

**TOTAL ENVIRONMENT CENTRE**

## **Submission to the Productivity Commission's Inquiry into Energy Efficiency**

### **Part One**

Total Environment Centre  
Level 2, 362 Kent Street, Sydney, 2000  
Ph: 02 9299 5599 Fax: 02 9299 4411  
[www.tec.org.au](http://www.tec.org.au)

**Prepared by Elizabeth Choy**

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## 1. Introduction

Australia is very vulnerable to climate change. A 2°C increase in global temperature would severely damage the Great Barrier Reef, Kakadu's wetlands, and the alpine regions of southeastern Australia. In particular, tropical rainforests in Queensland could decrease by 50%, freshwater wetlands could disappear and be replaced by mangrove communities, and coral bleaching episodes could become more frequent due to increases in sea temperature.<sup>1</sup> As a result of climate change, many species could also lose their habitats and face extinction. Unless we start to reduce greenhouse pollution now it will be all but impossible to avoid a 2°C increase in global temperature and consequent catastrophic impacts. To avoid a 2°C increase in global temperature, greenhouse pollution needs to be reduced 50-60% below 1990 levels by 2050.<sup>2</sup> To reduce greenhouse gas emissions, we must use energy more efficiently. In Australia 90% of all electricity is generated from coal and 50% of our total greenhouse pollution comes from electricity generation. Improving energy efficiency would result in lower production and use of electricity, which is beneficial to the greenhouse effect and climate change. Improving energy efficiency is consistent with all major objectives for energy policy as agreed by the Council of Australian Governments (COAG).

TEC welcomes the opportunity to participate in this important inquiry, which has major implications for a more responsible use of energy in the coming decade. It is essential that we move on all fronts simultaneously to trigger a critical mass that makes energy efficiency an automatic and cost-effective response to energy demand. This can be achieved through the timely implementation of Demand Management funds, reform of the NEM, and stricter equipment and building standards. It is critical that 'soft' or voluntary options are avoided. Instead, mandatory regulatory standards must be implemented across all institutions and jurisdictions to achieve significant and effective energy efficiency improvements.

## 2. Benefits of cost-effective energy efficiency improvements

Energy efficiency is an important way to alleviate the investment constraints on the supply side of Australia's electricity systems, create jobs, and boost competitiveness. The major environmental benefit of energy efficiency improvements is reduction in greenhouse emissions and, in turn, the slowing of global warming.

Compared to other forms of greenhouse emissions abatement, energy efficiency is also far more cost-effective than other forms of abatement. Many reports support these conclusions.<sup>3</sup> As noted in the modelling work by the Energy Efficiency and Greenhouse

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<sup>1</sup> Climate Change – An Australian Guide to the Science and Potential Impacts edited by Barrie Pittock, 2003, <http://www.greenhouse.gov.au/science/guide/pubs/chapter4.pdf>

<sup>2</sup> Australian Conservation Foundation (ACF), *Government must tackle dangerous climate change*, February 2005, <http://www.acfonline.org.au/asp/pages/document.asp?IdDoc=2316>

<sup>3</sup> Towards a National Framework for Energy Efficiency – Issues and Challenges, Discussion Paper, EEGWG, November 2003; *Sustainable Energy Jobs Report* for SEDA prepared by The Allen Consulting

Working Group (EEGWG), for example, there are significant economic benefits in improving energy efficiency. A very conservative scenario of a 50% penetration over a 12-year period of a low energy-efficiency improvement scenario (excluding the electricity supply sector) shows that in year 12 after the energy efficiency improvement has commenced, enhanced energy efficiency delivers the following economic benefits<sup>4</sup>:

- Real GDP would be \$1.8 billion higher (+0.2%)
- Employment would increase by around 9000 (+0.1%)
- A 9% reduction in stationary final energy consumption (-213 PJ)
- A 9% reduction in greenhouse emissions from the stationary energy sector (-32MT)

The January 2003 *Sustainable Energy Jobs Report* advances similar outcomes in respect to job creation. The study finds that adoption of a concerted range of energy efficiency measures to assist the Sustainable Energy Industry (SEI) could deliver the following outcomes<sup>5</sup>:

- More jobs in the NSW SEI (an increase of 1,310 jobs) and the NSW economy at large (a new increase of 4,100 jobs);
- The opportunity to boost SEI activity in NSW, raising learning opportunities and raising the competitiveness of SEI technologies in the longer term;
- Rather than imposing an economic cost, the package approach would lead to an improvement in economic efficiency boosting competitiveness and output in NSW (which is forecast to rise by 0.17 percent that is equivalent to more than \$500 million per annum); and
- Improved environmental outcomes as indicated by a forecast reduction in greenhouse gas emissions of 2.8 Mt CO<sub>2</sub>-e per annum.

The question is defining and identifying energy efficiency improvements which are cost effective for consumers including industry, business and residential users.

As noted in the EEGWG Discussion Paper on “Towards a National Framework for Energy Efficiency”, there is a significant gap between economically viable levels of energy efficiency and what is actually being delivered by the market.<sup>6</sup>

This gap represents a significant amount of untapped market potential – i.e. significant economic benefits that are available but not being exploited by the market. The EEGWG stated that energy efficiency efforts to date “have captured only a small proportion of the

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Group, January 2003; Alan Pears, *Energy Efficiency – Its Potential: Some Perspectives and Experiences*, Paris, April 2004.

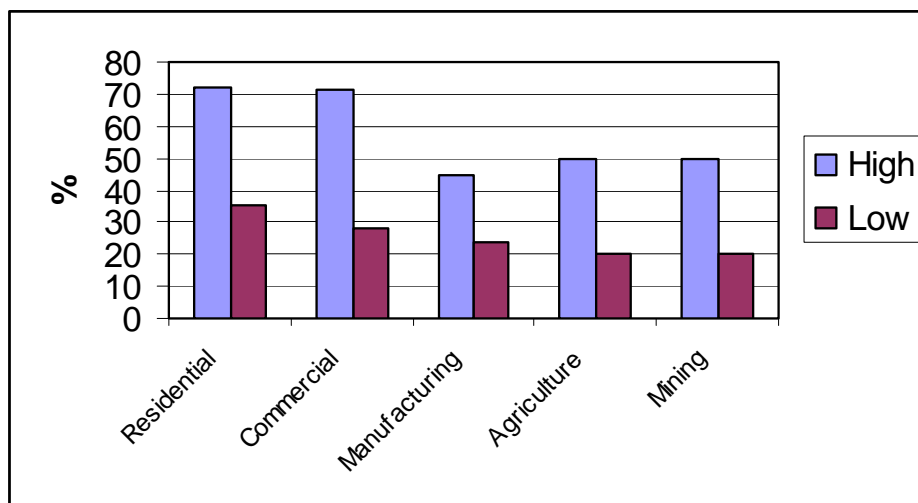
<sup>4</sup> Towards a National Framework for Energy Efficiency – Issues and Challenges, Discussion Paper, EEGWG, November 2003, p. 6.

<sup>5</sup> *Sustainable Energy Jobs Report* for SEDA prepared by The Allen Consulting Group, p. xxi.

<sup>6</sup> Towards a National Framework for Energy Efficiency – Issues and Challenges, Discussion Paper, EEGWG, November 2003, p. 5.

cost-effective energy efficient potential.”<sup>7</sup> Their analysis has “indicated significant energy efficiency improvement potential available to be exploited across all sectors of the economy,” with cost-effective potential savings of 35% in residential, 28% in commercial, and 25% in manufacturing, with an average four-year payback using technologies that are currently commercially available. A higher efficiency scenario involving an average eight-year payback using existing or potentially available technologies indicated opportunities would be more than double that amount (see Figure 1.1).

**Figure 1.1: Cost-effective energy consumption reduction potential**



Source: COAG Ministerial Council on Energy, Energy Efficiency and Greenhouse Working Group, “Towards a National Framework for Energy Efficiency – Issues and challenges” November 2003. Results of preliminary assessment. Low scenario assumes an average four-year payback using current commercially available technologies. High scenario assumes an average eight-year payback period and existing or developing technologies.

TEC also notes that research by Alan Pears, the Director of Sustainable Solutions Pty Ltd and an adjunct Professor of RMIT University Melbourne, has come to the same view with respect to benefits offered by energy efficiency measures.<sup>8</sup> His study finds that investing in energy efficiency measures is in fact cheaper per tonne of CO<sub>2</sub> avoided than most other options for emission reduction. For example, investing in energy efficiency measures with a simple payback period of one-year costs *minus* \$32 (i.e. saving of \$32) compared to a cost of \$30-40 per tonne for Green Power.<sup>9</sup>

<sup>7</sup> Towards a National Framework for Energy Efficiency – Issues and Challenges, Discussion Paper, EEGWG, November 2003, p. 4.

<sup>8</sup> Alan Pears, *Energy Efficiency – Its Potential: Some Perspectives and Experiences*, Paris, April 2004.

<sup>9</sup> See Appendix 1 for detailed analysis.

### **3. Barriers to improving energy efficiency**

This section summarises a range of barriers contributing to the low market uptake of cost-effective energy efficient opportunities.

#### **Barrier 1: Lack of available information and access to technical expertise**

It is generally regarded that there is vast technical energy efficiency expertise in the market but a lack of this information available to individuals, organizations and the government.<sup>10</sup> As a result, there is a lack of awareness of economic, social and environmental potential of energy efficiency, and a lack of understanding of potential cost-effective options that could be implemented. The EEGWG Stakeholder Consultation Report identified information availability for decision makers especially in the commercial and residential sector as a major barrier of energy efficiency. In particular, the industrial sector highlighted that a key problem was accessing and using appropriate information and technical expertise.<sup>11</sup>

#### **Barrier 2: Low returns and resource allocation (energy a small proportion of total costs)**

Every household or business has a variety of opportunities that compete for scarce time and capital resources. Energy use in general, and development of energy efficiency opportunities in particular, has low or no priority with the great majority of consumers. This is not unreasonable, as for most industries and households, energy is a small proportion of total expenditure. Energy efficiency opportunities also tend to be relatively unexciting, and lie far from core expertise, and interests.

#### **Barrier 3: Access to capital and finance**

There is a lack of financial and fiscal drivers or availability of capital to invest in energy efficiency measures.<sup>12</sup> This is partly due to the high hurdle rates and payback that is required for energy efficiency projects, addressed in Barrier 4 below. This is a key problem that the development of Demand Management Funds would address.

#### **Barrier 4: High hurdle rates on energy efficiency projects**

With respect to capital resources, the result is that a very high effective discount rate is applied to energy efficiency opportunities for both households and industrial customers, when capital is available at all. For example, AMCOR, which is widely recognized as a national leader in identifying and implementing energy efficiency opportunities, has a capital budgeting policy to pursue projects with a payback of under 2 years. This is a high discount rate of about 50%, far greater than the 8% to 12% discount rate currently used in

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<sup>10</sup> National Framework for Energy Efficiency (NFEE), Stakeholder Consultation Report, EEGWG, August 2004, p. 17.

<sup>11</sup> NFEE, Stakeholder Consultation Report, EEGWG, August 2004, p. 10.

<sup>12</sup> NFEE, Stakeholder Consultation Report, EEGWG, August 2004, p. 17.

assessing electricity network augmentations. In effect, energy efficiency opportunities developed by consumers typically must meet far more demanding requirements for financial performance than do other projects.

### **Barrier 5: Split incentives and the Free Rider**

Many of the financial and technical barriers centred on the issue of split incentives where the decision maker does not accrue the benefits of the investment decision because of a lack of consistency across jurisdictions of regulations, policies and programs directed at the commercial sector (this is also known as the free rider problem). There are also a lack of measures to reduce the impact of split incentives between builders and occupants in the residential and commercial sectors.

### **Barrier 6: Behavioural barriers, and organisational and cultural inertia**

Many consumers have a preference for simplicity and convenience, as opposed to gaining additional information about opportunities. For example, recognizing that some customers prefer simplicity in budgeting to feedback in energy costs, some retailers offer 'bill smoothing' or a 'budget plan' that allows paying equal installments throughout the year. While that plan doesn't necessarily reduce information provided regarding energy use, it does insulate the consumer from the more regular financial feedback or quarterly bills based on actual consumption.

### **Barrier 7: The National Electricity Market**

As the National Electricity Market (NEM) has evolved, focus has been almost entirely on supply at the expense of end-user efficiency. Six key barriers in the NEM have been identified:

#### **1. Massive incentive for consumption**

The use of a regulatory approach involving price caps rather than revenue caps creates a massive incentive for NSPs to promote additional consumption where networks are unconstrained, as that increases their revenues and earnings. The problematic use of price cap regulation in the jurisdictions, which promotes energy consumption, is harmful on both economic and environmental grounds.

#### **2. Price Cap Regulation**

Fuelled by the price cap form of revenue regulation currently in place, a key barrier is 'strategic behaviour' or manipulation of the revenue setting process to increase revenue. Both transmission and distribution network revenues are determined in relation to networks' Regulated Asset Base (RAB). While, in principle, this should not be a barrier to demand management, the lack of an effective procedure for rolling demand management investments into networks' asset bases creates an incentive for networks to build rather than defer their augmentations. As regulators do not effectively require the

networks to invest in DM when it is cost-effective, networks focus purely on new infrastructure as an answer to increasing demand. This means more poles and wires, and more incentives to sell more electricity. This is effectively an incentive for network owners to over-capitalise and gold plate their networks. Moves to artificially increase revenue include overstatement of the RAB, overblown demand projections and capital costs, and stone-walling of embedded generation projects.<sup>13</sup>

### **3. No obligation to implement DM if cheaper**

The pricing system in the NEM does not impose limitations on distribution network augmentations even when more cost-effective demand management alternatives are available. Under the system, DM still remains an optional choice for networks, that are still able to choose to augment the network, a likely scenario considering the ‘build’ culture within these businesses. This is a failure of network regulations to effectively ensure that prudential reviews are comprehensive.

### **4. Lack of clarification of what DM is**

Several NSPs have rightly noted that there is a lack of clarity regarding whether the transmission and jurisdictional distribution regulators would allow them to recover DM, and under what conditions. While IPART has attempted to address this issue in its Draft Determination for 2004-2009<sup>14</sup>, the ACCC has not provided explicit guidance on the treatment of DM spending by transmission NSPs, and the topic is not addressed in its Draft Statement of Principles for the Regulation of Transmission Revenue.<sup>15</sup> Notably, the Code specifically lists the costs of network augmentation and generation options, but not DM costs, as factors to be included in setting network revenue requirements, and does not require regulators to specify regulatory treatment.<sup>16</sup> While the NEC has a broad principle specifying that the transmission regulatory regime must “have regard to the need to... create an environment in which demand side options are given due and reasonable consideration”,<sup>17</sup> there are no provisions detailing how that might be achieved.

### **5. Lack of Australian Experience with Mainstream Energy Efficiency Implementation**

Given the lack of effort and limited experience to date with large-scale rollout in Australia of energy efficiency opportunities, there are uncertainties about the magnitude, cost and timing of the potential contribution of any specific implementation program. While there is excellent evidence that extensive economic energy efficiency opportunities exist, the absence of direct experience creates a reluctance to undertake mainstream implementation efforts.

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<sup>13</sup> Energy Users Association of Australia and Energy Action Group, *Submission to the Transend Revenue Application*, July 2003.

<sup>14</sup> IPART, 2004

<sup>15</sup> ACCC, Statement of Principles for the Regulation of Transmission Revenues, Draft, May 1999.

<sup>16</sup> NEC 6.2.4 (c)

<sup>17</sup> NEC 6.2.3 (d) (2)



## **6. Lack of a nationally consistent and coordinated approach to energy efficiency**

A key barrier is the lack of government leadership, coordination, commitment and regulation in promoting energy efficiency and the absence of a national goal or target (similar to national efforts on waste recycling and water use).

## **4. How to achieve cost-effective energy efficiency improvements**

To date, demand management and energy efficiency have been trapped in a gulf between policy and practice. We must move on all fronts simultaneously with the implementation of Demand Management funds, reform of the NEM, and stricter equipment and building standards. ‘Soft’ or voluntary options are not enough to improve energy efficiency. Mandatory regulatory standards must be put into practice across all institutions to achieve cost-effective energy efficiency improvements.

### **4.1 Incentive Mechanisms: Establish Demand Management Funds**

Demand Management (DM) Funds are an essential incentive mechanism to establish a viable market for DM and energy efficiency. Without such funds there will continue to be a lack of dedicated, well-resourced DM proponents capable of effectively representing DM opportunities and competing with traditional supply options.

The IPART Inquiry into Demand Management recommended the establishment of DM Funds as an essential step in the development of a DM market.<sup>18</sup> Acting on this recommendation, Premier Carr announced the establishment of a DM Taskforce to investigate this option in November 2003 and the NSW Government is currently progressing this project.<sup>19</sup>

In the US, Demand Management Funds have achieved enormous, cost-effective energy efficient greenhouse savings, at an average benefit to cost ratio of 4:1:

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<sup>18</sup> IPART, Inquiry into the Role of Demand Management and Other Options in the Provision of Energy Services, 2002, p. iii.

<sup>19</sup> Premier of NSW “Further Measures to Tackle Greenhouse Emissions and Global Warming” November 2003.

<b>State</b>	<b>Benefit to Cost Ratio<sup>20</sup></b>
California	8:1
New York	3:1
Connecticut	2:1
Massachusetts	2.5:1
Vermont	1.55:1
Minnesota	6:1

For example, in New York, the State's fund has secured commitments in the last 3 years that will reduce electricity demand by more than 140 MW while saving consumers tens of millions of dollars annually. Consumer savings are providing a 1.4-year payback on funds invested. Further, for each US\$1 spent out of the fund, customers, energy service companies and others are investing \$3, providing good leveraging of fund expenditures. These programs are also reducing emissions from power plants and helping economic development in the state.

More broadly, demand-side management activities in the U.S. (including activities funded by mechanisms other than demand management funds) generally cost less than US\$0.03 per kWh. This is consistently less than the cost to generate a kWh of electricity. US Energy efficiency efforts have saved 50-60 billion kilowatt-hours annually in recent years; yielded consumer energy bill savings of about US\$4 billion annually; and reduced peak electric demand by 25,000-30,000 megawatts.

A Rand Corporation study of California's energy efficiency efforts between 1977 and 1995 determined that they had paid back into that State's economy roughly US\$1000 per capita for the US\$125 per capita invested. Further, they had avoided the need for new power plant construction in that time period and avoided a 40 percent increase in stationary source air pollution. California's recent power crisis would likely have occurred many years earlier and been far more serious without concerted energy efficiency measures.

Five critical principles should guide the establishment of DM funds<sup>21</sup>:

- **Ensuring adequate funding** – For example, in NSW, a \$0.001/kWh levy on the network costs for a minimum of 5 years would establish a fund of about \$50 million per year
- **Establishing funds as special purpose independent entities in each state** – A DM Fund should be administered by an independent government-established body, and not by existing electricity companies. This would help ensure appropriate institutional priorities and incentives, and give prospective service providers confidence that their offerings would be appropriately considered. It would also

<sup>20</sup> NextEnergy and TEC report, *Demand Management and the National Electricity Market*, February 2004, p. 28 (in Appendix 2).

<sup>21</sup> NextEnergy and TEC, *Demand Management and the NEM*, February 2004, p. 30-32

avoid a significant number of potential conflicts of interest. It seems appropriate to establish a separate fund in each state. This approach would be more expedient, and would enable the fund to focus on particular issues and opportunities unique to the each region.

- **Focusing activities on specific areas with identified upcoming network constraints and establishing performance targets** – In prioritising Fund activity, it would be appropriate to identify areas where intensive DM activity would be most likely to be able to demonstrate an ability to defer network spending. Performance targets should be established consistent with the level of DM required to defer augmentation.
- **Adopting a timely and iterative approach** – Given the long-term lack of progress in achieving significant DM take-up, a DM Fund should accept the timeliness/perfection trade-off in favour of timeliness. That is, it would be preferable to conduct a ‘good’ RFP in the near term rather than a ‘perfect’ RFP in the indefinite future. Furthermore, it is inevitable that revisions to future RFP rounds would be made based on the experiences gained in the previous rounds. For example, the delay in progressing the NSW EnergyAustralia/ TransGrid/ Department of Infrastructure, Planning, and Natural Resources DM Fund has sent a poor signal to the market regarding the priority placed on demand management, and contributes to the continuing predominance of traditional supply infrastructure in meeting electricity needs.
- **Dividing a portion of Demand Management Funds to the residential and commercial sector** – A proportion of DM Funds should be allocated to these sectors to allow, for example, the efficient use of energy in domestic homes, and low-interest loans to small and medium enterprises for investing in energy efficiency initiatives.

## **4.2 Reform of the NEM: Require Networks to Test the Market for Demand Management Prior to Adopting Augmentation Decisions**

A variety of changes are needed to the NEM to reduce the incentives for excessive consumption and increase investment for Demand Management and energy efficiency. These include:

### **4.2.1 DM Protocols for Networks**

One of the major problems for DM proponents is the absence of an obligation on the part of networks to fully explore and solicit proposals for DM before expanding their networks. While DM proponents are free to come forward in the current National Electricity Code (NEC) planning approach, their proposals need not be specifically sought, and it is unclear how such proposals would be treated. This is inappropriate regulation for monopoly networks with an incentive to build under the price cap. It results in significant inefficiency, with peak demand driven network augmentations only being used for a small amount of the time. In a competitive market, the failure of

monopoly networks to treat non-network and generation options equally goes against the spirit and intentions of the Code.<sup>22</sup>

To ensure that networks operate efficiently, therefore, the NEC should require networks to solicit proposals for alternative non-network solutions before they undertake major network augmentations. This would involve clear protocols for information disclosure, specification of constraints, requests for proposals, and evaluation of proposals.<sup>23</sup>

#### **4.2.2 Clearer standard network connection provisions to facilitate small generators**

To facilitate small-distributed generators, each jurisdictional Distribution Network Service Provider (DNSP) regulator should establish standard negotiation guidelines and connection agreements, perhaps within DM Codes of Practice.

#### **4.2.3 Development of a market platform for real time DM**

In response to the Parer Report's recommendation that the dispatch process be modified to facilitate demand side response, NEMMCO is planning to investigate the design and development of a suitable process, and associated changes to the National Electricity Code and to IT systems.<sup>24</sup> NEMMCO should also establish a market framework for real time dispatch to facilitate interruptible contracts and distributed generation.

#### **4.2.4 Improved price signals, including trials of localized congestion pricing**

More cost-reflective locational pricing is necessary. Network costs can be very high at specific locations where growing peak demands approach capacity. However, distribution network tariffs typically are flat or averaged across both location and time. As a result they do not provide customers with price signals about congestion costs.

There are a number of challenges in developing and implementing tariffs that reflect congestion costs, including equity considerations.<sup>25</sup> Advocates for low-income consumers point out that these consumers may be adversely affected by congestion tariffs. However, with the exception of some special groups, it is quite possible to have cost reflective time-of-use and locational tariffs without raising average tariffs. This is done by raising tariffs at times of high congestion and lowering them at other times, with average bills remaining the constant. Each jurisdictional DNSP regulator needs to assess and implement as appropriate the establishment of congestion pricing trials

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<sup>22</sup> National Electricity Code, 5.6.2

<sup>23</sup> NextEnergy and TEC, *Demand Management and the NEM*, p31-32.

<sup>24</sup> NEMMCO "Statement of Corporate Intent and Budget 2003-04" May 2003 p. 7.

<sup>25</sup> NextEnergy and TEC, *Demand Management and the NEM*, p. 13; Public Interest Advisory Centre "Submission to the Independent Pricing and Regulatory Tribunal Review of Electricity Pricing Distribution" July 2003, p. 4; Australian Consumers' Association "Submission to the Independent Pricing and Regulatory Tribunal of New South Wales Review of Electricity Networks Pricing for 2004".

#### **4.2.5 The roll-out of interval meters and associated pricing issues**

Each jurisdictional DNSP regulator should accelerate and enhance their efforts to assess costs and benefits of interval metering roll-out and pricing, and implement as appropriate. It is also important that jurisdictions set clear policy objectives which outline what they are trying to achieve with a roll-out. These policy objectives would shape the roll-out approach, in terms of whether to have a targeted or universal roll-out and what sort of technology should be applied.

Such roll-outs would progress demand management, particularly of peak demand, reducing the need for increasing system capacity and ultimately reducing greenhouse gas emissions from the energy sector. With this in mind, interval meters should be introduced within a policy framework of emission reduction and demand management, as well as meeting social policy objectives, such as alleviation of fuel poverty and the removal of socially regressive cross subsidies. It is also acknowledged that meters alone will not be enough. A complete package of demand management initiatives is required, including time of use tariffs, remote control technology and other demand management programs.

#### **4.2.6 Clarify the regulatory treatment and recovery of spending by NSPs on DM**

As noted above, there is a lack of guidance networks in their treatment of DM. There is also a regulatory failure to ensure that the most cost-effective option is implemented, whether this option is DM or augmentation. In response, network regulations should clarify their approach to spending on DM and develop protocols on DM for use in accessing network spending.

### **4.3 Set a national energy saving target to be implemented over the next 10 years**

Based on its modelling, the NFEE working group has flagged a national 1% target for energy efficiency beyond business as usual (BAU).

TEC supports the development of a national saving target across Australia. Government needs to introduce a clear, well articulated, and nationally consistent goal for energy efficiency that will provide a focus for action. An interim target over medium term should also be considered. In effect, this would also establish a sense of purpose, and greater coordination between policies and programs in different jurisdictions, and solve the problem of split incentives.

### **4.4 Measures to achieve the target**

The Government should play a more active role to drive energy efficiency in the residential sector of the market by implementing far more aggressive Minimum Energy Performance Standards (MEPS), enhancing information and awareness-raising activities, and distributing provision of technical expertise.

While reward mechanisms such as the UK Energy Efficiency Accreditation Scheme<sup>26</sup> encourage the leaders, it is necessary to provide a rigorous bottom-line standard to ensure that the under-performers are improving.

#### **4.4.1 Equipment and Building Standards**

The NFEE should co-ordinate a national review and harmonization of efficiency standards for buildings and equipment, using the best from each state or Commonwealth initiative to ensure under-performers reach minimum standards. Targeted programs should include, but not be limited to, the Mandatory Efficiency Performance Standards (MEPS) for equipment, the Building Code of Australia (BCA) standards, the Victorian 5 Star building regulations and the NSW Building Sustainability Index (BASIX). Subsequent to this review, the NFEE should set stretch targets for each program, developing benchmarks that deliver phased-in efficiency gains linked to milestones.

The Government should set minimum energy performance requirements for new buildings and leased commercial premises. In particular, they should:

- Expand and strengthen MEPS for appliances and buildings in the residential sector
- Extend MEPS to buildings, commercial office equipment, lighting and heating, ventilation and air conditioning (HVAC) systems in the commercial sector
- Expand MEPS to cover all major industrial machinery and equipment in the industrial sector

## **5. About Total Environment Centre**

The Total Environment Centre (TEC) was established in 1972 to campaign on a vast range of environmental issues – natural and urban, coastal and inland, country and city. TEC's mission is to defend the environment.

TEC has a strong record in achieving greenhouse gas reduction commitments and renewable energy strategies for the energy market. TEC's climate change and greenhouse work focuses on energy.

## **6. References**

Climate Change – An Australian Guide to the Science and Potential Impacts edited by Barrie Pittock, 2003, <http://www.greenhouse.gov.au/science/guide/pubs/chapter4.pdf>

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<sup>26</sup> The Energy Efficiency Accreditation Scheme is a nationally recognised award for energy efficiency and provides independent verification of achievements in saving energy, [http://www.thecarbontrust.co.uk/energy/pages/page\\_327.asp](http://www.thecarbontrust.co.uk/energy/pages/page_327.asp)

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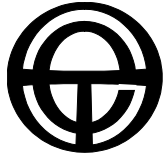
**APPENDIX 1: Alan Pears, *Energy Efficiency – Its Potential: Some Perspectives and Experiences* (Background paper for International Energy Agency Energy Efficiency Workshop), Paris, April 2004**

**Table 1: Relative costs of actions to meet emission reduction targets for a business that normally achieves 15% pa rate of return on investment**

<b>ACTION</b>	<b>COST/TONNE OF CO<sub>2</sub> AVOIDED OR STORED</b>	<b>COMMENTS</b>
Buy 'credits' from tree plantations	\$5-\$30	Cost depends on many factors
Buy permits on market	\$7-\$50	Economic modelling shows a wide range of costs, depending on assumptions in the modelling
Buy Green Power or other zero emission renewable power at 3c/kWh premium	\$30 to \$40/tonne (Aust mainland ave - \$22/t if it replaces Victorian average electricity, which gives a bigger CO <sub>2</sub> saving per kWh)	Use of energy involving capture of methane that would otherwise have been released into the atmosphere may have a lower cost/tonne of CO <sub>2</sub> equiv avoided, as the benefits of removing very greenhouse-active methane from the atmosphere may be counted
Buy low emission electricity at 1 c/kWh extra cost – e.g. hypothetical small scale cogeneration	\$10 to \$15	Assumes electricity at 1.0 kg CO <sub>2</sub> /kWh replaced by electricity from cogeneration or combined cycle gas at 0.25 to 0.33 kg CO <sub>2</sub> /kWh. If low emission energy purchased at same cost as BAU energy, cost/t CO <sub>2</sub> avoided is zero
Buy low emission electricity at 0.5c/kWh less – e.g. cogeneration	-\$3 to -\$55	As for above
Invest in energy efficiency measure with 1 year payback	-\$32	Assumes 10 year life of measure, 8c/kWh and 1.0 kg CO <sub>2</sub> /kWh for BAU electricity, and 15% pa discount rate to reflect 15% IRR threshold
Invest in energy efficiency measure with 5 year payback	-\$4.50	Assumes 15 year life, 8 c/kWh and 1.0kg CO <sub>2</sub> /kWh for BAU electricity, and 15% pa discount rate to reflect 15% IRR threshold
Invest in energy efficiency measure with 7 year payback	\$6.15	As above

Source: Pears, 2000





TOTAL ENVIRONMENT CENTRE



# **Demand Management and the National Electricity Market**

Total Environment Centre  
Level 2, 362 Kent Street, Sydney, 2000  
Ph: 02 9299 5599 Fax: 02 9299 4411  
[www.tec.org.au](http://www.tec.org.au)

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## About Next Energy

Next Energy is a Sydney-based consulting company with an exclusive focus on utilities issues. Its work includes advice on public policy and regulation; commercial and economic feasibility; development of business plans and models; strategic positioning; and government liaison. The company's clients include a variety of public, private and NGOs. The authors of this report were:

**Dr Robin Roy** – Robin has over two decades of experience in the energy sector in the U.S. and Australia. Over the last eight years, he has undertaken a wide variety of public and private sector consulting assignments in the Australian energy sector. He is a director of Sydney-based consultancy, Next Energy. Robin was formerly Project Director & Fellow at the United States Congress Office of Technology Assessment where he advised the Congress on competition in the electricity market, energy efficiency initiatives and nuclear industry issues. Prior to that, he worked with Pacific Gas and Electric Company in their strategic planning group. Dr Roy gained a Ph.D., MS and BS from Stanford University.

**David Nemtsov** – David recently concluded a 10 year term as President and CEO of the US Alliance to Save Energy, a high-powered coalition of business, government, environmental, and consumer leaders promoting the efficient and clean use of energy. He is widely recognised as one of the leading US experts of energy efficiency and has been regularly called upon to testify before US Congressional committees, advise White House officials and brief US corporations on energy policy. David has a BA from Brown University, an MPP from Harvard University's Kennedy School of Government and works as a consultant with Next Energy on a variety of projects.

**Graham Mawer** – Graham has spent the past seven years working on consulting projects in the Australian energy industry. He is a director of Sydney-based consultancy Next Energy where he has led a variety of energy efficiency, energy purchasing, energy generation and energy technology projects. Before coming to Australia, he worked for a UK technology consulting firm running their northern England office, serving clients in the energy, petrochemical and product manufacturing sectors. He previously worked as an engineering consultant on commercial building projects in Canada. Graham has a B.A.Sc. from the University of Toronto and an MBA from McGill University.

**Next Energy**  
Level 12 – 220 George Street, Sydney NSW 2000  
T 02 9251 4072

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## Executive Summary

Can demand management opportunities be harnessed to meet changing Australian electricity needs in a more efficient manner than an exclusive reliance on new generation and network augmentation? This report, commissioned by Total Environment Centre with funding from the National Electricity Code Administrator's Advisory Panel, suggests the answer is emphatically, yes.

The potential for demand management is well established and sizeable. The experience of a number of jurisdictions in the US suggests that at least 2800MW of demand management opportunities could realistically be harnessed across the NEM over the next decade with concerted effort. This is equivalent to about \$5 billion worth of generation and network assets. A more intensive effort could deliver outcomes well in excess of this level.

*“there is significant untapped potential for efficient demand management”*

IPART DM Inquiry 2002

While a number of barriers to demand management exist, other jurisdictions have demonstrated that these can be successfully overcome. Harnessing the potential of demand management in Australia to defer spending on new supplies, lower electricity bills and reduce environmental impacts requires four key steps:

*“significant energy efficiency improvement potential available to be exploited across all sectors of the economy”*

COAG Discussion Paper on Energy Efficiency Nov 03

### 1. Establish DM Funding Mechanism

International experience suggest that, while essential to have appropriate rules to enable demand management, it is insufficient to rely solely on competitive electricity markets to secure substantial demand management outcomes. Indeed, many jurisdictions in the US have concluded that a parallel market mechanism is needed to specifically target demand management services.

US experience suggests that one or more dedicated demand management funds should be established and mandated to purchase demand management from all players in the market. Without a specific funding mechanism that establishes a demand management market, there will continue to be a lack of dedicated, well-resourced DM proponents capable of effectively representing DM opportunities within the NEM and competing with traditional supply options.

The on-going funding mechanism must be of sufficient magnitude to foster a concerted market response (eg a figure equivalent to at least \$0.001 per kWh. This would total about \$65 million per year in NSW and \$40 million in Victoria, or around 1% of annual retail electricity revenues). Importantly, this funding should reduce consumers' electricity costs by redirecting funds that would otherwise go to more costly but avoidable network and generation augmentation. These funds could be administered by one or more dedicated demand management funds that would purchase demand management services from all players in the market.

#### **What is Demand Management?**

Demand management includes a diverse array of customer site activities that meet customer energy needs as effectively but more efficiently than the current situation. These include cogeneration, standby generation, fuel switching, energy efficiency, interruptible customer contracts, and other load shifting.

As the network planning approach specified under the National Electricity Code relies heavily on consultation with interested parties such as DM service providers, there is no reason to expect that DM would be adequately represented and developed until such time as there are dedicated, well-resourced proponents. Therefore, NECA should actively support and help facilitate the

creation of such a funding mechanism in each state to ensure that demand management resources are integrated into the electricity system. Without such effort, the NEC's network planning approach will continue to overlook DM opportunities in favour of traditional supply options.

An alternative approach to more adequately incorporate DM in the network planning process would be for the NEC to specify the DM evaluation activities that must be undertaken by network service providers. Given the lack of detailed information and experience with broad-scale DM deployment in Australia, this would also require earmarking funding by network service providers to ensure that adequate experience is gained to properly assess DM opportunities. While this approach might be effective, it would seem less effective than developing a DM services market and allowing it to compete.

## **2. Test the Market for Demand Management Prior to Adopting Network Augmentation Decisions**

Before network service providers undertake major network augmentations, they should solicit proposals for alternative non-network solutions. This would involve clear protocols for information disclosure, specification of constraints, requests for proposals, and evaluation of proposals. There should also be standing offers for small demand management services. Currently, the National Electricity Code does not have requirements for network service providers to test the market, nor does it provide for standing offers. NECA should promote a comprehensive approach through mandatory DM Codes of Practice for network service providers.

## **3. Adopt NEM Changes to Facilitate Specific Demand Management Opportunities**

A variety of developments are needed to extend existing National Electricity Code provisions to effectively facilitate DM. These include such areas as:

- clearer standard network connection provisions to facilitate small generators;
- development of a market platform for real time DM;
- improved price signals, including trials of localised congestion pricing;
- ongoing assistance to governments in reviewing the roll-out of interval meters and associated pricing issues;
- clarifying the treatment of avoided TUOS and DUOS; and
- clarify the regulatory treatment and recovery of spending by NSPs on DM.

NECA should directly address these areas and undertake changes to the National Electricity Code as appropriate.

## **4. Implement an Intensive National Framework for Energy Efficiency**

Beyond the NEM, a number of actions are required to capture energy efficiency opportunities more broadly. For example, these include strengthening of mandatory energy performance standards for buildings and appliances, and energy efficiency programs for existing buildings and industry. The Ministerial Council on Energy has recently undertaken to develop a NFEE, a step that should be expedited and strengthened to the maximum extent. More details of these suggested steps, and possible amendments to the National Electricity Code that may facilitate them, are given in Table 6.1.

The unfortunate truth is that in practice, no substantial demand management market has evolved in the first five years of the NEM and it is highly unlikely to do so without the types of changes recommended in this document. The two case studies reviewed in this paper (Sydney CBD Transmission Augmentation and the Latrobe Valley to Melbourne Augmentation) clearly demonstrate this point. Unless prompt and decisive action is taken, economic demand management opportunities will continue to be lost.

When established, the NEM generally was expected to both facilitate demand management and to be a primary market-based forum in which demand response would interact with supply operating and investment decisions. However, the core business, the expertise and the priority of the NEM lies in supplying electricity. With this in mind, it appears unrealistic to expect the NEM to be the primary driver of demand management. However, the NEM has a vital demand management facilitation role and needs to make some important changes to deliver in this role.

Similarly, network service providers (NSPs) are charged with both facilitating demand management and being the principal decision-makers concerning whether, when and where specific demand management options are pursued instead of network augmentation. However, the core business of NSPs is and will remain in building, maintaining and operating reliable and economic networks, and rightly so. Consequently, demand management is neither their priority nor a principal area of their expertise. Furthermore, demand management involves assets NSPs do not control, and they have limited relationships with consumers, which is where demand management opportunities lie. In addition, there are presently some regulatory and commercial disincentives for NSPs to aggressively pursue all but the narrowest subset of demand management opportunities. Accordingly, it appears most unrealistic to expect NSPs to be the primary drivers of demand management. Indeed, it may well be unhelpful to put more onus on them other than an active and increasingly effective facilitation role.

Who then are the appropriate parties to be the primary drivers and providers of demand management? Electricity retailers are better placed than NSPs to develop demand management because of their more direct relationship with customers. Additionally, many parties entirely outside the NEM also have major development roles to play in delivering on the full potential for cost-effective demand management. These include appliance vendors, property developers and owners, specialist demand management service providers, some large consumers, and perhaps others if given the right signals and incentives. The four key recommendations outlined above would facilitate these parties' aggressive pursuit of a demand management market.

**In short, Australia has an abundant supply of the cheapest, cleanest and smartest energy resource: demand management. To date, this supply is largely untapped which, while unfortunate, does present an excellent and relatively easy opportunity to pursue as a critical component of a reliable and affordable electricity system.**

## **1 Introduction**

As a vehicle to identify potential enhancements to demand management in the NEM, this paper examines two cases where DM options were passed over in favour of expenditure on traditional network augmentation. These cases are the Transgrid/EnergyAustralia transmission augmentation to the Sydney CBD and Vencorp's augmentation of the Latrobe Valley to Melbourne transmission network.

The case studies:

- 1) Explore whether DM was utilised to its full economic potential;
- 2) Review the economic, social and environmental impact of under-utilisation on consumers;
- 3) Explore why DM measures were not utilised to their full potential; and
- 4) Propose solutions to enhance the efficient development and use of DM in the NEM.

Many, but not all of the reasons why DM measures were not utilised to their full potential, and possible solutions, lie well within the purview of the NEM's regulators and administrators. This report also identifies some barriers and solutions that lie outside the purview of the NECA, NEMMCO, and the NEM regulators. While beyond the specified scope for the report, they are included for completeness.<sup>1</sup>

The two case studies involved augmentation of transmission networks, rather than distribution. There are significant distinctions between the code requirements and regulatory approaches to transmission and distribution. Nonetheless, much of the broader discussion of DM in this report should be relevant to distribution network DM opportunities as well.

## **2 Context**

### **2.1 Outlook for Large Increases in Electricity Supply Spending**

Australia is entering a period of intensive electricity infrastructure renewal and expansion. Aging electricity assets, a growing economy, changing population distribution and changing consumption patterns are all driving the need for upgraded infrastructure. The investment and operating choices made will have significant implications for consumers, investors (including States owning major electricity companies), the environment, and the economy as a whole.

In the coming decade, government and private parties are expected to invest about \$30 billion in new electricity infrastructure to meet the growing needs of Australia's vibrant economy.<sup>2</sup> In NSW alone, the Ministry of Energy & Utilities suggests the possible need for 1500-3000 MW of new generation capacity over the coming decade<sup>3</sup>, costing up to \$3 billion. In addition, the NSW network companies have identified capital budgets of about \$1 billion annually. Notably, while much of these projected costs could be avoided by demand management, there is little indication of anticipated DM investment.

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<sup>1</sup> Note: The project grant did not require investigation of barriers and solutions outside the purview of the NECA, NEMMCO and NEM regulators, but NextEnergy agreed with Total Environment Centre to undertake the additional work pro bono to provide a larger picture of the situation, to inform policy makers.

<sup>2</sup> See, e.g., "New ESAA Chair calls for decisive Government leadership on energy policy" 14 November 2003.

<sup>3</sup> Ministry of Energy and Utilities, NSW Statement of System Opportunities, June 2002.

## 2.2 Large Untapped DM Potential

Major advances in efficient electricity use have been made in Australia and internationally over the past two decades, with commensurate benefits to consumers, as well as broader economic and environmental benefits. These gains have come as the result of a variety of government policies, market forces, and consumer behaviours.<sup>4</sup>

That said, it is generally recognised that much electricity use remains highly inefficient both economically and technically, and that demand management can and should play a far greater role in meeting future needs. Domestically and internationally over the past decades, there has been extensive analysis and development of demand management technology, economics, and policy, which generally find scope for vastly increased uptake of DM.

Diverse DM opportunities, ranging from improved lighting in commercial office buildings to the replacement of electric chillers with gas chillers to the installation of cogeneration plants have long been recognised as having great untapped potential to meet energy needs reliably and cost-effectively, with minimal environmental impacts relative to traditional generation and network solutions.

This opportunity has been recognized in Australia for many years, as shown in a decade-old statement from the NSW Government Pricing Tribunal:<sup>5</sup>

*"It is widely accepted that there is considerable potential to improve the efficiency with which we use electricity and other forms of energy. This potential offers the possibility of reducing both environmental impacts and, up to a point, customers' electricity bills.....The Tribunal wishes to ensure that the regulation of prices helps the community tap the potential gains from demand management more effectively. To this end it wishes to, firstly, improve the price signals to which demand management responds and secondly, remove as far as possible regulatory biases against demand management..."*

The opportunity remains today, as the Tribunal concluded last year following an extensive inquiry into DM<sup>6</sup>:

*"The importance of the role demand management can play ... stands in stark contrast to the low level of activity in demand management to date. **It is the Tribunal's strong view that there is significant untapped potential for efficient demand management.**"*

The COAG Ministerial Council on Energy has come to the same view with respect to energy efficiency. In its November 2003 Discussion Paper, the MCE notes that energy efficiency efforts to date "have captured only a small proportion of the cost-effective energy efficient potential."<sup>7</sup> Their analysis to date has "indicated significant energy efficiency improvement potential available to be exploited across all sectors of the economy," with cost-effective potential savings of 35% in residential, 28% in commercial, and 25% in manufacturing, with an average four year payback using technologies that are currently commercially available (see Figure 2.1). A higher efficiency scenario involving an average eight-year payback using existing or potentially available technologies indicated opportunities would be more than double that amount.

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<sup>4</sup> For a broad review of historical energy efficiency programs in Australia, as well as recommended policies, see, Deni Greene and Alan Pears, "Policy Options for Energy Efficiency in Australia" Australian CRC for Renewable Energy Policy Group, January 2003.

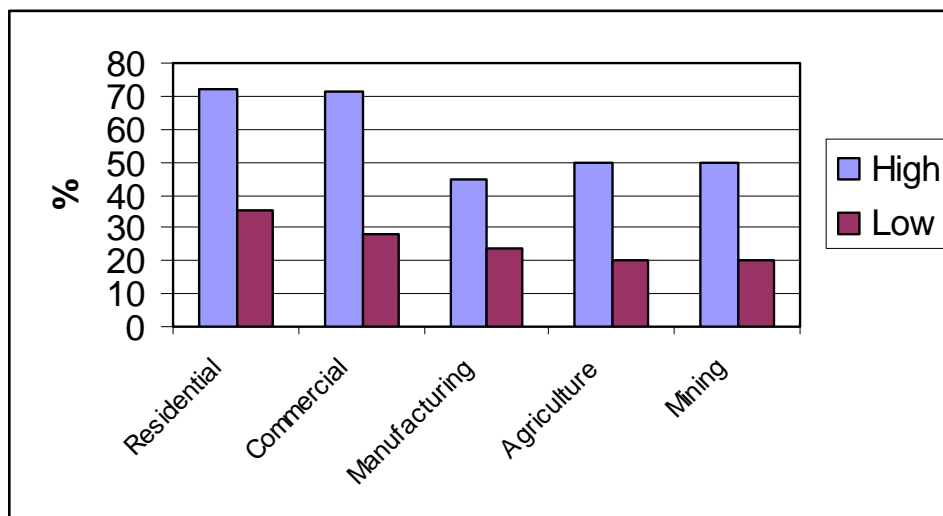
<sup>5</sup> Government Pricing Tribunal of NSW, Foreword, Price Regulation and Demand Management, Sept 1994,

<sup>6</sup> IPART Foreword, Inquiry into the Role of Demand Management and Other Options in the Provision of Energy Services, Oct 2002.

<sup>7</sup> COAG Ministerial Council on Energy, Energy Efficiency and Greenhouse Working Group, "Towards a National Framework for Energy Efficiency – Issues and challenges" November 2003.



**Figure 2.1: Cost-effective energy consumption reduction potential**



Source: COAG Ministerial Council on Energy, Energy Efficiency and Greenhouse Working Group, "Towards a National Framework for Energy Efficiency – Issues and challenges" November 2003. Results of preliminary assessment. Low scenario assumes an average four-year payback using current commercially available technologies. High scenario assumes an average eight-year payback period and existing or developing technologies.

While vast DM opportunity is widely acknowledged, it is also generally recognised that the current suite of government policies and market drivers will fail to deliver on the full potential of DM. Again, looking to the IPART DM inquiry, it is notable that fully thirteen broad initiatives were recommended.<sup>8</sup> **Without intensive support for such initiatives, it should come as no surprise that the vast potential for DM will remain untapped, and that the projected \$30 billion in networks and generation spending will be made, to the disbenefit of consumers, the environment and broader society.**

The challenge facing policy makers and governments lies not in assessing whether more DM should be pursued, but rather, in committing to act decisively and effectively on DM initiatives such as those recommended by IPART.

**Box 1: What is Demand Management?**

For the purposes of this report, demand management includes a diverse array of opportunities at a consumer's site<sup>9</sup> to meet their energy needs as or more effectively, such as:

- **Cogeneration**
  - Use of **standby generation** at customers' sites
  - **Fuel switching** (e.g., using natural gas-fuelled chillers; solar water heating)
- **Energy efficiency** (advanced controls for air conditioning and lighting; better appliances and equipment and buildings)
- **Load shifting** (e.g., deferring non-essential or lower-value loads during extreme peak periods)

<sup>8</sup> IPART Inquiry, pp. 32 – 97.

<sup>9</sup> While there may also be attractive energy efficiency opportunities within an NSPs facilities themselves, e.g., through application of power factor correction at a substation, they fall outside the definition used in this report. Such opportunities are well within the control of NSPs to implement directly, and do not face the same challenges identified in this report.

## **Box 2: Who Might Supply Demand Management Services?**

**A wide variety of parties could potentially provide DM services, such as:**

- Electricity retailers; (through a range of programs, like specialist DM providers)
- Specialist DM service providers – e.g., engineering consulting firms
- Property developers (by going beyond minimum appliance and building mandatory energy performance standards)
- Appliance and equipment vendors (by marketing higher 'star-rating' devices)
- Standby generator vendors and service providers;
- Metering companies (by enabling more cost-reflective pricing);
- Consumers (by managing their demand);
- Local governments; (by promoting residential energy performance improvements)
- Gas retailers (through fuel substitution).

### **2.3 Widely Recognized Barriers to DM**

With all the promising potential for DM, why has so little DM been taken up to date? The question of impediments to DM has drawn considerable attention for many years, and is increasingly well understood.<sup>10</sup>

This section reviews some key impediments to DM, and comments on the extent to which these are caused by, or could be mitigated more effectively, through the NEM.

#### **Barrier 1: Chicken and Egg: Lack of a Mainstream DM Services Industry**

The first and foremost challenge for DM is the chicken and egg problem of the absence of a strong DM services industry with adequate resources to demonstrate and promote demand management effectively. In contrast to the \$25 billion energy supply industry, the demand management industry is very small and immature, and has no major dedicated corporate players. Furthermore, DM opportunities are individually small relative to traditional supply options, dispersed across a large number of consumers and sporadic (eg DNSPs seek DM offerings infrequently and have not regularly taken up the offerings made).

As a result, there are few well-resourced, dedicated advocates to promote effective DM policies, argue for appropriate pricing and incentives, and overcome barriers. For example, whereas all the major NSW network service providers regularly participate in the NSW Ministry of Energy's working group revising the NSW DM Code of Practice, there is little participation by either current or prospective DM service providers.

Notably, the NEM and the NEC do not make provision for the current lack of well-resourced, dedicated DM proponents. This can be a significant barrier to adequate and effective consideration of DM opportunities in the NEM planning and network development. In particular, the NEC planning provisions rely on interested parties, including DM providers, to participate in a

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<sup>10</sup> For recent relevant reports including discussions of barriers to DM, see, e.g., IPART Inquiry into the Role of Demand Management and Other Options in the Provision of Energy Services Final Report, October 2002; Charles River Associates and Gallaughier & Associates "Electricity Demand Side Management Study" prepared for VENCORP, 7 September 2001; and COAG Ministerial Council on Energy, Energy Efficiency and Greenhouse Working Group, "Towards a National Framework for Energy Efficiency – Issues and challenges" November 2003.

consultation process conducted by the NSP to ensure that DM options are properly identified<sup>11</sup> and assessed<sup>12</sup>, and to dispute the plans of network service providers as needed.<sup>13</sup> While this consultation-oriented planning process may be appropriate once there are effective DM proponents, there is no reason to assume that it would obtain adequate participation under the current circumstances.

## **Barrier 2: DM not a priority for most consumers**

By definition, DM opportunities generally lie originally with consumers. However, every household or business has a variety of opportunities that compete for scarce time and capital resources. Energy use in general, and development of DM opportunities in particular, have low or no priority with the great majority of consumers. This is not unreasonable, as for most industries and households, energy is a small proportion of total expenditure. DM opportunities also tend to be relatively unexciting, and lie far from core expertise, and interests.

Consistent with the low priority placed on energy and DM, many consumers have a preference for simplicity and convenience, as opposed to gaining additional information about opportunities. For example, recognising that some customers prefer simplicity in budgeting to feedback in energy costs, some retailers offer 'bill smoothing'<sup>14</sup> or a 'budget plan'<sup>15</sup> that allows paying equal installments throughout the year. While that plan doesn't necessarily reduce information provided regarding energy use, it does insulate the consumer from the more regular financial feedback of quarterly bills based on actual consumption.

With respect to capital resources, the result is that a very high effective discount rate is applied to DM opportunities for both households and industrial customers, when capital is available at all. For example, AMCOR, which is widely recognised as a national leader in identifying and implementing energy efficiency opportunities, has a capital budgeting policy to pursue projects with a payback of under 2 years.<sup>16</sup> This is a high discount rate of about 50%, far greater than the 8% to 12% discount rate currently used in assessing network augmentations. In effect, DM opportunities developed by consumers typically must meet far more demanding requirements for financial performance than do network augmentations.

Similarly, company Boards of Directors, management, and staff all have a variety of activities that typically require more than the available time resources. The result is that non-core activities such as DM typically do not receive the attention they would need for implementation.

As discussed above, the NEM and the NEC do not make provision for the current lack of well-resourced, dedicated DM proponents. This can be a significant barrier to adequate and effective consideration of DM opportunities in NEM planning and network development, given the reliance on DM proponents and other interested parties to represent DM opportunities.<sup>17</sup>

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<sup>11</sup> NEC 5.6.6(b) (1) (iii) and 5.6.2 (f)

<sup>12</sup> NEC 5.6.6 (b) (5) and 5.6.2 (g)

<sup>13</sup> NEC 5.6.6 (h)

<sup>14</sup> AGL Energy Sales & Marketing "Submission on the Regulatory Arrangements for the NSW Distribution Network Service Providers from 1 July 2004 – Issues Paper" p. 5.

<sup>15</sup> <http://www.txu.com.au/residential/youraccount/budgetsolutions.asp>

<sup>16</sup> AMCOR energy efficiency policy statement.

<sup>17</sup> NEC 5.6.6 and 5.6.2

### **Barrier 3: DM not a priority, and maybe a competitor, for electricity companies**

Without a well-established, large DM industry, and without high priority among consumers, many expect that responsibility for DM must lie with electricity companies. In particular, electricity network service providers and electricity retailers are viewed as prospective proponents of DM.

However, while NEMMCO and NSPs have a vital DM role to play, these parties have core business obligations and expertise outside DM that necessarily compete for scarce resources, just as is the case for consumers. NSPs will always have a core competency and business interest in operating, maintaining, and as needed, augmenting highly reliable, economically efficient wires services to meet demand. The commercial interest for NSPs is clearly specified in the NEC, for example, with a regulatory objective for transmission pricing to provide for a revenue stream which includes a fair and reasonable rate of return on efficient investment.<sup>18</sup>

Similarly, NEMMCO must have a core competency and interest in achieving the lowest cost of supply to satisfy demand. The nature of DM opportunities is inherently different from network solutions and supply market operation in several ways. DM requires large numbers of small decisions by consumers, and at this immature stage in its development, involves implementation of novel programs and approaches, in strong contrast with the deployment of large-scale engineering solutions in networks.

Electricity retailers can play an important role, particularly if they view DM as providing an attractive offering to retain customers or secure new ones. However, retailers have a number of potential sales and marketing strategies beyond offering DM, which many may find as or more attractive to pursue.

In the course of its inquiry into DM, IPART came to the following view regarding the role of electricity companies:

*"To a large extent, one of the major obstacles continues to be a culture which favours traditional 'build' engineering solutions and which pays little more than lip service to alternative options."<sup>19</sup>*

Notably, VENCORP, in its most recent annual report, does not mention DM.<sup>20</sup> TransGrid pays significantly greater attention to DM in its annual report, noting the potential benefits, and describing a variety of assessments undertaken and steps to facilitate the emergence of DM service providers.<sup>21</sup> Similarly, EnergyAustralia devotes significant attention to DM in its annual report, and undertakes a variety of activities to investigate and develop it. However, these efforts are naturally very small relative to their main network business. For example, EnergyAustralia plans to make \$10 million in capital expenditure on DM during the 5 year period 2004/05 to 2008/09, or slightly more than one half of one percent, of the total planned capital expenditure of \$1,746 million.<sup>22</sup>

Furthermore, some regulatory practices create disincentives to DM activities by NSPs. For example, several NSPs have noted that there is a lack of clarity regarding whether the transmission and jurisdictional distribution regulators would allow them to recover DM spending, and under what conditions. In particular, the ACCC has not provided explicit guidance on the

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<sup>18</sup> NEC 6.2.2

<sup>19</sup> IPART Foreword, Inquiry into the Role of Demand Management and Other Options in the Provision of Energy Services, Oct 2002.

<sup>20</sup> VENCORP Annual Report 2002-03.

<sup>21</sup> TransGrid annual Report 2002.

<sup>22</sup> "EnergyAustralia's Submission on the 2004 Distribution Determination to the Independent Pricing and Regulatory Tribunal" 10 April 2003, p. xi.

treatment of DM spending by transmission NSPs, and the topic is not addressed in its Draft Statement of Principles for the Regulation of Transmission Revenue.<sup>23</sup> Notably, the Code specifically lists the costs of network augmentation and generation options, but not DM costs, as factors to be included in setting network revenue requirements, and does not require regulators to specify regulatory treatment.<sup>24</sup> While the NEC has a broad principle specifying that the transmission regulatory regime must “have regard to the need to...create an environment in which demand side options are given due and reasonable consideration”,<sup>25</sup> there are no provisions detailing how that might be achieved. As another example, the use of a regulatory approach involving price caps rather than revenue caps can create an incentive for NSPs to promote additional consumption where networks are unconstrained, as that increases their revenues and earnings. Notably, IPART has adopted a price cap as the form of regulation for the 2004 to 2009 Determination.<sup>26</sup>

Overall, while there are opportunities within the NEM to raise the level of effort by NSPs in promoting and facilitating DM, there should be no question that the NSPs primary role will be in facilitation and assessment, rather than in driving DM programs through to implementation.

#### **Barrier 4: Weak Price Signals and Incentives**

Network costs can be very high at specific locations where growing peak demands approach capacity. However, distribution network tariffs typically are flat or averaged across both location and time. As a result they do not provide customers with price signals about congestion costs.

Under the NEC, transmission network prices are now set for each connection point rather than averaged across each distributor.<sup>27</sup> However, they do not signal transmission congestion.

In the case of smaller customers, implementing stronger price signals is further impeded by the lack of interval, or time-of-use, meters.

Furthermore, the effectiveness of those price signals that do exist can be greatly weakened where the price of electricity service is paid by a tenant rather than an owner.

There are a variety of efforts to improve network price signals within the NEM. For example, EnergyAustralia has proposed a variety of pricing structures that promote DM, including demand and capacity charges for larger customers, interruptible, seasonal, and reverse block tariffs, and the roll-out of interval metering in conjunction with time of use pricing.<sup>28</sup>

There are, however, a number of challenges in developing and implementing tariffs that reflect congestion costs, including equity considerations<sup>29, 30</sup> a lack of cost-benefit assessment by some jurisdictional regulators regarding the broader roll-out of interval metering,<sup>31</sup> and practical issues

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<sup>23</sup> ACCC, Statement of Principles for the Regulation of Transmission Revenues, Draft, May 1999.

<sup>24</sup> NEC 6.2.4 ©

<sup>25</sup> NEC 6.2.3 (d) (2)

<sup>26</sup> IPART “Notice Under Clause 6.10.3 of the National Electricity Code – Economic Regulatory Arrangements, June 2002.

<sup>27</sup> NEC Chapter 6

<sup>28</sup> EnergyAustralia’s Submission on the 2004 Distribution Determination to the Independent Pricing and Regulatory Tribunal” 10 April 2003, p. 38.

<sup>29</sup> See, e.g., Public Interest Advisory Centre “Submission to the Independent Pricing and Regulatory Tribunal Review of Electricity Pricing Distribution” July 2003, p. 4.

<sup>30</sup> Australian Consumers’ Association “Submission to the Independent Pricing and Regulatory Tribunal of New South Wales Review of Electricity Networks Pricing for 2004”.

<sup>31</sup> Joint Jurisdictional Review of the Metrology Procedures, Draft, December 2003.

in coordinating with retailers' billing systems and offerings<sup>32</sup>. And, as noted in Barrier 2, some consumers have a preference for simplicity over strong price signals.

As an alternative to strong price signals, it may be possible to develop strong 'standard offers' that provide incentives to customers that implement DM opportunities. While standard offers have been mooted for NSW distribution companies, and are eventually intended to be included in the DM Code of Practice, they have yet to eventuate.

Many aspects of pricing and incentives fall well within the purview of the NEM and the NEC. However, the NEC does not provide direction or details as to how pricing and incentives should be developed to facilitate effective DM.<sup>33</sup> With respect to interval metering, the jurisdictional regulators are required under the NEC to conduct a joint review of metrology.<sup>34</sup> However, there are no provisions directing the jurisdictions to conduct the benefit – cost analyses upon which sound regulatory decisions should be based. That said, the NEM should provide a useful forum for addressing the challenges to better pricing, and promoting the adoption of clearer pricing and incentives that would facilitate economic DM. There are a number of steps within the NEM that could be taken to improve the development of clearer price signals and incentives. For example, in response to the Parer Report's recommendation that the dispatch process be modified to facilitate demand side response, NEMMCO is planning to investigate the design and development of a suitable process, and associated changes to the National Electricity Code and to IT systems.<sup>35</sup> As another example, jurisdictions could accelerate and enhance their efforts to assess costs and benefits of interval metering and pricing.

### **Barrier 5: Environmental Costs Not included in Prices**

Through the NSW Greenhouse Abatement Certificate legislation, NSW has taken an important step to including a cost of greenhouse emissions within electricity prices.<sup>36</sup> However, other NEM jurisdictions have not yet taken a similar step. Furthermore, it is unclear whether current NGAC prices accurately reflect the environmental costs that will eventuate over time as emissions trading or other greenhouse abatement measures are adopted across Australia.

Accordingly, current prices faced by consumers are lower than they would be if these external costs were internalised. While worth noting, this is likely to be a relatively less important barrier than the proceeding ones, for two reasons. First, many analysts estimate that the cost of greenhouse abatement is likely to be a small fraction of total price. Second, as discussed in Barrier 4, more accurate congestion-related price signals are likely to be more significant, and in any case, many customers would still place low priority on economic DM measures.

### **Barrier 6: Poor Negotiating Leverage**

Prospective DM service providers can be highly dependent on effective negotiations with NSPs. For example, standby generators must negotiate connection agreements, connection costs. DM service providers in general must also negotiate the avoided costs for which the NSP would pay them, including savings of transmission use of system charges, and savings from avoided or deferred network augmentation.

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<sup>32</sup> AGL Energy Sales & Marketing "Submission on the Regulatory Arrangements for the NSW Distribution Network Service Providers from 1 July 2004 – Issues Paper" p. 4.

<sup>33</sup> NEC, Chapter 6.

<sup>34</sup> NEC 7.13 (f).

<sup>35</sup> NEMMCO "Statement of Corporate Intent and Budget 2003-04" May 2003 p. 7.

<sup>36</sup> See [www.greenhousegas.nsw.gov.au](http://www.greenhousegas.nsw.gov.au) for details of the scheme.

Clearly, however, DM service providers have substantially less information regarding the nature and costs associated with the networks than do the NSPs. Furthermore, they have few practical alternatives should negotiations not proceed in a timely and effective manner.

The NEC requires NSPs to use reasonable endeavours to provide access arrangements, and to negotiate in good faith in establishing connection and service charges.<sup>37</sup> However, given the small number of such cases, it is unclear whether these NEC provisions are effective. Standing offers and connection arrangements would greatly simplify, speed-up and clarify this issue for all parties.

### **Barrier 7: Another Chicken and Egg: Lack of Australian Experience with Mainstream DM Implementation**

Finally, given the lack of effort and limited experience to date with large-scale rollout in Australia of DM opportunities, there are uncertainties about the magnitude, cost and timing of the potential contribution of any specific implementation program. While there is excellent evidence that extensive economic DM opportunities exist, the absence of direct experience creates a reluctance to undertake mainstream implementation efforts.

As discussed above, the NEM and the NEC do not make provision for the current lack of well-resourced, dedicated DM proponents. Similarly, they do not make provision for the lack of experience in large-scale roll-out, not require dedicated efforts by NSPs or other parties to achieve experience to adequately assess DM. This can be a significant barrier to adequate and effective consideration of DM opportunities in NEM planning and network development.<sup>38</sup>

## **3. Case I: Sydney CBD Augmentation**

### **3.1 Augmentation Plans Driven by Reliability Concerns**

In 1998, EnergyAustralia (EA) and TransGrid (TG) identified three concerns with the level of reliability for the supply of electricity to the Sydney CBD and inner suburbs.<sup>39</sup>

First, they came to the view that a high profile area such as the Sydney CBD required a higher reliability criteria than had previously been applied. Second, they noted that peak demands had been growing rapidly, and appeared set to continue on that path. They determined that with continuing rapid peak demand growth, the existing “n-1” criteria would not be met as of 2003. Third, they recognised that much of the existing transmission infrastructure serving the area, particularly some of the 26 132kV lines being relied upon, was old and increasingly at risk of failure.

Accordingly, and as required by Section 5.6.2 of the National Electricity Code, TG and EA undertook an evaluation of network and non-network options.<sup>40</sup> The entire planning process undertaken is summarized in Figure 3.1, and afforded extensive opportunity for input from interested parties.

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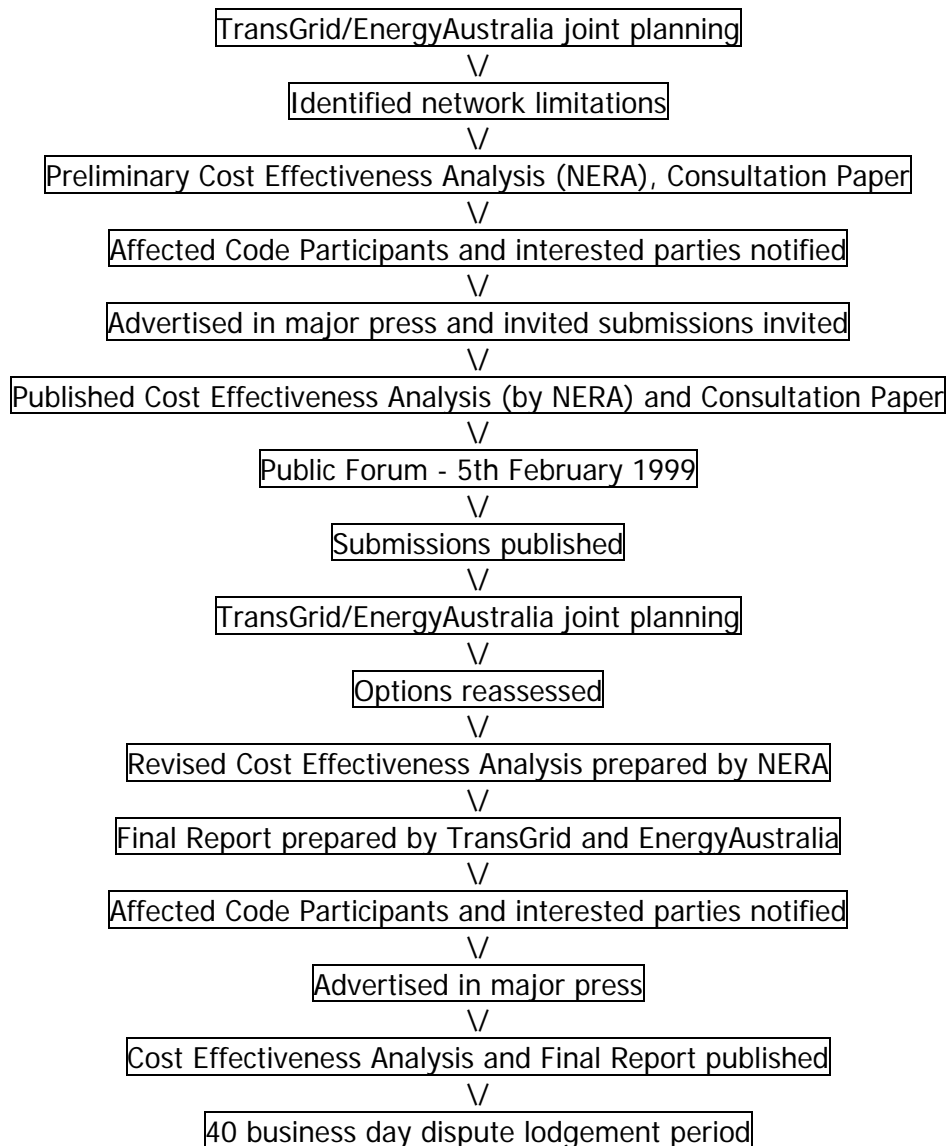
<sup>37</sup> NEC Section 5.5 (e) and (f).

<sup>38</sup> NEC 5.6.6 and 5.6.2.

<sup>39</sup> Transgrid NSW Annual Planning Statement 1999, pp 11, 24.

<sup>40</sup> The entire process is described in Transgrid and Energy Australia Electricity Supply to Sydney's CBD and Inner Suburbs: Final Report, February 2000

**Figure 3.1: Supply to Sydney’s CBD and inner suburbs – network planning process**



The planning process, including the consultation, was a substantial and extensive undertaking, and drew written comments from fourteen interested parties, four of which directly addressed DM. Fourteen options were examined, including four involving cogeneration, and four involving a diverse array of other DM activities. The estimated net present value of costs for the fourteen options varied significantly, from a low of \$124 million to \$345 million, as shown in Figure 3.1, under the 'base case' scenario.

Three other scenarios were also considered, involving alternate assumptions regarding whether market forces would result in cogeneration facilities being developed at either Botany, Kurnell or both. These two cogeneration sites had been under active development for some time and had development approvals, but there was question as to whether they would eventuate.



Table 3.1 – Options for the Sydney CBD &amp; Inner Suburbs

Scenario 1 - Base Case		
Option	Description	NPV (\$m)
1	132kV to CBD	238
2	Zetland 330kV	176
3	Sydney South-Haymarket330 kV	167
3A	330kV via Kurnell	178
4	Beaconsfield	169
5	95MW cogen plus 255MW at Botany	231
6	250MW GT at Haymarket	173
7	420MW cogen at Kurnell	345
8	420MW cogen at Kurnell +DSM	310
9	95MW cogen +255MW GT at Botany + DSM	196
10	Sydney South – Haymarket + DSM	134
11A	250MW DSM, with TG & EA cost estimates	124
12	330kV CBD cable and Botany 350MW	140
13	330kV CBD cable and Kurnell 420 MW	180

The 250 MW DM option (11A) was estimated to have the lowest cost in the base case scenario, and among the lowest costs across most other scenarios. However, TG and EA viewed the prospects of achieving 250 MW of DM as highly uncertain.

Ultimately, TransGrid and EnergyAustralia concluded that the “most cost-effective and achievable”<sup>41</sup> solution was to augment the network with a 330kV underground cable between Sydney South and the CBD (Haymarket), and carry out associated works on the 330kV and 132kV systems (option 3). The total capital cost was estimated at about \$340 million over the period to 2015.

TransGrid and EA sought and received approval from the Minister for Planning to proceed with the chosen option. Approval was granted to EnergyAustralia for its portion of the works in December 2001, and to TransGrid in February 2002.<sup>42</sup>

Among the conditions of consent to the development, the Minister required the establishment of a DM fund run by the Department of Planning, EnergyAustralia, and TransGrid. EnergyAustralia and TransGrid are to provide \$1 million annually for five years. To date, the fund manager has yet to call for an EOI for DM projects or conduct other major development activities. However, the fund manager notes that some calls for EOIs for DM should start to emerge in the next several weeks.<sup>43</sup>

While progress in applying the DM fund has been slow, the network construction work is proceeding well, and is anticipated for completion in time for the summer of 2003/04.<sup>44</sup>

<sup>41</sup> Transgrid and Energy Australia Electricity Supply to Sydney's CBD and Inner Suburbs: Final Report, February 2000, p 9.

<sup>42</sup> Minister for Planning, December 2001; and February 2002.

<sup>43</sup> Personal communication, November 2003.

<sup>44</sup> www.metrogrid.com.au/about.html November 2003.

### 3.2 Conflicting Views on Cost and Performance of DM

During the course of the planning process, there were substantially differing views as to the cost and availability of DM that could be implemented quickly enough to meet Sydney's reliability needs. In particular, SEDA proposed that over 250MW costing less than \$500 per kVA should be achievable from a variety of potential sources. Some of these sources are shown in Table 2.

SEDA based its estimates on both its broad experience across a range of projects and on a brief survey of opportunities identified by AGL, Trane and Energetics specifically in the CBD.

SEDA also put forward the view that a call for expressions of interest, based on a clear definition of the forecast constraints and required network support, would provide substantially better information on DM opportunities, and further suggested that EA and TransGrid provide cost-reflective incentives.

Transgrid and EA did not accept SEDA's assessment that at least 250 MW of peak reduction costing under \$500 per kW was reasonably achievable within 3 to 4 years. Rather, they concluded that SEDA's estimate "is extremely optimistic, and is not achievable within the next 3 to 4 years," noting that their consultants held the same view.<sup>45</sup> In their economic modeling, TG and EA assumed that 250 MW of DM would cost \$1100 per kW, or more than twice as much as estimated by SEDA.

TransGrid and EA did not pursue SEDA's recommendation to call for EOIs.

**Table 3.2 – Opportunities for DM in the Sydney CBD Identified by SEDA<sup>46</sup>**

	Demand Reduction	Net cost for DM
Small cogeneration	35 MW	\$450 to \$600 per kW
Replacing electric chillers with gas chillers	315 MW	\$200 to \$300 per kW
Standby generation	300 MW	Very low cost
HVAC, Building management system and ice storage systems improvements	~250 MW	\$3 to \$10 per kW for HVAC and BMS; under \$800 per kW for ice storage
<b>Total</b>	<b>&gt;&gt;250 MW</b>	<b>&lt;&lt;\$500 per kW</b>

Even with the benefit of hindsight, it is difficult to draw conclusions as to the whether EA's or SEDA's DM estimates were closer to the mark due to the continuing lack of large-scale roll-out efforts. There have been a number of further successful DM projects in Sydney's CBD, particularly in the area of energy efficiency.<sup>47</sup> However, despite a growing number of successful projects, these remain the rare exception rather than the rule, and the scale of deployment remains very small.

Subsequent to its initial work assessing DM relevant to the Sydney CBD and inner metropolitan suburbs, SEDA has gone on to publish more comprehensive assessments, including one

<sup>45</sup> Final Report, p 67.

<sup>46</sup> SEDA, Supplementary response to the consultation paper "Supply to Sydney's CBD and inner suburbs" 8 April 1999.

<sup>47</sup> See, e.g., Energetics "State Records of NSW: New Lighting Accounts for Savings at Archives" October 2002; and [www.abgr.com.au](http://www.abgr.com.au), which discusses the increasing take-up of the Australian Building Greenhouse Rating Scheme by building owners and tenants committing to achieve high levels of cost-effective energy efficiency in their buildings; and [www.ecsaustralia.com](http://www.ecsaustralia.com), which provides a number of case studies of energy efficiency projects.

commissioned by IPART.<sup>48</sup> The findings of that further work indicate a potential for DM at least as favourable as suggested in the original estimates of DM available for the Sydney CBD and inner metropolitan suburbs.

On the other hand, EA has gone on to issue a number of RFPs for DM proposals to defer network augmentation on its distribution network.<sup>49</sup> However, no projects have eventuated from those efforts.<sup>50</sup> Some DM proponents note that while the RFPs were a welcome step, apparent changes in deferral objectives and a lack of transparency have hampered meaningful commercial responses.

On a related front, the Energy Users Association of Australia conducted a paper trial of demand side response in the NEM during 2002. This effort included large consumers with some degree of shiftable loads, electricity retailers, and distribution network service providers. The paper trial indicated both real promise and real barriers, and suggested a series of additional steps that need to be taken.<sup>51</sup>

### **3.3 Sydney CBD DM Not Developed to its Economic Potential**

**DM has almost certainly not been developed to its economic potential in the case of the Sydney CBD.**

As discussed in Section 2.2, both DM generally, and EE in particular are vastly under-utilised across the Australian economy. As the current suite of government and private sector policies and programs have delivered “only a small proportion of the cost-effective energy efficient potential,” there should be no question that this condition is true for the Sydney CBD and inner metropolitan region. Notably, the energy efficiency potential identified by COAG in the National Framework for Energy Efficiency identifies residential and commercial buildings as having the greatest amount of waste<sup>52</sup> – the two main sectors in the Sydney CBD and inner metropolitan region. Much of the energy efficiency potential is likely to be in peak periods, such as improvements in air conditioning, lighting, and controls.

**The full extent of economic DM that could be developed in the Sydney CBD and inner suburbs, while likely to be large, remains speculative.**

While TransGrid and EA did not accept the validity of SEDA’s cost estimate, they did examine what such a cost would produce in terms of NPV. The results of that analysis indicated that, if the SEDA cost and availability estimates were accurate, the DSM option would be far less costly than the other 13 options considered. Specifically, the NPV would have been less than \$23 million, or a savings of over \$140million relative to the network augmentation option ultimately adopted by TransGrid and EA.

### **3.3 Why Did the NEM Planning Process Not Take up DM?**

As discussed in Section 2.3, there is a long list of reasons that DM has generally not been adopted to its full economic potential.

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<sup>48</sup> SEDA “Distributed Energy Solutions Cost & Capacity Estimates for Decentralised Options for Meeting Electricity Demand in NSW” February 2002.

<sup>49</sup> EA RFPs.

<sup>50</sup> EnergyAustralia’s Submission on the 2004 Distribution Determination to the Independent Pricing and Regulatory Tribunal” 10 April 2003, p. 38.

<sup>51</sup> Pareto Associates “EUAA’s DSR Trial Report of the Independent Consultant” 12 February 2003

<sup>52</sup> NFEED Discussion Paper, section 3.

Specific to the Sydney CBD augmentation case, all of those reasons contributed to the lack of take-up of DM. However, there are several good reasons for the NEM planning process to have adopted a network solution, even while economic DM opportunities remained untapped.

Most importantly, faced with an urgent reliability need, EnergyAustralia and TransGrid necessarily turned to the only solution that was proven, within their means to implement, within their areas of expertise, and consistent with their commercial incentives.

In contrast, while DM measures were highly promising, given the lack of effort and limited experience to date with large-scale rollout, there were significant uncertainties about the magnitude, cost and timing of the potential contribution that any DM program might achieve. Accordingly, to rely on DM would have been an ambitious and risky undertaking.

Furthermore, economic DM did not eventuate on its own (that is, without specific development by EA/TG), and should not have been expected to, due to the lack of an established DM industry, a lack of clear commercial incentives reflecting network and wholesale market cost savings from the NEM, and competing consumer interests and priorities.

Notably, while there are some areas in which the NEM could better facilitate DM (e.g., in establishing better price signals, and in clarifying connection requirements for small generators) the reasons that DM was not taken up are only partially to do with the NEM. Rather, without significant targeted DM programs sufficient to rapidly develop a substantial DM services industry, it is difficult to envision that DM will ever be deployed to near its full economic potential within the NEM.

## **4. Case II: Latrobe Valley to Melbourne Augmentation**

### **4.1 Augmentation Plans Driven by Economic Benefits**

Unlike the Sydney CBD case, which was driven by a concern over inadequate reliability, the Latrobe Valley to Melbourne augmentation was driven by economic opportunity.

Since 1995, VENCORP's planning processes have identified a transmission constraint between the Latrobe Valley, the location of Victoria's brown coal generation facilities, and Melbourne.<sup>53</sup> By easing the constraint, the following economic benefits could be delivered to customers:

- reduced losses on the network;
- reduced dispatch costs; and
- increased supply reliability beyond the minimum requirement, thereby lowering the cost of unserved energy.

#### **About VENCORP**

VENCORP is the monopoly provider of electricity shared transmission network services in Victoria.

VENCORP is responsible for planning and directing the augmentation of the Victorian electricity transmission network. Most transmission assets in Victoria are owned by SPI Powernet, which provides transmission services to VENCORP.

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<sup>53</sup> VENCORP, Consultation Paper – Optimising the Latrobe Valley to Melbourne Electricity Transmission Capacity, February 2002.

Also, unlike the Sydney CBD case, augmentation of the Latrobe Melbourne link could be achieved relatively simply and at low cost. In particular, transmission capacity was provided by three lines operating at 500 kV; and a fourth 500 kV line operating at only 220 kV. While greatly reducing the line's capacity, the lower voltage operation was adequate for systems needs at the time of the construction in the 1980s, and allowed the deferral of the purchase and installation of new 500 kV transformers. In proposing the augmentation, VENCORP's planning process had essentially determined that the time for installing the 500 kV transformers had arrived.

VENCORP's economic assessment was published for consultation in February 2002. Five options were considered:

1. No transmission augmentations;
2. Building an all new 500 kV line;
3. Minor upgrades to the other 3 existing 500 kV lines;
4. 4th line upgrade to 500 kV with new transformer at Rowville substation; and
5. 4th line upgrade to 500 kV with new transformer at Cranbourne substation.

Table 4.1 shows the results of the economic analysis. Note that the capital cost of the two options to upgrade the 4th line to 500 kV were about one tenth that of the Sydney CBD project.

**Table 4.1 – Estimated Capital Cost and Net Benefits of Transmission Upgrades Options<sup>54</sup>**

<b>Option</b>	<b>Capital Cost (\$ million)</b>	<b>Net Present Value* (\$ million)</b>
1. No Augmentation	0	0
2. New 500 kV line	71	-20.1
3. Minor upgrades	2.6	4.6
4. 4 <sup>th</sup> line upgrade – Rowville	23.8	7.5
5. 4 <sup>th</sup> line upgrade – Cranbourne	35.9	2.9

*\* Net Present Value under base case modelling, with 8% discount rate.*

Five parties made submissions to VENCORP. These included two distribution network service providers, the owner and operator of the Victorian transmission network, a major Latrobe Valley generator, and Snowy Hydro.

No submissions were received from consumers, retailers, or proponents of DM.

VENCORP published its response to submissions received in April 2002<sup>55</sup>, and indicated it would proceed with the Rowville option with operation expected for the summer of 2003/04.

In April 2003, VENCORP announced that it would be pursuing the Cranbourne option instead, based on information gained in the initial tendering and development process. A revised economic evaluation indicates that the capital cost estimates for each of the augmentation options increased significantly, as shown in Table 4.2. As a result of the revised evaluation, the Cranbourne option has now been selected. The 4th line upgrade is now expected to be operational by December 2004.<sup>56</sup>

<sup>54</sup> VENCORP, "Economic Evaluation Optimising the Latrobe Valley to Melbourne Electricity Transmission Capacity" February 2002, p. 30, and p. 22.

<sup>55</sup> VENCORP "Response to Submissions" April 2002.

<sup>56</sup> VENCORP "Update on the Economics of Optimising the Latrobe Valley to Melbourne Electricity Transmission Capacity, April 2003.

Table 4.2 – Revised Capital Cost Estimates for Augmentation Options

Option	Feb 2002 Estimate (\$ million)	April 2003 Estimate (\$ million)
New 500 kV line	71	85
Minor upgrades	2.6	5
4 <sup>th</sup> line upgrade – Rowville	23.8	38
4 <sup>th</sup> line 500 kV upgrade – Cranbourne	35.9	42

## 4.2 Limited Consideration of DM

VENCorp considered only a narrow subset of DM activities in its initial analysis and did not examine any DM options in the evaluation stage. DM options were excluded based on the view that "...there are no economic competitors for the network solution..." including both DM and additional generation.<sup>57</sup>

VENCorp's negative conclusion on DM appears to have been made prematurely in the process and was overly broad for the following reasons:

**1) No Consideration Given to Energy Efficiency:** The array of DM opportunities considered was inappropriately narrow and, in particular, did not include energy efficiency. Rather, it appears that only DM opportunities targeted to extreme peak periods were considered. There is no reasonable basis for the exclusion of other DM options.

Properly including energy efficiency opportunities could significantly increase the assessed value of DM. For example, one of the reasons given for excluding DM options from the economic analysis is that "As DSM is...available for brief periods at high price, it will not have any impact on the transmission losses."<sup>58</sup> However, there is a wide array of energy efficiency opportunities that would provide benefits across a large number of hours, such as accelerating the take-up of high efficiency refrigerators and other appliances. Such energy efficiency efforts may not be readily accessible by VenCorp but this is an insufficient basis to exclude them from the evaluation process.

An earlier report for VENCorp on DM opportunities also excluded energy efficiency opportunities from consideration as it focused on enhancing the role of dispatchable load targeted at 'needle peaks'.<sup>59</sup> However, as the Latrobe Valley to Melbourne augmentation is not driven by needle peak considerations, it is entirely inappropriate to exclude energy efficiency.

**2) No DM Cost and Performance Assumptions:** There does not appear to be any definition of DM, or the outlook for costs, performance, or availability of DM in the Consultation Paper, the Economic Evaluation, or the Technical Report.

**3) No Other Parties Highlighted the DM Opportunity:** While VENCorp's conclusion on DM was overly broad and in our view probably incorrect, it must be noted that no other parties stepped forward to propose additional or different consideration of DM.<sup>60</sup>

<sup>57</sup> VENCorp "Technical Report", "Economic Evaluation" and "Consultation Paper" p. 14. February 2002.

<sup>58</sup> VENCorp "Economic Evaluation" p. 21.

<sup>59</sup> Charles River Associates and Gallagher & Associates, "Electricity Demand Side Management Study" 7 September 2001.

<sup>60</sup> VENCorp "Response to Submissions" April 2002.

### **4.3 Melbourne DM Not Developed to its Economic Potential**

Demand management has almost certainly not been developed to its economic potential in the case of the Latrobe Valley to Melbourne augmentation.

As discussed in Section 2, both demand management generally, and energy efficiency in particular are vastly under utilized across the Australian economy. As the current suite of government and private sector policies and programs have delivered “only a small proportion of the cost-effective energy efficient potential,”<sup>61</sup> there should be little question that this condition is true for the Melbourne area.

The energy efficiency potential identified by COAG in the National Framework for Energy Efficiency identifies residential and commercial buildings as having the greatest amount of energy waste<sup>62</sup> – the two main energy consuming sectors in the Melbourne area. However, the full extent of economic DM that could be developed in the Melbourne area, while certain to be large, remains speculative.

### **4.4 Why Did the NEM Planning Process Not Take up DM?**

While the nature of the Melbourne augmentation need is considerably different from the Sydney CBD case, the reasons for not taking up DM are much the same.

As discussed in Section 2.3, there is a long list of reasons that DM has not been adopted to its full economic potential. Specific to the Latrobe Valley to Melbourne augmentation, all of those reasons contributed to the lack of take-up of DM. However, there are several good reasons for the planning process to have adopted a network solution, even while economic DM opportunities remained untapped.

Most importantly, VENCORP was able to clearly identify and assess a relatively low cost network solution that would provide significant economic benefits. The augmentation was well within VENCORP’s means to implement, within their area of expertise, and consistent with their commercial incentives.

In contrast, while demand management measures are highly promising, given Australia’s generally limited experience to date with large-scale rollout, and the lack of DM proponents participating in the network planning process, there was no good basis for VENCORP to define and assess a different demand management option package. Furthermore, there were no proponents of demand management positioned to come forward and address the specific context of the proposed transmission upgrade. Accordingly, it is hard to imagine how VENCORP could have taken the view that a demand management solution had merit.

Furthermore, economic DM did not eventuate on its own, and should not be expected to due to the lack of an established, mature DM industry, a lack of clear commercial incentives reflecting network and wholesale market cost savings from the NEM, and competing consumer interests and priorities.

Again, as with the Sydney CBD case, while there are some areas in which the NEM could better facilitate DM far more effectively (e.g., in establishing better price signals, and in clarifying

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<sup>61</sup> NFEED Discussion Paper, section 2.

<sup>62</sup> NFEED Discussion Paper, section 3.

connection requirements for small generators) the reasons that DM was not taken up are only partially to do with the NEM. Rather, without significant targeted DM programs sufficient to rapidly develop a substantial DM services industry, it is difficult to envision that DM will ever be deployed to near its full economic potential within the NEM.

## 5. DM Funds in Competitive US Electricity Markets

### 5.1 Overview

Electric utilities and regulators in the US have pursued energy efficiency and other demand management since the early 1980s. These activities have taken many different forms across the US over this period – including providing information; offering preferential financing; market transformation; and alternative electric rate design. They have entailed significant expenditures – DM spending in the US peaked in 1993 at US\$1.6 billion annually; it is currently at over US\$1 billion annually and rising with renewed interest in such programs following the introduction of competitive electricity markets<sup>63</sup> (see Figure 5.1). More importantly, DM has generated substantial energy savings and peak load avoidance – currently estimated at approximately 60,000 gigawatthours<sup>64</sup> and 25,000 megawatts<sup>65</sup> respectively.

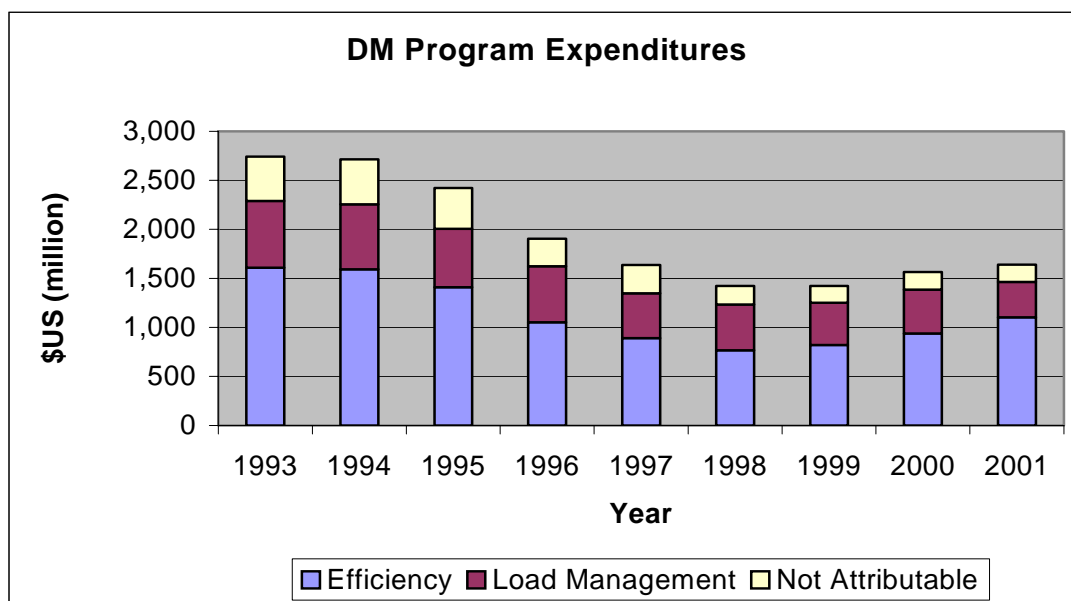


Figure 5.1. Figure 5.1 DSM Program Expenditures<sup>66</sup>

The introduction of retail competition into the electricity market in the US in the mid-1990s in several states has greatly changed DM policies and programs, including their magnitude, design, administration and support among stakeholders. Most importantly, in response to competitive pressures (current and anticipated; real and perceived) numerous states have established “public benefit funds” – state-wide DM and related activities funded by small, mandatory fees on electricity sales. PBFs for energy efficiency and other policy goals (including support for renewable energy, research and development and low-income bill assistance) came into existence

<sup>63</sup> York and Kushler, ACEEE, “State Scorecard on Utility & Public Benefits Energy Efficiency Programs: An Update” Dec 2002

<sup>64</sup> York and Kushler, ACEEE, “State Scorecard on Utility & Public Benefits Energy Efficiency Programs: An Update” Dec 2002

<sup>65</sup> U.S. Energy Information Administration, Form EIA-861, “Annual Electric Power Industry Report” as reported in U.S. EIA *Electricity Power Annual 2001*.

<sup>66</sup> U.S. Energy Information Administration, Form EIA-861, “Annual Electric Power Industry Report” as reported in U.S. EIA *Electricity Power Annual 2001*



in the mid-1990s and are now in place in some form in twenty states, investing over US\$1 billion annually.

Since the onset of the US's energy crises of the 1970s (notably the OPEC oil embargo and the Three Mile Island nuclear accident) there has been a vigorous debate about whether energy efficiency products and services should be actively promoted by government (through regulations, rate design, taxation, programs and other means) or be left principally to the marketplace. The changing face of electricity DM has both reflected and shaped that debate.

In the past, the primary objective of most DM programs was to provide cost-effective energy and capacity resources to help defer the need for new sources of power, including generating facilities, power purchases, and transmission and distribution capacity additions. However, due to changes occurring within the industry, electric utilities are also using DM to enhance customer service.

Accordingly, DSM programs generally fall into two main categories<sup>67</sup>:

- **Energy efficiency and conservation** - programs to reduce energy use by improving the efficiency of equipment (lighting and motors, for example), buildings, and industrial processes.
- **Load management** – programs to redistribute energy demand to lessen peak demand and hence reduce peak load on generation and transmission facilities and, sometimes to fill in troughs (to strategically increase energy use during periods of low electricity demand.). Examples include load shifting programs (reducing air conditioning loads during periods of peak demand and shifting these loads to less critical periods), time-of-use rates (charging more for electricity during periods of peak demand), and interruptible rates (providing rate discounts in exchange for the right to reduce customers' electricity allocation during the few hours each year with the highest electricity demand).

## **5.2 Types of US DM Activities**

DM efforts in the US have taken many different forms. It is worth keeping in mind the diversified and balkanised nature of the US electricity industry. There are some two hundred investor-owned utilities (providing approximately three-fourths of total US power); literally thousands of state, municipally and rural cooperatively owned utilities; and federally owned providers. Utility regulation is no less balkanised – the utilities are variously regulated by the fifty state utility commissions and/or state governments, and/or the Federal Energy Regulatory Commission and federal government. Demand-side activities are primarily regulated by the States.

Depending on which definition one uses DM may include any or all of the following overlapping but distinct components: energy efficiency, demand-side management, load management, peak load shifting, demand response, and distributed power generation (such as cogeneration and renewable energy sources). DM is used and useful for all consuming sectors: residential (including special efforts for low-income or hard-to-reach populations), commercial and institutional, governmental, and industrial.

DM activities, in turn, may be categorised as follows.<sup>68</sup> Any of these activities may be used to promote any of the DM areas and any of the consuming sectors listed in the previous paragraph;

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<sup>67</sup> Thanks to: IRP and DSM for China paper

<sup>68</sup> IRP & DSM for China paper

however, to maximize effectiveness and cost-effectiveness it is necessary to design and implement specific activities to desired areas and sectors.

1. **General information** to inform customers about generic energy efficiency options.
2. **Site-specific information** to provide information about specific DM measures appropriate for a particular enterprise or home.
3. **Financing** to assist customers with paying for DM measures, including loan, rebate, and shared-savings programs.
4. **Direct installation** to provide complete services to design, finance, and install a package of efficiency measures.
5. **Market transformation** to seek to change the market for a particular technology or service so that the efficient technology is in widespread use without continued utility intervention.
6. **Alternative rate design** including time-of-use rates, interruptible rates, and load shifting rates. These programs may or may not save energy, but they can be effective ways to shift loads to off-peak periods.
7. **Bidding schemes** in which a utility solicits bids from customers and energy service companies to promote energy savings in the utility's service area.

The first five activities listed above are programmatic in nature and require an expenditure of funds to implement; the latter two are regulatory in nature and do not require a significant implementation budget. Accordingly, Public Benefit Funds may be used for any or all of the five program areas, but are not directly appropriate for the two regulatory issues (beyond providing funds for design, analysis, etc.).

### **5.3 U.S. Experience with Demand Management**

DM activity in the U.S. has been successful by all metrics, including energy saved, load and peak load avoided, generation and transmission investments deferred or avoided, and emissions avoided. With the widespread introduction of contestable energy markets, recent years have seen enormous shifts in program structures and approaches. This appears to have resulted in slight declines in overall outcomes from the peak year of 1996 but, as new DSM programs and public benefits funds have been introduced, the overall benefits are again growing.

Total peak-load reductions from DM were 24,955 megawatts in 2001, according to the U.S. Energy Information Administration (EIA).<sup>69</sup> This level of peak reductions is up 9 percent from the previous year – but down 17 percent from 1996, the year of greatest peak reductions from DM (See Figure 5.2). Energy savings due to DM for the year 2000 were 56,808 gigawatthours, according to analysis conducted by the American Council for an Energy Efficient Economy (ACEEE) using the EIA and other data<sup>70</sup> (See Figure 5.3).

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<sup>69</sup> U.S. EIA Electricity Power Annual 2001. Data on demand-side management activities by utilities and public benefit funds are self-reported to the EIA (and not independently verified) according to EIA guidance and definitions.

<sup>70</sup> York and Kushler, ACEEE, "State Scorecard on Utility & Public Benefits Energy Efficiency Programs: An Update" December 2002

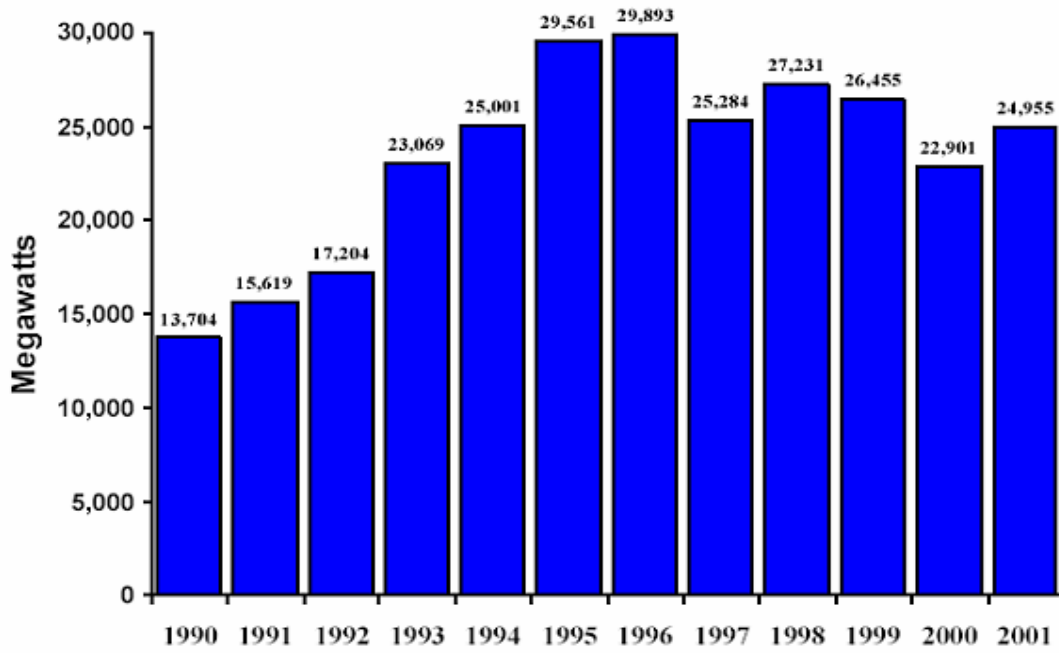


Figure 5.2 - Demand-side management peak load reductions in US, 1990-2001<sup>71</sup>

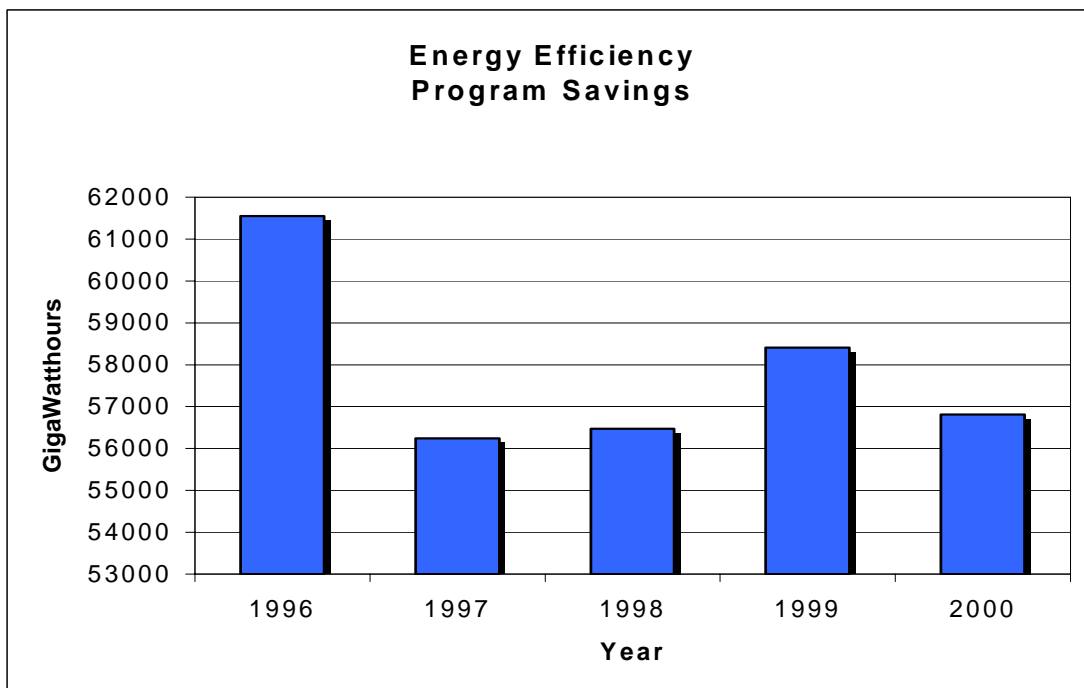


Figure 5.3. Energy Efficiency Program Savings<sup>72</sup>

<sup>71</sup> U.S. Energy Information Administration, Form EIA-861, "Annual Electric Power Industry Report" as reported in U.S. EIA *Electricity Power Annual 2001*

<sup>72</sup> Kushler "Scorecard", page 24, Appendix C "Time Series Data for Selected Variables"

## 5.4 Public Benefit Funds

Twenty states in the U.S. have established demand management trusts or similar entities, supported by a small charge (typically around 1 tenth of a cent/kWh) on distribution service.

### California

A Rand Corporation study of California's energy efficiency efforts between 1977 and 1995 determined that they had paid back into that State's economy roughly US\$1000 per capita for the US\$125 per capita invested. Further, they had avoided the need for new power plant construction in that time period and avoided a 40 percent increase in stationary source air pollution.

***California's recent power crisis would likely have occurred many years earlier and been far more serious without concerted energy efficiency measures.***

### New York

In New York, the State's fund has secured commitments in the last 3 years that will reduce electricity demand by more than 140 MW while saving consumers tens of millions of dollars annually. ***Consumer savings are providing a 1.4-year payback on funds invested.*** Further, for each US\$1 spent out of the fund, customers, energy service companies and others are investing US\$3, providing good leveraging of fund expenditures. These programs are also reducing emissions from power plants and helping economic development in the state.

### OTHER STATES/EXAMPLES

- **Connecticut** – Energy Conservation and Management Board oversees US\$87m/yr in programs. The programs are estimated to have yielded benefits of 1.7 times costs for residential initiatives and 2.4 times costs for commercial and industrial initiatives.
- **Vermont** – Efficiency Vermont oversees US\$11m/yr in programs. The estimated benefits are 1.55 times the costs.
- **Massachusetts** – Massachusetts Electric Co. undertakes US\$50m/yr in state mandated programs under close regulatory supervision of the Massachusetts Department of Telecommunications and Energy. The estimated economic benefits are 2.5 times the overall cost of the measures implemented.<sup>73</sup>
- **Minnesota** – Xcel Energy undertakes US\$38.5m/yr in state mandated programs. The estimated economic benefits are over the lifetime of the measures installed in that year are estimated to be \$233 million, or over six times the program spending.<sup>74</sup>

Demand-side management activities in the U.S. generally cost less than US\$0.03 per kWh saved and, in general, average between US\$0.02-0.03 per kWh over the last two decades for a wide variety of programs. In addition, the reductions delivered by these programs are highly coincident with peak demand (on average, peak load reductions are three times greater than would be expected from energy efficiency measures targeting flat loads). This has yielded consumer energy bill savings of about US\$4 billion annually.

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<sup>73</sup> Massachusetts Division of Energy Resources "2001 Energy Efficiency Activities"; and Southwest Energy Efficiency Project "America's Leading Demand-Side Management Programs: A Sampling" November 2003.

<sup>74</sup> "Minnesota Energy Planning Report 2001" January 2002.

## 6. NEM Steps to Effective DM Utilization

Based on the general understanding to date, on the two case studies, and on the US DM experience, we believe there are four critical steps to achieving effective DM utilisation in the NEM.

These are:

- 1) **Establishing an Adequate DM Funding Mechanism**
- 2) **Test the Market for DM Prior to Adopting Network Augmentation Decisions**
- 3) **Adopt NEM Changes to Facilitate Specific Demand Management Opportunities**
- 4) **Implement an Intensive National Framework for Energy Efficiency**

Perhaps the most effective way to ensure that the proposed changes are adequately implemented would be through NEC amendments, as laid out in Table 6.1.

**Table 6.1 Recommended Steps to Ensure Adequate Utilisation of DM in the NEM**

Recommendation	Relevant Code provision, if amendment is required	Principle Body for Implementation
Establish DM Funding Mechanism	5.6.2; 6.2; 6.13	Each NSP regulator to assess and implement as appropriate the establishment of a DM funding mechanism sufficient to provide adequate information to perform DN analyses under 5.6.2(f) and 5.6.2(g)
Test the Market for Demand Management Prior to Adopting Network Augmentation	5.6.2 (c)	Each NSP regulator to establish appropriate requirement
Develop Market Platform for Real Time DM	3.8	NEMMCO to establish DM market platform
Clarify Treatment of DM Expenditure by Both Transmission and Distribution NSPs	6.2.3; 6.2.4(c); 6.10.5(7)(iii)	Each regulator to adopt regulatory principles specifically addressing treatment of DM expenditures in setting NSP revenue requirements
Clarify Standard Network Connection Provisions for Small Generators	5.3; 5.5	Each jurisdictional DNSP regulator to establish provisions, perhaps within DM Codes of Practice
Establish DM Code of Practice for both Transmission and Distribution NSPs	5.6.2(c); 5.6.2(f); 5.6.2(g)	Each NSP regulator to establish an appropriate DM Code of Practice
Establish Congestion Pricing Signals to Facilitate Informed Consumer Choice	6.13; 6.14	Each jurisdictional DNSP regulator to assess and implement as appropriate the establishment of a congestion pricing trials
Support Roll-Out of Interval Meters	7.13	Each jurisdictional DNSP regulator to assess costs and benefits of interval metering roll-out, and to implement as appropriate
Improve Reporting of Potentially Constrained Areas in Network Planning Documents	5.6.2 (b)	Each NSP regulator to specify steps in detail, perhaps within DM Codes of Practice
Specify/Strengthen Requirements for DM Analysis and Consultation Prior to Network Augmentation	5.6.2 (f)	Each NSP regulator to specify steps in detail, perhaps within DM Codes of Practice

## 6.1 Establish Large Scale Dedicated DM Funds

By far the single most important step to achieving an effective take-up of demand management is the establishment of dedicated DM Funds with adequate funding. Simply put, without a large scale Demand Management Fund deployed with concerted effort, prospective service providers will not come forward, a market in DM services will not evolve, and the benefits that are offered by DM will remain largely untapped.

This urgent step is in accord with Recommendation 1 of the 2002 IPART DM Inquiry<sup>75</sup> and the announcement on 20 November 2003 by the Premier of NSW that a demand management fund is to be established in NSW.<sup>76</sup>

We would suggest six critical principles in guiding the establishment of DM Funds:

- **Dedicate \$0.001 per kWh for a minimum of 5 years** - Given the current level of maturity of the DM services market, the level of funding should be small relative to the anticipated total opportunity (and to total network and overall electricity spending), yet be sufficient in scale and predictability to attract serious attention from a diverse array of potential suppliers of demand management services. A sum equivalent to \$0.001 per kWh would be a reasonable starting point, consistent with international experience and domestic opportunities. This would be about \$65 million in NSW, and \$40 million in Victoria, or about 1% of electricity revenues. Importantly, this funding should reduce consumers' electricity costs by redirecting funds that would otherwise go to more costly but avoidable network and generation augmentation.
- **Encourage and Harness Competitive Markets** - A DM Fund should harness the innovation and dynamism of competitive markets. This could be done by making regular Requests for Proposals that specify the overall goal of facilitating large scale deployment of a broad array of demand management measures on a timely basis and enable respondents the greatest latitude in suggesting projects accordingly. The suggested level of funding should achieve a high level of commercial interest and innovation from existing and prospective demand management providers. To encourage a wide range of non-network solutions, some consideration should also be given to local generation that is not necessarily DM (e.g., stand-alone peaking generation in the distribution network.)
- **Establish Fund As Special Purpose Independent Entity in Each State** - A DM Fund should be administered by an independent government-established body, and not by existing electricity companies. This would help ensure appropriate institutional priorities and incentives, and give prospective service providers confidence that their offerings would be appropriately considered. It would also avoid a significant number of potential conflicts of interest. It seems appropriate to establish a separate fund in each state. This approach would be more expedient, and would enable the fund to focus on particular issues and opportunities unique to the each region.
- **Focus Activities on Specific Areas with Identified Upcoming Network Constraints and Establish Performance Targets** - In prioritising Fund activity, it would be appropriate to identify areas where intensive DM activity would be most likely to be able to demonstrate an ability to defer network spending. Performance targets should be established consistent with the level of DM required to defer augmentation.

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<sup>75</sup> IPART, *Inquiry into the Role of Demand Management and Other Options in the Provision of Energy Services*, 2002, p. iii.

<sup>76</sup> Premier of NSW "News Release Premier Announces Further Measures to Tackle Greenhouse Emissions and Global Warming" 20 November 2003.

- **Adopt a Timely & Iterative Approach** - Given the long term lack of progress in achieving significant DM take-up, a DM Fund should accept the timeliness/perfection trade-off in favour of timeliness. That is, it would be preferable to conduct a 'good' RFP in the near term rather than a 'perfect' RFP in the indefinite future. Furthermore, it is inevitable that revisions to future RFP rounds would be made based on the experiences gained in the previous rounds. For example, the delay in progressing the NSW EnergyAustralia/ TransGrid/ Department of Infrastructure, Planning, and Natural Resources DM Fund has sent a poor signal to the market regarding the priority placed on demand management, and contributes to the continuing predominance of traditional supply infrastructure in meeting electricity needs.
- **Support Broader Participation in NEM Planning Processes** – The great majority of funds should be dedicated to implementation of DM projects. However, some funding should be made available to support broader participation by DM advocates in NEM planning processes, including both the annual planning reviews performed by NSPs and network individual augmentation cases. Currently, few parties beyond current NEM participants regularly comment in NEM planning processes. However, a variety of non-government organisations, industry and consumer associations, and individual DM service providers have differing insights and perspectives that could beneficially test the NSPs' conclusions and propose alternative approaches.

NECA should actively support and help facilitate the creation of such a funding mechanism in each state to ensure that demand management resources are integrated into the electricity system.

## **6.2 Test the Market for Demand Management Prior to Adopting Network Augmentation Decisions**

Before network service providers undertake major network augmentations, they should be required to solicit proposals for alternative non-network solutions. This would involve clear protocols for information disclosure, specification of constraints, requests for proposals, and evaluation of proposals. NECA should promote a comprehensive approach through mandatory DM Codes of Practice for network service providers, clarifying and extending the provisions of Section 5.6.2 in the National Electricity Code. This would be a key step in facilitating a DM services market. Furthermore, recognising that transaction costs of participating in a request for proposal process would be very high for many small DM opportunities, NECA should also promote standing offers for small DM services.

NSW has begun adopting such an approach for distribution network service providers, which is detailed through a DM Code of Practice (See figure 6.1).<sup>77</sup> A central feature of the Code of Practice is that it requires NSPs to provide planning information and solicit Requests for Proposal from DM service providers and providers of other non-network options.

A DM Code of Practice requiring testing of the market prior to adopting network augmentation decisions, such as the one evolving in NSW, would have two primary benefits. First, it would lay out in some detail key steps for distributors to take in investigating the opportunity to avoid or defer network augmentation. This goes well beyond the general guidance provided in the NEC, which requires only that NSPs identify and examine DM and other non-network options. As the COP has been recognised by the NSW government, following it should give distributors added

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<sup>77</sup> Letter from Director General, Ministry of Energy and Utilities, to Convenor, Demand Management Working Group, 1 August 2001. [http://www.doe.nsw.gov.au/industry\\_performance/index.htm](http://www.doe.nsw.gov.au/industry_performance/index.htm)

confidence both that they are performing adequate investigations, and that they are complying with the relevant provisions of their license conditions and of the National Electricity Code.<sup>78</sup>

Second, such a COP should ultimately encourage proponents of DM services to come forward. In particular, a COP increases the transparency of the network evaluation process by requiring distributors to provide access to the information. It also should increase proponents' confidence that their proposals will be appropriately evaluated. In contrast, while DM proponents are free to come forward in the current NEC planning approach, their proposals need not be specifically sought, and it is unclear how such proposals would be treated.

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<sup>78</sup> Under the NSW Electricity Supply Act, the Minister for Energy imposes license conditions electricity distributor to investigate demand management strategies. However, the Act and the license conditions give little guidance on how those investigations are to be performed, or what would be considered adequate.



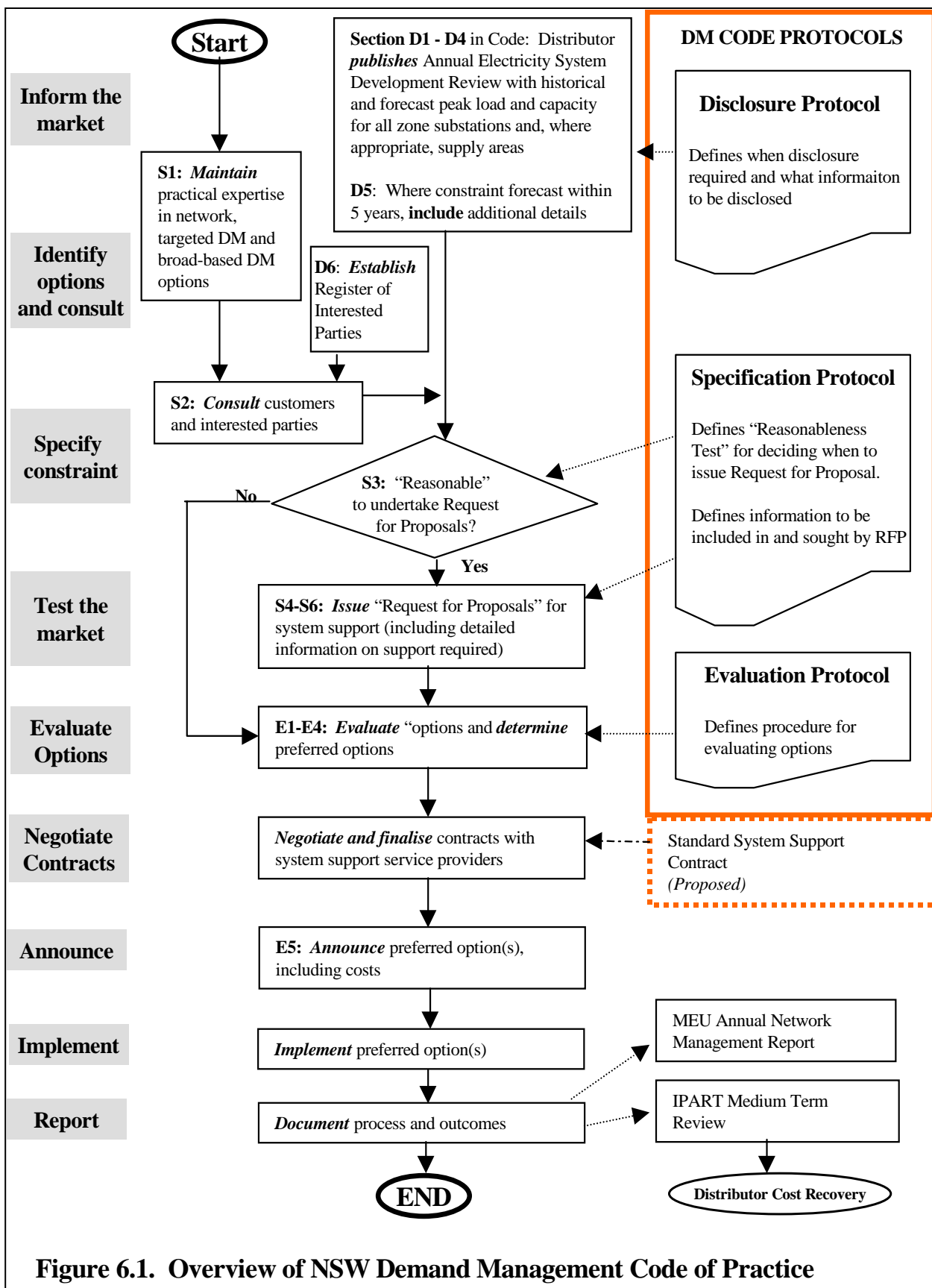


Figure 6.1. Overview of NSW Demand Management Code of Practice

### **6.3 Adopt NEM Changes to Facilitate Specific Demand Management Opportunities**

A variety of developments in the NEM have been suggested to more effectively facilitate demand management. These include such areas as standing offers to facilitate small demand management activities, clearer standard network connection provisions to facilitate small generators, development of a market platform to facilitate interruptible contracts and distributed generation, and improved price signalling and metering to facilitate informed consumer choices. NECA should directly address these areas and undertake changes to the National Electricity Code as appropriate.

IPART, in its 2002 Inquiry into the Role of Demand Management, developed a set of recommendations to improve the utilisation of DM. IPART's recommendations, together with the existing Code of Practice, appear fairly comprehensive and broadly consistent with proposals made by the Victorian Essential Services Commission, and the COAG Energy Market Review, as well as a number of DM proponents.

While these are not 'silver bullet' policies that are sufficient to deliver on the DM potential, they are necessary changes to underpin a DM market and will play an important facilitating role. It should be noted that ongoing revision of DM policies and programs will undoubtedly be necessary as greater experience is gained.

Building on the effort and experience gained to date, NECA should, as a first step, directly address the specific policies recommended by IPART and others in recent years and undertake changes to the National Electricity Code as appropriate. Specifically, NECA should consider the following:

#### **1) Facilitate small distributed generators by:**

- i) requiring establishment of standard negotiation guidelines and connection agreements<sup>79</sup>
- ii) requiring establishment of a market framework for real time dispatch<sup>80</sup>

#### **2) Improve prices and price signalling by:**

- i) requiring DNSPs to undertake trials of localised congestion pricing<sup>81</sup>
- ii) requiring regulators to formally set out treatment of avoided TUOS and DUOS<sup>82</sup>
- iii) assisting governments in reviewing the roll-out of interval meters, including directing regulators to enhance and accelerate their performing cost-benefit analyses of interval metering and associated pricing issues<sup>83</sup>

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<sup>79</sup> See, e.g., IPART recommendation 8, COAG Energy Market Review; Victorian Essential Services Commission, "Guideline for Embedded Generation: Issues Paper" July 2003; and Australian Ecogeneration Association "COAG Energy Market Review Issues Paper" April 2002.

<sup>80</sup> See, e.g., IPART recommendations 11 and 12, EUAA DSR Trial & COAG Energy Market Review, and Pareto Associates "EUAA D[emand] S[ide] R[esponse] Trial Report of the Independent Consultant" February 2003, which recommends further work toward a DSR facility.

<sup>81</sup> See, e.g., IPART recommendation 6; and Australian Ecogeneration Association "COAG Energy Market Review Issues Paper" April 2002.

<sup>82</sup> See, e.g., IPART recommendation 7; and Australian Ecogeneration Association "COAG Energy Market Review Issues Paper" April 2002.

<sup>83</sup> See, e.g., IPART recommendation 10, COAG Energy Market Review.

- 3) **Facilitate real time demand response by requiring the establishment of a demand response trading platform**<sup>84</sup>
- 4) **Generally encourage NSPs to undertake DM by requiring regulators to clarify the recovery of spending on DM**<sup>85</sup>

#### **6.4 Implement an Intensive National Framework for Energy Efficiency National Framework for Energy Efficiency**

Beyond the NEM, a number of actions are required to capture energy efficiency opportunities much more broadly across the economy. This is urgently needed for energy opportunities that are difficult for electricity consumers to control, such as strengthening of mandatory energy performance standards for buildings and appliances. Some major steps forward have been taken recently, such as the adoption of strong mandatory energy performance standards for new housing in Victoria and New South Wales, and the development of Australian Building Greenhouse Rating Scheme for existing and new commercial buildings. There are also opportunities to assist and motivate the energy efficiency efforts of industrial and other customers, by providing technical and institutional support, as in the Energy Efficiency Best Practice Program, the Greenhouse Challenge, and state programs implemented by SEDA and SEAVic. However, far more remains to be done across all sectors, and many energy efficiency programs could be greatly strengthened and accelerated.

The Ministerial Council on Energy has recently undertaken to develop a National Framework for Energy Efficiency, a step that should be expedited to the maximum extent possible. An example of intensive policies that could be implemented under the National Framework for Energy Efficiency can be found in a discussion paper produced by the Australian Business Council for Sustainable Energy.<sup>86</sup> The broad ranging policy options indicate the types of effort that might constitute an intensive NFE. Rapid implementation of the suggested "Ten First Steps to an Energy Efficient Future" would go a long way to achieving high levels of DM.

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<sup>84</sup> See, e.g., IPART recommendations 11; Pareto Associates "'EUAA DSR Trial Report" and COAG Energy Market Review.

<sup>85</sup> See, e.g., IPART recommendation 5.

<sup>86</sup> Australian Business Council for Sustainable Energy "Driving Energy Efficiency – cutting greenhouse emissions – growing the economy – boosting jobs" November 2003.



TOTAL ENVIRONMENT CENTRE



**COAG'S QUANDARY:  
WHAT TO DO WITH THE  
ENERGY MARKET'S REFORM PROGRAM?**

**A REVIEW**

February 2005

**Gavan McDonell FTSE**  
DEng(Qld) PhD(NSW) MA(*Johns Hopkins*) BE(Qld)  
FIEAust CEng

This project was funded in part by the National Electricity Code Administrator's Advocacy Panel.

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**For further information contact:**

Total Environment Centre  
2/362 Kent St  
Sydney, 2000  
Ph: 02 9299 5680  
F: 02 9299 4411  
[www.tec.org.au](http://www.tec.org.au)

Alternative Technology Association  
Level 2/332 Albert St  
East Melbourne, 3065  
Ph: 03 9415 2105  
F: 03 9419 2441  
[www.ata.org.au](http://www.ata.org.au)

‘...in choosing between the available options (in *Re Wakim*), the majority (of the High Court) did not take account of the rationale of the scheme and rejected as normative guidance the previously accepted notion that cooperative federalism ought, as a general rule, to be fostered and encouraged. Instead, the majority reached a decision that served no countervailing policy choice.’

Professor George Williams, *Cooperative Federalism and the Corporations Law: Wakim and Beyond* (see note 48 below).

### ***Is the Energy Markets Reform Program legally doubtful?***

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#### **‘Back to the Future**

It seems that not so long ago, in the dawning of competition in the Australian electricity market, all the talk was about disassembling the country’s vertically integrated structures. However, today many are questioning whether the competitive market is at risk for “creeping” re-integration...The ACCC has limited powers to stop such re-integration...For a market created in the spirit of “deregulation” it will be ironic should the ACCC push for more regulation in an attempt to stave off vertical ownership...the alternative offers unchecked re-integration perhaps leading us back to where we were with the exception of private ownership rather than public.

#### **‘Energy Shocks**

There are claims that increases up to 20 percent can be expected in Sydney and Newcastle over the next five years...In response to higher prices, the ACCC is investigating whether some electricity generators are withdrawing capacity from the market during peak demands...Over the past five years, there have been a number of mergers and acquisitions involving generators resulting in those generators being owned by a few dominant players...rates are on the rise and this is of concern especially to the manufacturing industry wherein 10 percent of their ...expenditures relates to electricity’

NUSConsulting Group website, 18 Oct and 16 Nov 2004, a large US-based international adviser to industry and business on energy costs and efficiency with some 25000 clients.

### ***Is the EMRP economically unsound?***

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‘...it is important to recognize that any inherent ‘over-reliance’ on electricity generation with high CO<sub>2</sub> emissions is a reflection of the failure to price for externalities...prices for electricity from whatever fuel source do not fully reflect the social costs of provision.’

Productivity Commission, *Draft Review of the National Competition Reforms*, Oct 2004

### ***Is the EMRP environmentally damaging?***

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## Summary of Major Conclusions

1. This review considers issues relating to the structure, economics and design of proposals on electricity in the Energy Markets Reform Program (EMRP) of the Ministerial Council on Energy (MCE) of the Council of Australian Governments (COAG).
2. There are political and legal concerns as to COAG's status when it defines new national policies. Recent High Court decisions have thrown doubt on basic aspects of the Cooperative Federalism initiative.
3. COAG has not reviewed the electricity market in detail since 1996, nor since it delegated energy and related environmental matters to the MCE in 2001. There is room for doubt both as to the substance and the constitutionality of MCE processes and decisions.
4. The EMRP is being steered by an anonymous group of bureaucrats, the Standing Committee of Officials (SCO), which uses a tokenistic, compressed and shallow industry/public consultation process and makes hasty judgments and unsupported recommendations without effective industry and public review. Two examples:
  - a list, itself *156 pages long(!)*, of complex and far-reaching amendments to the National Electricity Law was issued on 1 December with public submissions on key issues required by Christmas
  - an explanation of the key new market objective was issued on 23 December based on a report (undisclosed) of a panel of experts (unnamed) provided to SCO on 14 October. The proposed new objective is, *on inspection*, economically incoherent.
5. Legal staff of the Australian Parliament have expressed serious doubts about the Constitutionality of the enabling legislation, passed in a rush through the Australian Parliament last June, for the EMRP proposals. These concerns have not been addressed. Legal doubts of this sort will threaten public, industry and investor confidence in the National Electricity Market (NEM) and its institutions.
6. The NEM is probably the largest and most complex econo-technical policy initiative ever attempted in this country. The NEM now extends through linked economic/financial/engineering systems and markets across some 4000 kilometres and involving many billions of dollars of investment and revenues.
7. The design and development of the NEM was effectively directed by a government/regulator/industry club which the MCE itself has now recognized had inadequate participation by end-users, ie, virtually all householders, businesses and taxpayers.
8. The blueprint for the NEM was written by a 1991 Industry Commission review. This had serious gaps, notably regarding the economic principles for the design of the market, the regulation of the monopoly networks and the requirements of the essential hedge contracts financial markets. These and other issues have not been addressed satisfactorily, or at all, by the NEM authorities since then.

9. The IC's vision was of an essentially privatised electricity sector. This has not eventuated and there is a preponderance of state ownership. The governance and theoretical issues related to this have not been dealt with.
10. The pricing system in the NEM has the economic defects of, among others, excluding externalities such as greenhouse emissions and thus subsidising fossil fuels. This major NEM shortcoming has been recently recognised and criticised by the Productivity Commission.
11. A recent Federal Court decision has pointed out that aspects of the market arrangements are 'artificial', such as the idea that Retailers own the electricity used to satisfy the largely fixed demands of customers over which they have little control. It also shows that the pool auction and the financial hedges operate as one market. Economic methods for characterizing and assessing the performance of such a market are lacking.
12. It is admitted on all sides that the monopoly networks provide perhaps the largest regulatory problem in the NEM, but not only is the EMRP process not addressing this issue, it has probably made it worse by, among others, an early, rushed decision on merchant interconnectors and transmission congestion rights.
13. The economic/regulatory/legal controversy between 1996 and 2003 over SNI, TransGrid's proposed transmission interconnector between NSW and South Australia, showed, through the process of Merits Review, that neither jurisdictions nor regulators understood the most important safeguard in their own Code against strategic uneconomic investment. The legal and governance tasks entrusted to SCO, which include matters such as this, are being directed by NSW and South Australia.
14. An EMRP proposal to revise the National Electricity Law and to change the Code into Rules is being rushed through over the 2004 Christmas period. The likely result of the proposed changes, which, among other concerns, endanger Competition principles and do not address basic design issues noted above, is regulatory and administrative gridlock developing in the NEM. The EMRP proposal to remove Merits Review is astounding since it will make the operators of the vast Australian power system virtually unaccountable. It should not be countenanced.
15. Economic measures such as Demand Management and Energy Efficiency with important environmental advantages have been consistently stymied in the NEM and by the EMRP.
16. There has been a conspicuous lack of solid, systematic research throughout the history of the NEM, unlike in other developed countries, and no attempt to remedy this in the EMRP. There are now substantial industry and public doubts over the EMRP. It should be given an early audit by COAG and an authoritative review of the NEM by the Productivity Commission or other expert panel.
17. There is much wrong with the NEM and deep analysis, sound planning and careful implementation are required to improve it, but it ain't broke, and there is no need to rush to fix it. It is not clear why the EMRP is being conducted in such haste, but, speculatively, perhaps it is because jurisdictions see the need to protect the revenues they receive from the surpluses of corporatised and other entities.

## **Executive Summary**

### **Introduction**

This review considers decisions and proposals by the Council of Australian Governments' (COAG's) Ministerial Council on Energy (MCE) regarding the Energy Markets Reform Program (EMRP) with a view to identifying issues for clarification and appropriate action especially as they might affect Distribution and Retail (D/R). In practice it is not possible to separate D/R from the framework issues and the document primarily deals with structure, economics and design.

### **The role of COAG**

There is political and legal discussion of the implications of aspects of Cooperative Federalism and of some of COAG's actions, and those of its Ministerial Councils. These include actions which might involve jurisdictions in deciding not just on matters of administrative coordination but, as apparently in this case, on new matters of national policy for which they might not have an electoral mandate. There is thus concern whether actions are short-circuiting legitimate public debate and individual exercise of the franchise. In addition, whereas, previously, the High Court was sympathetic towards new proposals requiring the interpretation of the Constitution where they have a policy orientation towards 'better housekeeping' such as regulatory integration, as in the EMRP, in recent years there has been a change in the High Court's attitude and passage can no longer be assumed.

### **Doubts on the constitutionality of the EMRP legislation**

In addition, two Australian Parliament Bills Digests for the guidance of members outlined basic, cogent reservations about the constitutionality of the enabling Commonwealth legislation for the EMRP process and its institutions and about the possibility of the High Court vacating it on appeal. The Digests recommended further advice. This legislation was rushed through in June 2004 in the last week of the old Parliament, without such advice. In addition, the Digests raised considerations as to whether the legislation would adversely affect Commonwealth/State relations and reforms in other markets.

### **The role of the MCE, the SCO and the validity of its EMRP**

The MCE's EMRP embraces the reform of policies and institutions which cover all the functions affecting both electricity and gas.

The EMRP process is steered by an anonymous group called the Standing Committee of Officials (SCO). Their work is opaque and they conduct tokenistic, compressed and shallow industry/public consultations on suites of issues. After further unrevealed consultations and considerations, SCO then conveys judgments and recommendations to

Ministers on crucial industry matters which are not open to further public and industry debate. An intolerable example of abbreviated process is the issue, on 10 December *with submissions on key issues due by December 24 (Christmas Eve)*, of the exposure draft for the revised National Electricity Law, together with the amendments necessary to change the Code into Rules (see below). The draft was accompanied by a ‘table’ providing an *annotated list* of the revisions to the Law: this ‘table’ alone is 156 pages long with about 1500-2000 notations on the amendments in all. Many of the actual amendments have complex and uncertain legal force and meaning.

In addition, on 23 December 2004, the SCO issued an ‘explanation’ of the key new national market objective (purported to be an overarching efficiency objective) which it said was supported by the report (undisclosed) of an expert panel (unnamed) provided to the SCO on 14 October! An economic examination of the proposed objective shows that it is incoherent.

Under the previous arrangements NECA and ACCC employed transparent consultation procedures for decisions on such matters. SCO’s work has aroused skepticism and doubts about the validity and authority of the EMRP process.

### **The short-circuiting of public participation**

*End-users pay all the costs of electricity supply.* The power reform initiative, however, has been pursued much in the form of a government/industry club, in effective isolation from public participation, independent review and organized scientific research. This leaves the NEM on doubtful social foundations. While the National Electricity Code Administrator (NECA) and the National Electricity Market Management Company (NEMMCO) developed excellent consultation processes for interaction with the industry, in practice these were pursued within the ‘club’. This situation, which as one American analyst has described it, was ‘...motivated by special interests’, is not unique to Australia, but has undesirable and inefficient results wherever it occurs. Fortunately, this major problem has at least been recognised by the MCE in its promotion so far of end-user participation, but much remains to be done.

### **Issues in the National Electricity Market project**

The policy initiative to develop the NEM is probably the most complex and most socially extensive econo-technical project ever attempted in this country. The Australian experiment was inspired largely by the poorly thought through initial UK electricity market experience. Although the NEM development and design avoided many of the UK problems, it has left several important defects unaddressed and even unnoticed. Unfortunately, the 1991 Industry Commission report which provided the blue print (see below) omitted key issues.

Much of the thinking underlying the Australian markets has proceeded as if it would be possible for them, ‘as they mature’, to become effectively independent of governments. This will never be the case. All governments are held responsible by their electorates for

‘keeping the lights on’. But the economic costs, greenhouse emissions and other environmental impacts of power supply and usage also raise policy and economic issues now regarded as pressing by all jurisdictions involved in the national electricity markets. All of this involves a host of difficult questions. The EMRP is passing many of them by. In particular, it has disregarded, without explanation, many of the recommendations of the Parer Report which, in large measure, it was set up to implement. Indeed, the Parer Report has been removed from the web.

### **The origins of the NEM**

A 1991 Industry Commission report focusing on the promotion of competition among generators provided the blueprint for the national electricity market. It had important gaps which have left their mark on subsequent developments and in salient respects remain unaddressed, including:

- The brief and conventional treatment of the problems of regulating the natural monopoly networks-high voltage transmission and low voltage distribution-which comprise about half or more of all investment in the sector.
- Failure to deal with the design and specifics of the market’s centrepiece, the pool, and its interaction with the networks.
- Failure to deal with the related economic issue of externalities, mentioned above.
- Failure to provide discussion and guidance on the necessity, function and needs of the financial derivatives market in hedge contracts.
- The inappropriateness for complex network industries of relying on a single ‘light handed’ regulator’-a deficiency which the EMRP is doubtfully attempting to address.
- Failure to recognise the need for and to recommend upon, a well funded basic research program.

### **The exclusion of externalities**

From the start, the NEM was designed and set up to exclude the costs of *externalities*, in particular greenhouse emission and local environmental costs, from the pricing process. This is an *economic* fault in the market design. There has been some recent official recognition of the fact that ‘over-reliance’ on electricity generation with high CO<sub>2</sub> emissions is ‘a reflection of the failure to price for externalities, rather than from the introduction of greater competition’ (Productivity Commission’s draft review of National Competition Reforms, October 2004) . Despite this, the key forums of the NEM, and now the MCE and the EMRP, have ignored the issue of how the present market arrangements are to be redesigned to *include* externalities. Indeed, contrary to



established Federal, State and Territory economic, resource and environmental policies, NEM arrangements are skewed in favour of fossil-fuels and subsidise them, and effectively lock-out promising opportunities for low or no emission technologies such as renewables and Demand Management.

### **Market structure**

The regulated and competitive dimensions of the electricity market function very differently from the conventional descriptions of profit maximising entrepreneurs of standard economics. Perceptions of, and arguments for, the benefits arising from, competitive regimes are largely based on such assumptions.

Despite some minor elements of sales competition now present in the end-user markets, there is little evidence of, or opportunity for, price response on the demand side in a highly complex, and largely uncharted market environment. In an important recent case a Federal Court judge decided that the national electricity markets, although comprised of two distinct limbs-the 'wholesale' pool physical and the hedge contracts financial-operates, and should be regarded, as an integrated whole. After observing that in practice electricity storage is almost insignificant, he also pointed out the artificiality of regarding retailers as 'owners' of the electricity commodity.

This view accords with economic understandings: in practice, retailers pass through more or less fixed demands to the pool auction (spot market) where NEMMCO matches them to generation supply price bids. There is price competition in supply, but little in demand, and simultaneously the huge financial risks arising from sharp price spikes in the pool auction are managed through hedge contracts. There is no single way currently available for characterising and analysing this market structure in economic terms, nor of how well or otherwise it conforms to some market 'objective'. That this issue is ignored by the EMRP is further evidence of the murky waters into which the MCE is sailing. In the context of the controversial history of the Regulatory Test below it is relevant to note a change proposed in the EMRP to provide a benefits test, that is, a test assessing whether changes in a market promote the public welfare. The economic principles for assessing this, like all Competition reforms, lie in welfare economics, as in the case of the Regulatory Test, and involve a determination of the characteristics and performance of the relevant market.

At various places, notably in the proposed Code/Rules changes distributed on 10 December, there is discussion of new market objectives, and of the role of tests under the new arrangements. As importantly, though, SCO has not indicated any awareness of the lack of valid economic methods for assessment. Without these attempts to assess market performance will inevitably become rigmaroles of ritual, recalling the SNI episode (see below). As if aware that this will be the case, the proposed amendments on this point do not provide to the new national regulator, the Australian Energy Regulator, the duty to have regard to them in performing its enforcement functions!

## **Network regulation**

Intricate problems affect the regulation of the Australian system of transmission and distribution networks. These are probably made worse under the EMRP proposals. Networks issues include:

- the problematic use of price cap regulation in the jurisdictions, which promotes energy consumption, harmful on both economic and environmental grounds;
- The incentive for network owners to over-capitalise and gold plate their networks;
- the failure to use network policy to promote demand management (DM) and energy efficiency (EE);
- the failure to charge new remote generators for network augmentations other than direct connection costs;
- the charging of *all* network costs to consumers, and none to generators;
- inconsistencies and interventions arising from the staggering across the various jurisdictional networks of regulatory reviews of transmission performance, revenue assessment and incentives; and
- the early, rapid decision, by the MCE, based on a hastily commissioned and slender report, and without public consultation, to reverse the previous policies of ACCC and NECA, developed over several years, to encourage private investor merchant interconnectors. These and related measures dealing with network congestion which could provide some competition for, and greater efficiencies from, the regulated networks have been ignored by the EMRP.

Failure by the EMRP to recognise, let alone address, these issues effectively will inevitably diminish the economic, financial and environmental performance of the NEM and result in future regulatory uncertainty and backtracking.

## **NEM processes and economic regulation**

The SNI episode displayed the telling inability of the key NEM bodies and participants to understand and apply the intent of their own National Electricity Code in regard to what jurisdictions, regulators and industry themselves had said was the most important safeguard against uneconomic investments in the regulated monopoly networks. The matter involved the prolonged regulatory and, ultimately, legal battle between, on one side, TransGrid, the NSW State owned monopoly transmission utility, and its proposed regulated transmission interconnector, called SNI, to link NSW and South Australia, and,

on the other, the private owners of Murraylink, an entrepreneurial interconnector already approved over a similar route. NEMMCO approved SNI after a long and controversial consultation and assessment process. There was no demur by jurisdictions and regulators as to the correctness of NEMMCO's procedures.

Murraylink appealed and merits review revealed that the test applied by NEMMCO was *economically meaningless* and, on its face, *encouraged 'gold plating'*-that is, investment in uneconomic regulated assets which is strictly against the Code. It showed that the jurisdictions, regulators and much of the industry did not understand the economic and welfare meanings of their own Code in regard to one of its most important safeguards. Despite the fact that NSW and South Australia had before them an expert view which showed that the SNI proposal was not justified and was biased towards gold-plating, they supported Transgrid's appeal to the Victoria Supreme Court. ACCC subsequently accepted the expressed and implied criticisms arising from that expert view by making extensive changes in accord with it to the revised Regulatory Test issued in August 2004. NEMMCO did not notify the public or industry of the negative-for them-results of the appeal processes, and neither the jurisdictions nor the MCE have commented on them, nor on the changes to the Regulatory Test.

The integrity of NEM networks regulation, and its defence against uneconomic monopoly infrastructure, has been compromised. This damaging result, ignored by the EMRP and regulatory bodies, is a critical public issue.

### **Change of Code into Rules**

A central feature of the MCE's proposals for institutional change involves the translation of the existing National Electricity Code into a set of Rules contained within an amended National Electricity Law. As noted above, drafts of the legislation and Rules/Code changes were released on 1 and 10 December 2004 for submissions on key issues by Christmas and finalization by January 2005. This legislation is planned to be enacted via lead legislation of South Australia, that is, it would be State legislation, followed by mirror legislation in the other jurisdictions. Adherence to these Rules would then be obligatory under the amended NEL for participants in the NEM. Because the Rules would be mandatory, Market Participants following them, according to advice sought and taken by the MCE, would not generally be at risk of prosecution for anti-competitive trading or access breaches under the TPA .

Presumably, it is to be expected that, in general, the MCE would seek to ensure that amendments to the National Electricity Law (NEL) and that changes to the Code/Rules are consistent with the Commonwealth Competition provisions and COAG Competition agreements. But, since the NEL is State legislation there will be no necessity for this. Real possibilities exist of Rules being established of an anti-competitive, anti-economic and anti-environmental nature under the State legislation, with, by several avenues, the ACCC, the 'competition watchdog', being bypassed.

Even without explicit decision by the MCE such outcomes are especially likely considering:

- the complex history of amendments to the Code to date;
- the instances of misunderstanding and misapplication of the Code, such as in the SNI case;
- the misinterpretation or absence of appropriate economic principles being used in the construction of the Rules;
- the language in decisions being stretched to harmonise intra-Council disputes and least-common-denominator resolutions; and
- the continuation of Code provisions that permit discrimination against Energy Efficiency, Demand Management and Distributed Generation and in favour of fossil fuels.

### **Proposed removal of merits review**

Given the embarrassing history and systemic failure of the NEM institutions and regulatory procedures regarding the strategic SNI/Murraylink interconnectors' controversy, one of the most extraordinary EMRP proposals seeks to remove merits review from the NEM. That this should be contemplated for a vast, sprawling, market-based power system of such intricacy is astounding. It would mean that the multitude of assessments, judgments, implementation of protocols, economic and technical tests required to order, operate and develop this huge and complex system could be conducted without any independent examination and validation of the 'facts'.. It would give *carte blanche* to a wide array of practices prejudicial to the public interest and allow system operators virtual unaccountability. It is extraordinary that this is being put forward for an institutional group that in the only case of merits review so far was found to be asleep at the wheel. The proposal should not be countenanced.

### **The demand side**

On the demand side, the net economic benefits of the NEM reforms are less than clear, if they exist at all. While some generators have improved physical performance and reliability, and some businesses have gained, some householders have not. Figures on price reductions attributed by the Productivity Commission to the benefits of competition up to 2001 are at least arguable. In recent years there have been expensive policy errors in relation to new generation projects, demand-side efficiency, economic and environmental objectives.

Current EMRP discussion and recent Productivity Commission comments on investment in the gas market are primarily concerned with the 'introduction of new measures to

facilitate efficient investment'. These are aimed at possible risks to and constraints upon the calling forth of private investment for essential infrastructure and '...to ensure that new infrastructure investments are not deterred by exposure to access regulation'. The general direction of such prescriptions bypass the great opportunities in electricity for higher efficiency, resource economy, and enhanced environmental outcomes from investments on the *demand side* in the form of Demand Management and Energy Efficiency. These are essentially *economic* in nature. In the present state of the NEM, scarcity of capacity generally arises from the *decision* to cater for peak demands by using the most expensively priced plant. The peak demand could, of course, be managed by reducing it. The failure of the EMRP's Distribution/Retail Issues paper to even mention DM is symptomatic of the biased emphasis on supply-side responses within the market.

### **Lack of knowledge**

One of the striking features of Australia's power reform initiative is its conspicuous deficits in authoritative research. This will have ongoing ramifications for the ultimate efficacy of the reform process. From its beginnings the NEM has relied upon economic and related ideas which were current in the early 1980s and which have since had little updating. Reforms have proceeded on the basis of the work of officials and commercial consultants, and energy industry representatives. The matter-of-fact, routine processes of independent international and interdisciplinary modern academic scientific research has been generally absent in Australia. There has been no body of extra-industry, expert, high level, national discussion and analysis of the key issues. This situation deserves the highest priority for rectification and is in sharp contrast with some other developed countries.

### **Conclusion**

However they have come about, heavy doubts now hang over the legitimacy, authority and validity of the MCE and EMRP processes. The program is being driven through at a speed and in ways which deeply prejudice the outcome. They should be suspended pending an expert COAG audit. This could provide the basis for the effort to be salvaged. COAG has not considered electricity reform since its meeting in 2002 when it endorsed the MCE program, and prior to that in 1995. An urgent meeting of COAG could establish interim arrangements for a review of, and any urgent action necessary for, the EMRP initiative, pending the set-up of an authoritative enquiry.

Though there is much that needs to be changed and improved in the national electricity markets, the NEM is not broke, and there need be no rush to fix it. There must be some questioning as to why such urgency as we have seen has been pursued: perhaps it is because the majority of the jurisdictions, in a period of high demands on always short public revenues, own or control entities which directly supply badly needed surpluses which those jurisdictions seek to protect.

Public involvement in the new process is essential, if the whole reform is to have an enduring foundation. To this end a member of COAG without major portfolio conflicts of interest (the President of the Australian Local Government Association?) should be appointed by COAG as the point of reference for all community concerns and submissions about the MCE/EMRP process prior to this meeting. In conjunction with this, COAG should appoint an independent expert panel to screen on its behalf the submissions made by SCO and by the public and the industry and to make recommendations as to, in particular, any immediate and/or high priority actions COAG needs to take.

Finally, COAG and the MCE would provide for the national importance of ensuring the success, now endangered, of this reform initiative if it arranged for the Productivity Commission or a similar authoritative and appropriately resourced agency or panel to complete a full and urgent review of the NEM, of the electricity access regime, and of options for development. This should include at least the legal, economic and environmental policy questions noted here, and also of electricity/gas convergence, a complex economic and environmental issue now almost unnoticed. COAG and the MCE would then have at their disposal the results of a formal, well-conducted public investigation before finalising decisions which will otherwise be piecemeal, heavily compromised, constitutionally doubtful and difficult, if not impossible, to implement or correct.

## 1. Introduction: Purpose, Scope and Comment

### 1.1. Purpose

I am asked to review the Ministerial Council on Energy (MCE) proposals on the Energy Markets Reform Program (EMRP)<sup>1</sup> with a view to identifying issues for clarification and appropriate investigation and action especially as they might affect Distribution and Retail.

### 1.2. Scope

Because of the brief time available for this review within the period provided by the EMRP's already short consultation process, it has not been possible to consider in depth the numerous issues involved. Since Distribution and Retail (D/R) are the last steps in the chain from production to use of electricity, it is necessary to examine the gamut of market philosophy and design and some specific issues relating to D/R identified by the Standing Committee of Officials (SCO). This review principally considers matters of structure, economics and design. It should be noted that the various criticisms made do not necessarily relate to other specific parts of the EMRP, such as gas (except for the omission of issues of convergence), but those concerning legislation, governance, institutions and process generally do so apply.

### 1.3. Comment

The policy initiative to develop the national electricity markets<sup>2</sup> is probably the most complex and most socially extensive techno-economic project ever attempted in this country. Electricity production and sale now proceeds over linked physical, regulated and financial markets extending from the north of Queensland to the west of South Australia, with Tasmania being added soon. Electricity as a market commodity has several characteristics of its own:

- effectively all modern households, businesses and industries rely upon it, its standard and its security of supply;
- its economic value is effectively immeasurable;
- in the power industry it cannot be stored, apart from some specific exceptions, generally small in terms of energy; and
- the electrical demands arising from all the households, businesses and industries must be in balance with the power generated, second by second.

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<sup>1</sup> Details of the MCE and EMRP are available at [www.mce.gov.au](http://www.mce.gov.au).

<sup>2</sup> See Glossary for terms underlined in text.

Much of the thinking underlying the Australian markets has proceeded as if it would be possible for them, 'as they mature', to become effectively independent of governments. This will never be the case. All governments are held responsible by their electorates for 'keeping the lights on'. Responsible jurisdictional governments in Australia would never, for example, be expected to allow an officially accepted national market design to prevail if it ran counter to the security of supply in their own jurisdiction, for example by allowing a scarcity of investment to imperil the future capability of the system.<sup>3</sup> But the greenhouse emissions and other environmental impacts of power supply and usage also raise policy and economic issues now regarded as pressing, even by industry and governments conservative in their attitudes to environmental questions. All of this raises a host of questions which are dense and in many ways new. Certainly, many of them have not been seriously addressed in this country.

The Ministerial Council on Energy's EMRP embraces the reform of policies and institutions which cover all the functions affecting both electricity and gas. It is, of course, not possible here to address them all: the discussion below deals with a series of topics mainly related to electricity which seem to the writer to be especially important and urgent. They are complex and in several cases quite basic to the reform initiative. They will require time and resources to resolve and it would be most unfortunate if undue haste to complete the present EMRP timetable led, as appears very likely, to decisions which would simply require redoing in the future. As the later discussion shows, there is much in the present arrangements of the national electricity markets which needs change and improvement; but the NEM is certainly not broke, and there is no need for the present rush-for what reason?-to fix it. Continuation of the failures within the EMRP to address properly the essential measures required will lead to imponderable penalties and costs.

The UK experience provides a salutary example. Electricity markets had been developed in some countries in the 60s and 70s, notably in Scandinavia. It is generally accepted though that the impetus to electricity markets in Australia and in a number of other countries arose out of the New Right policies articulated and implemented by the Thatcher government. In practice, the implementation of the policies in the power sector was weakly thought through: it is now widely known that its principal aim was to raise public funds by selling off the electricity assets, with little attention to the impacts of market power in private, or public, hands. Before long, the system, which like the Australian one, was centred on the auction pool, was in administrative gridlock. Several comprehensive restructurings have been carried out. In 2001 the pool was abolished and

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<sup>3</sup> Recent NSW moves to nominate and negotiate future capacity additions privately financed, for example, as proposed in the *Energy Directions Green Paper*, 6 December 2004, represent a form of capacity market set up *outside* the Code. If proceeded with, they will make significant impacts upon the rest of the National Electricity Market (NEM). The NEM is an 'energy only' market, ie, only electrical energy is traded: in the market's normal operation it is expected to have dynamic efficiency and so to provide financial incentives for investment in new capacity in good time. There is no official, separate, nationally mandated market for generating capacity such as some countries have. In Australia there is still wide debate as to whether the market has achieved dynamic efficiency.



replaced by arrangements rather similar to the world oil market.<sup>4</sup> The results are still controversial. While the original motivation was largely ideological, the fact is that restructuring was directed at the very unpopular public monopoly giants - a situation repeated in Australia. It was this that provided the political wind for the first liberalizing squadrons.

The Australian experiment was better prepared, partly by learning from the UK's mistakes. But several important defects have passed almost unnoticed here and the EMRP promises to lead to a regulatory quagmire.

As important as the electricity reforms are within themselves, their significance extends well beyond that. In increasingly individuated, decentralized and 'local' cultures, within weakened states and globalistic networks, they reflect a polity's ability to fashion fair, efficient, publicly interactive arrangements for regulation and sustainability. These are increasingly needed for resolving and deploying inter-related scientific and social scientific issues within radically democratised societies and cultures.<sup>5</sup>

### 1.3.1. Exclusion of externalities

From the start the NEM was designed and set up to exclude the costs of environmental externalities within the pricing process. In practice, this has almost entirely removed the power reform process, and thus one of the largest areas of environmental impact, from the arena of environmental policy. In particular, the uniform price auction adopted by the NEM for the pool is well known in economics as being unsuitable in situations where there are significant externalities. In its recent draft report on the *Review of the National Competition Reforms*, the Productivity Commission (PC) said: '...it is important to recognize that any inherent 'over-reliance' on electricity generation with high CO<sub>2</sub> emissions is a reflection of the failure to price for externalities, rather than from the introduction of greater competition'; and agrees with critics that '...prices for electricity from whatever fuel source do not fully reflect the social costs of provision' (section 5.4). The PC makes specific claims, some of which are at least arguable, for gains from competition in the electricity sector. Unfortunately, though, it passes over the issue of how the present market arrangements are to be redesigned to *include* externalities.

This issue is also closely tied up with the inappropriateness of one of the Code's objectives: that a particular energy source or technology should not be treated more favourably or less favourably than another energy source or technology. It might not be so bad if this provision has not been observed *only* in the breach from the start of the NEM: some fuels, in particular, coal, are more favourably treated than others, as the PC's

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<sup>4</sup> John Kay (2003): *The truth about markets*. Allen Lane, 136.

<sup>5</sup> '...the challenge now is the overcoming of the division of politics into the dual worlds of pure subjectivity and identity on the one side and, on the other, the release of an unfettered instrumentalism driven by the market and technology. ...the implications ... lie in what might be called the discursive regulation of power by ...a self-regulating society of creative citizens.' Gerard Delanty (1999): *Social theory in a changing world: conceptions of modernity*. Polity Press. 182ff.

quote above recognises: nothing has been done to correct the situation except as reflected to a modest degree in the Commonwealth MRET scheme and some jurisdictional Green Power provisions. But the Code objective as presently framed removes the option of implementing what might well be good policy of ‘penalizing’ or ‘subsidising’ particular sources or technologies - on environmental, social, economic or other grounds.

The immediate issue, though, is that the Australian electricity market has deep design flaws and the EMRP processes are papering them over.

### **1.3.2. The short-circuiting of public participation**

The power reform initiative has been pursued much in the form of a government/industry club, in effective isolation from public participation, independent review and organized scientific research. *It must not be forgotten that end-users pay all costs of electricity supply.* While the MCE has made a positive step by acknowledging the inadequacy to date of consultation with end-users, its plans to improve participation are currently subject to ongoing negotiation within the MCE and with the various social and environmental advocacy groups.

The National Electricity Code Administrator (NECA) and the National Electricity Market Management Company (NEMMCO) have articulated excellent consultation processes for interaction among, governments, regulators and industry, but in practice they have been pursued almost entirely within this ‘club’, with little opportunity or expertise available for end-user participation. This situation is not unique to Australia, but has had undesirable and inefficient results wherever it occurs. In a paper on market design<sup>6</sup>, Cramton, a research analyst in that field, said:

‘...A second explanation for the appearance and persistence of design flaws has to do with the design process. In the case of electricity this process has most often been design by a committee of interested parties. More often than not, design proposals were motivated by special interests. The final designs involved a bargaining compromise that tended to focus on the split of gains among special interests, rather than a design that best achieved the market’s objective.’(7)

### **1.3.3. The networks**

The 1991 Industry Commission (IC) report focused almost entirely upon the competitive possibilities of a market in generating electricity. The fact that the networks account for about the same order of investment and have constituted perhaps the single most intractable issue for regulation was passed over with little comment. The inertia of the networks in attempting innovation or aiding environmental initiatives has remained an obdurate problem to date. A potentially very effective avenue of introducing competition

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<sup>6</sup> Peter Cramton (January 2003): Electricity market design: the good, the bad and the ugly. Published in *the Proceedings of the Hawaii International Conference on System Sciences.*

and innovation into the network sector, the establishment of privately funded merchant interconnectors - an obvious threat to the incumbent transmission utilities - was largely closed by an MCE decision even before the EMRP process was effectively underway. The networks remain a major, in some ways, *the* major issue, still absent systematic, continuing and coherent analysis.

#### **1.3.4. The hedge markets**

A further extraordinary gap in the conceptual framework set up by the IC Report for implementation was the ignoring of the necessity of, and the requirements for, a market in hedge contracts, to manage the price spikes inherent in electricity pool auctions as an integrated element of the whole NEM. This mistake has cast a long shadow which still remains. The problems of the financial markets have been attended to in a piecemeal fashion at best.

#### **1.3.5. Lack of knowledge**

The policy initiative has been intellectually undercapitalized: it has relied upon economic and related frameworks which were current in the early 1980s and have had little updating. It is true that, increasingly, levels of analysis of established economic principles, especially in legal testing and in some PC publications, have been traversed. These have rarely if ever been examined in Australian policy before. Since the 1980s there have been major advances in, for example, the economics of auctions, in institutional economics, network economics and in environmental economics. A PC staff research paper on auctions<sup>7</sup>, otherwise a useful addition to local economic literature, mentions the electricity pool auction only in passing! Developments in the relevance and sophistication of social theory also provide basic insights and innovatory resources. Little if any of this has been used in the policy process, nor has the MCE shown any recognition of the need. This is a lack which will have ongoing negative ramifications on the ultimate efficacy of the EMRP.

The Australian reform has proceeded on the basis of the work of officials and commercial consultants, with substantial additions by energy industry representatives and almost entirely without the benefit of scholarly, scientific enquiry and research. This is in no way a comment on busy officials or on conscientious consultants whose work must principally comprise the brokering of existing knowledge. They have neither the time, the funds, the staff resources nor the obligation to do original research. It is, however, a comment on governments and industries and on simplistic views of the tasks involved.

Although there have been a few valuable, individual efforts, there has been very little funding indeed of scientific work on these markets by the Australian Research Council (ARC) or any other Australian research body. The sketchiness of the understanding of the economics of a market structured around the market failures of the networks led to

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<sup>7</sup> Chris Chan, Patrick Laplagne, David Appels (2002): *The role of auctions in allocating public resources*. Staff Research Paper. Productivity Commission.

the long-running fiasco of NEMMCO's assessment of the NSW/SA transmission interconnector SNI in which it used-with no demurrers from jurisdictions, regulators or the industry-a form of investment criterion which was economically meaningless and, taken on its face, fostered the gold-plating of regulated networks, the very opposite of the ACCC's regulatory intent.

The sketchiness of the understanding of the economics of a market structured around the market failures of the network led to the long-running fiasco of NEMMCO's assessment of the NSW/SA transmission interconnector SNI. NEMMCO used-with no demurrers from jurisdictions, regulators or the industry-a form of investment criterion which was economically meaningless and, taken on its face, fostered gold plating of regulated networks, the very opposite of the ACCC's regulatory intent.

Much of the doubt about the present and future performance of the NEM could have been avoided by a well-directed research program, which included, for example, the building of an econometric model of the national system for diagnostic purposes. This possibility has not received, apparently, any official consideration.

The situation in regard to research is different in other countries (the process of energy market development now runs across the world) and in particular in other OECD countries. Many of them have large and well funded research programs and their results feed into reform processes. These advances have been largely ignored in the Australian policy process, except for occasional references generally to specific developments in the Anglophone countries, mainly UK and US. Neither of these is an especially useful model for Australia, and much interesting R&D has proceeded in non-Anglophone countries. The matter-of-fact, routine processes of international and interdisciplinary reference, collaboration and investigation which characterize modern academic scientific research have been generally absent in Australia. It is a potent source of weakness which deserves the highest priority for rectification.

### **1.3.6. The MCE's EMRP processes**

The processes being used by the MCE and the SCO in the EMRP are disturbingly problematic. The legislation on which it is based was rushed through Federal Parliament in June last, in the last sitting week, despite well founded concerns, expressed by legal researchers in the Australian Parliament House for the guidance of the Parliament, as to its constitutionality, and therefore, its possible vulnerability to High Court appeal. Taking into account recent High Court decisions, these related to its doubtful constitutionality, the legal status of Cooperative Federalism, effects upon Commonwealth/State relations and reform in other areas and markets.

Views like this are shared by other legal commentators. The MCE's EMRP process is a corporatist initiative of the practically-oriented but legally problematic Cooperative Federalism initiative introduced by Federal Labour governments and carried on by the Coalition governments: such processes have sparked considerable legal and political comment for the way, essentially, in which full public debate is or might be short circuited by jurisdictions and perhaps other unknown actors moving in concert.

The SCO processes are opaque, unaccountable except to ministers, with minimal opportunity for debate on issues raised by the public after SCO recommendations have been made. Delphic judgments emerge with little or no supporting argument.

### **1.3.7. A balance sheet for the NEM?**

The domestic energy markets initiative is now over ten years old. It took its origins from policies and public enquiries which set out to rein in the heavy overinvestment by, and lack of efficiency and accountability of, State Electricity Commissions in the 1980s. Market processes and operation, at least in theory, provide the political benefit and social advantages of greater access and decentralised decision-making compared with the 'closed shops' of the old monopoly Commissions. But these are not gained without costs and the reform's net economic benefits or costs, and their distribution, remain unclear.

On the supply side, the 1985-86 NSW public enquiry into generation planning pointed to efficiencies that, if implemented, would make the then existing generation plant sufficient till the early years of this century. This forecast has been realised, though important gains were achieved before market start in the mid 90s.

On the demand side, the net benefits are less clear, if they exist at all. Some businesses have gained, some householders have not. The validity of using electricity price reductions up to 2001 as a measure of efficiency gains, adduced by the PC in its Competition Policy Review quoted above, are at least arguable. In the years since there have been expensive policy errors in relation to demand-side efficiency, economic and environmental objectives. These have largely resulted from governmental inaction on surging demand, stimulated by subsidised prices, particularly in relation to the increasing use of air conditioning by residential consumers.

All of this raises anxieties about the damaging impacts of the MCE's EMRP processes on both Australian energy markets and Australian democracy

#### **1.4. Criticisms**

This review contains some deep criticisms of the national electricity markets and their institutions. This should not be allowed to deflect from the dedication and skill and continuing application of the many people who have, in fact, operated the system day by day, and kept the lights on. This comment refers, in particular, to NEMMCO, not kindly dealt with elsewhere in this document, and the skill and zeal of its staff in maintaining the far flung system's good order, reliability and security.

#### **1.5. Opinion**

As far as possible the analysis here is based on published information and on well known economic arguments. In some cases, where, for commercial-in-confidence and other reasons, necessary information is not in the public domain, industry estimates and assessments have been used. I have tried to avoid personal judgments and to analyse the issues according to the terms and the principles in which they have been represented and justified in official statements. In particular, the discussion does not represent an argument one way or the other over the basic merits of the markets initiative. The public debates over this issue have been unrewarding, with, on the one hand, a deeply ideological and uncritical celebration of markets as public policy tools, without a theory of society, and, on the other, an equally ideological and unreflective celebration of public ownership of natural monopolies, without a theory of action. The previous state owned, vertically integrated monopolies had obvious shortcomings. The markets initiative, intended to remedy those shortcomings and provide something better, has been so inadequately conceived and implemented that it is not possible to form a firm judgment on 'what might have been'. Redressing this situation should be the first priority.

I would like to express one frankly personal opinion: the workings of the MCE call only too well to mind the period of the late 1800s when the sheer practical problems of trying to run a nation as a collection of jurisdictions precipitated the formation of the Australian Commonwealth. If the policy requirements of energy had been then what they are now energy could well have been listed under the Commonwealth Heads of Powers. That is where they should be now.

#### **1.6. Acknowledgments**

Numerous people have contributed to this review, all of whom cannot be named here, but many thanks to them all. In particular I would like to acknowledge the valuable comments by Emeritus Professor Ted Kolsen and Prof George Docwra; Andrew Martin; Dr Jeff Washusen; the liaison with Kane Thornton of the Alternative Technology Association (ATA) and the continuing assistance and devoted editing of Jane Castle of the Total Environment Centre (TEC). Comment or assistance does not imply endorsement, and the result is the author's.

## **2. History of NEM development**

A general understanding of the history and institutions of the NEM is assumed in this review. Useful historical and other details are available on the websites of both NEMMCO ([www.nemmco.com.au](http://www.nemmco.com.au)) and NECA ([www.neca.com.au](http://www.neca.com.au)). There have been a number of books and other documents published with historical details of general and specific developments. A number of reviews, legal decisions and other documents external to the NEM have been especially significant in its origins and in regard to key developments, including those of the EMRP. See Appendix 1 and section 3 below.

### **3. Summary of issues from documents of particular historical relevance**

The following subsections discuss issues arising from policy, regulatory and review processes and documents which have been important in the development of the national electricity markets and which have resulted in continuing unresolved issues for the reform initiative.

#### **3.1. 1991 Industry Commission (IC) Report on electricity and gas**

This report provided the blueprint for the reform program in electricity and gas. It might seem rather late in the day to be returning to that document, but its examination is instructive: much of the subsequent development of the Australian markets has been, and still is, heavily influenced by its strengths and weaknesses, and by its gaps.

##### **3.1.1. Treatment of networks**

The IC Report was focused primarily on the policy, competitive potential, institutional and regulatory arrangements for developing a nem. It dealt at length, firstly, with unbundling the existing government owned vertically integrated utilities, including the transmission, distribution and retail arrangements; and secondly, with the establishment of conditions for more competitive arrangements, particularly for the generation sector. Most of the discussion was at the level of institutions and the generic characteristics of competitive markets. Apart from a few pages with some specific details of arrangements in a range of other countries, the bulk of the discussion concerned Anglophone countries. There was an appendix discussing some of the types of electricity pool available, but no treatment of the special economic characteristics of auction markets (which pools generally comprise) nor on what basis an Australian design might be selected.

The thrust of the Report was on the potential for competition among generators. It was accepted that the networks would require economic regulation to provide for market failure, in particular natural monopoly. The regulatory and institutional provisions for the transmission and distribution grids were dealt with in a few pages, and it passed unnoticed that networks investment accounts for around 50% of total sector investment. With time and deterioration, the networks now represent a very large stock, and proportion, of new investment needs and remain a systemic regulatory problem, which the EMRP will do little, if anything, to address, and may make worse.<sup>8</sup>

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<sup>8</sup> The MCE institutional and network proposals will still leave Australia with individually regulated transmission networks, in practice ensuring that the regulation is not consistent across networks; that distribution networks will be subject to significant and subtly different jurisdictional regulation; and with arrangements that send conflicting locational decisions in electricity and gas pricing that impact directly on investment decisions for gas-fired electricity generation. Moreover, the competitive potential of privately financed merchant interconnectors, on which NECA and NEMMCO worked for years, and was a basic factor in the fated SNI decision, has been essentially bypassed as 'an academic' experiment by an extraordinary and rapid MCE decision in December 2003. See section 4.6.3.



### **3.1.2. Treatment of energy conservation and environment**

The treatment of energy conservation and environmental costs was similarly brief, and was skeptical of the role of governments in promoting better practices, relying instead upon the clarification of market signals. As noted earlier, this led to a major defect in the reform initiative which has still not been addressed.

### **3.1.3. Hedge or financial derivatives markets**

The essential role in risk management which hedge markets play was also not mentioned, even though the pool process was not commercially feasible without a parallel financial market process. Although it had available research commissioned from a consulting firm on the need for a futures market, the matter was ignored. The failure to appreciate the necessity and complexity of these markets, their liquidity requirements, and their need for sound design and oversight has been a continuing vulnerability in NEM administration and development. It is relevant to note here that the effects of major failures in California several years ago were exacerbated by the inadequacies of the hedge markets.<sup>9</sup>

### **3.1.4. No research program identified**

The IC's focus upon competition among generators was to be expected - especially given the context of the existing overseas market arrangements at that time and, in particular, the situation in the UK which the IC took as particularly relevant. (It is widely accepted in the industry, in retrospect, that this was an unfortunate and problematic precedent.) There was some reference to international examples of markets and regulatory arrangements but no indication of how an investigation of the most appropriate options for Australia should be conducted, nor of the scale and complexity of the tasks. No research program was recommended. It seemed to be imagined that appropriate arrangements for what is essentially an economic representation - a regulated market - would emerge as a matter of course from the National Grid Management Council, then being established, with engineering and accounting staff from the existing State Electricity Commissions and little economic expertise.

### **3.1.5. Light-handed regulation**

One of the most influential of the IC's recommendations was for the introduction of 'light-handed regulation' defined as 'relying on an over-sighting agency'.<sup>10</sup> This was intended to apply to private corporations, and was contrasted with the other extreme of 'heavy-handed regulation' which employs '...detailed regulations to circumscribe industry behaviour...' The spread of the private corporation has been partial, with most of the sector still in public hands. This eventuality was not provided for. Further, as noted above, the encouragement of private investment in the networks has been reversed.

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<sup>9</sup> I am grateful to Jeff Washusen for reminding me of this point.

<sup>10</sup> '...implicit (in which) is the threat of detailed regulation and close oversight if market power is misused', p. 84

The term ‘light-handed regulation’ subsequently became something of a mantra in industry reform, with vague understandings of what it might mean. As discussed below, some of the MCE proposals raise questions as to whether legislative and regulatory aspects of those proposals extend beyond ‘light-handed’ (as defined) to the ‘heavy-handed’. Further, as to the nature and role of the over-sighting body, from the two options of a general body or industry specific bodies, the IC recommended the former<sup>11</sup>, as subsequently did the Hilmer Committee (see 3.3 below). The relevant body was later realized in the form of the ACCC. Various industry specific regulatory bodies have since been established and the MCE’s proposals to constitute the AEMC and AER are a further example. The original proposals, which many thought at the time were wishful thinking for such complex network industries, have now been substantially reversed.

### **3.1.6. Conclusions**

These and related questions of the economics, structure, regulation and governance of the electricity industry have not been revisited by the IC or (PC). There has been no other extra-industry, expert, high level, national discussion and analysis of those issues which have most troubled the establishment and development of the NEM<sup>12</sup>. This gap relates in particular to the provisions of Part IIIA (access) and Part IV (anti-competitive practices) of the Trade Practices Act (TPA). The PC did report on the general issue of access in all the relevant industries in relation to Part 10 of the TPA in its 2003 Review of the National Access Regime, and in the relevant aspects of its 2004 Gas Access Review, and these are discussed further below. Thus, fundamental aspects of the architecture and design of the Australian markets were poorly addressed, or not at all in the IC Report and have not been examined since then except in damagingly piecemeal fashion by NECA, NEMMCO, ACCC and now the MCE. As policy prescription the IC report was hastily adopted and carried through, with unsurprising difficulty and waste resulting.

### **3.2. National Grid Management Council (NGMC)**

The NGMC was established in 1991-2, after the IC Report, to provide oversight and guidance to the development of the national electricity market as generally conceived in that Report. It was comprised primarily of engineering and accounting officials from the existing State monopoly commissions and, as noted above, little specifically *economic* research or expertise.

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<sup>11</sup> Saying, *inter alia*, ‘...that the direct and indirect costs of industry-specific regulation can be significant and that, in recognition of those costs, there must be a demonstrated need for such regulation’, p. 87.

<sup>12</sup> The only significant external review was the 2002 Parer report, but this was very much a document of the status quo, based largely on judgments derived from some overseas visits, and with little basic research into local requirements.

### 3.2.1. Market design

In 1994 the NGMC produced the draft Grid Management Protocol which became the National Electricity Code when it was accepted by the ACCC in 1997. The centrepiece was the pool or spot market. In Australia this is a '*uniform price auction*' - retail demand is offered into the trading process in time-based blocks and the price set by the bid of the marginal generator applies to all purchases from the pool. Very little was published then or since in Australia on the choice of this model. The issues are complex, and cannot be traversed here, but two points are worthy of note for this discussion:

- uniform price auctions have been substantially criticized because of their tendency to confer market power<sup>13</sup>; and,
- markets of this kind can only function satisfactorily where externalities are so small as to be negligible.<sup>14</sup>

The externalities represented by greenhouse emissions and other environmental impacts cannot be regarded as negligible. No provisions for them have yet been introduced into the NEM itself. To the extent they are attended to at all, such matters generally fall within the responsibilities of jurisdictional regulators, which are not national. The one principal exception is the Mandated Renewable Energy Market Target (MRET) scheme which is, in effect, an attempt to force a subsidy arrangement into a market framework.

### 3.2.2. Demand management

As far back as the NGMC's Protocol of 1992, agreements regarding the NEM have endorsed the importance of Demand Management (DM) but little indeed has been accomplished. Similar injunctions have also appeared in the National Greenhouse Strategy 1998 and the Council of Australian Governments' (COAG) Communiqué of 2001.

### 3.2.3. Energy Efficiency

Similar comment can be made regarding the achievement of Energy Efficiency (EE).

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<sup>13</sup> See, eg, Catherine Wolfram (1998): Strategic bidding in a multi-unit auction: An empirical analysis of bids to supply electricity in England and Wales. *Rand Journal of Economics* 29, 703-725; Nils Von der Fehr and David Harbord (1993), Spot market competition in the UK electricity industry, *Economic Journal* 103, 531-546; Paul Klemperer (1999) Auction Theory: A Guide to the Literature, *Journal of Economic Surveys*.

<sup>14</sup> Larry Ruff (October 1998): Competition in Electricity: Where do we go from here? Institute of Economic Affairs, London Business School. For a basic treatment, Ronald H Coase (1960): The problem of social cost. *Journal of Law and Economics*, 1

### 3.2.4. Ecologically Sustainable Development

Similar comment can also be made on the NGMC's objectives in relation to environmentally sound development, in particular, Ecologically Sustainable Development.

Specific issues relating to DM and EE are discussed in more detail below.

### 3.3. Hilmer Report and Competition Legislation

The Hilmer Report of 1993 provided the blueprint for what became National Competition Policy and the associated Legislation. This included far reaching changes to the Trade Practices Act (TPA). The analyses and conclusions regarding the application of competition principles to public policy and the public benefit were based upon the propositions of standard economics, including the doctrines of welfare economics.

#### 3.3.1. Markets and welfare

The basis of the preference for 'competitive markets' is the demonstration in standard economics that perfectly competitive markets are characterized by conditions with the maximum public benefit, known as the most 'efficient' position: 'benefit' is here defined in terms of consumption, and, broadly speaking, the benefit consists of the sum of the dollar value of the added consumption accruing to consumers (consumer surplus), and to producers (producer surplus)<sup>15</sup>. Competition theory has no provision for the tracing or evaluating of the distribution of the surpluses, and objectives of equity are sought in the realm of politics and the sphere of social policy within that. Since within the Australian Constitution energy is a responsibility of the States these matters generally have been dealt with by State Parliaments. With the passage of time, greater economic interdependence and technological advance has made this a central issue of national political arrangements.

In the NEM, the wholesale market is conceptually constructed as a regime of efficiency through competition. Thus, at that level, issues of distribution are avoided and so pass to State and Territory level. This matter is returned to below. The point to be made here is that the legitimation of any competitive market policy, especially when regulation is included, here in the case of electricity, depends on the analyses of *welfare economics*. Various forms of competition exist and an assertion that state A is more 'competitive' than state B, and therefore better, can only be established from close analysis of actual conditions.

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<sup>15</sup> A change in economic outcomes, for example through regulation, is often regarded as 'good' (efficient outcome) if benefits exceed costs, according to the Kaldor/Hicks compensation principle, even if actual money transfers do not take place. This has been criticised because actual transfers are required for the total social values of gains and losses to be properly assessed. This relates to the point made in the following sentences.

### **3.3.2. Conclusion**

The Hilmer report has led to major changes in the competitive conditions of Australian industry, especially those formerly controlled and operated through public monopolies. However, it had little to say about the quite specific issues of the electricity industry and the reforms in that sector have been conducted rather at a distance from those in other industries. This is now being addressed in certain ways, partly through the role of legal interpretation and decision, but a concerted program to resolve the continuing issues there has not been articulated.

### **3.4. ACCC acceptance of the Code as an ‘undertaking’**

The Code is the only ‘undertaking’ that has been accepted under the three routes of declaration, certification, and undertaking provided in the Trade Practices Act (TPA). It was accepted by the ACCC in 1997 on the basis of a draft Code (intended at that time only for application in the eastern States) prepared by the NGMC and vetted for the ACCC for its consistency with the TPA by officials of the West Australian power utility. There is room for consideration as to the completeness of that vetting. Be that as it may, the Code accepted by the ACCC did, in fact, contain the economically defective Customer Benefits test, discussed further below and subsequently changed by the ACCC. In regard to the access arrangements which will finally emerge from the EMRP process, it is not clear as to what, if any, route will be followed. This is discussed further below.

### **3.5. Processes and decision-making: the SNI interconnect, NEM procedures and merit/judicial review**

One of the prime rationales for the NEM relied on the system efficiencies to be gained from the interconnection of the States’ transmission grids. This had been technically feasible but politically and bureaucratically impossible under the former State owned and directed system. Interconnection allows reserve generation capacity in one State to be used to complement the capacity in another State at times of high demand there. Consequently, the planning and construction of new interconnects has been one of the key and most controversial issues for the NEM. Initially, proposals were based on the use of regulated interconnects built by State transmission utilities. However, theoretical, engineering and financial developments overseas had suggested the feasibility and efficiency of commercial interconnects, acting in competition with generators and bidding direct into the pool. Accordingly, provision was subsequently made for these Market Network Service Providers (MNSPs) as they were called in the Code as revised to include them. Indeed NECA, ACCC and others had encouraged the development of the MNSP model as they saw in it, not unreasonably, an avenue of competition with, and hence of greater efficiency from, regulated networks. Further comment on MNSPs and related issues is made in section 4 below.

Acceptance of proposals for regulated interconnects and for some other large network augmentations is based in the Code’s requirements for satisfying the Regulatory Test

(RT), drawn up and promulgated by the ACCC. The RT is one of the fundamental provisions of the Code.

### 3.5.1. NEM processes

A microcosm of the NEM's regulatory and decision processes is provided by the history of what was originally proposed in 1996 by Transgrid, the NSW state owned grid operator, as a regulated interconnect between NSW and South Australia (SANI). The writer played a role in this history, set out briefly below and in more detail in Appendix 3, and that role should not be emphasized. The insights required were routine and could have been expected as a matter of course from any conventionally trained professional economist familiar with the sub-discipline of cost benefit analysis (CBA).

The unraveling of the long skein of events which decided the fate of TransGrid's proposal showed, *inter alia*, that the jurisdictions, NEMMCO, the Code participants and perhaps ACCC, NECA and industry consultants did not understand and apply the intent of their own Code in regard to what had been seen by its architects and accepted by jurisdictions, regulators and industry as one of the most important investment safeguards. This can reasonably be expected to rank as a critical public issue.

### 3.5.2. Application of the RT to SANI/SNI

Briefly, when Transgrid put up the SANI transmission grid regulated interconnector proposal for approval in 1996 it was required to meet the application of a public benefits investment test which was then in the form of the Customer Benefits Test. This was a patently defective investment criterion since it included only benefits to customers; but the test in that form had been passed by the Western Australian officials who had vetted the Code for ACCC and it had been subsequently accepted by ACCC. The problem could have been seen *on inspection* by a competent economist but only after extensive mathematical testing did NEMMCO approach ACCC to have the RT reviewed. The ACCC issued the revised RT in December 1999 and Transgrid resubmitted its proposal, now somewhat modified and renamed SNI, but basically serving the same purpose. In the meantime an MNSP across a similar link proposed by Murraylink Pty Ltd had been approved: private merchant networks are not regulated, do not have to meet the RT, and sink or swim financially on their own.<sup>16</sup> After the public consultations, internal studies, a great deal of controversy involving the industry, allegations of political interference, and the final 'application' of the RT, NEMMCO approved SNI in December 2001.

Murraylink applied to the National Electricity Tribunal (NET) shortly after the NEMMCO decision for that decision to be reviewed as one of the 'reviewable decisions' defined in the Code. The application was heard in September 2002 and, according to the procedures adopted in the NET, was defended by Transgrid on behalf of NEMMCO. The Majority, two senior counsel with extensive judicial experience, decided in favour of

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<sup>16</sup> Although they can apply to be converted to regulated interconnects, a route Murraylink finally took. Given the roller-coaster regulatory ride its investors had been taken on, it is hardly surprising that they did.

NEMMCO. The Minority, the technical member of the NET panel (and the author of this review), found that the test applied by NEMMCO, despite having been conducted in public over several years, was not only economically meaningless but that it was systematically biased towards gold plating and so contrary to the regulatory intent. The Minority decided that SNI had not passed the RT. Murraylink appealed against the Majority decision to the Victorian Supreme Court (VSC), where Nettle J decided in its favour in July 2003.

All of the criticisms made and implied in the Minority decision of the form of the RT as a cost benefit analysis were subsequently brought to the notice of ACCC and were taken up by them during a public consultation process. The ACCC had been reviewing the RT again and appropriate amendments addressing those criticisms were drafted. The new RT incorporating those amendments was issued in August 2004.

Although Transgrid had before it an expert view demonstrating that the test applied to SNI was economically meaningless and biased towards gold plating, it nevertheless apparently without review of the Minority decision, proceeded to defend its project in the VSC appeal, and was supported by the Ministers of Energy of NSW and South Australia.

For its part, NEMMCO carried on its website a news item of the Majority opinion, but was silent on the Minority opinion and, later, the VSC decision. A Minister tried to prevent a University seminar being given on the subject of the SNI decision.

### **3.6. Productivity Commission Review of the National Access Regime**

This Report, completed in 2002, makes recommendations for proposed changes to the national access regime within the National Competition Policy package for ‘essential’ infrastructure services, noted above, under which ‘...businesses can seek access to these services on reasonable terms and conditions in cases where replicating the infrastructure concerned would not be economically feasible’.<sup>17</sup> Provisions relating to such regimes are set out in Part IIIA of the TPA. The Code contains an access regime for electricity, one of many accepted for various industries. These recommendations may have significant impact on the NEM and, therefore, on the EMRP.

#### **3.6.1. New measures to facilitate efficient investment**

Careful consideration will be required, therefore, of the significance for electricity of all of the Review’s recommendations: they would involve substantial changes to various areas in the whole national access regime. However, the discussion here is concerned only with particular aspects of proposals applying to the ‘introduction of new measures to facilitate efficient investment’<sup>18</sup> as they might concern the electricity industry. These deal with possible risks to and constraints upon the calling forth of private investment for essential infrastructure and ‘...to ensure that new infrastructure investments are not

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<sup>17</sup> Productivity Commission (2002) *Review of the National Access Regime*, xiii.

<sup>18</sup> *Ibid*, xxv

deterred by exposure to access regulation'.<sup>19</sup> The investments generally relevant here, as discussed by the PC, are those on the supply side, particularly in generators and networks. Electricity, however, provides a great opportunity for better efficiency, resource economy and enhanced environmental outcomes from the inherent possibilities for investment and other measures on the demand side. These are generally referred to as demand management (DM) and energy efficiency (EE), which replace supply side increments. These either reduce or shift levels of demand.

In the present state of the NEM, scarcity of capacity generally arises from the decision to cater for peak demands by using the most expensively priced plant. The peak demand could, of course, be managed by reducing it.

There are two basic kinds of peak periods: those occurring each day, for example, in the early evening, the diurnal, and those occurring each year, or over several years, the secular, which signal the amount of reserve margin remaining in the system. In the two largest regional markets, NSW and Victoria, the secular peak demand now occurs in summer, largely as a result of the spread of air conditioners (This has also been the case in South Australia for some time, and is becoming so in Queensland). The failure to mobilize DM or EE to compete with generator supply has greatly exacerbated the situation.

The decision to call forth investment or other measures to keep the system in balance during peak periods is an area of much recent debate, as the 'supply overhang' arising from the excessive investment of the 70s and 80s, especially in NSW and Victoria, comes to an end. As a result, questions of the dynamic efficiency of the market have arisen. DM and EE measures may require relatively small amounts of capital investment, and some require none at all, but are sometimes more, and often very much more, efficient than supply side investments. Many studies have found that the potential for DM/EE has not been attained because of institutional and regulatory structures, constraints arising from and within the supply side industry and regulation, lack of research, ineffective policies and chronic inaction.<sup>20</sup> As noted earlier, while many invocations for the development of DM and EE have been issued by governments and regulators, little has been achieved in the years of NEM development. This is discussed further below.

### **3.7. AGL v ACCC and other recent cases**

An important development in the history of the NEM and other areas of competition reform has been the legal testing of various parts of Competition Law. Most of this has been in industries other than the electricity sector, notably gas, which are affected by the TPA. It is notable that no appeal has *yet* been made against the regulatory framework as

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<sup>19</sup> Ibid, xxviii

<sup>20</sup> For example, Charles River Associates, *Electricity Demand Side Management Study: Review of Issues and Options for Government*, September 2001; Independent Pricing and Regulatory Tribunal, *Final Report from the IPART Inquiry into the Role of Demand Management and Other Options in the Provision of Energy Services*, October 2002; NextEnergy, *Demand Management and the National Electricity Market*, February 2003.



a whole. As mentioned earlier, an important case decided in late 2003 dealt directly with the electricity industry and concerned an appeal to the Federal Court against the rejection by ACCC of a proposal by AGL to purchase part of Loy Yang power station.<sup>21</sup>

This case covered various aspects of the effects of the law on market competition, market power and exclusive dealings. For this discussion, the broad pertinence of the decision by Justice French is:

- firstly, that assessment of the existence of competition or of market power in the electricity markets is to be made on the basis of actual conditions and behaviour in the existing markets in the specific case before the Court, rather than by reference to economic theory;
- secondly, he defined the relevant national market as *one* market comprising *both* the physical market, overseen by the NEM institutions, *and* the hedge market used to manage financial risk in the NEM, overseen by the national finance industry institutions.

Aspects of this decision are discussed below. Other relevant legal cases are listed in Appendix 1.

### **3.8. New ACCC regulatory test and implications for economic basis of ACCC approach**

The new RT is explicitly a CBA. CBA was developed primarily for application to market failure in situations of government monopoly where, in general, markets were deficient or absent. It has subsequently been satisfactorily applied to other evaluations, for example, of specific policy regimes. The theory assumes satisfaction of the conditions of perfect competition in general or partial equilibrium. The new Test clarifies the status and intent of the RT as an investment test and the appropriate criteria for CBA. However, it makes no reference to the doubts as to whether cost-benefit analysis, devised for static monopoly market failure, should be applied to the highly dynamic electricity markets. This basic issue was raised in the Minority Decision on Murraylink, and in submissions to the RT review process. Be that as it may, in the meantime CBA, properly conducted, provides a pragmatic way to test regulated augmentations. It should be noted, however, that the ACCC specifically delimits its application to partial, not general, equilibrium. How energy-relevant policies developed for other industries and markets as planned by the EMRP are to be integrated with that position is quite unclear.

In addition, it is unclear whether, and if so to what extent, defective algorithms similar to the one used in the SNI case, meaningless in economic terms, and, on their face, encouraging ‘gold plating’, have been used to assess the many other Transmission and Distribution augmentations which have already occurred. This should be explicitly reviewed by ACCC and the results published.

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<sup>21</sup> See note 1 above.

### **3.9. PC Gas Access Review**

Published in June 2004, the report of this Review contains an extensive discussion of the regulatory assessment of competition and of the principles of pricing for the natural monopoly, network industry of gas transportation. This was significantly influenced by submissions made on its Draft Report which traversed numerous aspects of the issues raised by the legal cases cited earlier in this review. The PC gas report also canvasses a considerable number of issues which relate to the electricity industry. These include:

- Whether there is a place for an access regime
- Conditions of competition and access
- The type of economic regulation
- The presence of conflicting objectives
- The plethora of regulatory bodies, a gross problem (not, as we have seen, effectively addressed by the present EMRP proposals for a single national regulator, desirable though that result might be if feasibly and properly formed)

A key issue not addressed in the Gas Review, but raised in the EMRP consultation paper on Distribution and Retail, is that of the increasing convergence of the gas and electricity industries.

These are all very weighty issues, and it would be very desirable for the PC<sup>22</sup> or other appropriate, well-resourced body to be commissioned to complete as soon as possible a full review of the NEM and the electricity access regime, and of options for its development. This should include the issue of electricity/gas convergence. THE EMRP process should be suspended until it is completed.

The MCE would then have at its disposal the authoritative results of a formal, well-conducted public enquiry before finalizing decisions which, partly for reasons discussed in section 5 below, will otherwise prove piecemeal, defective, counterproductive and difficult, if not impossible, to correct.

### **3.10. The Parer Report**

In June 2001 COAG established a review of energy market directions, chaired by a former minister in the Coalition government, which presented its final report in December 2002. It is known as the Parer Report. This review covered a wide range of topics across the energy markets. It was heavily criticised by environmental groups and

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<sup>22</sup> In environmentalist circles the PC is rather a *bête noire* because, it is said, of its emphatically and simplistically pro-market ideology and neglect of ecologically sustainable development (ESD) issues. In recent times, though, it has shown itself more attentive to these considerations. It is probably the only existing public body with the resources of expertise and experience to handle such a task. It also has a longstanding practice of including upon the enquiry panel one or more external specialists external in the area of investigation. In this case, undoubtedly the areas needing such expertise are the grave, economic-environmental defects of the energy markets.

others for its proposals on renewable and other energy sources. It was not deeply researched, and reference to overseas experience was almost entirely limited to Anglophone systems, gained from some overseas visits during the review. However, there were some useful proposals made, though here it is only possible to deal briefly with some of the more important aspects of its recommendations affecting the NEM:

- ***Establishment of a single national regulator***

Such proposals had been raised for discussion several years previously. There has been wide acceptance inside and outside the industry that the heavily fragmented regulatory landscape needed better focus and institutional concentration at a national level. The Parer review was thus on popular ground in making this recommendation but gave little attention to how it might be implemented. Constitutional difficulties regarding this are discussed in section 5.

- ***Price caps not revenue caps***

As discussed in section 4, price caps provide a direct incentive for networks to enlarge their revenues and profits by promoting increased energy use, in direct opposition to economic and environmental policies on efficient resource use and environmental degradation.

- ***Full retail contestability and removal of retail price caps***

This proposal overlooked the way the retail markets work in conjunction with the hedge market and the deep problems in managing financial risk that its implementation would produce.

There were four other recommendations of particular importance and likely benefit to the NEM as a whole and to promoting greater efficiency and lower costs in network operation, in particular:

- 1. Market power and constraints***

The review criticised the pricing behaviour of NSW generators in mid 2002 which resulted in revenue gains of some \$300million and the operation of two retailer risk controlling schemes, the ETEF and BPA arrangements by the NSW and Queensland governments.

- 2. Network planning function for NEMMCO***

This recommendation was widely seen as a positive move towards better strategic development of the transmission grids and the management of important augmentations. Again, the intricacies of how the goal might be achieved, however,

were not examined in detail. It is to be noted that the review did not recommend the abandonment of NECA/ACCC merchant transmission initiatives.

### ***3. Penalties and bonuses for networks to meet defined service standards***

This recommendation was presumably designed to counter the policy conflict just noted.

### ***4. Firm financial transmission rights (FTRs) for inter-regional trading***

Financial transmission rights are designed to manage the inter-regional trading risk, and to enhance both the security and efficiency of network operation. They represent a development somewhat similar to the way merchant transmission links operate. It was also proposed that FTRs could operate as the trigger for new network investment.

The response of the MCE to these last key recommendations is instructive: little progress has been made.

#### ***1. Market power and constraints***

No action reported

#### ***2. Network planning function for NEMMCO***

A seven page *outline* of the possible requirements for the Annual National Transmission Statement (ANTS), and a one page outline of an Annual Planning Report were produced in October 2004. The major decision of virtually removing opportunities for further merchant transmission was taken, as discussed in section 5, in December 2003.

### ***3. Penalties and bonuses for networks to meet defined service standards***

No action reported

### ***4. Firm financial transmission rights (FTRs) for inter-regional trading***

In March 2004 there was a forum at which presentations were made by NEMMCO and by industry bodies. These contained various criticisms of NEMMCO's approach. In October the consultant studying regional boundary and congestion issues *since 2001* presented a further report with detailed analyses of the complex issues and options for resolution.

In fact, much of substance in the Parer Report has been sidelined or bypassed by the EMRP. Indeed, the Report has disappeared from the website.

### 3.11. The NSW Energy Directions Green Paper December 2004

It is convenient to notice here this document which was published when this review was almost complete. This is not the place to examine it in detail - it has its own consultation purposes and program, but some comments are relevant.

The Energy Directions Green Paper purports to be an options paper. It is nothing of the sort. It might perhaps be called a discussion paper, though a very partial one. It is garbed with a pretended objectivity, ranges widely over highly selective descriptions of the many issues the Government now has to confront. This will provide an excuse of consultation at some future time if the Government makes unpopular decisions. Overall, it is a tissue of contrivance and artifice.

In its treatment of supply/demand and the relation of NSW to the NEM it bravely tries to have a bob each way: it both mentions the NEM and its trans-jurisdictional arrangements, and also insinuates that NSW still retains full energy sovereignty, and that all relevant decisions are firmly in the hands of the Government. (Of course, NSW lost much of its energy sovereignty a decade ago when it signed on to the NEM.) We are not far here from, as one observer has put it in relation to some present attitudes in the area of Cooperative Federalism, 'the narrow gauge track'.

The Paper tries strongly to project the impression that the Government has been ahead of the jurisdictional pack - which, for example, it commendably has been in some aspects of Green Power; and that it is confronting the issues in good time and an ordered way. In fact, NSW governments have had the same issues before them since at least 1991, and the present Government for about ten years, and it is moving now because time is running out.

There is, unsurprisingly perhaps, no mention of:

- the severe rebuff the Government took in 1997 at the Labor Party Conference over the Premier's and his then Energy Minister's active privatisation proposals and the subsequent disappearance of all references to privatisation from NSW political debate when the Opposition was roundly rejected on the issue by the electorate in 1999;
- the failure to explore *in depth* the anomalies and other issues resulting from major public investment in a mixed ownership, decentralised market and how to deal with them;
- the implications for the NEM and NSW (including the uncertainties of its electricity sector investment climate which has been extensively discussed) of the operations of the Electricity Trading Equalisation Fund (ETEF) criticized by the 2002 Parer review - see later discussion;

- the demonstrations in mid 2002, also criticized by the Parer review, of market power by the State-owned portfolio generators; nor
- the fact that the Green Paper's 'options' for new generation capacity would constitute a 'capacity market' *outside* the NEM design of an 'energy-only market', with deep and unexplored effects upon that nationally agreed and mandated electricity pool.

The Green Paper is not, however, entirely without good things; there are several ways in which energy policy in NSW is in advance of that in some other jurisdictions and it is right and proper for these, and current moves to enhance them, to be celebrated, as they certainly are in this document.

But the most valuable, and very refreshing, part of the Paper is the frank and informative discussion, after a good deal of earlier twisting and turning, of the pressing need now to bring externalities into the NEM pricing system. It is a task easier said than done; it has been present from the day the NGMC design was made; but only now, in fading light rather late in the day, does the NSW Government, its jurisdictional partners, and much of the industry fall over the rock at their feet.

**The matters discussed in section 3 are identified as issues for clarification and appropriate investigation and action.**

## 4. Economic characterization of the structure of the existing electricity markets

The electricity markets are technically, economically and financially complex. They can be outlined, however, using some basic economic ideas.

However, a most important *caveat*, already mentioned, has to be borne in mind in any discussion of the economics of electricity, namely, that in both the previous state owned and directed system, and in the present situation of the market operation, prices *do not* include externalities, in particular, those affecting the environment. This is so both in regard to global impacts such as greenhouse emissions, and to local impacts, such as water usage, tailing dams, temperature effects on lakes and oceans, and the opportunity costs of land used for power stations, mines and other facilities.

### 4.1. Electricity: an unusual good

Electricity is a producer, not a final, or consumer good. That is, the demand for it is derived from the demands for the goods and services it makes possible. Effectively, in the context of a power system, it cannot be stored.<sup>23</sup> As a result, pool prices can be very volatile at times of low reserves, for example, at peak periods, or when generators go off line, or transmission lines fail.<sup>24</sup> In commerce and industry, apart from a few energy intensive industries which generally account for a small proportion of total energy usage, electricity forms a small proportion of total product costs, perhaps about 3-5%, or less, under prevailing prices. For households, the cost of electricity has been a politically sensitive topic.

Because of the small proportion of electricity costs in industrial and household budgets, demand for it has generally had a low price elasticity of demand. Of course, even though the relative cost is small, demand could be expected to be price-elastic if opportunity and price signals existed for consumer decision. For most consumers, this is not the case, though we are told that some NSW retailers plan to introduce them in a year or so. We have heard, unfortunately, such promising talk before.

Prior to the NEM, prices for households were set by governments entirely through regulated tariffs, and kept rather low compared with imputed costs. Typically, households

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<sup>23</sup> Except for pumped storage systems. These have some significance in certain parts of the Australian system but do not provide much of energy production. There is active research overseas to address the issue of storage. The Japanese, especially, are making large advances in the development of super-capacitors. The ability to store economically even modest amounts of energy would quickly lead to the reorganization of the operation and economics of the power system and its markets.

<sup>24</sup> See, for example, NEMMCO (May 2004): *NEM Market Outcomes-9: March 2004*. On Tuesday 9 March the pool price in NSW rose from about \$68 to \$9700 between 11am and 3.30pm as a result of extreme demands in NSW and Queensland associated with unseasonably hot weather and the consequent use of air conditioners, outages of key NSW generators and a planned transmission outage. Within that period, the price went from about \$408 to \$4860 between 12.30pm and 1.30pm. Later in the day, the price fell from \$9083 to \$116 in the half hour from 5.00pm to 5.30pm.

were preferentially treated compared with businesses, an allocation which has been changed in the NEM. For low income households, various concessions and other social equity provisions applied.

As noted earlier, the guiding vision of the IC's 1991 report was of an effectively privatised electricity system. In fact, the NEM is of mixed state/private ownership, with a preponderance of the state, which can be summarised as follows:

- **Victoria:** All privatised except Vencorp which retains Transmission (TNSP) planning powers.
- **NSW:** Primarily state owned and corporatised, except for AGL Retail, and some small scale Independent Power Plants (IPPs) under long term contract to government owned retailers.
- **Queensland:** Primarily state owned and corporatised, except for a number of generating stations privately owned or with part government/part private equity. One small scale private merchant interconnector (MNSP) between NSW and Queensland, now applying for regulated status.
- **South Australia:** All effectively privatised (through long term lease) and new private generating stations. One small scale private MNSP between Victoria and South Australia, now granted regulated status.
- **Tasmania:** All state owned and corporatised except for private involvement in thermal power station converted from oil to gas firing, and the Basslink interconnector, both of which will operate under long term contract to government corporations.
- **ACT:** All state owned and corporatised.
- **Northern Territory:** All state owned and corporatised.
- **West Australia:** All state owned and corporatised with the exception of some small private generators supplying and/or selling to industrial loads.

(NB: the last two jurisdictions are not members of the NEM).

We can now glance at the central process of competition in the NEM; but, before proceeding, it is important for the reader to have some familiarity with the categories of Code and Market Participants. These are set out in Appendix 2.



#### 4.1.1. The spot market: a uniform price auction

The arena of competition between Market Generators and Retailers/Market Customers is the pool. It is a very unusual and problematic form of competition. Here, in an electronic process closely supervised second by second by NEMMCO using computer-based mathematical formulations, Generators *offer* prices at which they will supply electricity in specific quantities and at specific times. Retailers and other Market Customers<sup>25</sup> *bid* demands (loads) also specified in terms of quantity of energy and for specific times. These offers are then aggregated by NEMMCO and matched against the generator bids. NEMMCO then dispatches the offered generation in its merit order, according to the lowest prices bid. This process is also constrained by the five NEM regions, the flows between them, and other system security considerations. Effectively though, the demands offered into the pool are *simply the sums of the demands of households and businesses at the specific times passed on directly by Retailers according to more or less fixed tariffs and transported through the regulated transmission/distribution networks*. At this level the role of allocation by price competition on the demand side is very small, or zero, for most groups. As Justice French has noted (see 4.4), there is also a key question as to whether the electricity ‘sold’ by Retailers can be regarded in any real economic sense as their ‘property’.

Price variation is an especially important characteristic of electricity markets, as we have seen earlier, and there are two ways of viewing such variation: the *diurnal* and the *secular*. The diurnal or short term, in this case daily, analysis shows, in one form, the *exact trace* of pool price including all the variations. The diurnal picture can also be displayed using price *averages*: this picture generally closely follows the daily *load curve*, the name given to the curve showing the ongoing balance between physical system demand (load) and system supply (energy generation). They both typically start from low levels in the early hours of the morning, when base load plant, generally coal, is running. Throughout the later morning and early afternoon, the intermediate period, plant with higher marginal costs, of whatever kind, is added. By middle afternoon or evening the peak period occurs. The highest price levels depend largely on weather and season - from air-conditioning loads in summer or heating loads in winter. At this time more expensive plant may be bid in, unless the possibility of higher prices provides sufficient incentive for lower cost plant to be bid into the market. Viewed over a period of a year or years, the secular analysis shows changes occurring across the year, or trends of change over several years if they exist. In both diurnal and secular analyses, we can talk about price change and therefore price elasticity, even though, in general, electricity demand has been inelastic.<sup>26</sup>

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<sup>25</sup> Though, as to the size of load, those of the former are generally much larger than those of the latter.

<sup>26</sup> For demand to become price elastic, important changes will be required in household behaviour, industrial processes and other technologies. Many of these are available but are not used in this country.

#### 4.1.2. Retail tariffs under the NEM

Since the introduction of the NEM and pool auction and price competition within it, there has been ‘deregulation’ of the retail markets, including what is called ‘full retail competition’ (FRC). Nevertheless, in at least the jurisdictions accounting for the great bulk of usage - NSW and Victoria which consume about 70% of total energy produced - it appears that the majority of households remain on set tariffs decided by jurisdictional regulators. A minority have switched to negotiated individual contracts. These contracts, however, apparently remain close in structure to the regulated tariffs and perhaps one or two percent lower in price.<sup>27</sup>

In effect, since there are very few time-of-use (TOU) tariffs, this discount is largely in consideration of the household entering into long term contracts, thereby reducing marketing, accounting and other costs for the Retailer. The lower prices have little to do with price competition in the wholesale market.

Many small businesses remain on the set tariffs. Most medium to large size businesses are now on negotiated contracts, though it appears that these also remain close in structure to the regulated tariffs. In fact, apart from some large customers, accounting for a small proportion of total energy use, the new ‘competitive’ contracts are not responsive to time-of-use, and have set prices for specific levels of usage. Thus, the efficiencies which could arise from flexible pricing are lost. Apparently, as noted above, these reductions are typically in respect of savings in Retailer costs, not the supply price. That is, competition has primarily occurred in the *sales function* of the sector.<sup>28</sup>

In the final price charged to end users, it appears that the average wholesale energy price is about 40-50% of that price, with the regulated network tariffs and the retailing costs accounting for about 50-60% of the total. (Distribution costs make up about 85 % of the network costs).<sup>29</sup> Thus, the effects on demand of changes in wholesale energy price alone would be heavily dampened, even in a truly competitive retail pricing situation, which the nem does not provide.

Certainly, under present arrangements, demand is still price-inelastic for households, and even for businesses in the contestable retail markets since, generally, they have little incentive to adjust usage according to price. In practice, end-users are shielded from sharp moves in the pool price or even from the daily and seasonally repeated peak and off-peak price patterns, discussed below. This arises from the ‘smearing’ that occurs of fixed costs and varying usage costs into prices, and by the absence of TOU or locational pricing.

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<sup>27</sup> See, for example, PriceWaterhouseCoopers (May 2004): *Information on Negotiated Contracts offered to Small Electricity and Gas Customers in NSW*: Report to the Independent Pricing and Regulatory Tribunal.

<sup>28</sup> The situation might be compared with the competition in the sales functions provided by motor car dealers, or real estate agents.

<sup>29</sup> These industry estimates are made in the NSW context. There are likely to be variations elsewhere, but the broad picture would be similar.

However, the Retailers and Market Customers have to buy in the pool and so have to manage the very large price spikes which we have noticed. The function of the derivative financial markets, the hedge contracts markets, is thus to allow sellers and buyers to enter into bilateral contracts which hedge the prices they have to pay within close limits to minimize financial risk. This makes the electricity markets *financially feasible*, and so is a necessary part of the whole regime. The costs of this risk management are passed on to the end-user through periodic reassessments of Retailer costs for the purposes of jurisdictional tariff regulation.

In talking about energy management it is important to be clear here. The use of measures such as DM and EE for energy management can mobilize sensitivity to price on the part of customers and produce responsiveness of demand to *average* pool prices as they vary during the day or the season. Variations of this type, however, are rarely more than a few fold, and even these are large by comparison with those of other commodity markets. TOU tariffs, which could produce significant resource and environmental savings, scarcely exist in Australia, despite much talk.

But, with current distribution supply technology used in Australia, the variations arising from price spikes cannot generally be managed to a significant degree by these TOU tariffs except for specific classes of load like interruptible aluminium processing. Because of this, hedge contracts, as we have seen, are necessary. That is, even if DM and EE were introduced on a substantial scale, hedging by Retailers and Generators, and its costs of operation, would still be necessary, unless there were to be substantial changes to the functionality of the Australian system.<sup>30</sup>

#### **4.2. Justice French’s analysis of the market (1): the artificiality of retailer ‘ownership’**

It is useful here to quote from the description of the electricity markets in Justice French’s decision in the important case noted in Appendix 1<sup>31</sup>. His comments are important partly because they are the first instance in Australian law of a definition of the nature and extent of the electricity markets. But in making legal distinctions, he has also pointed to *economic* characteristics of the market which have been little recognized and debated as such in the industry.

In the quotation following, he describes some of the unusual aspects of the functions of the distributors and retailers in electricity and how they differ from transporters and sellers in most other markets:

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<sup>30</sup> This is not a hypothetical situation. A number of electric utilities in the US (Utah Power for example) are able to offer customers automatic, remotely activated, “interruption services” for particular types of load because they have invested in suitable supply technology. In addition, the Italian electricity distributor, *ENEL Distribuzione*, is rolling-out a sophisticated two-way communications and metering technology that has the potential for near “real-time” load control capability (and much more). I am indebted to Jeff Washusen for contributions here.

<sup>31</sup> *AGL v ACCC* (No3) FCA 1525 2003-04 19 December

'The operators of generators are commonly regarded as the 'wholesalers' of electricity. Although properly an incident of the wholesale function, the transmission of electricity from generators in Australia is effected, for the most part, through transmission networks which are separately owned and which may include inter-connectors to link one region to another. Electricity is sent from the transmission networks into distribution networks for 'retail' delivery to consumers. Distribution and retail sales may be carried on by the same or distinct operators. *Importantly the so-called wholesale and retail functions are not reflective of physical delivery of energy from generators to retailers and from retailers to consumers. There can be no storage of electrical energy by retailers for distribution to end users. The electrical energy from the generator flows directly to the customer whether or not a retailer is involved. The designations 'wholesale' and 'retail' for the purposes of market analysis are best attributed to the financial arrangements and transactions between generators, retailers and end-users.*'<sup>32</sup>

Further:

'There is a degree of artificiality in my opinion in defining the relevant markets as though electricity *were a product sold by wholesalers to retailers and on-sold by retailers to end users...*The words 'purchase' or 'sell' in the Code and the Act will no doubt take their meaning from the kinds of transactions which are commonly so described in the operation of the NEM. *They do not mean that in any intelligible sense the retailer acquires ownership of electricity as one would own a piece of personal property.*'<sup>33</sup>

French J, by distinguishing the economic functions of participants, has here identified characteristics of great relevance to the electricity market. For the most part, Retailers are simply conduits for pre-existing demands from end-users and to this extent function without price competition. Even if there were wider price competition it would be because of end-users modifying their demands, for example, through accepting TOU incentives, using improved demand control technology, etc, rather than by competition among Retailers themselves.

Further aspects of French J's discussion are returned to below.

### **4.3. Retail and financial market arrangements**

There are several layers of retail and financial markets.

#### **4.3.1. Retailers and jurisdictional regulation**

Retailers within jurisdictions may be independent private businesses acting solely as retailers. They also may be private businesses registered as Distributors within jurisdictions and/or as a category of Generator. Retailers can also be government or private entities which are bundled or unbundled. If a Retailer owns a generating plant it

<sup>32</sup> Ibid,18, paragraph 17. Italics added.

<sup>33</sup> Ibid, 114, paragraphs 381-2. Italics added.

may also be registered as a category of Generator. Though corporatised, unbundled, government-owned or privately-owned entities are thus supposed to act like private firms, speculation recurs from time to time as to whether political interference plays a role. Both Retailers and Distributors are subject to jurisdictional regulation in addition to NEM regulation.

Under jurisdictional regulation, there is typically control by a Jurisdictional Regulator of at least some aspects of tariffs, standards of service, information requirements, etc, and of matters relating to equity and environment. These requirements arise from the policies defined by the individual jurisdictions. Thus, for example, tariffs may be required to have special provisions for low-income groups or pensioners, and there may be requirements concerning 'Green Power' or DM investigations and reporting. These are noted only as categories here and are treated in more detail below.

#### **4.3.2. The hedge contracts market**

In addition to these arrangements, which are often referred to as the 'physical' markets, there are also, as we have seen, financial transactions, generally within regions/jurisdictions, which do not involve the physical delivery of electricity, and which together comprise the hedge contracts market, or financial derivatives market.

Without the facility which the hedge market provides of managing the risk of massive price changes in very short time periods at any moment of system operation the NEM could not exist as a financial arrangement for decentralized decision-making. Some hedge contracts are simply negotiated bilaterally between Market Participants, but a substantial number of financial intermediaries - brokers, bankers, financial services firms, futures exchanges-also operate in this market negotiating contracts for Market Participants, but the number is not known. Indeed, little is publicly known about the hedge market. From time to time there has been speculation as to whether it was sufficiently liquid ie, had enough funds available to finance the volume of contracts sought by Participants to cover risk. If a failure occurred in these conditions the results could be disastrous. As noted above, this key dimension of the market was overlooked in the IC Report of 1991.

#### **4.4. Market power**

Degrees of market power occur in the 'wholesale' market, the NEM, but it is widely accepted among regulators and industry as operating 'competitively'. Market Generators though, have been especially regarded as having market power, actually or potentially, because of their ability to change output relatively quickly, and to bid so as to capture the financial gain from price spikes, although this gain only arises from uncontracted energy. Market Customers have not yet come under much notice in this regard, though this might change if one or more gains sufficiently high levels of NEM purchases.

For economic regulation, the basic question to be resolved is not necessarily whether market power exists but whether it can be exercised to the detriment of the market.

Particular opportunities for the exercise of market power have been regarded as existing at times of ‘constraint’- ie, when the interconnectors between regions are congested, either partially or fully (‘binding constraint’), or at times of high pool price volatility. These situations arise, typically but not necessarily, under peak conditions, either from high demand when optimum interconnect and other grid capacity is available and demand exceeds that capacity, or when other parts of the networks are congested or separated out, or when interconnect and/or related network capacity have been reduced because of temperature, other physical causes or equipment failures. These could be very suitable conditions for DM and EE to be mobilized, but, instead, market failure and the present regulatory arrangements only result in more electricity generation.

Although all the jurisdictional grids are linked together to form the NEMMCO-controlled NEM power system it has often been suggested that the NEM is not yet a truly competitive national market and that the regional markets are rather separate though linked markets in which the exercise of market power is possible. Graphs showing considerable price variations among regions, which largely coincide with State boundaries, are often used to demonstrate this point.<sup>34</sup>

#### **4.5. Justice French’s analysis of the market (2): definitions of the market and the existence or otherwise of market power**

French J’s decision went on to discuss the question of competition and market power in the NEM in a way which draws out some of the economic realities.

The AGL v ACCC case arose from the apprehension of the ACCC that AGL’s proposed purchase of some Loy Yang generation assets would be likely to allow it to exercise market power in the Victorian market. In assessing the evidence before him Justice French made pertinent comments on the operation of the electricity markets. Firstly:

‘Competition in a market is not assessed by a snapshot view of participant behaviour at a particular time. The theatre of competition is a theatre of real actors and shadow actors. The shadows are cast by the potential of new entry. The competitive process is informed by the rivalry of the participants and the potential rivalry of potential participants. Competition so understood is conceptually distinct from the idea of the market and the elements of market structure which may constrain or facilitate it. Those structural elements are referred to, *inter alia*, in the factors set out in s50(3) of the Act’.<sup>35</sup>

From this basis he proceeded to relate the interpretation of the Act to the ‘theatre of competition’ as it had been described in the evidence before him. A first step here was to define the market. Quoting his earlier judgment in another case<sup>36</sup> he said:

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<sup>34</sup> See, for example, slide 16 in the TEC/ATA second submission.

<sup>35</sup> Ibid, 350. See Appendix 4

<sup>36</sup> Singapore Airlines v Taprobane Tours WA Pty Ltd (1991) 33 FCR 158 at 178.

‘It is a focusing process and the court must select what emerges as the clearest picture of the relevant competitive process in the light of commercial reality and the purposes of law. There is a feedback between any proposed market and the structure and power distribution which that proposal throws up.’<sup>37</sup>

He then went on to define the market, repeating his earlier comments to the effect that ‘...electricity delivered into the common transmission system has the character of a fluid joining a common stream. Once within the transmission system it cannot be subdivided by reference to its origins. The generators and retailers operate in a kind of ‘virtual reality’ of sale and purchase...There is also a degree of unreality involved in separating out and identifying separate markets for the sale of electricity and the provision of derivative contracts...’<sup>38</sup>

He came to the following conclusions:

#### **4.5.1. On the definition of the market and market power**

‘In my opinion ...having regard to the structure of the market and the extent to which its major participants operate across regional boundaries, I am satisfied that there is one NEM-wide geographic market for the supply of electricity, and associated with that, entry into electricity derivative contracts.’<sup>39</sup>

Thus, he seemed to accept that market power could be exercised only transiently and, in those conditions, was not detrimental to the market. It is to be noted though, that he made the following qualification: ‘...where interconnector constraints are not applicable the availability of electricity to be dispatched from one region into another has the potential to limit the ability of generators in one region to materially increase prices above those in another region.’<sup>40</sup> This seems to say that he accepted that when constraints do apply generators might have the ability to increase prices in their own region in a way that would demonstrate the exercise of market power to the detriment of the market.

#### **4.5.2. On barriers to entry**

‘In my opinion, having regard to the above matters and the response of potential new entrants to price signals in the summer of 2000/2001, it cannot be said that barriers to entry into the NEM - wide wholesale market are such as significantly support or contribute to market power on the part of any of the market participants.’<sup>41</sup>

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<sup>37</sup> Op cit, 377.

<sup>38</sup> Ibid, 382

<sup>39</sup> Ibid, 387.

<sup>40</sup> Ibid, 59, 189.

<sup>41</sup> Ibid, 391.

### 4.5.3. Comment

French J's definition at 4.5.1. is especially important for this review, since it describes the whole market, comprising *both* physical *and* financial markets, as the arena in which any public benefit is to be assessed, and is discussed further below. It is to be noted, though, that the analysis did not extend to the characteristics of the exchange between Retailers and Customers.

### 4.5.4. Other evidence on market power

In regard to French J's conclusion at 4.5.2 on market power, it is a matter for speculation whether there would have been the same finding if evidence of other events in the history of the NEM had been put at the Court's disposal which it apparently wasn't. There is a question here as to whether the ACCC did not wish to embarrass jurisdictions.

An especially notable example, criticized in detail by the 2002 Parer Review, concerns bidding behaviour by NSW generators in relation to the Electricity Tariff Equalisation Fund (ETEF) in 2001-03 and, in particular, between May and June of 2002<sup>42</sup>. In circumstances which are described in more detail at Appendix 5, the NSW government-owned generators bid in ways which resulted in about \$300 million being paid out from a fund set up within the NSW Treasury to protect retailers against the financial risks arising from pool price volatility in respect of their regulated loads.

The 2002 Parer review commented that the NSW generators had departed from their typical offer strategies and expressed strong concern at the behaviour and price events, and at the issues thereby raised for investors wishing to enter the NSW market.<sup>43</sup>

A point here, on which the learned judge's opinion would be valuable, is that the exercise of market power even over a limited period, that is, transiently, can produce large profits, and materially affect annual average pool prices and forward contract strike prices.

### 4.5.5. The market economically defined

It follows from the above, and leaving aside the question of market power, that Justice French has defined for legal purposes<sup>44</sup> the market in a way that for this writer appears to capture basic economic elements of the situation. What both the NEM and the nem consist of is a single market formed by the integration of two separate but linked market

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<sup>42</sup> Gavan McDonell (2004): *NSW Government Ownership in a Mandatory Pool: 'Neither Fish nor Fowl nor ...'* in Graeme Hodge et al: *Power Progress: An Audit of Australia's Electricity Reform Experiment*, Australian Scholarly Publishing, Melbourne. The May-June episode does not seem to have attracted any official regulatory notice or analysis, nor has the impact of the NSW ETEF scheme upon the workings of the national market.

<sup>43</sup> See note 2.

<sup>44</sup> The legal term 'ownership' is defined in terms of exclusive possession, while 'property' is said to have a number of standard incidents, eg, right of personal use and enjoyment, to manage use by others, to income arising from, etc. See, eg, Kevin Gray(1991): Property in Thin Air, *Cambridge Legal Journal*, 50 (2), 252-307. I am indebted to a comment here by Andrew Martin.



processes, physical and financial. This market might, and sometimes does, separate into disconnected regional markets. The differences between them, as explained in the Glossary, is that, as to size, the NEM consists of about 100 trading entities, while the members of the nem number many thousands; and, as to economic function, the end-users of the nem are passive consumers, very largely sealed from price competition and from price risk.

#### **4.5.6. The physical segment**

The first process of the two processes we may *conceptually* define is the physical segment centred on the uniform price auction of the pool. This *spans from Generators to end-users*: in broad terms, Generators ‘sell’ to Customers (mainly Retailers) and electrical energy is transported between them through the regulated Transmission and Distribution networks. They do not in an economic sense *own* the electricity as a commodity. It is then passed on to end-users at tariffs highly constrained by jurisdictional regulators in a circumscribed, price-inflexible milieu. In the other direction the demands of end-users are passed through to Retailers, DNSPs and TNSPs to the pool to be matched against supply. Supply is instantaneously matched to demand. The requirements of end-users have the basic characteristics of a fixed demand. Retail price competition is almost entirely a matter only of competition in the *sales function*.

#### **4.5.7. The financial segment**

Secondly, there is a financial hedge market spanning from Generators to Customers, again mainly Retailers, but not end-users, in which hedge contracts are traded to manage the risks of price volatility in the physical pool. There is no single way currently available for characterizing and analyzing this market structure in economic terms, nor of assessing how well or otherwise it conforms to some ‘objective’.

#### **4.5.8. The networks**

The transmission and distribution networks comprise about half or more of total investment in the electricity markets. Because of the spread of population and therefore demand, the networks play an unusually large part in the effectiveness and competitiveness of the whole system in Australia. The need for their efficient operation is therefore even greater here than elsewhere. In general, they are made into a regulated market because of the natural monopoly characteristics which they are regarded as having. Thus obtaining greater efficiencies from their investment and operation than is likely to be the case with market monopolies is a principal goal of regulation. The issues involved here are complex and can be glanced at only here. But there are several basic points which are of great concern in the design and operation of the Australian system and are probably made worse under the EMRP proposals. It is convenient to discuss aspects of this here rather than in section 5. Briefly, the principal issues involved are:

- The use of price cap regulation
- The failure to use network policy to promote DM and EE

- The early decision by the MCE to reverse the previous policies of ACCC and NECA on the role and regulation of private investor merchant interconnects and other transmission facilities, known under the Code as MNSPs.

#### 4.5.9. Price cap regulation

In general, the networks (that is, the high voltage transmission networks which account for about 10% of electricity costs, plus the low voltage distribution networks, which account for about 40% of those costs) are monopoly services, and so are subject to regulation to limit the inefficiencies which flow from their market power. In broad terms, regulation works to provide networks with predetermined streams of revenue sufficient to yield to the network owners what the regulator regards as a satisfactory return on assets. Regulation also tries to provide incentives to network owners to introduce economic efficiencies and other appropriate goals of public policy into their operating practices.

There are two basic ways in which economic regulation is used to restrict the profits of market power for network monopolies - by controlling prices, and by controlling revenues, both of which also control profits. Other incentives are used to encourage networks to pursue network and system efficiencies. There has been a very large and controversial debate over many years regarding the methods of economic regulation of natural monopolies.

In Australia, the system generally chosen by the jurisdictional regulators has been based on price caps - the prices charged during a regulatory period must stay within set levels.

One<sup>45</sup> of the most deficient aspects of present price cap regulation is that it *provides incentives to increase the transport of energy through the grid*, since the greater the quantity of energy moved, the greater the revenue and hence the opportunity for profits. That is, *this system of regulation provides direct incentives both to increase industry's economic costs and to encourage greater household demand*. And both of these responses produce greater environmental degradation and more greenhouse emissions.

Clearly, this has major disabling effects upon economic policies seeking to limit inefficient resource use and, especially important here, upon environmental policies aimed to reduce detrimental impacts such as greenhouse emissions. A notorious result of this is the unrestrained promotion of air-conditioning which has been the single greatest force driving the rise in electricity demand and peak levels in recent years. Attention is being given to this by policy makers and regulators-and has been for many years, but little has yet resulted though some jurisdictions have made some advances. The whole issue requires very high priority indeed, on economic, and *therefore* environmental, grounds.

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<sup>45</sup> Apart from the fact that, because various parts of the network in Australia are reviewed by the ACCC and other regulators at different times, consistency of treatment is generally impossible,

The transmission networks are regulated by the ACCC which uses a revenue cap system. However, important inconsistencies among regional grids develop because their reviews are conducted at different times, and also because of specific and inconsistent managerial-type interventions by the regulator.

These systems also provide incentives for network owners to overcapitalise and to gold-plate.

#### **4.5.10. Use of networks to promote DM and EE**

Because networks account for about 50% of electricity costs, and the bulk of those costs are fixed capital costs, numerous benefits follow if network investment can be decreased. As has been pointed out, for example, recently by Dunstan<sup>46</sup>, of the NSW Sustainable Energy Development Authority, an immediate effect of obtaining energy efficiency and of managing demand is to reduce or defer network investment. The attractiveness of this is greatly enhanced in the present situation where peak demand is growing faster than energy sales. Under these conditions the investment in NSW distributors is forecast to double between 2000 and 2009 from about \$500 million per annum to about \$1000 million per annum. These are large sums. There will be associated price rises in distributor prices. There are various feasible strategies to promote DM and EE and so restrain not only peak demand but also network costs, strategies about which much has been heard, but little done by the EMRP.

#### **4.5.11. Other**

**There are other regulatory deficiencies which can only be noted here.**

**Firstly, new remote generators are not charged for network augmentations required for their operation other than the direct connection costs.**

**Secondly, *all* network costs are charged to customers, that is, businesses and households, and *none* are charged to generators.**

#### **4.5.12. The role of MNSPs and their fate**

This cannot, however, be said about another development aimed at network efficiencies and which threatened the Australian regulated networks. As discussed earlier, privately financed interconnectors and other appropriate transmission facilities, known in Australia as MNSPs potentially provide competition to the generally State-owned monopoly utilities. The ACCC and NECA had worked for some years to encourage development of MNSPs precisely for that reason, and the Parer review in 2002 had supported that.

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<sup>46</sup> Chris Dunstan (September 2004): *First, do no harm...Making network regulation work for energy efficiency*. Presentation to Second National Energy Efficiency Conference, Sydney.

In August 2003, after the July VSC decision discussed earlier in which Murraylink won its appeal against the proposed Transgrid SNI regulated interconnect and before an important meeting in December 2003 of the MCE, a consulting firm was commissioned on behalf of the NEM ministers to make regulatory and institutional proposals for transmission.<sup>47</sup> Interviews were conducted on an individual basis with government and industry entities: there was no formal public consultation. The final report was presented in November 2003. Whatever other no doubt useful aspects of this report, compiled on a vastly complex topic in a total of three months, its treatment of the vexed issue of MNSPs was brief, slenderly researched and final. Any advantages previously given to these entities should be removed. Such entities were mainly supported only in the 'academic' literature (which is not the case) and a few only of such documents were cited. Very doubtful arguments as to MNSPs unsuitability in the conditions of Australia's 'less dense' networks were cited. A major initiative was dismissed in a few pages

It is, unfortunately, not possible here to canvass this topic in any detail. It is difficult, though to know how to assign credibility to a report which includes what it regards as an important discussion of the ACCC's Regulatory Test (RT), its application and ways of improving it but which overlooks:

- the formal requirements and implications of a CBA;
- the NET appeal;
- the conclusions of the Majority;
- the critique by the Minority of the meaninglessness of the NEMMCO algorithm and the deficiencies of the RT;
- the VSC decision;

and went on to base its conclusions regarding MNSPs on slender and selective research.

The report was not, apparently, given a formal public airing, and its recommendations in regard to MNSPs were endorsed and adopted at the December 2003 MCE meeting a few weeks after its submission to SCO.

It is hardly surprising that this episode caused dismay and alarm in sections of the industry and cast a cloud of doubt on the validity, justice, reliability and motives of the MCE process.

#### **4.6. Uncharted waters**

It is clear from the discussion above that:

- Electricity prices are not, and cannot be, efficient without the inclusion of the significant externalities attendant upon electricity production.

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<sup>47</sup> Firecone (November 2003): *Regulatory and institutional framework for transmission: Final report.*

- The pool pricing system should be reviewed.
- Where about fifty percent of total investment used is in the regulated networks, electricity prices are not, and cannot be, efficient unless the prices charged for the use of that investment are themselves efficient, or can be regarded as reasonable approximations. This cannot be assumed in the present state of the regulation of the networks.
- The only electricity market structure which can be considered as an economic market entity is that which consists of the ‘physical’ market branch extending from producers through the pool and then via the networks to the end-users taken together with the ‘financial’ market branch extending from the producers to the retailers.
- A competitive market of this kind, in which Retailers pass through to the pool auction demands presented to them by end-users in one direction, and pass back financially hedged supplies into the regulated jurisdictional markets in the other, function very differently from the conventional descriptions of profit maximising entrepreneurs of standard economics upon which arguments for the welfare benefits of the regime are largely based.

Despite some minor elements of competition now present in the end-user markets, there is little evidence of price elastic profit maximizing to be found on the demand side, only on the supply side, in a highly complex, and largely uncharted market environment. How, then, is the fulfillment of policy and market objectives to be assessed, and on what economic principles and computational procedures are the existence or otherwise of public benefits to be determined? A first step would have as a prerequisite the construction of an adequately calibrated econometric model of the actually existing market system described above.

This issue is fundamental and crucial to, but is entirely lacking from, the proposals of the EMRP, and evidence of the murky waters into which it is venturing.

**The matters discussed in section 4 are identified as issues requiring clarification and appropriate investigation and action.**

## 5. Issues arising from changes proposed in the EMRP

Set out in this section are matters arising from proposed changes within the MCE's EMRP as they relate to the industry framework and to issues of distribution and retail which are relevant to outcomes for end users and the community. It is first necessary to examine briefly the framework within which it works.

### 5.1. The Council of Australian Governments (COAG)

The Council of Australian Governments comprising the Heads of all Australian jurisdictional governments, plus the President of the Australian Local Government Association, was established in 1992 as part of the then Labour government's Cooperative Federalism initiative. It has the objective of coordinating and harmonising the policy and regulatory positions and actions based on the often diverse arrangements in specific fields of the various jurisdictions. It meets on an 'as needed' basis and there has been a total of 14 meetings, the most recent one in June 2004. A communiqué is issued after each meeting: the archive is available at [www.coag.gov.au](http://www.coag.gov.au).

In general, though by no means always, COAG meetings deal with issues at a high level, and a system of Ministerial Councils has been established to whom is delegated the carrying forward of much of the coordination and policy action in specific areas. COAG is widely regarded as having performed services of practical and strategic value in improving and making more consistent the frameworks of all the jurisdictions. In a nation with a federal Constitution this is an important consideration, as Justice Starke noted as long ago as 1939:

'Cooperation on the part of the Commonwealth and the States may well achieve objects that neither alone could achieve; that is often the end and the advantage of co-operation'<sup>48</sup>.

It is this advantage which was strongly argued for the Cooperative Federalism project and was widely accepted, and has been strongly argued also for the MCE's EMRP process. In the period from 1987 to 1995 during Sir Anthony Mason's period as Chief Justice, the High Court adopted decisions which showed a willingness to recognize the policy force of law making and constitutional interpretation, but with the advent of five new judges from 1995 a new reception of the issues became evident.<sup>49</sup> The case where this was

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<sup>48</sup> (1939) 61 CLR 735 at 774

<sup>49</sup> For an extended discussion, see, George Williams (2001): *Cooperative Federalism and the revival of the Corporations Law: Wakim and beyond*. Speech to the Law Council of Australia. Published in the Company and Securities Law Journal, Vol20, 160-71; for other recent comment, see, for example, Wayne Goss (2004): *Is cooperative federalism fading?* Business Council of Australia: Governance and Politics: [www.bca.com.au](http://www.bca.com.au).

George Williams is the Anthony Mason Professor of Law at UNSW, a distinguished specialist on Constitutional Law. Wayne Goss, former Premier of Queensland, is a partner in Deloitte, Touche, Tohmatsu.

much in evidence was *Re Wakim: Ex parte McNally*<sup>50</sup>. The general tenor of this new view can perhaps be gained from the remarks of McHugh J:

‘Co-operative federalism is not a constitutional term. It is a political slogan, not a criterion of constitutional validity or power. It records a result reached as the result of a State and the Commonwealth legislating within the powers conferred on them by the Constitution. Behind its invocation in the present cases lies a good deal of loose thinking’.<sup>51</sup>

Beneath much of the legal and political discussion lies a perception of potential, and perhaps actual, anti-democratic repercussions flowing from the *modus operandi* of Cooperative Federalism when COAG and its member jurisdictions might step beyond the coordination of policy into, *de facto*, the making of new policy without electoral mandates.

In terms of political philosophy, these concerns develop from COAG’s corporatist dimensions. As a very general explanation, The Oxford Dictionary of Sociology has an entry on ‘the corporate society, corporatism’<sup>52</sup> which runs, in part:

‘These terms refer to a type of society in which various large-scale corporate organizations with powerful vested interest are involved in the economic, social and political decision-making process. Examples of groups of people acting jointly in their interest include business groups, the professions, trade unions, and pressure groups....’

Though corporatist actors are often economic, the form is basically political, and the example of COAG illustrates this clearly.

Criticisms of the political form are focused on the way in which corporatist decision-making short-circuits the broad debates of the public which inform and lead up to electoral decisions on alternative policies. These decisions are often made in the name of the ‘good-housekeeping’ virtues of efficiency and governance such as have been argued for regulatory coordination and streamlining in the EMRP case. Much of the analysis of corporatism has dealt with the coordination of political decision-making by governments working directly with economic groups, mainly business interests and trade unions. The Labor government which came to power in 1983 developed an explicitly corporatist initiative—the famous Accord between the Federal government, business and unions. In its own terms this was effective and widely popular but was heavily criticized by the Coalition opposition then and later for what were essentially its corporatist threats.

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<sup>50</sup> (1999) CLR 511

<sup>51</sup> (1999) 198 CLR 511 at 566.

<sup>52</sup> Gordon Marshall (1998) *Oxford Dictionary of Sociology*. OUP, 122. There is a large literature: see, for example, for a broad review, John Goldthorpe, ed., (1984) *Order and conflict in contemporary capitalism*. OUP; and for a treatment by an Australian, Peter Self (1985): *Political theories of modern government: role and reform*. Unwin Hyman.

COAG itself is, however, another initiative with corporatist dimensions, this time among different governments, Federal, State and Territory, which have different responsibilities, legal frameworks, types of accountability, and policy and regulatory programs. The Coalition government has pursued this stream of Cooperative Federalism with enthusiasm since it came to power in 1996.

While many practical advantages have apparently been obtained from the COAG arrangements, there is concern whether, and, if so, to what extent, decisions are made, or might be made, which short-circuit legitimising debate and electoral decision in the individual jurisdictions. In particular there is a question as to whether State and Territory jurisdictions might be able, either directly or effectively, to make national policy for which they have no mandate from, and no accountability to, their electorates. There is room for thinking that this is occurring in the MCE's Energy Markets Reform Process.

This is discussed further below; but before proceeding it might be noted that electricity reform figured largely in the early COAG meetings, and was on all the agendas from 1992 to 1996. After the NEM was established it did not reappear until the June 2001 meeting when it was mentioned in the context of the establishment of the MCE and of appointing the Parer Committee to prepare within one year a comprehensive review of energy market directions for implementation. It does not appear to have been discussed since. Detailed work on this and other energy matters was entrusted to the MCE when it was set up in 2001.

## 5.2. The MCE and its proposals

In brief, the MCE is chaired by the Commonwealth minister for industry, tourism and resources, and the members comprise the ministers of energy of the States and Territories. The ministers for energy of New Zealand and Papua New Guinea are observers. The EMRP follows the COAG endorsement of the Report by the MCE on Reform of Energy Markets of 11 December 2003. Ministers agreed that further reform should be undertaken to:

- 'Strengthen quality, timeliness and national character of **governance** of the energy markets...'
- 'Streamline and improve the quality of **economic regulation** ....'
- 'Improve the planning and development of **electricity transmission** .....
- 'Enhance the participation of **end users**, including through demand side management and the further introduction of retail competition...'
- 'Further increase the penetration of **natural gas** ....'
- 'Address **greenhouse emissions** from the energy sector ...'



The MCE's EMRP process is steered by an anonymous group called the Standing Committee of Officials (SCO). (The writer, seeking a telephone contact for the Chairman of the SCO, spoke to a person said to be a representative of the EMRP in the Department of Industry, Tourism and Resources but was given no subsequent response.) The considerations and work of this group, except for specific documents referred for decision to the MCE and made public, are not known. Presumably, some knowledge could be obtained through FOI enquiries based upon the file lists published by the Department of Prime Minister and Cabinet if, in the time available for submission, this were possible. Gaps in the public record include:

- what consultations are held by the SCO;
- with whom, when and how it meets;
- the records of its meetings; and
- from whom it takes specialist advice (except for commissioned studies and other reports, some at least of which are released)

The SCO acts for the MCE in taking forward the task programs decided upon by the ministers. These task programs have been allotted to specific jurisdictions. That dealing with governance and institutions, and consequently the legislative and Code/Rules set of issues, is the responsibility of NSW and South Australia, the States most directly concerned in the SNI interconnector debacle and which supported the appeal to the Victorian Supreme Court.

The SCO conducts what must be regarded as tokenistic and opaque processes of public consultation and of judgment making. These processes differ greatly from the extended and detailed public submission/official response protocols of the ACCC and NECA. Submissions made by the public, including industry and all community groups, are summarized in, and pronounced upon, in judgments often of a few words. These judgments are then taken to the MCE meetings, and, it appears, generally endorsed. The obvious anti-democratic shortcomings are exacerbated by the great haste with which the EMRP is being conducted. An egregious example is the current 'consultation' on the draft of the revised National Electricity Law and, in particular, the change of the Code into Rules (see later discussion in this section). Details were provided in an Energy Market Reform Bulletin of 10 December.

SCO advises that there will be a 7 January meeting to allow 'stakeholders to discuss key issues raised in their submission with a panel of officials in a public forum...Please note there will be limited opportunity for audience questions or involvement during the hearing.' Posted on the web are:

- the draft National Electricity Rules;

- a marked-up version showing the changes between the Code and the Rules;
- a consultation paper; and
- a table summarizing the amendments made to the Code in the draft Rules.

This ‘*table*’ is one hundred and fifty six pages long with about a dozen annotations per page on the individual, generally intricate and complex amendments to be made! This is an obvious travesty of public consultation. All of this is especially worrying when much of what has been urgently decided will either make no difference to already vexed aspects of the markets, or will make them worse.

Another example is the publication on 23 December, after various discussions and publications during preceding months on the key issue of an appropriate benefits test for the new market arrangements, of an ‘explanation’ of the now proposed benefits test in the form of an overarching efficiency objective. This is a key issue of the new legislation. This document says:

‘The Standing Committee of Officials (SCO) has *taken a policy position* (emphasis added) that a single efficiency-focused overarching objective is appropriate for the National Electricity Market (NEM). To test this policy position, a panel of experts was engaged by SCO to provide feedback on this and related matters ....’ It is sufficient to note here that:

- it is not for officials to take policy positions
- neither the identities of the expert panels nor their report were made public
- that report, according to information later in the ‘explanation’, was provided to SCO on 14 October!
- The benefits test is a crucial aspect of the new arrangements and will be included in the new National Electricity Law

‘Stakeholders’ are thus invited to participate in a process for settling the gamut of legislative, regulatory and economic, social and environmental issues involved in the electricity reform program which has the following schedule:

- 7 January for final submissions on the National Electricity Law
- 28 January for final submissions on the National Electricity Rules

- 1 February for a ‘pre-finalisation’ hearing on the National Electricity Rules
- *Early February for introduction of NEL (which is to include the Rules) into SA Parliament (emphasis added)*

Such a process is a blatant sham. The proposed new objective itself is discussed below at section 5.4.

Of course, officials do not generally report their work for ministers in public but, in this case, they are engaged in investigations and recommendations on matters which heretofore have been, to a very large degree, carried out openly. Their decisions will have the broadest ramifications for the operations of an extraordinarily complex economic-technical market *which is maintained, coordinated and regulated by public bodies on an operational basis and is paid for entirely by taxpayers*. This market includes a mix of private and public organisations, *the latter of which are responsible to the same ministers making up the MCE*.

An especially tendentious example of the abuses which this system makes possible is the routine reply to any matter purported to be ‘environmental’-that environmental issues will be dealt with elsewhere. *The plain fact is that virtually all such issues are directly economic and arise from the economic failures of the market design and the economic inadequacies in regulating the conditions of market failure through monopoly which are at the centre of that design*.

The Productivity Commission itself has recently drawn attention to some of these grave deficiencies in its criticisms, noted above, of the electricity pricing system and the externalities which it is based upon. There must be some wonder as to why responsible ministers are acting in so abbreviated a way and demonstrating not only disregard for democratic processes but also risking grave economic errors.

It is not possible here to review all of the MCE decisions and recommendations. The following sub-sections summarise questions arising from several of the proposals as they might affect the principles, transparency and certainty of decisions on the energy markets, especially for electricity, and so affect public benefits and public consequences at the distribution and retail levels.

### 5.3. Constitutional issues arising from the Australian Energy Market Commission Act 2004 and the Trade Practices Amendment (Australian Energy Markets) Act 2004

Two Commonwealth Parliament Bills Digests<sup>53</sup> discussing the Bills for these Acts, introduced to the Commonwealth Parliament to provide for the establishment of the two national regulators proposed by the MCE were prepared for the advice of the Parliament. They outlined severe reservations about some of the principal provisions of the Bills and whether the High Court might on appeal strike some of them down. This could, of course, deeply prejudice the operation of the regulatory system and would affect industry and public perceptions of regulatory certainty. Briefly, these concern the effects of the Bills on their face to:

- give the South Australian Parliament (lead legislators) the ability to modify Commonwealth law, regulations and rules;
- give State and Territory Parliaments the power to confer powers on the AER which will have the consent of the Commonwealth and will bind the Commonwealth; and
- allow the ACCC-‘instead of carrying out its own consultations in accordance with ... the Act (the TPA)’-to rely on consultations undertaken by the AEMC in considering applications in relation to the National Electricity Code to authorize particular activities’.

The issues raised, briefly told, are:

- a) Ad 5.1.1: Digest No 171 notes regarding the Trade Practices Amendment Bill that ‘however much this may make sense in practice, and notwithstanding the agreement of governments from all relevant jurisdictions, there may be an issue as to whether allowing the people of South Australia through their elected representatives to makes laws with application to the Commonwealth generally is allowable under the Australian Constitution’<sup>54</sup>.
- b) Ad 5.1.2: Digest No 172 notes regarding the Australia Energy Market Commission Bill that the relevant sections of (44AI and 44AJ) ‘...are designed to avoid constitutional problems in conferring State powers on the AER following the decision of the High Court in *R v Hughes*<sup>55</sup>. It discusses

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<sup>53</sup> Peter Prince and Mike Roarty, *Bills Digest* No 171, Information and Research Services, Commonwealth Parliamentary Library, 203-04; Peter Prince, *Bills Digest* 172 2003-04, idem. These documents and similar other reports are provided ‘...for general distribution to Senators and Members of the Australian Parliament...great care is taken to ensure that the paper is accurate and balanced...’, but ‘...The views expressed are those of the author ....’.

<sup>54</sup> Bills Digest 171, 4

<sup>55</sup> (2000) 202 CLR 535

with authorities a reservation that *Hughes* could be interpreted to read ‘...that any provision in a Commonwealth law that *authorizes* the use of State law by a Commonwealth body for enforcement purposes may need to be supported by a specific head of power in the Constitution.’<sup>56</sup>

- c) Ad 5.1.3: Digest No 172 notes that ‘...This (the ability of the ACCC to rely on consultations by the AEMC) will apply, for example, where a market participant makes an application under section 88 to enter a “proposed contract, arrangement or understanding (that) ...might be an e exclusionary provision or...might have the effect of substantially lessening competition”. If the AEMC has conducted the consultation process specified in the new provision, the ACCC is permitted to ‘disregard any submissions...’<sup>57</sup>. There is a question here then as to where this leaves the basis for the control of anti-competitive and unfair trading practices, and the relevance of the Competition Policy Agreement and various aspects of the Competition legislation. There is legal doubt as to whether a court could make any sense of this at all.
- d) The legislation was brought into the Parliament under exemptions and was passed in a week, and assented to on 30 June 2004.

### 5.3.1. Need for further legal advice

Coming from such a source, these reservations must be taken seriously. They raise questions about the Constitutional validity of the legislation. Thus the risk would arise of the new arrangements being vacated by High Court decision with consequent uncertainty, confusion and regulatory redesign in the electricity sector. Even the possibility of a High Court challenge will prejudice industry, public and investor confidence. As Bills Digest No 172 states, ‘...parliament may wish to consider requesting detailed submissions on the constitutional validity of the enforcement regime envisaged by the Bill, including the consequences of any invalidity’<sup>58</sup>. Such submissions were not sought.

In the debate in the Senate<sup>59</sup> on the 24 June 2004 there were some rather sharp exchanges between Senator Brown who, apart from issues of economic and environmental policy, raised some of the constitutional issues noted above, and Senator Minchin, who focused upon the practical advantages to be gained from the cooperation of the jurisdictions and of a single national energy regulator. With all due respect to the Honorable Senator from South Australia, examination of this debate shows that there is room for doubt whether he had been made aware of:

- the force of the legal issues raised in the APH Digests;

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<sup>56</sup> Bills Digest 172, 2

<sup>57</sup> Bills Digest 172, 4

<sup>58</sup> Ibid, 6

<sup>59</sup> Hansard: Senate, 24 June 2004, pp25061-25094

- the recent tendencies of the High Court in dealing with such issues;
- the wide ramifications of what he was espousing for;
  - Commonwealth-State relations
  - the Government's competition reforms, of which he has been a strong supporter; or
  - its likely effects upon reform in other markets, such as in regard to off shore leases.

It is to be hoped that even now Senator Minchin, and his Prime Ministerial and Ministerial colleagues, would find the time to review this debate and the issues raised by the APH staff and those outlined above. They are likely to find the results of their interest to be of deep concern not only for their Government but for the nation. The MCE has not published an opinion on these questions.

### **5.3.2. Decisions at times of crisis**

There is another issue of constitutional governance which is important to the integrity of the power system, as the history of the Australian electricity industry shows, especially in relation to the cascade of failures in the interlinked NSW, Victorian and Snowy grids in 1981: what provisions exist for the resolution of inter-jurisdictional disputes which arise in, or affect, a situation of crisis in the NEM?

Such situations include linked regional failures, loss of peak capacity, industrial disturbances, major plant outages, (all of which occurred in 1981), or other disasters, such as terrorist attacks. The MCE provisions which might cover these eventualities have not been disclosed. NEMMCO has recently been given enlarged powers on system security to direct plant to operate and otherwise override normal protocols, but it is not difficult to imagine situations which would present grave problems for institutional cohesion with consequential impacts upon end users.

## **5.4. Definition of market and of the public benefits objective**

### **5.4.1. The market**

In the exposure draft of the new National Electricity Law published by SCO on 1 December, the "national electricity market" means, as described in the Information Paper on the National Electricity law and National Electricity Rules, December 10-

- the wholesale exchange operated and administered by NEMMCO under this Law and the Rules; and
- the generating systems and other facilities connected to the interconnected transmission and distribution system; and

- the interconnected transmission and distribution systems in the participating jurisdictions, used to convey, and control the conveyance of, electricity that connects:
  - (i) generating systems and other facilities; and
  - (ii) loads settled through the wholesale exchange.

Before proceeding, it is to be noted that this definition inextricably confuses the economic categories of market and the engineering categories of physical equipment, a confusion often seen before in the history of the NEM. A market is a legal/social and economic artifact consisting of social/legal and economic representations and constructions, realized through engineering artifacts consisting of physical representations and constructions.

Whatever else the definition might be supposed to mean, it is clear enough that it does not include:

- the financial hedge market
- a final customer or buyer

As the discussion in section 4 showed, a vision of this market which excludes the financial market is at best only half a vision, and is one quite untestable. Again, a vision of this market, any market, *without a buyer* is worse-it is no vision at all.

#### **5.4.2. The public benefits objective**

The new NEL contains the public benefits goal referred to above in the form of the “national electricity market objective” which is to:

‘promote efficient investment in, and use of, electricity services for the long term interests of consumers of electricity with respect to price, quality, reliability, safety and security.’

Firstly, efficiency cannot be sought, let alone tested, without efficient prices. Those of the national electricity market, as discussed in section 4, are inefficient in several respects:

- they do not include externalities;
- they are produced in a pricing system, the uniform auction process of the pool, which is not reliable where there are major externalities;
- the prices for networks are at best efficiency seeking; and, crucially; and,

- the vast majority of end-user prices are regulated by the jurisdictions in ways not reflective of efficiency and which are intended to yield surpluses for the jurisdictions. This latter is not inappropriate as jurisdictional public policy, but it is not efficiency based.

Secondly, there is no concept of ecologically sustainable development: this should be a *sine qua non* of any such objective.

In addition, it has been shown in the discussion in section 4 that there is no present convenient way of representing the electricity market as described there. Such a way could only be found, and should be, by research, including the construction of an econometric model of the market, along with practical approximations of efficient prices in substitution for the actually existing inefficient prices. Thus, for example, externalities could be provided for by appropriate penalties or credits added to current prices for the purposes of the pool auction. Such a course was recently adopted in California by adding points (adders) to price bids according to the greenhouse emissions of the producing plant.

In regard to the ‘market’, not as it exists, but as now defined in the new draft NEL, it would be impossible to seek or to assess efficiency in the absence of any consideration of the financial hedge market, and of ‘buyers’.

In short, the definitions of the market and the objective are incoherent and to deploy the proposed objective as defined within the context of the proposed market as defined would lead, as in the SNI case, to yet another rigmarole of ritual.

### **5.5. Change of Code into Rules**

A central feature of the MCE’s proposals for institutional change involves the translation of the existing Code (agreed to by participants in the NEM and subject to authorization of proposed changes by the ACCC), to a set of Rules contained within an amended National Electricity Law. This is planned to take place via the lead legislation of South Australia, followed by template legislation in the other jurisdictions. Adherence to these Rules would then be *obligatory* under the amended NEL for participants in the NEM. Because the Rules would be mandatory, Market Participants following them, would not generally be at risk of prosecution for anti-competitive trading or access breaches under the TPA for following them, according to an opinion published by the MCE<sup>60</sup>. Under the terms of the AEMC and TPA Amendment Bills, proposed Rules changes would be consulted on by the AEMC with the industry and public and also with the ACCC and the AER. The amended National Electricity Law would be State legislation.

As we have seen, the States and Territories have the power to enact legislation and regulations for the public benefit. These are expected to be consistent with Competition Law in general, but might not be-aside the discussion above of the NSW ETEF, and

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<sup>60</sup> Noel Hutley SC and Sarah Pritchard (2004): *Memorandum of Advice Re: the National Electricity Market Rules*. MCE Standing Committee of Officials.



provisions in other jurisdictions could also be cited. The prevailing sanctions against this under the Competition funding agreements are financial, not legal. That is, jurisdictions can be penalized for not following Competition policy in relevant areas by losing funding provided as an incentive to jurisdictions under the COAG Competition agreements.

Presumably, it is to be expected that the MCE would seek to ensure that amendments to the National Electricity Law and changes to the Code/Rules are consistent with the Competition provisions. Nevertheless, a real possibility exists of Rules being established of an anti-competitive nature, with the ‘competition watchdog’ powerless to intervene. This is especially likely considering the complex history of amendments to the Code to date, and the instances of misunderstanding and misapplication of the Code, some of which have been indicated above.

Not least of the possibilities here would lie in the misinterpretation or absence of appropriate economic principles being used in the construction of the Rules. Differences could arise from varying jurisdictional views on the *desiderata* of specific reforms. Resolution by consensus, the usual mode of MCE decision-making, tends to produce, where interests conflict, the ‘lowest common denominator’ among the views of the parties. Inconsistencies could also arise where the linguistic expressions of inter-jurisdictional agreements were stretched to include diverse jurisdictional views, with resulting ambiguities of interpretation, operational and legal, and impacts upon regulatory uncertainty.

#### **5.5.1. Heavy-handed regulation?**

There is a question as to whether the need to abide by detailed rules requiring the close oversight of an industry-specific regulatory body will not in practice amount to the ‘heavy handed’ regulation dismissed by both the IC in 1991 and the Hilmer Committee in 1993. There was then much to be said on the issues of regulation, and, in particular, whether an industry specific regulator would not be necessary for an extremely complex network industry like electricity. The advantages of either are not being canvassed here, but there is a need for greater clarity as to whether the doctrine of ‘light handed’ regulation, always a vague matter, is now being changed at base.

#### **5.5.2. Inhibition of negotiation?**

There is also a question as to whether, and if so in what way, the need to abide by mandatory Rules rather than consensual Code provisions will in practice inhibit the negotiation of agreements among market participants. The desirability and feasibility of negotiation and flexibility in reaching such agreements is regarded as one of the central features of the present system as planned by the IC and by the Hilmer Committee and designed into the Code. In this regard, though, it is to be noted that the promotion of negotiation has not gone far enough: where it has been between monopoly networks and DG/DM proponents it has been doomed to fail.

## 5.6. Proposed removal of merits review

One of the more extraordinary of the EMRP proposals is to remove merits review from the NEM. That this should be contemplated for a vast system of such intricacy is astounding. It would mean that the multitude of assessments, judgments, implementation of protocols, economic and technical tests required to order, operate and develop this huge and complex economic, engineering, legal and social artifact could be conducted without any independent examination and validation of the ‘facts’-protocols, algorithms, measurements, terms, etc-upon which they were based. It would give *carte blanche* to a wide array of practices against the public interest and would allow the operators of the system to proceed virtually without accountability.

The arguments for this are that the pre-existing processes need to be *streamlined* because of such imbroglios as the SNI episode. This is a plain error. The regulatory processes have worked sometimes slowly but in general well, and, except for some suggestions of political intervention, in transparent ways. What *has* been lacking, though, has been jurisdictional and regulatory awareness of the economic and other principles upon which the NEM is supposed to be based. This is combined with the fact that external bodies of review such as NET and the Courts have produced unpleasant answers.

It is extraordinary that this proposal, now included in draft National Electricity Law and Code/Rules changes, to remove merits review, the most basic practical and legal safeguard available to the industry and the public is being put forward for an institutional group that, in the only instance of merits review so far conducted, was found to be asleep at the wheel.

The proposal should certainly not be countenanced.

## 5.7. An external assessment of energy market directions in Australia

The reform initiative in Australia is not being conducted in a vacuum and is watched with considerable interest overseas. It is worth noting remarks dated October and November of this year and carried on the website of the Nusconsulting Group, a large US consulting firm with eleven international offices in North America, Europe, South Africa and Australia. It specialises in studies of, and in advising industries and businesses on, energy cost recovery and energy efficiency in plants, factories, offices and other facilities. It consults to some 25,000 clients around the world.

In an article on the Australian reforms dated 18 October 2004 and headed ‘Back to the future’ it said that

‘... many are questioning whether the competitive market is at risk for “creeping” re-integration ... Most UK and US buyers have ... left the scene, absorbing huge losses. The new owners, accustomed to the Australian energy business, began re-integration into the market by possessing total or partial ownership of generation, distribution, retailing and even transmission. ...AGL ...now owns a significant

stake of electricity generation, distribution and retailing assets. Singapore Power, already the owner of Victoria's transmission system, recently bought TXU's distribution and retail businesses. Singapore Power also owns Victoria's major gas storage facility and has an interest in the Victoria/South Australia pipeline.... The Australian Competition and Consumer Commission (ACCC) has limited power to stop such re-integration if it cannot demonstrate that market competition is being hindered.... For a market created in the spirit of 'deregulation', it will be ironic should the ACCC push for more regulation in an attempt to stave off vertical ownership. However, the alternative offers unchecked re-integration, perhaps leading us back to where we were *with the exception of private ownership rather than public* (italics added)....'

In a later article dated 16 November, it said:

' The Energy Users Association of Australia (EUAA) has called on the Australian Energy Regulator to investigate electricity pricing due to concerns regarding big increase in rates to large end-users...there are claims that increases up to 20 percent can be expected in Sydney and Newcastle over the next five years...the main reason behind these rising costs is a recent regulatory decision allowing electricity distributors to invest heavily in replacing outdated network equipment and on-going maintenance costs ...in response to higher prices, the ACCC is investigating whether some electricity generators are withdrawing capacity from the market during peak demands. According to the ACCC, if wholesale prices spike at their highest level for just five hours per year, the average annual wholesale price will increase by some 19 percent ...consumers need to stop hoping for 'better times' and start to regain control of their purchases concerning this most vital commodity.'

When we add to these concerns over the ultimate directions of 'creeping' policy towards re-integration the failures to address environmental impacts resulting from the economic defects of both market design and policy, it is even clearer that a major and rapid overhaul is needed.

## **5.8. Conclusion**

The MCE's EMRP process is being conducted with unseemly and unnecessary haste, using procedures, built on doubtful Constitutional foundations, which are inimical to public welfare and respect, democratic rights, sound economics, investor confidence, *and* environmental good.

Decisions have been quickly made which run counter to the principles upon which the electricity markets were set up under the Competition Agreements and Legislation. Other issues concerning economic flaws in the original design of the markets which have had bad economic and environmental effects go unattended to, or are dealt with in decisions which are likely to make them worse. There is no recognition of the need for careful, continuing research.

Measures are being taken which would remove the conduct and regulation of the electricity market system from effective operational accountability. The scope for making decisions contrary to accepted economic, environmental and social principles, and contrary to the Competition reforms, has been enlarged.

There is room for consideration whether a body of elected ministers is being led by a group of Federal, State and Territory officials. It is difficult to understand how the present situation has been allowed to come about.

There is also room for consideration whether COAG, which in recent years has been taken up with other matters, is really aware of the implications of policy development on the energy markets. There is extensive concern in the industry.

There is a need for an urgent expert external audit of the EMRP work to date, a task for which a Productivity Commission review, suitably directed, is the most obvious candidate, though there are others, such as a demonstrably expert panel well resourced. Such a panel should comprise;

- A micro-economist familiar with welfare theory and regulated markets
- A resource economist familiar with the economics of the environment and sustainability
- An econometrician
- A lawyer specialized in Constitutional and administrative law.

COAG needs to inform itself on proceedings and decisions to date, with the aid of such an audit. It needs to establish a means for public and expert interaction to be integrated into the development of firm, enduring, and well researched governance and regulatory arrangements, so that, in contrast to the present situation, justice, public interaction and environmental and economic good both are, and are seen to be, pursued.

**The issues raised in this section are identified as matters requiring clarification and appropriate investigation and action.**

## APPENDIX 1

### Glossary

The entries here are of two types:

- terms which are used in the NEM and which have meanings specific to that context and to the electricity industry; and
- economic terms used in this review and which might not be familiar to all readers. For these, the whole or part of entries from two commercial, readily available dictionaries of economics are used, sometimes with some additional explanation: the Collins Dictionary of Economics, 3<sup>rd</sup> Edition, cited as ©; and the Penguin Dictionary of Economics, 5<sup>th</sup> Edition, cited as (P). The entries are intended to give a broad meaning of the term for the reading convenience of non-economists; they are not exhaustive. The dictionary generally regarded as an acceptable source for legal and other such purposes is The New Palgrave Dictionary of Economics, available in university and research libraries. Its entries are authoritative but also often long and technical.

Algorithm: A procedure for calculation, usually machine based. The algorithms for dispatch in the electricity market pool and for the evaluation of the RT are composed of linked series of mathematical expressions whose evaluation at particular values of the variables is calculated on computers.

Auction: ‘A type of transaction in which the buyer of an item and the price that is paid for it are chosen after potential buyers have each made some declaration of their willingness to pay... Auctions can be held in a variety of forms: the *English auction*, in which the bidders sequentially offer higher prices...with the last remaining bidder paying his last offered price; the *Dutch auction*, in which a list of sequentially lower prices are offered by the seller...until a potential buyer accepts one of these prices and then pays that price...the *sealed bid auction*, in which each bidder is given one chance to make an offer, in ignorance of the offers of other bidders, and in which the highest offer is accepted...and the *second-price (or Vickrey ) auction*, which is exactly like a sealed-bid auction, except that the highest bidder only has to pay the price offered by the second bidder‘ (P)

Subtypes include the uniform price auction, in which all suppliers receive the clearing price bid by the marginal supplier; and the discriminatory price auction in which bidders receive the prices they have bid. The Australian electricity pool is an English uniform price auction. There is much controversy, largely over the availability and distribution of knowledge, about the most efficient form of auction.

Bundled: term for the vertical integration of various activities-such as generation, transmission distribution, retailing-into one organization which was characteristic of many previous state owned monopoly utilities. Unbundling is the separating out of such functions in ways which are intended to promote greater accountability and competitive efficiency.

Code: The large set of provisions upon which the conduct of the NEM is based. See Appendix 2. It is available at: [www.neca.com.au/code](http://www.neca.com.au/code).

Commodity: Also ‘good’: ‘In economic theory..., a good or service resulting from the process of production. Differences between commodities, real or imagined, will determine whether or not they are close substitutes for one another’ (P).

Competition: ‘1. A form of market structure in which the number of firms supplying the market is used to indicate the type of market it is, eg, perfect competition (many small competitors), oligopoly (a few large competitors). 2. a process whereby firms strive against each other to secure customers for their products, ie, the active rivalry of firms for customers ....’ (C).

Cost: Also opportunity cost: ‘The value of what must be given up to achieve something’ (P); In the case of electricity markets, a particular category of cost, marginal cost, is especially important : ‘The increase in the total costs of a firm caused by increasing its output by one extra unit...’ (P) and there are two kinds:

- *short run marginal cost* is the additional cost of producing one extra unit of the item, here electrical energy, in ‘a period of time in which only some variables change or economic processes work. It is a concept which can strictly be defined only in the particular context in which it is applied ...Its most common use is in the theory of the firm....where it is defined as the period in which the quantity of certain factors of production employed (for example, plant and machinery ) is fixed and only, say, the number of workers hired can be changed....’ (P); and
- *long run marginal cost* is the additional cost of producing an extra unit in ‘an abstract time period (in the theory of supply) long enough for all factor inputs to be varied, but within an existing, technological framework (known production methods) ...In the very long run, the technological framework itself changes as a result of new inventions and knowledge.’ (C).

In general, it can be readily shown from abstract models that in perfectly competitive markets price equals marginal cost (short or long run, depending on the purpose of the analysis), except where there are economies of scale-ie, decreasing unit costs as output increases. In the extreme case, economies of scale lead to monopoly.

Cost Benefit Analysis (CBA): ‘a technique for enumerating and evaluating the total social costs and total social benefits associated with an economic project. Cost-benefit analysis is generally used by public agencies when evaluating large-scale public investment projects, such as major new motorways, or rail lines, in order to assess the welfare or net social benefits that will accrue to the nation from these projects ...’ (C)

Dispatch: Unfortunately there does not seem to be a glossary online at the NEMMCO site which contains this: in non-engineering terms, dispatch is the physical connecting to the grid of a demand offer or a supply bid. The general idea can be gained from the description of central dispatch in the Code at 3.8.1 (a): ‘NEMMCO must operate a central dispatch process to dispatch scheduled generating units, scheduled loads, scheduled network services and market ancillary services in order to balance power system supply and demand, using its reasonable endeavours to maintain power system security .... and to maximize the value of spot market trading on the basis of dispatch offers and dispatch bids.’

Economic value: In economics value is ‘The worth of something to its owner. Two concepts of value have been distinguished in economics. The first is value in use-the pleasure a commodity actually generates for its owner; the second is value in exchange-the quantity of other commodities (or, more usually, money) a commodity can be swapped for. Water, for example, has high value in use, but low value in exchange...’. (P)

Efficiency: ‘the relationship between scarce factor inputs and outputs of goods and services ... the concept of efficiency is used as a criterion in judging how well markets have allocated resources’ (C)..

Efficient markets are described in terms of three types of efficiency:

*allocative:* ‘..when all profit levels are consistent with the real resource costs of supplying products ...’ (C)

*distributive:* the efficiency of a market in distributing its outputs from suppliers to consumers ...’ (C)

*dynamic or productive:* ‘...efficiency of a market in producing current products at the lowest possible cost in the long run, using existing technology. Productive efficiency is achieved when output is produced in plants of optimal scale and when there is a long-run balance of market supply and demand..’(C )

Equilibrium: Broadly, in economics, the balance of supply and demand. ‘A situation in which the forces that determine the behaviour of some variable are in balance and thus exert no pressure on that variable to change’ ... in perfect competition in the short run firms’ profit-maximising behaviour can lead to a market equilibrium with price equal to marginal cost ...A distinction can be drawn between a static equilibrium, when the value of the relevant variable is

unchanging, and dynamic equilibrium, when the value of the variable is changing but in a regular way' (P)

*Partial equilibrium analysis:* '1. The study of the behaviour of economic variables taking full account of the interaction between those variables and the rest of the economy.' (P)

*General equilibrium analysis:* 'The study of the behaviour of variables which ignores the indirect effects that changes in the variables have on themselves through the impact they have on the rest of the economy.' (P)

Externalities: 'Consequences for welfare or opportunity costs not fully accounted for in the price and market system.' (P) Externalities have been recognised in economics for many years but a seminal modern treatment is: Ronald H Coase (1960): The problem of social cost. *Journal of Law and Economics*, 3,144-171.

Gold plating: The addition of uneconomic assets to a regulated utility's asset base, thus increasing the value of its regulated revenues and, therefore, the costs of end users.

Hedge contracts market: Also known as the financial derivatives market: a market in which are traded forms of contract between counterparties, for example, generators and retailers, which specifies quantity and price of a transaction at a specified future time. In electricity hedge contracts allow the price risks arising from volatile prices to be managed at least in part. For Retailers, they are designed to hedge future financial risks arising from pool price changes. These may occur over a wide range of prices in short time periods<sup>61</sup>. Similarly, Generators purchase contracts in advance for the delivery of electricity in specific quantities and at specific times in order to ensure that their production will be sold at profitable prices. To the extent that they are 'contracted' their capacity must be available to meet those commitments. In general, only the capacity not thus contracted for is available to be bid into the pool to take advantage of any price spikes. As a result of this, high levels of contracts relative to capacity limits the effective exercise of a generator's market power. The financial derivatives, or hedge contracts, market basically consists of such bilateral contracts between Market Generators and Market Customers to sell/buy energy in specified quantities at specified prices at specified times in the future. As discussed in the text, the NEM would not be financially feasible without them. They are conducted outside the NEM framework but within the Australian financial system and within the regulation, prudential and otherwise, of that system. The contracts are made either through 'over the counter' contracts entered into directly with other Participants (generally the larger contracts) or through brokers (generally involving trades below 50MW), or (a relatively small volume of contracts)

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<sup>61</sup> Price volatility is typically much greater in electricity markets than in those of any other commodity and as discussed in the text forms a special characteristic of these markets.



through trading on the ASX Futures Exchange or the Sydney Futures Exchange. A hedge, though not a complete one, against interregional price risk, known as ‘basis risk’, is provided for in the NEM itself through the Inter-Regional Settlement Residue Auction conducted by NEMMCO, the details of which need not detain us here. In addition, some hedges for transactions between buyers and sellers in *different* regions may also be effected. Even without going into this matter in any detail it can be seen that the hedging arrangements are large, complex, diverse, and many layered. Market participants such as generators and retailers, and some large Customers, typically have a large portfolio of hedges.

Producer good: Also known as intermediate good: a commodity used in the production of other goods and services as distinct from final or consumer goods.’ (P).

Imperfect or monopolistic competition: ‘competition in an industry in which there are many firms each producing products that are close substitutes. Three features characterise such an industry...’ (P), which, summarized, are:

- many firms and buyers
- differentiated products (ie, they are close but not perfect substitutes)
- free market entry and exit

Market: ‘a collection of homogeneous transactions, ie, where the commodities are perfect or close substitutes. A market is created whenever potential sellers of a good or service are brought into contact with potential buyers and a means of exchange is available.’ (P)

In economics there can be free markets, where prices emerge from the balance of supply and demand and are not regulated; and administered markets where prices and other conditions are imposed by governments; and various sorts in between. Thus the previous State owned and organized electricity regime was an administered market.

Market power: ‘The degree to which a firm exercises influence over the price and output in a particular market. Under perfect competition, all firms are assumed to have zero market power: they have to take the going price....Wherever firms represent a non-negligible portion of the whole market...they will face a downward sloping (demand curve). This means that, in contrast to the perfect competitor, if they raise their price they do not lose all their sales...Where market power exists, the producer has such influence on the market that the amount he decides to produce affects the market price....’. (P)

In Australian law, the Trade Practices Act prohibits the exercise of market power where this is detrimental to the market.

Merit order: a term not defined in the Code: broadly, it is used in the electricity industry to indicate the order in which generation plant is dispatched at a particular time by reference to the lowest prices bid. Merit order was also used for the dispatch of generation plant in the state-owned monopoly systems: there it was based upon the marginal cost calculated by the monopoly owner, who had access to complete knowledge of plant performance.

Merits review: The review of an administrative decision to determine whether it was validly made: for example, of the issue of a speeding fine to see whether the speed of the vehicle was validly measured ie, merits review is concerned only with the ‘facts’ of the case. It is to be contrasted with judicial review, the purpose of which is to see whether the decision was legal: eg, to establish whether the framing of the speeding regulation was in accord with the law, ie, it is concerned only with legal correctness and procedural fairness.

Monopoly: ‘a market in which there is only one supplier’ (P), and which is ‘characterised by:

- a) one firm and many buyers ...
- b) a lack of substitute products
- c) blockaded entry.; (C)

It can be readily shown using abstract models that monopoly is inefficient because price is higher than marginal cost, and there is no tendency for cost minimization because there is no pressure from intending entrants. Most countries have controls on monopoly for those reasons or they are state owned. Monopoly frequently exists where there are economies of scale, ie, where the average cost of production falls as output rises, and in this case the large single firm may provide the most efficient production and have efficient characteristics, for example,, high levels of knowledge throughout the production and sales processes; network and other ancillary efficiencies, resources for R&D. Such benefits might not, however, balance out the other disbenefits, and a policy/regulatory issue becomes how to realize the social benefits of such a monopoly while avoiding the social disbenefits.

National electricity markets: The Code does not contain a definition of the national electricity markets. Briefly, two market arrangements can be distinguished: that extending from Generators through the pool to Retailers and including the financial hedge market spanning Generators, some Customers, Retailers and financial intermediaries-see NEM below; and that extending from Generators to end-users, also including the hedge market spanning Generators,

Retailers, some Customers and financial intermediaries -see nem below. A new definition of the market is proposed by the EMRP and this is discussed in the text

NEM: the National Electricity Market extending from Market Generators through the pool auction and Transmission Network Service Providers to Retailers, and involving Distribution Network Service Providers, all integrated with the hedge contracts market. The involvement in the pool auction is managed by NEMMCO and administered by NECA, both quasi national bodies. Problems with regarding the Retailers as ‘buyers’ are discussed in the text.

nem: the national electricity market extending from generators through transmission, distribution, retailers to end-users, physically traded through the pool auction between sellers (mainly market generators) and buyers (mainly retailers) and then passed on to end-users as regulated by jurisdictional regulators, all integrated with the financial hedge market transactions between, essentially, generators and retailers.

Oligopoly: ‘a type of market that is characterised by:

- a. few firms and many buyers ....
- b. homogeneous or differentiated products ...
- c. difficult market entry...

Basically, each firm, when deciding upon its price and other market strategies, must explicitly take into account the likely reactions and countermoves of its competitors in response to its own moves ... (C)

Because of the tendencies of such firms to collude and thus produce types of monopoly behaviour, most countries have controls on oligopoly.

Perfect competition: ‘a type of market structure characterised by:

- a) many firms and buyers ...
- b) homogeneous products ...
- c) free market entry and exit ...
- d) ‘perfect knowledge of the market by sellers and buyers ...  
... individual sellers ... have no control of the price at which they will sell, the price being determined by the aggregate market demand and supply.... Static market theory shows perfect competition to result in a more efficient market performance than other forms of market organisation ...The

conclusion of competitive optimality, however, rests on a number of assumptions some of which are highly questionable ...'(C)

Neither buyer nor sellers can influence the price and are price takers.

Pool: In electricity, where the matching of supply bids and demand offers is conducted by a system operator, in Australia NEMMCO. There are two basic kinds of electricity pool: *mandatory*, or gross pool, the Australian version, where all generation and demand has to be bid into the pool; and *voluntary*, or net pool, where sellers and buyers are not obliged to conduct all their physical matching through the pool.

Price elasticity of demand: The ratio between the percentage by which the quantity of demand changes in relation to a percentage change in price at a given level. The demand is said to be price elastic when the ratio is greater than one, and inelastic when it is less than one.

Regulatory Test (RT): The RT is a test now explicitly based upon cost-benefit analysis (CBA) promulgated by the ACCC. Proposals for regional interconnectors and certain other network augmentations are required to satisfy the RT. It can be noted here that the history of the Australian RT has repeated that of the origins of cost benefit analysis: it was developed in the 1930s to replace inconsistent and unfounded engineering attempts to assess scheme benefits and market failure in multi-purpose projects such as those of the Tennessee Valley Authority.

Welfare economics: 'The study of the social desirability of alternative arrangements of economic activities and allocations of resources. It is, in effect, the analysis of the optimal behaviour of individual consumers at the level of society as a whole... welfare economics consists of the following:

- first, the determination of efficient states in which no individual can be made better off without an offsetting loss to another individual...;
- secondly, the choice between the many efficient states that can exist, either through a decision imposed by a dictator, or through democratically determined decisions....;

- thirdly, coverage of a number of other smaller topics like the optimal provision of public goods, externalities, and the theory of the second best...all to these topics share the common aim of helping to show when it is desirable to move from one economic state to another....'(P)

Welfare doctrine has had a long and intricate history. In the pre-WWII period economists rejected the previous notion that personal utility was measurable and accepted that economic welfare is immeasurable and that judgments on welfare are normative, ie, based on value judgments. 'Despite its methodological intricacies, welfare economics is increasingly needed to judge economic changes, in particular rising problems of environmental pollution that adversely affect some people while benefiting others. Widespread adoption of the 'polluter pays principle' reflects a willingness of governments to make interpersonal comparisons of utility and to intervene in markets...' (C).

Wholesale market: The trading between generators and retailers (and in some cases large commercial customers) in the pool, mediated through the networks: also simply called the pool. It requires for financial feasibility the existence of the hedge contracts market.

## **APPENDIX 2**

### **Some external documents of relevance to the development of the NEM**

#### **1. Industry Commission (IC)**

The Industry Commission's 1991 report on electricity and gas provided the basis for the initiative to produce electricity and gas markets. It is discussed at section 3.1 in this review. In 1995 the IC also published a significant review: *The Growth and Revenue Implications of Hilmer and Related Reforms*. This made forecasts of quantitative gains in GDP expected from implementation of the Competition Reforms. It was expected that electricity would form a large proportion of the total, a claim variously disputed.

#### **2. Australian Parliament House**

There are a number of valuable Australian Parliament House (APH) research notes on competition and the electricity reforms. Two APH publications are especially useful: Bill Digests No. 171 and 172 of 2003-04. These deal with the enabling legislation for the EMRP reforms.

#### **3. Legal Cases**

##### **3.1. AGL v ACCC (No3) FCA 1525 2003-04 19 December**

The history and descriptive analyses of the Australian electricity markets system set out in this important Federal Court case decided by Justice French in late 2003 are especially valuable reading.

##### **3.2. Other recent cases**

Other recent cases also provide important insights. Several, like the AGL case, concern questions of how the existence of competition and market power is to be decided, and involve a critique of the economic models. They also have implications for the definitions of exclusive dealing, natural monopoly, contestable markets, 'with' and 'without' competition, network economics and other aspects of economic regulation. These cases include:

- Supreme Court of Western Australia: Epic Energy (WA) Nominees Pty Ltd and Anor (2002) WASCA 231, 23 August 2002
- Federal Court of Australia FCA 38 (28 January 2000): Stirling Harbour Services Pty Ltd v Bunbury Port Authority

- Australian Competition Tribunal: Application by Epic Energy South Australia Pty Ltd ACompT (10 December 2003)
- Australian Competition Tribunal: Application by GasNet Australia (Operations) Pty Ltd ACompT 6 (23 December 2003)

#### **4. Productivity Commission (PC) Reviews**

The PC has produced a number of reviews and other publications of relevance to the energy markets. These include:

- *Review of the National Access Regime 2002*
- *The Role of Auctions in Allocating Public Resources.* Staff Research Paper. February 2003
- *Review of the Gas Access Regime 2004*
- *Review of National Competition Reforms: Discussion Draft October 2004*

The submissions to these Reviews from industry and the public are also important resources.

## APPENDIX 3

### The Code and its Participants

#### 1. The Code

The National Electricity Code sets out the detailed requirements for *operating* the National Electricity Market. It is highly complex and lengthy, comprising about one thousand pages, and is an extraordinary social artifact. It has the following chapters:

- Chapter 1: preliminaries and objectives
- Chapter 2: Code participants and registration
- Chapter 3: market rules
- Chapter 4: power system security
- Chapter 5: network connection
- Chapter 6: network pricing for transmission and distribution
- Chapter 7: metering
- Chapter 8: administrative functions
- Chapter 9: jurisdictional derogations and transitional arrangements

There have been nine major tranches of amendments to the Code, listed on the NECA website. They have involved hundreds of pages and thousands of clauses of very precise detail.

#### 2. Market objectives

These are set out at Code 1.3:

The objectives of the national electricity market (called “market objectives”) are as follows:

- (1) the market should be competitive;
- (2) customers should be able to choose which supplier (including generators and retailers) they will trade with;
- (3) any person wishing to do so should be able to gain access to the interconnected transmission and distribution network;
- (4) a person wishing to enter the market should not be treated more favourably or less favourably than if that person were already participating in the market;
- (5) a particular energy source or technology should not be treated more favourably or less favourably than another energy source or technology; and



- (6) the provisions regulating trading of electricity in the market should not treat intrastate trading more favourably or less favourably than interstate trading of electricity.

### **3. Code objectives**

The objectives of the Code itself are set out at Code 1.4 :

- (1) to provide a regime of “light-handed” regulation of the market to achieve the market objectives;
- (2) to provide for a set of market-oriented rules authorised by the ACCC governing market operations, power system security, network connection and access and network services pricing;
- (3) to provide a cost-effective framework for dispute resolution;
- (4) to provide for adequate sanctions in cases of breaches of the Code;
- (5) to provide efficient processes for changing the Code;
- (6) in particular, to provide for the following in respect of technical and market operations:
  - (i) responsibilities of all Code Participants;
  - (ii) detailed market rules, including bidding, dispatch, spot price determination and settlements arrangement;
  - (iii) detailed operational requirements, including power system operations and power system security, emergency operations, metering and maintenance scheduling;
  - (iv) terms and conditions of access and technical standards that will apply for connection to the network; and
  - (v) the methods to be used for pricing network services.

### **4. Market Participation**

*Code* Participants (NEC2.1.2) are those ‘...bound by the Code through registration.’ and include those who must, under the National Electricity Law, register and those who choose to do so’. *Code* Participants include, briefly and broadly:

- 
- **Generator** (NEC2.2) - a person who owns, controls and operates a generating system that supplies electricity to a transmission or distribution system *must* register; a person who otherwise supplies electricity to a network system *may* register as a Generator. There are other distinctions which need not detain us here. A *Market Generator* is one who does not sell all its sent out generation in its entirety to a Local Retailer or Customer, must sell all its sent out generation to the spot market and must be registered with NEMMCO. Non-Market and Market Generators are further classified as Scheduled or Non-scheduled broadly according as to whether their capacity is greater or less than 30MW
  - **Customer** (NEC2.3) - is a person so registered with NEMMCO and who purchases electricity (purchases are known as loads) supplied through a transmission system or a distribution system through a connection point.
    - A First Tier Customer is a person who purchases electricity at a connection point directly and in its entirety from the Local Retailer.
    - A Second Tier Customer is one who purchases electricity at connection point other than from the Local Retailer or the spot market.
    - A Market Customer is a person who purchases at a connection point other than from the Local Retailer and directly from the spot market and classifies that load as a market load and must register with NEMMCO as a *Market Customer*
  - **Network Services Provider** (NEC 2.5) - a person who owns, controls or operates a network must register with NEMMCO. Broadly, an NSP which is not a Market NSP have their tariffs and other arrangements regulated by the ACCC for Transmission NSPs or by jurisdictional regulators for Distribution NSPs. These include both Transmission NSPs and Distribution NSPs.
    - A Market Network Service Provider is, briefly, one which lodges dispatch bids in the spot market ie, its tariffs are not regulated
  - **Trader** (NEC2.5A) - is a person registered with NEMMCO for the purpose of bidding in settlement residue auctions and so becomes a Code Participant
  - **Special Participant** (NEC2.6)-is a person who is either:
    - A System Operator—who is an agent appointed for the purpose of performing NEMMCO’s power security functions: or
    - A Distributions System Operator-who controls or operates a portion of a distribution service

- **Market Participant** (NEC2.4) - is a Market Generator, Market Customer or Market Network Service Provider registered with NEMMCO in the National Electricity Market (NEM).

## 5. The number of Market Participants

The list of Market Participants current at time of writing is at [www.nemmco.com.au/operating/participation/044.htm](http://www.nemmco.com.au/operating/participation/044.htm). They number 99 and are registered in 153 categories of Participant as follows, and so degrees of vertical integration exist:

Scheduled Market Generator	27
Non-Scheduled Market Generator	14
Non-Market Scheduled Generator	1
Non-Market Non-Scheduled Generator	11
Market Customer	34
NSP (Transmission)	8
NSP (Distribution)	13
Market NSP	2
NSP (Other)	2
Special Participant System Operator	4
Special Participant Distribution System Operator	13
Intending	17
Trader	7

It can be seen that the registered Code participants do not comprise a large number. In addition to these, however, are the financial intermediaries of the hedge market in significant but unknown numbers.

In addition to the above are the many thousands of end-users who are not registered participants, but are those for whom the system exists, and who pay the bills. The NEM and the nem are explained further in the Glossary.

## 6. Comment

The force of all the foregoing is, generally, that Market Participants buy or sell in the NEM's spot market (also known as 'the pool' or the wholesale market) which is operated by NEMMCO. Such a pool is known as a mandatory pool because registration is compulsory<sup>62</sup> for participation. It is an 'energy only' pool, ie, only electricity, in units of Mega-Watt-hours (MWh) is traded: the price signals and surpluses thus made available are expected to provide sufficient incentives to call forth further investment in plant to meet emerging demand, or to foster DM and EE.

<sup>62</sup> There are various kinds of pool. For an accessible discussion by a lawyer of a mandatory pool (and the history of the UK restructuring) see Mel Marquis (2001): *Introducing free markets and competition to the electricity sector in Europe*. Wisdom House.

That is, the NEM is expected to achieve dynamic efficiency, unlike the arrangements in some other countries where there is a separate market for arranging necessary investment.

The national electricity market (nem), however, extends beyond this.

There are no definitions available of the terms 'national electricity market' or 'customer' used in the statement of objectives of the national electricity market quoted above but the following broadly appears to be the case:

- *national electricity market* = National Electricity Market + regional markets in which households and businesses buy from retailers within jurisdictions + financial intermediaries; and
- *customers* = Market Customers + buyers from Retailers within jurisdictions. There are few Market Customers other than Retailers - mainly industrial concerns with large energy usage such as aluminium processing customers. Households and businesses comprise the vast majority of energy users.

All of these terms are often confused in, eg, media comment and even in industry/public consultation processes.

## APPENDIX 4

### The Development and Application of the Regulatory Test and the SANI/SNI Episode

#### 1) The Customer Benefits Test

The evaluation of the original SANI proposal carried out by NEMMCO was vitiated by the discovery *by mathematical testing* that the then existing, so-called Customers' Benefits form, referred to at 3.4 above, of the RT produced unstable results. The Customers' Benefits Test had been accepted by the ACCC, as noted earlier, with no demur, or from, also, NECA, NEMMCO, the jurisdictions, and the industry. However, it could have been found, on inspection, to be economically vacant as an investment criterion since its form excised producer surplus from the calculation of the benefits.

#### 2) Review of the RT

As a result of NEMMCO's complaint on the instability of the Test, the ACCC reviewed the RT and subsequently decided in late 1999 on a new RT which apparently represented a cost benefit analysis form of public benefits appraisal<sup>63</sup>. All of this had resulted in delays, and consequent regulatory and other uncertainty for the industry and the public. The earlier SANI project was variously modified, and renamed with the acronym SNI, but it still served the same basic purpose. The new RT was then applied to this revised regulated interconnect proposal. NEMMCO's industry consultation processes on the application of the RT and its consequent decision making extended over several years and resulted in approval of the SNI proposal in December 2001.

#### 3) The appeal by the Murraylink MNSP against the NEMMCO decision

In the meantime, however, approval under different provisions of the Code had been given by ACCC for a new private investor, Murraylink Pty Ltd, a subsidiary of Hydro Quebec, to build a new MNSP, an unregulated interconnect, also to link NSW and South Australia. Hydro Quebec had been a leader in the development of the direct current (DC) technology needed for merchant inter-connectors. *Unregulated* interconnects do not have to pass the RT as they are commercial ventures and are expected to make sufficient market revenues for financial viability. Decisions on interconnects, regarded by the architects of the Code and the NEM as key issues, are included in the categories of 'reviewable decisions' for which the NEC provides for merits review by the National Electricity Tribunal (NET). Murraylink made an application for review of NEMMCO's SNI decision by NET since if the regulated SNI were also built its financial basis would be threatened.

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<sup>63</sup> It was accepted as a form of cost benefit test in the following industry consultation processes.

The appeal was heard in September 2002. This is the only relevant instance of merits review in the NEM. Its outcome is very pertinent to the EMRP proposal to remove merits appeal from the NEM, and leave only avenues of judicial review which is discussed in the text. Briefly, the decision of the Majority of the NET panel<sup>64</sup> deciding the appeal accepted that NEMMCO's processes and decision making-which had spanned a period of several years- satisfied the economic and other criteria of the Regulatory Test.

The Minority, found that NEMMCO's processes did not constitute a cost benefit analysis, were economically meaningless and if accepted at face value were *systematically biased against the regulatory intent* because they encouraged 'goldplating'. As a separate issue the Minority also found that there was some doubt as to whether a cost benefit test was satisfactorily applicable as contemplated by the RT within the highly dynamic electricity market.

#### 4) The appeal to the Victorian Supreme Court

The Majority decision was overturned in July 2003 on appeal by Murraylink to the Victorian Supreme Court (VSC)<sup>65</sup>. The criticisms of the formulation of the RT as a cost benefit test involved in the Minority decision were addressed by the ACCC through extensive clarifications, explicit formulation as a cost benefit analysis and other changes to produce the new Regulatory Test promulgated by the ACCC in August last<sup>66</sup>. Neither the regulators, the jurisdictions, advisers nor industry had commented on the rather obvious economic shortcomings of NEMMCO's algorithm and evaluation processes.

#### 5) Comment

In this telling example, a string of failures in the quality of advice and of the government/industry consultation process is revealed. Criticisms of the delays and

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<sup>64</sup> The Majority Decision, by Jerrold Cripps QC and Douglas Williamson QC, and the Minority Decision, by Gavan McDonell FTSE, can be found at [www.netribunal.net.au](http://www.netribunal.net.au).

<sup>65</sup> *Murraylink Transmission Company Pty Ltd v National Electricity Market Management Company Ltd & Ors* [2003] VSC 265 (24 July 2003). It is significant, and does not seem to be well understood in the industry, that neither the NET Majority Decision nor the VSC decision appear to have accepted, in effect, economic specialist interpretations of economic terms-'terms of art'-as having legal force. This is not a settled issue. The VSC decision was founded in part on a decision of the High Court (*Collector of Customs v Agfa-Gevaert* (1996) 186 CLR 386) which was slightly equivocal on the value of 'trade usage' as opposed to 'natural and ordinary meaning': "there appears to be little reason for a rigid rule that disallows recourse to the trade meaning of a word that forms part of a composite phrase" (at [43]). Thus, Courts can be expected to test carefully the legal status of, for example, cost benefit analysis as a management tool. I am indebted here to a comment by Andrew Martin.

<sup>66</sup> While the previous RT and commentary was set out in a document of about 20 pages the new one fills about 120 pages. Much of that increase, however, arises from a long industry debate on 'competition benefits'. Known in other applied economic fields eg, transport economics, as induced or tertiary benefits, it is well known there that these are small in these kinds of markets, and the ACCC now notes in this in the new RT. It seems surprising that the debate on this issue should have taken the time and resources it did. Both versions of the RT can be found at [www.accc.gov.au/electricity/regulatory\\_test](http://www.accc.gov.au/electricity/regulatory_test).

uncertainties-but not of NEMMCO's algorithm which two legal enquiries had accepted-had come from Ministers, the National Competition Council and other bodies. In all the process took six years or so.

Many thousands of dollars were involved in NEMMCO's assessments and other related processes in that period. There were also the large costs borne by Participants for their involvement in the numerous consultations and in project preparation. Apart from preliminary hearings and the Tribunal's own costs, the NET proceedings ran for about a week, using the services of about a dozen senior and junior counsel. It seems extraordinary that the delays and other inadequacies have apparently been attributed in the EMRP proposals to the duplicative cumbersomeness of the regulatory processes involved in approval by ACCC.

This is now put forward as a major reason for key EMRP proposals discussed in the text. This merely distracts attention from the more relevant fact that at the root of the matter was the failure of jurisdictions, officials, advisers, and the industry itself to understand their own Code in relation to what they themselves regarded as the primary investment criterion for regulated networks, a major part of the whole system.

It is even more extraordinary that the same arguments are used in the EMRP for removing any avenue of merits appeal from the NEM system. In this only case of its use, not only did it do exactly what it is intended to do-test the practical application of the law in this most intricate and detailed econo-technical apparatus-but also displayed chapters of defects in the jurisdictional and regulatory systems. All of this was greeted by important NEM parties with silence, and efforts are now being made to remove merits review itself.

## APPENDIX 5

### Section 50 (3) of the Trade Practices Act

Without limiting the matters that may be taken into account for the purposes of subsections (1) and (2) in determining whether the acquisition would have the effect, or be likely to have the effect, of substantially lessening competition in a market, the following matters must be taken into account:

- (a) the actual and potential level of import competition in the market;
- (b) the height of barriers to entry to the market;
- (c) the level of concentration in the market;
- (d) the degree of countervailing power in the market;
- (e) the likelihood that the acquisition would result in the acquirer being able to significantly and sustainably increase prices or profit margins;
- (f) the extent to which substitutes are available in the market or are likely to be available in the market;
- (g) the dynamic characteristics of the market, including growth, innovation and product differentiation;
- (h) the likelihood that the acquisition would result in the removal from the market of a vigorous and effective competitor;
- (i) the nature and extent of vertical integration in the market.

From the data base at [www.austlii.edu.au](http://www.austlii.edu.au). The words underlined have hyperlinks in the original.



## APPENDIX 6

### NSW Generators and the ETEF

#### 1) The Electricity Trading Equalisation Fund

The decision to set up this fund arose after the former NSW generator Pacific Power refused to honour an agreement with the Victorian private distributor-retailer Powercor for certain transactions for energy to be supplied over a 10 year period.<sup>67</sup> When Powercor sought orders for performance Justice Gillard of the Victorian Supreme Court decided in its favour.

The ETEF is an arrangement introduced by the NSW Treasury in 2000 designed to provide protection to NSW retailers against the price risks associated with their regulated, or franchise, loads. It is based on the regulated energy cost (REC) for each Retailer, which is related to the long run marginal cost of electricity, as assessed by IPART.<sup>68</sup>

When the pool price is above the REC the fund pays the retailers according to the difference, and when below, retailers pay the fund. If the fund balance becomes negative, the NSW government-owned generators pay into the fund, and when it becomes positive the fund makes rebates to them up to the level of their contributions. In the meantime they are out of pocket. The ETEF exactly covers the exposure of retailers to pool price for their respective franchise loads, while the generators' risks are unchanged. From their point of view, when they have paid into the fund their profits have been 'garnished'.

#### 2) The effects of ETEF and the behaviour of generators

As REC is based upon long run costs the participants in the NSW scheme face an effective price based upon long-run marginal costs while all other operators in the NEM face prices based on short-run marginal costs. This probably means that for much of the time a NSW generator is setting the marginal pool price for the whole of the NEM, not just for NSW. This probably also influences the prices of forward contracts in the derivatives market so that all contestable consumers pay more, and also reduces the liquidity and hence the prudential soundness of the NEM's derivatives market.<sup>69</sup>

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<sup>67</sup> For details of the transactions and risk management practices in Pacific Power, see, NSW Auditor General (2000): *Review of Pacific Power's electricity trading practices*. Report to Parliament, Volume 6, 119-126.

<sup>68</sup> See, eg, Intelligent Energy Systems (April 2004): *The Long Run Marginal Cost Of Electricity Generation in NSW. A Report for the Independent Pricing and Regulatory Tribunal*. Sydney.

<sup>69</sup> These issues are discussed in more detail at McDonell, op cit, 82-5. See note 37.

In any event, between mid May and late June 2002 the balance of ETEF was reduced by over \$300 million as a result of extreme price rises well above REC.