discussion

The discussion following the panel speakers' presentations focused on the following key areas:

- the adequacy of the economic framework for dealing with environmental issues;
- the potential applicability of a 'carrot and stick' approach (as is embodied in the competition payments) for achieving environmental reform; and
- ideas for future directions.

Adequacy of the economic framework for assessing environmental issues

The merits, or otherwise, of an economic framework for considering environmental issues was raised by various participants.

In Hamilton's view, evidence of the impacts of microeconomic reform on the environment is ignored. Hamilton considered that microeconomic reform should wait when the environmental impacts of the reform are large and negative, and when we cannot adequately deal with these impacts. In these cases, Hamilton considers that microeconomic reform should be deferred until it can be undertaken properly — that is, until the environmental implications of microeconomic reform can be adequately addressed. According to Hamilton, this approach implies that all aspects of the economic framework are taken seriously — not just those relating to perfectly competitive markets, but also those relating to externalities and public

goods. In a similar vein, Denniss queried the definition of 'efficient' used in National Competition Policy. He asked how electricity reform could be considered efficient without an assessment of the associated large negative externalities.

Samuel disagreed with Hamilton's suggested approach. He considered that dealing with public interest issues arising through microeconomic reform does not necessarily require adoption of a less efficient economic structure.

Kates considered that the economic framework was the only framework that could be used to make progress in considering environmental issues, and that its most significant contributions are its focus on costs as well as benefits, and its analysis of the merits and limitations of markets.

Dovers disagreed with this view. He considered that economics, particularly the neoclassical economic framework, cannot deal with long run sustainability issues. Harriss Olsen also considered that economic frameworks are imperfectly designed, and that frameworks, while required, must be improved over time. Similarly, Slatyer stated that economics has a long way to go to understand long run impacts fully or to deal with indirect impacts and scientific uncertainty about cause and effect. However, Harriss Olson pointed out that economists' understanding of such issues has dramatically improved.

Potential applicability of a 'carrot and stick' approach to environmental reform

Samuel considered that the 'carrot and stick' approach had worked in the context of competition policy, and that it may be a model worth adopting to achieve environmental reform. However, he noted that it may be difficult to get the States to agree to this type of arrangement again. On the other hand, Samuel noted that environmental reform would produce substantial financial, social and environmental dividends to the Commonwealth Government, which could be passed on to the States in exchange for implementing environmental reform.

Fisher agreed that a 'carrot and stick' approach would be useful to achieve environmental reform, and was more positive about the prospects of the States agreeing to a process that involves funding conditional on performance. Fisher also emphasised the need to ensure accountability and efficiency in the use of public funds for the environment, and the need for a national policy framework in the area of natural resource management and the environment.

Harriss Olson also emphasised the role of performance standards, given the level of funding that will need to flow to rural communities to bring about environmental

improvements. She noted that accountability has not always been a feature of funding arrangements. Lovett added that, apart from ensuring accountability of arrangements between the Commonwealth and the States, farmers would also need to be more accountable in terms of their environmental management.

Goss explored why the ‘carrot and stick’ approach of competition payments is successful. He considered that it forces continued negotiation between the Commonwealth and States on reform issues. He drew parallels with the process used by the Murray Darling Basin Ministerial Council, which also encourages Commonwealth–State negotiation on environmental management. The ministerial council processes encourage continuing negotiation by requiring decisions to be made unanimously (or reversed unanimously), and by requiring the parties to meet under statute. Despite the advantages of these processes, Goss considered that both have real risks of fracturing.

Future directions

Samuel raised the question of whether water reforms perhaps provided useful lessons for achieving reform in other environmental sectors. He noted that the reform agenda for water goes beyond the usual competition policy agenda of removing impediments to the operation of markets to change structures in a way that allows business to deal with environmental issues. As such, it could provide insights into the issues that government will need to deal with in other environmental contexts.

Marsden asked participants to consider what components a future framework for environmental reform should comprise. He considered that such a framework should include legislation review, monitoring and assessment of outcomes, and a requirement that investment decisions explicitly account for ecologically sustainable development. Samuel added that another fundamental element would be a requirement for cost–benefit analysis of economic and social issues. He acknowledged that cost–benefit analysis of social issues was sometimes missing in National Competition Policy.

Taking a different approach to future directions for environmental reform, Slatyer questioned whether it would be useful to conceptualise farming differently rather than focus on the amount of funds required to correct environmental problems or concerns. According to Slatyer, the conceptualisation of farming could be broadened beyond the production of traditional products, such as food and fibre, to include environmental services such as those provided by soil, water and biodiversity. Markets could then be devised for these other products and services which would move us towards a solution. Remaining tasks would include

developing a way in which to recognise property rights, and obtaining the scientific know-how to identify changes in the quality of soil, water and biodiversity attributable to an individual farmer's efforts. He considered that recent scientific developments in this area are promising. For Slatyer, this implies that we could possibly create a situation where farmers are viewed as custodians or managers of the landscape, and rewarded by the population for sound environmental management.

Lovett agreed that this approach was a way forward, but considered that it would take some time to establish. She considered that an important initial step should be a widespread education campaign to inform all Australians about the environmental services provided through sound land management by farmers and other land users.

In commenting on future directions in general, Beardow emphasised the social aspect of reforms in any sector and the need to 'bring in the people' to achieve objectives. She considered that this was a clear lesson of competition policy. Similarly, Kates noted that environmental or economic policies are severely limited by what is acceptable and tolerable politically.

SUMMARY

14 Summary

Mike Young
CSIRO Land and Water

14.1 Introduction

Australia has made impressive progress in microeconomic reform in the past decade. Many lessons have been learned along the way, but as problems have been solved, new ones have been discovered. While reforms that have rapid feedback effects are relatively well understood, those involving feedback effects over a much longer term are not. These slower feedback effects are part and parcel of environmental issues. In these cases, the relationship between cause and effect is not always understood and, at times, the focus is on immediate symptoms, rather than the fundamental problems and causes.

National Competition Policy seeks to remove impediments to the operation of market disciplines and processes. The result has been a clear improvement in productive and allocative efficiency in some cases. Processes have become more transparent and prices better reflect true costs. However, while significant progress has been made in microeconomic reform over the past decade, there has been a general lack of progress in environmental reform. Some significant achievements have been made in the forest and water sectors, but the same cannot be said for other environmental issues such as greenhouse gas emissions. As yet, there has been little progress towards what some people refer to as the 'triple bottom line', which is the simultaneous delivery of environmental, social and economic improvement.

If economic reforms produce increases in productivity, which then produce more environmental degradation or social decline, then one must question whether true progress has been made. Arguably, the search for policy instruments and reform strategies that guarantee simultaneous progress across the entire frontier of social, economic and environmental objectives is one of the biggest challenges to face governments in the future.

A clear message of this workshop is that addressing environmental concerns is not a simple proposition. This is largely because environmental interactions are complex

and interdependent, and long time lags are involved. Reform in the forest sector, for example, can have implications for water use and, through altered flows, the quality of wetlands. While it can be easy to develop simple prescriptions for environmental problems, it is very difficult to find solutions that work in all cases across space and over time. It can also be difficult to assess progress in reaching objectives. Developing a way in which to do this is an important challenge, and success will partly depend on how we address another key issue raised by this workshop — the inadequacy of data and information.

The inadequacy of data and information embodies both a lack of it, and a lack of access to it by the community. Determining ways in which to provide broader access to data and information would improve individuals' ability to make decisions that account for environmental and other long term impacts. Improved access would also help address issues of public trust in policy processes — issues that were also raised during workshop discussions.

14.2 Key issues

A major issue identified at this workshop is the need to determine the best sequencing or ordering of reform. This involves considering whether it is acceptable to leave environmental reform for a while, make changes slowly, or whether action is required urgently because the environment is in major crisis. The Head of the Commonwealth Treasury and many others are expressing concern about the increasing cost of deferring expenditure on the resolution of environmental problems.

A related question is whether economic reforms should be implemented incrementally or only once a complete integrated solution (including an environmental solution) is available. This issue of amalgamating or separating the environment from economic reform processes needs careful consideration. While the integrated solution may be theoretically attractive, the sequential approach is more feasible in practice. However, it is obvious that the expected future costs of environmental degradation are increasing. And, in the long run, divorcing the economy from the environment does not make sense. If economic improvement is put before environmental and social improvement, it is important that these closely related objectives follow in the sequence and are not put off indefinitely.

Another key issue raised in workshop discussions was that of welfare — that is, the impact of environmental and economic reforms on people's lives and livelihoods. There is a need to acknowledge that the condition or state of environments, communities and natural resources are far from uniform across Australia, and that

the design and implementation of reforms need to account for these differences. Finding ways to deal with social issues transparently and equitably are important tasks for the future.

The pace of change and its implications for the community, as well as for the environment, also need to be addressed. In some cases, there is time to deal with environmental concerns but feedback from the actions taken can be slow. This highlights the need to engage the community and industry in resource and environmental management to improve understanding of the gains that environmental reform can bring.

14.3 A way forward

This workshop has identified many opportunities for change. Improving the use of incentives and identifying the appropriate mix of instruments to signal the extent of externalities are key issues for the future. The latter goes beyond improving the specification of property rights and the design of markets to better reflect community concerns about environmental outcomes. It also involves acknowledging the merits of, and making use of, other tools such as regulation and statements of obligations and responsibilities. It will also be important to develop ways in which to understand how such mixes of instruments should change through time.

Audits and accreditation and certification systems can also play a role. Importantly, all of these tools need to be designed carefully, and they should evolve and improve over time. It is interesting to note that accreditation and certification arrangements associated with the environment are being developed by industry, not government. Some of these firms see certification as a means to increase market share at the expense of other firms who are less able to compete on environmental performance as well as price. Others add altruistic and ethical reasons to the case. Many are finding that ‘polluting wastes’ can be turned into profitable products.

Institutional reform is also required. Institutions need to be improved so they provide incentives that encourage government agencies and other decision makers to produce decisions that are efficient as well as equitable, and remain so. This requires improved mechanisms to ensure accountability of all players.

A response to the data and information inadequacies identified by the workshop is also required. This includes considering ways in which to improve the education of, and consultation with, the community and industry about the processes of reform and their expected benefits and costs. There is a need for a clear set of principles on

which managers can call to decide how best to engage the community in decision making.

Most importantly, a review of reforms achieved to date is needed to identify insights for the future. National Competition Policy has built a strong platform from which it will be easier for Australia to meet the challenges characterising its commitment to ecologically sustainable development. Whether the way forward requires a whole new framework, an extension of the competition policy framework, or simply a re-statement of its objectives remains to be answered.

Environmental objectives need to become an integral part of microeconomic reform. This will require stronger environmental and social signals in the frameworks that guide development and assessment of compliance with National Competition Policy. In doing this, it will be necessary to consider how best to integrate concepts such as the maintenance of intergenerational equity and the precautionary principle with economic concepts (such as the discount rate) and standard assumptions (such as that the relative prices of environmental and marketable assets will remain constant through time).

While the most appropriate form of the framework for the future is not clear, the framework should be one that enables the following issues to be addressed.

- What is the state of the environment and how is it expected to change over the next few years as a result of reforms that are already underway?
- Who should pay to address environmental problems, especially those induced by incentive programs of earlier eras?
- What principles should drive the formation of environmental policies and guide tradeoffs among social, economic and environmental objectives?
- How can the costs to the environment of various activities be internalised?
- Which operational frameworks and tests will provide an objective means to assess whether progress is being achieved simultaneously on the environmental, social and economic fronts?

Epilogue

*Neil Byron
Productivity Commission*

*For every complex problem, there is a simple solution,
which is invariably wrong!*

To understand the interactions between microeconomic reform and the environment is a complex task, and I never expected that we would achieve closure at this workshop. This workshop was exploratory — an attempt to unpack diverse relationships between different types of microeconomic reform and just four dimensions of that complex of bio-physical systems that we foolhardily lump together and call ‘the environment’. Discussions at the workshop identified important differences in the way each of the four sectors have interacted with microeconomic reform. At the same time, a clear message is that environmental issues cannot be addressed in a piecemeal way because of the interdependencies within the system, such as between water and forests, forests and greenhouse gas emissions, land degradation and water quality, and so on.

It was ambitious to attempt all this in one day, and we could have spent at least a day on each session. But what I found particularly informative were the comparisons and contrasts between sectors in the types of microeconomic reform undertaken, whether the reforms have had beneficial environmental and social impacts (and, if so, why), and what experiences may be relevant and transferable to other sectors.

One insight from the workshop is the need to have a sensible and coherent ‘big picture’ for each sector, as well as for the country/society/economy. John Paterson called this a threshold issue — a pre-requisite before making incremental adjustments such as pricing, management reforms, etc. It seems to me that the Council of Australian Government’s water policy provides such a strategic vision and framework. The National Forest Policy Statement of 1992 attempts to do so, but to a lesser degree. There is currently no strategic vision regarding environmental issues related to the energy and transport sectors. The focus of the National Electricity Market is to improve the market performance of the electricity industry, rather than on environmental issues. However it seems that the issues can be

worked through, with some transitional problems. In the transportation sector, dealing with the absence of a coherent strategy seems critical if we are to address effectively the microeconomic reform or the environmental issues, and preferably we should do both simultaneously.

The quest for greater economic efficiency/productivity and the increase in public environmental awareness are both major drivers of reform. The twin objectives are closely intertwined in the water policy, while in the forestry sector they are explicit but separate. (Competitive neutrality addresses one objective, codes of forest practice address the other, but the two mechanisms are quite unconnected.) In contrast, reforms in transport and electricity have been almost exclusively focused on economic performance, and may or may not have adverse environmental impacts. There does not seem to be a mechanism to consider these *ex ante*, or to follow up in practice. Prevention, even mitigation, of such adverse impacts requires assessment, which in turn requires scientific knowledge and access to relevant data, as well as the commitment to undertake and use such analyses.

When we looked at the structure and performance of the Australian economy 10 to 20 years ago, we saw myriad problems, but then a broadly based policy process emerged in the agreements on National Competition Policy. If we used competition as our compass, and always selected policies that were pro-competitive rather than anticompetitive, major improvements in economic performance would result. When I consider Tim Fisher's list of environmental challenges facing Australia, I despair of developing tailormade solutions to each — for catchments, estuaries, groundwater, etc. Is there an analogue to competition policy which we can use as a compass, to minimise adverse environmental impacts right throughout the economy?

On behalf of the Productivity Commission, I sincerely thank all participants for their thoughtful and thought-provoking contributions, and for sharing their experience and knowledge with us. The Commission will be actively following through on many of the issues discussed here today, in its future research and inquiry programs.

WORKSHOP PROGRAM

NOVOTEL, MELBOURNE

FRIDAY 8 SEPTEMBER 2000

8.30 am – 9.00 am	<i>Registration/coffee</i>
9.00 am – 9.20 am	Opening address
Welcome	Mr Gary Banks, Chairman, Productivity Commission
Speaker	Dr Neil Byron, Commissioner, Productivity Commission
9.20 am – 10.20 am	Session 1: the water sector
Chair	Mr Kevin Goss, General Manager of Natural Resources, Murray Darling Basin Commission
Speakers	Mr Tim Fisher, Campaign Coordinator, Australian Conservation Foundation
	Mr Andrew Amos, Economic and Strategic Planning Adviser, Hunter Water
10.20 am – 10.40 am	<i>Morning tea</i>
10.40 am – 11.40 am	Session 2: the electricity sector
Chair	Ms Gwen Andrews, Chief Executive Officer, Australian Greenhouse Office
Speakers	Dr Clive Hamilton, Executive Director, The Australia Institute
	Ms Margaret Beardow, Consultant, Electricity Supply Association of Australia
11.40 am – 12.40 pm	Session 3: the transport sector
Chair	Dr Rod Maddock, Chief Economist, Business Council of Australia
Speakers	Mr Tony Slatyer, Executive Director, Bureau of Transport Economics
	Dr John Paterson, former Secretary, Department of Infrastructure
12.40 pm – 1.40 pm	<i>Lunch</i>
1.40 pm – 2.40 pm	Session 4: the forestry sector
Chair	Professor Peter Kanowski, Head of Department of Forestry, Australian National University
Speakers	Dr John Marsden, Principal, Marsden Jacob Associates
	Dr Hans Drielsma, General Manager, Forestry Tasmania
2.40 pm – 3.00 pm	<i>Afternoon tea</i>
3.00 pm – 4.30 pm	Panel discussion
Chair	Ms Anthea Tinney, Deputy Secretary, Environment Australia
Speakers	Mr Graeme Samuel, President, National Competition Council
	Ms Anwen Lovett, Director of Environment, National Farmers' Federation
	Dr Stephen Dovers, Centre for Resource and Environmental Studies, Australian National University
	Ms Molly Harriss Olson, Director, Eco Futures
4.30 pm – 4.50 pm	Summary
Rapporteur	Mr Mike Young, Policy and Economic Research Unit, CSIRO Land and Water
4.50 pm – 5.00 pm	Workshop close
	Dr Neil Byron, Commissioner, Productivity Commission

WORKSHOP PARTICIPANTS

NOVOTEL, MELBOURNE

FRIDAY 8 SEPTEMBER 2000

Mr Andrew Amos	Hunter Water Corporation
Ms Gwen Andrews	Australian Greenhouse Office
Ms Margaret Arblaster	Australian Competition and Consumer Commission
Ms Barbara Aretino	Productivity Commission
Mr Gary Banks	Productivity Commission
Ms Margaret Beardow	Benchmark Economics
Dr David Butcher	Worldwide Fund for Nature
Dr Neil Byron	Productivity Commission
Mr Richard Clarke	Productivity Commission
Mr Drew Collins	NSW Environment Protection Authority
Mr Ross Dalton	Department of Agriculture, Fisheries and Forestry
Ms Siobhan Davies	Productivity Commission
Mr Richard Denniss	The Australia Institute
Mr Frank Di Giorgio	Department of the Treasury
Dr Stephen Dovers	Australian National University
Dr Hans Drielsma	Forestry Tasmania
Mr Gavan Dwyer	Productivity Commission
Mr Mark Eigenraam	Department of Natural Resources and Environment, Victoria
Mr David Fickling	Department of Treasury and Finance, Victoria
Mr Tim Fisher	Australian Conservation Foundation
Professor John Freebairn	University of Melbourne
Mr Kevin Goss	Murray Darling Basin Commission
Ms Lisa Gropp	Productivity Commission

Mr Christopher Guest	NSW Cabinet Office
Dr Don Gunasekera	Environment Australia
Dr Clive Hamilton	The Australia Institute
Ms Molly Harriss Olson	Eco Futures
Dr Bob Hawkins	Access Economics
Mr Terry Healy	Department of Natural Resources and Environment, Victoria
Ms Paula Holland	Productivity Commission
Ms Margo Hone	Productivity Commission
Ms Ann Jones	Productivity Commission
Professor Peter Kanowski	Australian National University
Mr Steven Kates	Australian Chamber of Commerce and Industry
Mr Robert Kerr	Productivity Commission
Ms Anwen Lovett	National Farmers' Federation
Dr Rod Maddock	Business Council of Australia
Dr John Marsden	Marsden Jacob Associates
Ms Anna Matysek	Productivity Commission
Mr Greg Murtough	Productivity Commission
Dr John Paterson	Former Secretary of the Department of Infrastructure, Victoria
Dr Deborah Peterson	Productivity Commission
Mr Garth Pitkethly	Productivity Commission
Mr Darrell Porter	Office of Regulation Review
Ms Deborah Radford	Department of Treasury and Finance, Victoria
Mr Cameron Robinson	Australian Council of Trade Unions

Mr John Salerian	Productivity Commission
Mr Graeme Samuel	National Competition Council
Mr Michael Schuele	Productivity Commission
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Ms Deb Wilkinson	Marsden Jacob Associates
Mr Michael Woods	Productivity Commission
Mr Mike Young	CSIRO Land and Water

