Pricing and decision-making in the Australian electricity, road transport and water sectors: Towards sustainability?

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Abstract

This paper considers the way in which pricing and decision-making processes in the Australian electricity, road transport and water sectors seek to balance multiple objectives. Specifically, it examines the ways in which the principles of National Competition Policy and the economic, environmental and social dimensions of sustainability are addressed in specific decisions about energy, transport and water infrastructure. In the electricity sector, we consider the planned roll out of smart meters and decisions on retail price regulation in NSW. We also consider emissions trading proposals affecting the electricity and transport sectors and the existence of energy and transport subsidies amounting to billions of dollars per year. Finally, we consider recent water planning decisions in South-East Queensland and Sydney. Despite a rhetorical commitment to principles of cost-reflective pricing and market efficiency by Australian governments, the primary objective in many of the cases considered appears to be political self-interest. Least cost options, environmental outcomes and social justice are rarely given the attention they deserve and systematic failures in decision-making processes are evident. We suggest ways to move towards sustainability pricing and decision-making by making prices more cost-reflective, adopting specific actions to address social justice concerns, using representative, deliberative processes to engage the community in decision-making and undertaking comprehensive sustainability assessments in the electricity, road transport and water sectors.

Key words: Sustainability, National Competition Policy, decision-making, cost-reflective pricing

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1 Introduction: National Competition Policy and sustainability

In April 1995, all Australian governments reached agreement on a National Competition Policy (NCP) for Australia. The objectives of the NCP included restructuring of public sector monopoly businesses and application of competitive neutrality principles to government businesses. NCP led to significant programs of reform in the electricity, gas, water and road transport industries, where public sector monopolies had been the norm (National Competition Council 1998).

The NCP established some important competition principles to guide reform processes. Under the Competition Principles Agreement of 11 April 1995, all Australian governments are required to consider the following issues when deciding on a preferred option to meet a policy objective:

- Government legislation and policies relating to ecologically sustainable development
- Social welfare and equity considerations, including community service obligations
- Government legislation and policies relating to matters such as occupational health and safety, industrial relations and access and equity
- Economic and regional development, including employment and investment growth
- The interests of consumers generally or a class of consumers
- The competitiveness of Australian businesses
- The efficient allocation of resources (National Competition Council 1998, pp.14-15).

The above list of concerns spans economic well-being, environmental protection and social justice. As such, it resonates with the concerns of ecological economists and others who seek to create a sustainable society (e.g. Costanza 1989; Daly 1992). However, balancing these concerns in practice is exceedingly difficult (e.g. Lehtonen 2004; MacLeod & McIvor 2006). For example, increasing the price of electricity to better reflect the real cost of its provision is consistent with ecologically sustainable development (as higher prices encourage lower use and lower greenhouse gas emissions) and with efficient allocation of resources (as it reduces subsidies, cross-subsidies or externalities). However, higher electricity prices can have negative impacts on social welfare, equity and access to electricity (by increasing the cost of an essential service) and the competitiveness of Australian businesses (by increasing the cost of production).

The Competition Principles Agreement provides some guidance to governments on how to balance these issues in the specific case of price oversight of government business enterprises. The Agreement states that the 'prime objective' of any independent source

of price oversight advice 'should be one of efficient resource allocation, but with regard to any explicitly identified and defined community service obligations imposed on a business enterprise by the government or the legislature of the jurisdiction that owns the enterprise' (National Competition Council 1998, p.16). Giving primacy to efficient allocation of resources encourages governments to focus on objectives of market efficiency and cost-reflective pricing, possibly at the expense of other objectives. This is a common problem for those seeking to build a more ecological economics or a more sustainable society; all too often, market objectives trump ecological and social concerns.

In this paper, we consider case studies of how the multiple objectives of the NCP and the multiple objectives of sustainable development influence decision-making and pricing in the electricity, road transport and water sectors. We also consider the impacts of current practice on the sustainability of resource use and suggest ways in which decision-making and pricing might be improved.

2 The electricity sector

In the electricity sector, the NCP initiated a process of restructuring and reform that is still ongoing. The initial round of reforms included disaggregation of vertically integrated electricity providers into generators, network service providers and retailers, the introduction of competition between generators and retailers and price regulation of monopoly network businesses (COAG 2002). An important part of the restructuring was the establishment of the National Electricity Market (NEM). The NEM is a physical wholesale spot market for electricity, covering six States and Territories (jurisdictions) and almost 90% of the Australian population (MacGill, Outhred & Nolles 2006).

In 2003, after a review process (see COAG 2002), the Ministerial Council on Energy initiated a new round of reforms focusing on governance of energy markets, economic regulation, planning and development of electricity transmission networks, end user participation in energy markets and greenhouse gas reduction (MCE 2003). Below, we discuss four examples of how the multiple principles of the NCP, and the multiple principles of sustainability, have been considered during this new round of reforms.

2.1 Smart meters for residential consumers

In February 2006, the Council of Australian Governments (COAG) agreed 'to improve price signals for energy consumers and investors' through the 'progressive national roll out of "smart" electricity meters' as long as benefits outweigh costs for residential users (COAG 2006). A smart meter, or interval meter, measures electricity consumption during short intervals (e.g. every half hour); traditional electricity meters only measure accumulated electricity consumption and may only be read on a quarterly basis.

The stated objective for the roll-out of smart meters across Australia is 'to improve the efficiency of the Australian Electricity Market' (MCE 2007, p.2). As with the NCP principles discussed above, market efficiency is given primacy. There are several ways in which smart meters can potentially improve market efficiency.

First, smart meters allow electricity retailers and network businesses to introduce tariffs that better reflect the actual cost of supply at different times of the day or year. The electricity network must be designed to meet peak demand, even if this demand is only reached for short periods during the year. At peak times, the full capacity of low-cost baseload power stations is used up and more expensive peaking power stations are called upon. This increases the cost of electricity generation. In addition, network service providers need to set their prices to reflect the high marginal cost of providing network capacity that is only used for a short period of time each year. As a result, the cost of supplying electricity at peak times is much higher than the average cost of supply.[2] Currently, most residential consumers do not see these high costs at peak times; costs are averaged out over time. As such, there is no incentive for consumers to reduce consumption at peak times and peak demand continues to grow, prompting additional generation and network investment. Smart meters make it feasible to implement tariffs with higher prices in peak periods and lower prices in off-peak periods. The expectation is that consumers will respond by reducing 'demand for peak power, with consequential infrastructure savings (e.g. network augmentation and generation) and improved security of supply' (MCE 2007, p.2). Australian trials of smart meters have found reductions in peak demand from residential customers of as much as 30%, although it is unlikely that a wider roll out would achieve such large reductions (Riedy 2006).

Second, smart meters have the potential to strengthen end user participation in electricity markets by providing improved price signals, information and feedback about electricity consumption and the impact of demand management actions. Currently, residential consumers are billed for electricity as much as three months after they have used it and have no way to connect the electricity consumption figures and cost in the bill to specific actions they have taken. With smarter meters, consumers get feedback almost instantly on actions they take in their home. Better information on electricity use may encourage residential consumers to manage their demand personally or through the market to achieve lower bills, particularly if better information is accompanied by time-of-use tariffs.

Third, there is some evidence that smart meters and more cost-reflective tariffs encourage overall reductions in electricity use as well as shifts of electricity use out of peak periods. Using smart meters and cost-reflective tariffs alone, reductions observed in Australian trials have been small – no more than 5% (Riedy 2006). However, smart meters also provide 'a potential platform for other demand side response measures', (MCE 2007, p.2) such as remote load control and energy auditing, so may facilitate greater reductions in energy use and greenhouse gas emissions in the future.

Fourth, smart meters have the potential to reduce operating costs for electricity retailers and networks by allowing remote meter reading, remote connection and disconnection and electronic billing. These changes would increase market efficiency by reducing overheads associated with electricity supply and could drive greater 'efficiency and innovation in electricity business operations' (MCE 2007, p.2).

[2] As an indication of the price variation, EnergyAustralia is trialling a residential retail tariff in which the off-peak price is 6.5 cents/kWh but the price increases to $2/kWh up to 12 times a year for periods of half an hour to four hours. This is a 30-fold increase.

Clearly, smart meters have the potential to improve market efficiency by reducing peak demand, supporting demand-side participation and reducing operating costs. They also have potential to meet environmental objectives by reducing overall electricity consumption levels, although this benefit is less certain. However, their impact on social welfare and equity is less clear. While the technology of smart metering is relatively unproblematic, the tariffs that they allow could create problems of social justice.

The idea behind more cost-reflective tariffs is that they provide customers with price signals to which they can respond. By responding to price signals, for example by shifting demand out of peak periods, customers can ensure that their electricity bills do not increase. However, many customers are unable to manage their electricity demand in this way (Riedy & Wilson 2004). Low-income households who have little discretionary (or luxury) energy use may have few options to reduce their demand at peak times; they are already using as little energy as possible. The working poor, living in cheap, poorly designed housing, may have little choice but to use air conditioners at peak times during summer to maintain reasonable levels of comfort in their home. Large families who need to get children bathed and meals prepared at the end of the day may have little choice but to use energy at this time due to other time pressures. In general, low-income and disadvantaged households have the least ability to respond to price signals and are most likely to be further disadvantaged by more cost-reflective tariffs (Riedy 2006). To date, policy makers intent on the roll out of smart meters appear to have given these social justice issues relatively little attention.

The roll out of smart meters is a good example of market efficiency and (to a lesser extent) environmental objectives being placed ahead of social justice objectives, at least in the initial stages of the policy debate. It will be interesting to see how these social justice issues are addressed during the cost-benefit analyses of the meter roll out, planned for completion during 2007.

2.2 NSW retail pricing

Regulation of retail pricing in NSW provides another example of how policy makers are balancing competing objectives in the electricity sector. Since 1 January 2002, all electricity customers in NSW have been free to choose their electricity retailer and negotiate an electricity supply contract. So far, only around 30% of residential customers have taken up this option. The other 70% remain on retail tariffs that are regulated by the Independent Pricing and Regulatory Tribunal of NSW (IPART) (IPART 2007).

At its 10 February 2006 meeting, COAG agreed to phase out regulation of retail prices 'where effective competition can be demonstrated' (COAG 2006). Consequently, in its current review of retail prices for 1 July 2007 to 30 June 2010, IPART is seeking to reduce customer reliance on regulated retail prices and encourage retail competition (IPART 2007). The Terms of Reference provided to IPART by the NSW Government:

> do not direct the Tribunal to have regard to the impact of its determination on customers. Instead, the focus on ensuring that tariffs are cost reflective (from the perspective of the hypothetical retail business) by the end of the regulatory period is stronger than in previous terms of reference (IPART 2007, p.2).

This is a very clear statement of how the NSW Government has chosen to balance objectives in this case. Market efficiency, via cost-reflective tariffs, is given primacy over customer impacts and related social justice concerns.

In its Draft Determination, IPART set real retail price increases of 4.5% per year for EnergyAustralia, 5% for Integral Energy and 4% for Country Energy (IPART 2007).[3] These are significant increases. While there is real upward pressure on retail prices as a result of higher energy purchase costs, network costs and greenhouse policy costs, these price increases exceed the increase in costs for each retailer. IPART has effectively increased prices above the level of efficient costs for the three incumbent retailers as a way of stimulating retail competition. In other words, IPART has artificially increased the prices for regulated customers to encourage them to move to a market contract, where they will theoretically be able to obtain a lower price. The idea is that, by pushing regulated prices to a higher level, there will be more room for competition by new and existing retailers.

While it may well be appropriate to remove retail price regulation for many customers, the decision not to examine the impact of this on residential customers is a stark example of how abstract goals of efficient and competitive markets are being prioritised over real impacts on customers and on social equity. There is an assumption that the short-term pain created by higher prices will be outweighed by the long-term gains from a more competitive market.

2.3 National emissions trading

A third example of how competing objectives are being balanced in the electricity sector is provided by the policy debate over a national emissions trading scheme. Emissions trading is a way of incorporating some of the externalities associated with greenhouse gas emissions into the price of electricity. It essentially puts a price on greenhouse gas emissions, so that technologies that generate greenhouse gas emissions become more expensive. The intent is to encourage a market-based transition to technologies with lower greenhouse gas emissions. Emissions trading potentially meets both market efficiency and environmental objectives.

The State and Territory Governments of Australia have proposed a National Emissions Trading Scheme to commence by the end of 2010, in the absence of Australian Government action. The following objectives guided the design of the proposed scheme:

- Environmental integrity, i.e. the scheme must actually reduce greenhouse gas emissions
- The scheme must provide investor certainty, particularly for investors in long-lived capital in energy markets

[3] EnergyAustralia, Integral Energy and Country Energy are the three incumbent electricity retailers in NSW with responsibility for provision of regulated retail tariffs in specified parts of the state.

- Economic impacts must be minimized by constructing the scheme as efficiently as possible, promoting least cost reductions in emissions, capping the cost of compliance and protecting the competitiveness of Australian trade-exposed industries

- Flexibility to cope with uncertainty and new information

- Equity, i.e. the design must provide the means to assist those most adversely affected by reducing emissions through the scheme (National Emissions Trading Taskforce 2006).

Like the NCP principles, these objectives span economic well-being, environmental protection and social justice. The scheme would cap 2030 emissions from the electricity sector at either 1997 levels or 2000 levels (National Emissions Trading Taskforce 2006). Given projected levels of growth in emissions from this sector, these are significant reductions, although much less than some are proposing (The Greens 2007). The scheme is estimated to reduce Gross Domestic Product in 2030 by 0.6% and to increase electricity bills by between 70 cents a week and $3.60 a week, depending on the scenario and State (National Emissions Trading Taskforce 2006). These economic impacts appear manageable and the scheme would also auction some emission permits to provide a source of funds 'to offset the impacts of the scheme on others, which could include households, regions and small business' (National Emissions Trading Taskforce 2006, p.xxvii). Although it can be argued that the scheme does not go far enough in its proposed emission reductions, it is at least a reasonable attempt to balance competing economic, environmental and social objectives.

The other major initiative in this area is the Prime Ministerial Task Group on Emissions Trading, announced by the Prime Minister on 10 December 2006. The Task Group has been asked to 'advise on the nature and design of a workable global emissions trading system in which Australia would be able to participate' (Task Group on Emissions Trading 2007, p.1). However, the terms of reference for the Task Group also included the following statement:

> Australia enjoys major competitive advantages through the possession of large reserves of fossil fuels and uranium. In assessing Australia's further contribution to reducing greenhouse gas emissions, these advantages must be preserved (Task Group on Emissions Trading 2007, p.1).

Whereas the State and Territory scheme seeks to balance economic, environmental and social objectives, the Australian Government has ensured that the economic objective of maintaining a competitive advantage is given primacy in consideration of an emissions trading scheme. Further, there is no mention of social justice or equity issues in the Issues Paper prepared by the Task Group on Emissions Trading. The Australian Government approach demonstrates a very different way of balancing competing objectives to the State and Territory approach.

Whatever approach Australia adopts, it is clear that an emissions trading scheme will increase electricity prices for residential consumers. This is entirely appropriate from an

environmental perspective, as consumers are not currently paying for their contribution to climate change. Economically, the Stern Review established that the costs of reducing emissions are less than the expected costs of climate change (Stern 2007), so higher energy prices need to be accepted in this context. The concern is that social equity and access objectives will be compromised by higher energy prices. While the State and Territory Government approach has shown some sensitivity towards this issue, social objectives do not appear to have the same weight as economic and environmental objectives under either of the proposed schemes.

2.4 Energy subsidies

The last three examples are all attempts to make electricity prices more cost-reflective: by allowing them to vary with time; by stimulating retail competition; and by incorporating the cost of climate change. However, these moves towards cost-reflective prices are being undermined by the existence of public subsidies for electricity generation, estimated at between $1.2 billion and $2.1 billion in 2005-06 (Riedy 2007). An energy subsidy exists where government action or inaction lowers the cost of production, raises prices received by producers, lowers prices paid by consumers or prevents full cost recovery for a service. Identified subsidies in the electricity sector are summarised in Table 1. Further details on each subsidy are available in Riedy (2007).

Whereas other actions in the electricity sector are seeking to establish more cost-reflective prices, subsidies act to make prices less reflective of real costs. Consequently, the existence of significant subsidies in the electricity sector undermines other policy actions. Further, as shown in Table 1, subsidies in the electricity sector are overwhelmingly directed to production and consumption of fossil fuels, rather than renewable energy. More than 92% of the total value of identified subsidies in the electricity sector is directed to fossil fuels. This distorts markets in favour of fossil fuels and specifically undermines the environmental objectives that are being pursued through the roll out of smart meters and, potentially, through emissions trading.

Subsidy	*Description*	*Value ($m in 2005-06)*	
		Fossil fuels	*Renewable energy*
Subsidised supply of electricity to aluminium smelters	There is strong evidence that the aluminium smelting industry receives cheaper electricity than similar large industrial customers, as a result of long-term supply contracts negotiated with State governments attempting to attract industry to their State	195-306	15-24
Fuel subsidies at coal-fired power stations	There is evidence that black coal-fired power stations in Australia pay significantly less than the international market rate for their fuel, even after taking into account differences in energy content and costs of transport to ports	447-1,111	

Devaluation of coal-fired power stations at time of deregulation	When electricity markets were deregulated, governments appear to have devalued coal-fired power station assets, contrary to standard accounting practice, resulting in very low ongoing depreciation charges	283	
State energy concessions	Various energy concessions and payment assistance schemes for particular household customer groups	289	10
Mandatory Renewable Energy Target	Australian Government scheme providing support for renewable energy		31.3
Other electricity support programs	Various small schemes, mainly at the Australian Government level, that support renewable energy		53.3
TOTAL		**1,214-1,989**	**110-119**

Table 1: Summary of subsidies to electricity generation in Australia in 2005-06.

In approximate terms, the current subsidies in the electricity sector reduce the price of electricity by a little over $5 per MWh, or about 3.9% of prices paid by residential customers (Riedy 2007). Although this distortion is relatively small, and outweighed by the retail price increases that IPART is proposing in NSW, it is indicative of the way that policies in the electricity sector can conflict.

The existing subsidies variously seek to meet economic objectives (in the case of the aluminium smelting and power station subsidies), environmental objectives (in the case of the Mandatory Renewable Energy Target and other renewable energy subsidies) and social objectives (in the case of the state energy concessions). What appears to be missing is a comprehensive assessment of how the full suite of government policies and actions in the electricity sector combine to meet the objectives under the NCP, or a broader objective of sustainability.

3 Road transport

In contrast with the policy approach in the electricity sector, governments have taken definite steps to avoid cost-reflective pricing of road transport, particularly in relation to fuel prices. Below, we consider two examples: the subsidisation of road transport and the exclusion of transport from emissions trading proposals.

3.1 Road transport subsidies

Estimated subsidies to road transport in 2005-06 were $6.3 billion (Riedy 2007). Specific subsidies are summarised in Table 2. Further details on all subsidies are available in Riedy (2007).

3.1.1 The road user deficit

The largest single subsidy in Table 2, making up 74% of the identified subsidies, is the 'road user deficit'. The road user deficit is the difference between the total cost of providing and maintaining the road network and the revenue collected from road users. Following Pender (1999), the road user deficit is calculated by assuming that the road network is provided by a hypothetical privatised road authority that is subject to a regulator's decisions on road network improvement and capacity expansion. The road authority incurs expenses associated with road maintenance and any capacity expansion directed by the regulator. As a private entity, it must also pay state land tax on the 'single dwelling residential use' value of land under roads in urban areas (Pender 1999). In addition, the road authority must pay the state a normal rate of return on the value of the land under roads and the written down value of road materials. When the revenue that this hypothetical road authority should obtain was compared with the revenue actually obtained from road users through tariffs, taxes, fees, excise and tolls, there was a shortfall in 2005-06 of $4.7 billion (Riedy 2007).

3.1.2 Abolition of fuel excise indexation

One of the biggest contributors to the current road user deficit was the abolition of fuel excise indexation by the Australian Government. The Federal excise on petroleum products and crude oil is the largest single source of revenue from road users; it is expected to raise $14.7 billion in 2007-08 (Australian Government 2007). The fuel excise adds 38 to 40 cents to the cost of each litre of fuel used by road users. Although revenue from the fuel excise goes into general revenue, road users experience fuel excise as a charge for their road use. In other words, fuel excise forms an important part of the price that road users pay to access and use the road network.

Subsidy	*Description*	*Value ($m in 2005-06)*	
		Fossil fuels	*Renewable energy*
The road user deficit	The gap between appropriate revenue from road users (sufficient to pay for maintenance and expansion of the road network, land tax and an appropriate rate of return on assets) and actual revenue from road users	4,599	94
Excise exemption for condensate	Condensate from the petroleum industry is exempt	250	

from the petroleum industry	from fuel excise		
Fuel Sales Grants Scheme	Grants scheme for fuel retailers and distributors of petrol and diesel in regional and remote areas of Australia, established to prevent rises in regional fuel prices as a result of the implementation of the GST	257	
Petroleum Products Freight Subsidy Scheme	National subsidy scheme (now discontinued) that provided assistance to offset the cost of freighting eligible petroleum products to remote Australian places	3.5	
Cleaner Fuels Grants Scheme	Grants scheme that provides grants to licensed excise manufacturers and importers of eligible cleaner fuels to offset the excise and customs duty payable on alternative fuels	8.7	4.3
Statutory formula method for fringe benefits tax on cars provided by employers	Employees that are provided with a vehicle by their employer can use a statutory formula to determine their fringe benefits tax liability. The formula assumes that the proportion of private use, and the tax liability, falls as annual distance travelled increases. The subsidy arises because actual private travel is greater than that assumed by the formula.	1,130	
Alternative Fuels Conversion Program	Program that assists vehicle owners and manufacturers to trial new engine technologies and fuels, including hybrid engines, natural gas, LPG and hydrogen	0.9	
TOTAL		**6,250**	**98**

Table 2: Summary of subsidies to road transport in Australia in 2005-06.

Until March 2001, the value of the fuel excise was indexed twice a year to ensure that it remained a constant source of revenue in real terms. Fuel excise indexation was abolished in March 2001 as a political response to community concerns about rising petrol prices. It has not been reintroduced, despite a recommendation to do so by the Fuel Taxation Inquiry in 2002 (Fuel Taxation Inquiry Committee 2002). This means that the real value of fuel excise revenue is declining over time. As a result, revenue from fuel excise is failing to keep pace with increased spending on the road network and contributing to growth in the road user deficit.

The abolition of fuel excise indexation is an example of short-term political objectives overriding market efficiency and environmental objectives. There is some economic justification for the decision, as lower petrol prices keep operating costs lower for business. There are also social justifications, given that many people living in areas with

poor public transport have little option but to pay the higher petrol prices. However, the primary motivation was to ease the political pressure associated with rising petrol prices in the year of a Commonwealth election.

3.1.3 Fuel Tax Credits Scheme

Another major contributor to the road user deficit is the Fuel Tax Credits Scheme. This scheme reduces fuel costs by providing credits for fuel excise. Essentially, the scheme returns fuel excise to the consumer when fuel is used in specified on-road and off-road activities. In 2005-06, the Energy Grants Credits Scheme, which preceded the Fuel Tax Credits Scheme, returned $3,536 million in fuel excise to fuel users (Australian Government 2006).

The return of fuel excise for fuel used off-road is, arguably, appropriate. If fuel excise is a charge for use of the road network, then those who are not using the road network when they use fuel should not have to pay excise. However, the return of fuel excise for fuel used on-road contributes directly to the size of the road user deficit. In 2005-06, the on-road component of the Energy Grants Credits Scheme was about $936 million (Riedy 2007). Changes to the Fuel Tax Credits Scheme from 1 July 2006 that increase eligibility for credits are expected to increase this figure significantly.

The Australian Government's intention is that the Fuel Tax Credits Scheme:

> minimises tax on business inputs, is competitively neutral, applies in a consistent and transparent way to all relevant fuel and fuel users and minimises compliance and administrative costs for business and government (The Commonwealth Treasurer 2006).

Here, the principles of the NCP are apparent in the objective of competitive neutrality. Further, minimising tax on business inputs potentially contributes to objectives of regional and economic development, and competitiveness of Australian businesses. The Fuel Tax Credits Scheme prioritises these objectives over cost-reflective pricing and greenhouse gas emission reduction.

3.1.4 Impact of the road user deficit

The road user deficit means that motorists do not pay the full cost of providing the road network. In other words, the price of road transport in Australia is not cost-reflective. Riedy (2007) estimates that the total subsidy for use of fossil fuels in the road transport sector in 2005-06, excluding externalities such as the cost of accidents and climate change, equates to a reduction in petrol prices of 38 cents per litre. This is significant, given current petrol prices in Australia of around $1.20 per litre. Based on a long-run price elasticity of demand for petrol of -0.58 (AGO 1999), an increase in petrol prices of 38 cents per litre would bring a reduction in petrol demand of 18 per cent and an associated greenhouse gas emission reduction of 12.5 Mt CO_2-e. In the case of the road user deficit, it appears that political objectives and a desire to support business have won out over market efficiency and environmental concerns.

3.2 Emissions trading

The transport sector contributed 14.4% of Australia's greenhouse gas emissions in 2005 and emissions have grown by almost 30% since 1990 (AGO 2007). Despite this, the transport sector is not included in the National Emissions Trading Scheme proposed by the State and Territory Governments. The proposed scheme design does allow for creation of offsets in the transport sector that can be traded, and for future expansion of the scheme to cover transport if sufficient notice is given (at least five years) (National Emissions Trading Taskforce 2006).[4]

Although there is little discussion of why the transport sector is excluded, it is noted that 'transport emissions appear fairly insensitive to petrol prices in the short term' and that the expected price increases under the emissions trading scheme would be unlikely to have a significant impact on short-term demand (National Emissions Trading Taskforce 2006, p.205). This may be true; however it constitutes a decision not to move towards more cost-reflective pricing of transport that includes major externalities. Given the passionate public and media response to previous petrol price rises in Australia (e.g. preceding the Australian Government decision to abolish fuel excise indexation), it appears likely that the decision not to include transport under the emissions trading scheme is motivated at least partly by political self-interest.

4 The water sector

In the water sector, the National Water Initiative commits Australian governments to best practice pricing that reflects the cost of water supply and, where feasible, associated externalities (COAG 2004). Most State Governments have now established economic regulatory oversight mechanisms via independent pricing regulators, and some jurisdictions also have regulatory requirements for utilities to invest in the least cost options. For example, the Western Australian Government has a requirement for the application of integrated resource planning as part of the State Water Strategy (Government of Western Australia 2003) and the NSW Independent Pricing and Regulatory Tribunal has similar requirements (White 1996). Yet governments and local water authorities continue to support water supply options, such as new dams and desalination infrastructure, that are rarely the most cost-effective way of meeting water security objectives in the long-term. In most cases, the full potential of cheaper demand-side options is not captured, mainly due to the absence of sound decision-making processes for clarifying and meeting objectives, including the use of appropriate methods of community engagement. The higher cost of implementing more expensive supply-side schemes puts unnecessary upward pressure on water prices. We provide two supporting case studies below.

[4] At the time of writing, the scope of any emissions trading scheme proposed by the Prime Ministerial Task Force on Emissions Trading remains unclear.

4.1 Water planning in South-East Queensland

The current drought is the worst on record for the water supply system that supplies Brisbane and surrounds. A comprehensive drought response strategy, involving supply options, effluent recycling and demand management, is being implemented under Queensland State Government emergency legislation at a cost of more than $8 billion. Although a rapid process of planning and roll out is involved, such action is understandable given the short-term risk to water security. However, in addition to the drought response strategy, a new large water storage is being proposed, and included within the emergency legislation, despite being of no benefit in the current drought. This proposal, announced in April 2006 prior to a September 2006 state election, called for a dam on the Mary River at Traveston Crossing, costing over $2.5 billion with a stated yield of 150,000 megalitres (ML) per year. This proposal has been the subject of considerable controversy in the Mary River region. In November 2006, one of the authors was commissioned by a coalition of local municipalities to lead a team to undertake an analysis of the decision.

That review (Turner et al 2007) concluded that the dam, which has been proposed for the express purpose of meeting a deficit in the supply-demand balance, would not be required until after 2030, using the Queensland Government's own revised estimates for the yield from the water supply system. The Queensland Government had previously reduced their yield estimate from 635,000 ML/year to 450,000 ML/year, primarily due to a re-writing of rules on future water restrictions to significantly reduce their frequency and depth. This change, which has a major impact on the cost of water supply, was made without any customer survey or engagement to determine what level of future restrictions the community was willing to accept.

In addition to this failure in the decision-making process, the choice of the Traveston Crossing dam as the next major supply source for meeting the supply-demand balance after 2030 has not been based on a consideration of the potential of the full suite of demand-side and supply-side options. The review concluded that, while the Traveston Crossing dam would supply water at a unit cost of more than $3/kL, a suite of demand management measures would provide a greater yield (190,000 ML/year compared to 150,000 ML/year) and at an average unit cost of $1.15/kL (Turner et al 2007).

4.2 The Sydney Metropolitan Water Plan

In late-2004, the drought that Sydney's water supply system had been experiencing since 2002 had worsened, and storage levels had fallen to the extent that the NSW Government, as part of the 2004 Metropolitan Water Plan, decided to investigate the possibility of constructing a desalination plant to supplement Sydney's drinking water supplies. For 12 months, these investigations were conducted on the basis that a plant would not necessarily be constructed unless the drought worsened to the extent that it was required for emergency supply. In August 2005, the newly appointed Premier of NSW, Morris Iemma, announced that the plant would be built 'drought or no drought'.

In December 2005, a team led by one of the authors was commissioned by the NSW Cabinet Office to review the 2004 Metropolitan Water Plan. This review process led to advice that the pre-emptive construction of such a plant represented a significant financial risk, estimated to be at least one billion dollars based on likely inflow patterns (White et al 2006). An alternative strategy was suggested, in two parts, the first of which dealt with the immediate drought response strategy. This advice recommended that the desalination plant not be pre-emptively constructed, but that planning to enable 'readiness to construct' continue so that construction could be triggered should storage levels drop below 30%. This advice was accepted and announced by the NSW Cabinet in February 2006. A second aspect of that advice related to the medium to long term supply demand balance, and highlighted the potential for water demand management and effluent recycling to help meet this, and questioned the need for a major augmentation of inter-catchment transfers from the Shoalhaven River system, south of Sydney. This advice was also accepted, and was incorporated in the 2006 Metropolitan Water Plan released in April of that year.

In February 2007, with a state election scheduled for late March, dam levels had dropped to below 35%, and the NSW Government announced that tenders would be called for the desalination plant construction. Subsequent inflows have increased storage levels, and even with the election behind it, the Government has remained committed to pre-emptive construction, a reversion to the pre-February 2006 position (Clennell 2007). There has been no attempt at a process of community engagement regarding the implications of this decision, despite the potential additional cost impost on the community exceeding one billion dollars.

4.3 Lessons from the case studies

Several important conclusions can be drawn from these two examples, and the many other similar examples that could be drawn on from other jurisdictions.

First, there is a remarkable lack of will to consistently apply a rigorous framework for decision-making and to adhere to the outcome of that process. The usual criteria that apply to decision-making processes, such as clear objective setting; impartial option development and assessment; portfolio selection; and multi-criteria decision processes are often partially undertaken or 'gamed' through the option selection process.

Second, and related, is that the role of the demand-side is rarely taken as seriously as its potential and cost effectiveness would indicate is optimal. This is despite the example of Sydney, where demand management will represent the largest single contribution to the supply demand balance in 2015 (145,000 ML/year), followed by effluent recycling (70,000 ML/year) and new supplies (77,000 ML/year) (NSW Government 2006). As a result, government involvement in the water sector is often moving markets away from the most efficient, least-cost outcomes.

Thirdly, Treasuries and independent economic regulators appear compliant in these poor decision making processes, despite the economic implications. In the former case this may be due to the fact that water utilities can extract monopoly rents from customers, and so long as dividends to state governments are protected there is little

incentive to question such politically driven decisions. In the latter case, economic regulators appear to interpret their role as guardians of allocative efficiency narrowly, and focus more on internal efficiencies of water utilities. The use of price regulation, rather than revenue regulation, also limits their ability to require publicly owned utilities (and by implication their political masters) to utilise least cost solutions to meet water service needs.

Finally, and most critically, the most appropriate reality check is missing in these and most other similar situations—the appropriate engagement of the community in the decisions that are being made in their name. The use of representative, deliberative processes that are influential would do much to ensure that the decision-making process was improved (Carson & Hartz-Karp 2005).

5 Discussion: Towards sustainability pricing and decision-making

The cases from the electricity, road transport and water sectors considered in this paper demonstrate very different approaches to balancing the NCP principles and sustainability concerns. Table 3 summarises our assessment of how the NCP principles and sustainability concerns have been balanced in each of the cases considered in this paper. We have added an additional objective to the list of NCP principles: political self-interest. It was evident in many of the cases considered that political motivations and the desire to be re-elected were prioritised over the NCP principles and sustainability concerns. In Table 3, a tick indicates that policies and decisions were consistent with that principle, a cross indicates that they were inconsistent with that principle, a dash indicates that a particular principle did not seem relevant in that case and a question mark indicates that the consistency with that principle was not clear.

Drawing on Table 3 and the more detailed discussion in the paper, it is possible to draw at least two conclusions. First, there is no consistency in approach across sectors. In the electricity sector, cost-reflective pricing is strongly pursued, potentially to the detriment of social justice objectives. In contrast, governments have moved away from cost-reflective pricing in the road transport sector as a result of political pressure. This does not automatically mean that social justice is given more consideration in the road transport sector. Instead, it means that taxpayers are contributing to the cost of the road network and this may have an overall positive or negative impact on social welfare and equity. The examples from the water sector are perhaps the most problematic; infrastructure decisions have been made to meet short-term political goals with little consideration of market efficiency, least cost options, environmental objectives or social impacts.

Second, there is little evidence that policy makers have been able to successfully balance the multiple objectives of the NCP, or multiple sustainability concerns, in the cases considered here. Despite the direction in the NCP to give efficient allocation of resources primacy, this principle is frequently trumped by political self-interest. Similarly, environmental objectives are only pursued to the extent that they are consistent with political self-interest. Social objectives are rarely given explicit consideration in the early stages of policy development, although they may be considered later in response to concerns raised by community advocates. The State and Territory proposal for a national emissions trading scheme is perhaps the best example of striking a balance between multiple objectives, but even here the consideration of social impacts is limited to the possibility of raising money to address these impacts. It seems that political self-interest is the objective that is given primacy in almost all cases, even where this is to the detriment of the public interest and long-term sustainability.

The cases considered here point to fundamental problems with decision-making processes and a lack of capacity to balance multiple objectives in the public interest. Some possible ways forward are considered below.

It is clear that cost-reflective pricing offers a way to balance objectives of market efficiency and environmental protection. Allowing prices to vary over time according to the varying cost of supply, removing inappropriate and hidden subsidies and incorporating the cost of externalities such as climate change are all approaches that help to expose consumers to the real cost of consumption. Although demand for electricity, road transport and water is inelastic, higher prices do act to encourage reductions in demand, with consequent environmental benefits. Most economic analysis indicates that, in the case of climate change, the economic impact of higher prices resulting from climate change response is preferable to the economic impact of dangerous climate change (Stern 2007).

While cost-reflective pricing can provide a way of balancing economic and environmental objectives, the social impact is often neglected. Impacts on access to essential services and the welfare of vulnerable consumers need to be explicitly considered in the design of approaches that move towards cost-reflective pricing. It is possible to increase the price of electricity, petrol and water without adversely impacting vulnerable consumers. For example, governments can:

- Provide direct assistance to vulnerable consumers to improve their energy, water and transport efficiency through retrofits and demand management, so that the impact of price increases on total bills is reduced

- Use the additional revenue from emissions trading or ecological taxes to provide rebates or tax relief for vulnerable consumers, to offset higher prices

- Introduce regulated social tariffs that would provide vulnerable consumers with access to essential quantities of energy, water and petrol at discounted prices (see for example Bates 2007).

These and other options to mitigate social impacts of cost-reflective pricing deserve more attention in Australian policy debates.

One problem with the implementation of cost-reflective pricing is the need to put a value on externalities if these are to be built into prices. Many externalities are intangible or uncertain, and methods to value them are necessarily subjective. There is evidence that participatory and deliberative approaches to valuation can help to put a value on externalities that is better informed and more reflective of the public interest (Howarth & Wilson 2006). An Australian example is the Yarra River Values Forum, run by the Institute for Sustainable Futures, that asked a group of citizens to deliberate on, and assign values to, externalities associated with urban water supply in Melbourne (Herriman, Plant & Chong 2007). Deliberative approaches seem to have great potential as a way of improving the cost-reflectivity of prices and incorporating externalities.

There is also a broader role for representative, deliberative processes. It is clear in the cases examined here that policy makers have struggled to balance multiple objectives and that political self-interest has often been prioritised over the public interest. Representative, deliberative processes, often involving randomly selected citizens, appear more able to balance multiple objectives in the public interest (see the many

contributions to Gastil & Levine 2005). Citizens' juries, consensus conferences, deliberative polls and World Cafés are a few examples of the kinds of processes that should be employed to help policy makers to balance multiple objectives. However, these processes must be given real influence in the decision-making process rather than a tokenistic role.

Finally, there would be great value in undertaking comprehensive sustainability assessments of the collection of policies and mechanisms existing in the electricity, road transport and water sectors. Such assessments would help to identify policies that are conflicting or are actively working against sustainability objectives and could be used to shape policies that are more sensitive to the multiple concerns of sustainability.

Sustainability Concern	*NCP Principle*	*Case Study*						
		Smart meters	*NSW retail pricing*	*Emissions trading (electricity)*	*Subsidies (electricity)*	*Subsidies (transport)*	*No emissions trading (transport)*	*Water planning*
Economic well-being	Economic and regional development, including employment and investment growth	-	-	-	✓	✓	✓	✓
	Competitiveness of Australian businesses	✓	✓	?	✓	✓	✓	?
	Efficient allocation of resources	✓	?	✓	×	×	×	×
Environmental protection and enhancement	Ecologically sustainable development	✓	✓	✓	×	×	×	×
Social justice	Social welfare and equity, including community service obligations	×	×	?	?	?	?	×
	Occupational health and safety, industrial relations and access and equity	×	×	?	?	?	?	×
	The interests of consumers generally or a class of consumers	×	×	?	?	?	?	×
Political self-interest		-	-	✓	✓	✓	✓	✓

Table 3: Summary of how the multiple objectives of the NCP and multiple sustainability concerns have been balanced in the case studies provided in this paper.

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