Macquarie Generation

Corporate Office

34 Griffiths Road
LAMBTON NSW 2299

PO Box 3416
HAMILTON DELIVERY CENTRE
NSW 2303 AUSTRALIA

Telephone 61 2 4968 7499
Facsimile 61 2 4968 7433
Website www.macgen.com.au
ABN 18 402 904 344

The Reliability Panel
Australian Energy Market Commission
PO Box H166
AUSTRALIA SQUARE 1215

EMAIL: panel@aemc.gov.au

Dear Panel

COMPREHENSIVE RELIABILITY REVIEW

Macquarie Generation has prepared the following response to the AEMC Reliability Panel's *Issues Paper, Comprehensive Reliability Review*, released in May 2006.

The submission sets out Macquarie Generation's views on the setting of reliability targets and minimum reserve levels, performance of the NEM to date, accuracy of demand forecasting and the effectiveness of various reliability mechanisms.

The reliability standard

Macquarie Generation has no major concerns with the current approach to the setting of reliability targets in the NEM.

Macquarie Generation considers that the Reliability Panel should retain the unserved energy target as the measure for setting the reliability standard for the NEM. The National Generators' Forum has commissioned research by McLennan Magasanik Associates that sets out a process for calculating an optimal standard for the NEM based on the costs of providing reserve capacity and the economic costs of load shedding in various regions.

The MMA quantitative analysis shows that the current 0.002% unserved energy target is at the lower end of estimates of an optimal standard for the NEM. Macquarie Generation considers that the Reliability Panel should apply the MMA methodology to the calculation of an appropriate reserve target before recommending any variation to the existing target.

NEMMCO has introduced a number of improvements to the methodology it applies in calculating minimum reserve levels in the NEM in recent years. Key changes include:

- replacing the previous assumption of the largest generating unit in each region as the minimum reserve requirement with a more probabilistic assessment of likely reserve levels;
- recognition of the potential for reserve sharing between regions; and
- incorporating some degree of demand diversity between regions.

NEMMCO commissioned an independent review of its reserve margin methodology by KEMA in January 2005. KEMA generally endorsed the approach adopted by NEMMCO, with some suggestions for improving the forced outage data used by NEMMCO and recommending caution in the use of 10% probability of exceedance forecasts in its analysis. Macquarie Generation has worked with the NGF and NEMMCO to improve the reporting of forced data and agrees with KEMA on the need for care in the presentation of demand forecasts.

NEMMCO commissioned a further study by KEMA in 2005 to assess the process for preparing load forecasts for the Statement of Opportunities. That report proposed a number of improvements to the methodology for calculating load forecasts including a recommendation that NEMMCO undertake comprehensive back-casting of demand projections to test the accuracy of jurisdictional forecasts. Macquarie Generation supports the recommendations in the KEMA report.

Performance of the NEM

Macquarie Generation considers that the NEM is functioning well against the criteria of system reliability, competitive price outcomes and new investment.

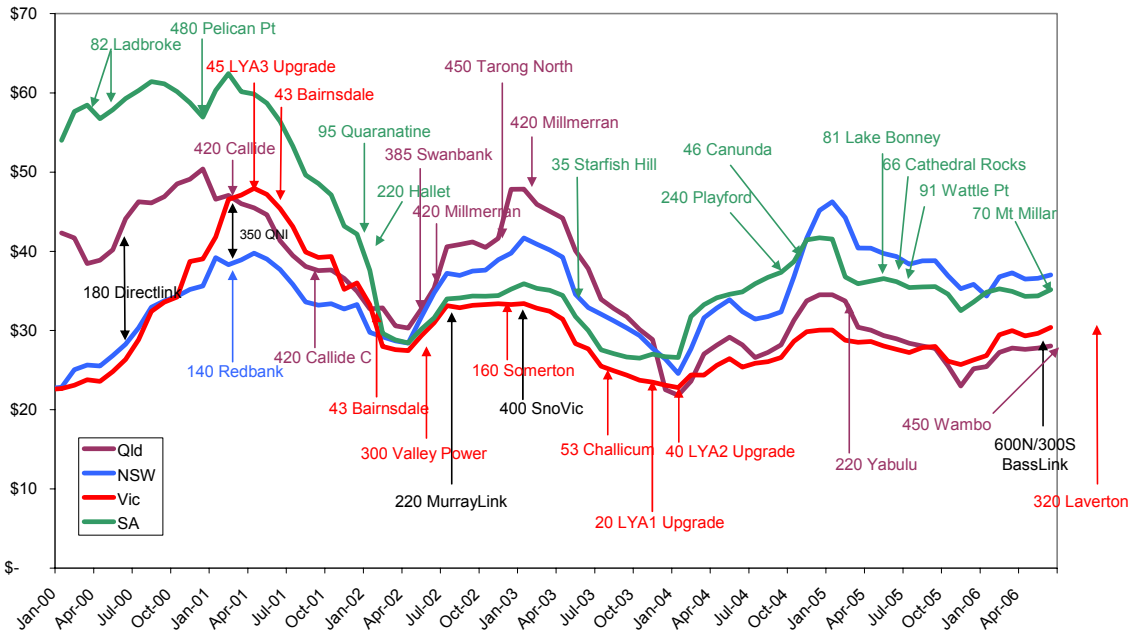
In the four years to the end of June 2005, there was sufficient capacity from the energy market to meet consumer demand at all times in all regions, apart from one incident in NSW during December 2004 when 200MW of load was shed for 1 hour.[1] Apart from significant load shedding in the summer 2000-01, when industrial action and high demand led to supply shortfalls in Victoria and South Australia, the NEM has delivered high levels of bulk supply reliability for customers. The long term average unserved energy result for NSW since market start is 0.0001% and nil unserved energy for Queensland.

Chart 1 shows rolling 12-month rolling average NEM spot prices in the period from January 2000 to end June 2006, and significant new generation and transmission projects commissioned in that time. The chart indicates that investment has occurred in response to price, most notably following the summer of 2000-01, and in those regions with higher prices. It also demonstrates the importance of interconnection in delivering significant price declines in Queensland following its entry and connection to the national market.

While there is some cyclical volatility in spot prices as shown in Chart 1, regional prices have on average been below the long run marginal cost of generation – NSW $34.66 MW/h, Queensland $35.44, Victoria $30.66 and South Australia $40.61.

[1] Reliability Panel, *Annual Electricity Market Performance Review, Reliability and Securi*ty, 2005.

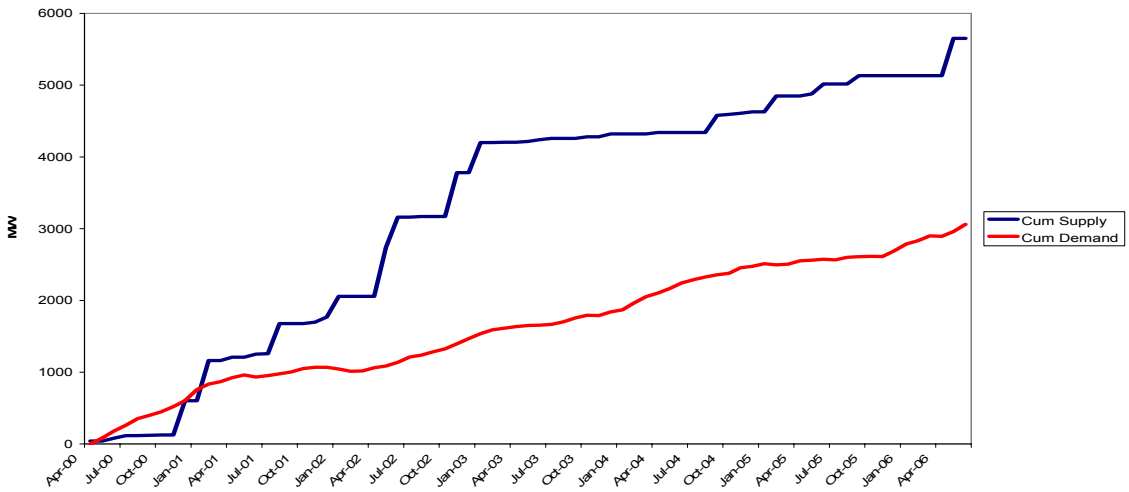
Chart 1: New investment in the NEM and 12 month rolling NEM prices



Despite some perceptions that the market has relied on a supply overhang since its commencement, the reality is that there has been significant new generation investment in the past 6 years. Chart 2 shows that investors have added a total of more than 5,500 MW of generation capacity since 2000, while annual demand has grown by less than 3,000 n the same period. The new generation consists of major new generation projects, as shown in Chart 1, but also significant upgrades and improvements to the existing portfolio of plant. These figures exclude the benefits of new capacity available to the market through Basslink (630MW) and the soon to be completed Laverton project in Victoria (320MW).

Attachment A provide a detailed summary of all new investment projects and transmission upgrades by region and fuel type over the last six years.

Chart 2: Cumulative growth in mainland NEM system demand and new generation capacity, April 2000 to June 2006



Demand forecasting

Macquarie Generation considers that there are some significant problems with the accuracy of demand forecasting by the jurisdictional planning bodies in some NEM regions. A review of historical forecasts shows a persistent bias towards a conservative estimation of likely demand levels.

Charts 3 and 4 compare forecast winter and summer peak demand levels in all mainland regions with actual demand levels over the last 6 years. The figures were compiled using the regional forecasts reported in the NEMMCO Statement of Opportunities for the year prior to the actual season and assume 5% load diversity in summer and no load diversity in winter, consistent with NEMMCO practice.

Chart 3 shows the combined winter actual demand is well below the 90% PoE in all but one year - the probability of this occurring is less than 0.0001%. Chart 4 shows that the actual summer demand tends also towards the 90% PoE forecast level in three years – the probability of this occurring 0.1%.

Chart 3 and 4 also show an increase through time in the spread between the 10% PoE and the 90% PoE forecasts, most noticeable in the summer projections. This increase in the range of forecasts may indicate a further move towards overly cautious forecasting, most noticeable in the summer months.

Chart 3: Mainland NEM winter peak demands, actual and forecast, 2000 to 2006

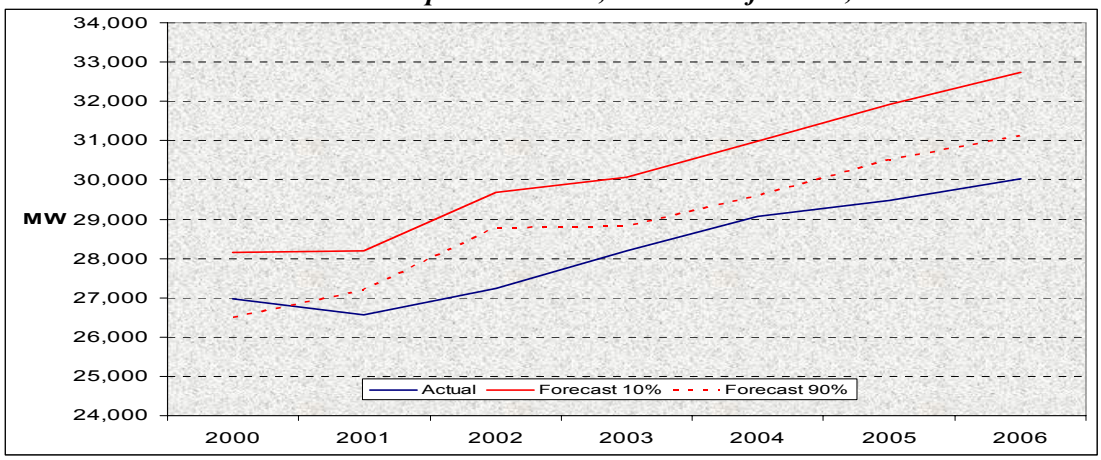
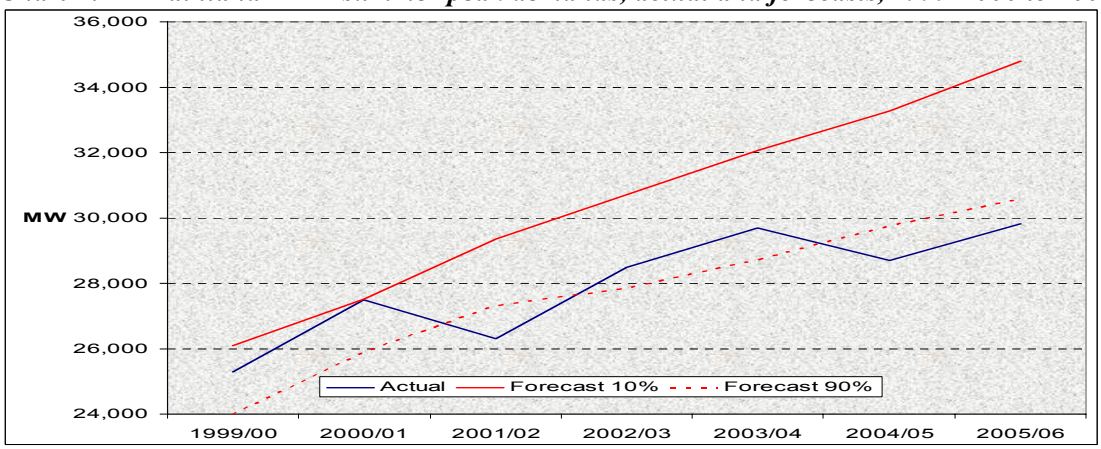


Chart 4: Mainland NEM summer peak demands, actual and forecasts, 1999-2000 to 2005-06



South Australian demand forecasts are by far the least accurate of all NEM regions – see Charts 5 and 6. This may be explained in part by the greater variability of load in South Australian driven by more extreme weather events in the southern States. Nevertheless, persistent overestimation of likely system load does have an impact on the projected assessment of supply and demand balances in the NEM through the NEMMCO Statement of Opportunities process and therefore external perceptions about the performance of the market. It may also lead to the pre-emptive triggering of reserve trading arrangements.

Attachment B details the winter and summer projections for the other mainland NEM regions. The charts show a consistent pattern of NEM forecasts tracking the 90% PoE winter forecasts in all regions. Like South Australia, Victoria also has a history of consecutive actual load levels at the lower end of the forecast range for both winter and summer. NSW and Queensland recorded actual summer load levels in the forecast range but consistently underestimated likely winter load.

Chart 5: South Australian winter peak demands, actual and forecasts, 2000 to 2006

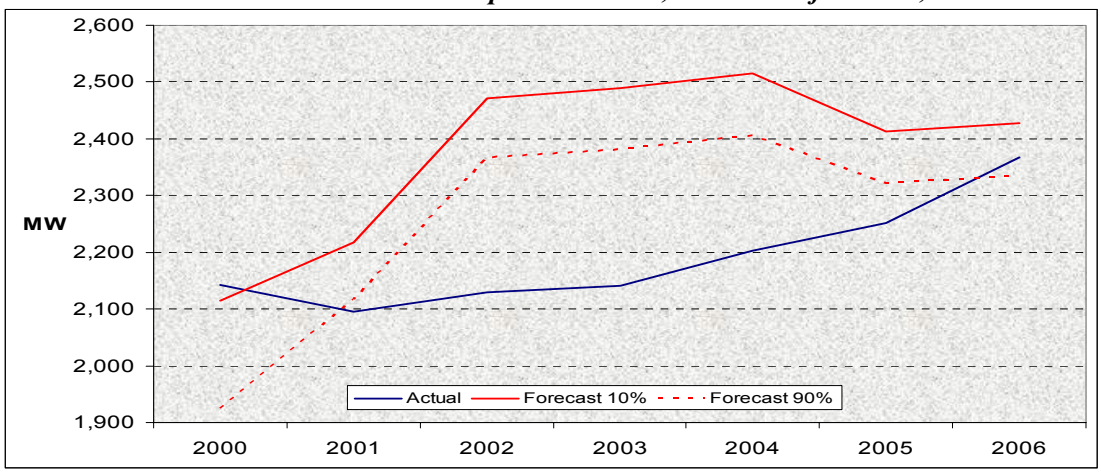
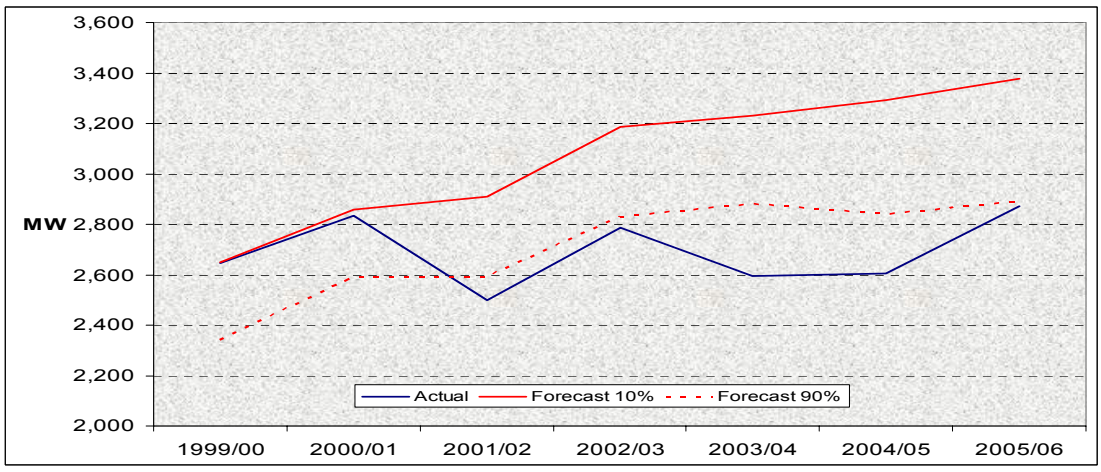


Chart 6: South Australian summer peak demands, actual and forecasts, 1999-2000 to 2005-06



Macquarie Generation believes that there is a strong case for some centralisation of the demand forecasting role given the demonstrated inadequacy of current arrangements and its impact on external stakeholder perceptions about looming supply shortfalls in future years. Given the importance of the demand forecasts in the various assessments of supply reliability, Macquarie Generation is of the view that the AEMC should recommend that a single body should prepare the demand forecasts using a nationally consistent methodology.

Intervention mechanisms

Macquarie Generation does not have a major concern with the ongoing operation of NEMMCO's reserve trader function provided that it is based on realistic assessments of likely demand and supply balances in each NEM region.

NEMMCO has enacted the reserve trader mechanism in Victoria and South Australian in the past two summers, recruiting 84 MWs of reserve capacity for 2004-05 and 375 MWs for 2005-06 at a total cost of $5.5 million. The reserve capacity was not required in either year. Macquarie Generation's concern is that NEMMCO may have triggered the reserve trader contracts unnecessarily, driven by conservative forecasts of anticipated summer loads in both years, as noted above. This action imposes a cost on customers to fund the reserve trader contracts, albeit relatively small as a proportion of total wholesale energy costs. More importantly, it may crowd out market-based responses from new investors and retailers to a potential tightening of reserve levels.

Macquarie Generation believes there is merit in the AEMC investigating the benefits of a standing reserve trader model – as detailed in attachment 2 of the Commission's issues paper. Under this arrangement, generation capacity would be commissioned by one of the market institutions, possibly NEMMCO. The plant would only operate in those trading intervals where loading shedding was imminent and spot prices had reached VoLL. This arrangement would need to be codified in the Rules to provide certainty for existing and potential investors that the reserve generation would not be dispatched in any other circumstance.

In terms of plant-type, it would make sense for the reserve generation to be open-cycle gas turbine generation, given its ability to operate at short notice and the relatively low capital cost of such technology. To offset the impact of possible transmission problems that may contribute to a potential load shedding event and limit the ability of any individual plant to service load in other regions, it may be necessary to strategically locate the reserve generation in more than one region of the NEM.

End use customers would fund the capital cost of the reserve capacity through an uplift payment or as part of network charges. The standing capacity would earn spot revenues when dispatched. These revenues would be used to offset fuel costs, with any residual revenue contributing to the capital cost of the plant in that period.

This model offers the potential benefit of providing some assurance to governments, policy makers and customers that there is dedicated plant available to deliver a known reliable supply of last resort to support the system in extreme circumstances. The energy-only market could continue to function as it does at present, with spot and contract prices providing a signal for new investment. Such a mechanism may remove the need for any substantial overhaul of the wholesale market, avoiding the potential disruption and debate over possible alternatives such as capacity payments to generators.

Yours faithfully

RUSSELL SKELTON
MANAGER MARKETING & TRADING

30 June 2006

Attachment 1: New NEM generation and interconnection, 2000 to 2006

Owner	Capacity	Fuel	Date Announced	Date Comm.	Region	Name/Location	Cost ($ millions)
Eraring Energy	1.7 Generation - new	Wind		Aug-98	NSW	Crookwell	$ 10
Origin	41.0 Generation - new	Gas		Apr-00	SA	Ladbroke Grove	
North Power	180.0 Interconnection			Jun-00	Qld/NSW	Directlink	$ 135
Origin	41.0 Generation - new	Gas		Jun-00	SA	Ladbroke Grove	
	35.0 Generation - new	Cogen		Jul-00	Qld	Bulwer Island	
Stanwell	4.3 Generation - new	Wind	Jun-99	Sep-00	Qld	Windy Hill	
Eraring Energy	3.6 Generation - new	Wind		Oct-00	NSW	Blayney	$ 20
International Power	478.0 Generation - new	Gas	Jun-98	Dec-00	SA	Pelican Pt	$ 400
Original - National Power/Babcock	140.0 Generation - new	Coal	Oct-97	Feb-01	NSW	Redbank1	$ 230
CS Energy/Shell	420.0 Generation - new	Coal	May-98	Feb-01	Qld	Callide C	$ 400
Transgrid/Powerlink	920.0 Interconnection			Feb-01	Qld/NSW	QNI Tarong to Liddell	$ 350
Loy Yang	45.0 Generation - upgrade	Coal		Apr-01	Vic	Latrobe Valley	$ 36
CVC Reef	0.5 Generation - new	Wind		May-01	NSW	Hampton	$ 2
Duke	43.0 Generation - new	Gas	Apr-00	Jun-01	Vic	Bairnsdale	
Pacific Hydro/ Energy Pacific	6.6 Generation - new	Wind	Nov-99	Jul-01	Vic	Codrington	$ 33
CS Energy/Shell	420.0 Generation - new	Coal	May-98	Aug-01	Qld	Callide C	$ 400
Yallourn	10.0 Generation - upgrade	Coal		Nov-01	Vic	Latrobe Valley	
Yallourn	10.0 Generation - upgrade	Coal		Nov-01	Vic	Latrobe Valley	
Origin	72.0 Generation - new	Gas	Mar-01	Dec-01	SA	Quarantine	$ 63
Origin	23.0 Generation - new	Gas	Mar-01	Jan-02	SA	Quarantine	$ 22
AGL	220.0 Generation - new	Gas/Distillate	May-01	Jan-02	SA	Hallett	
Duke	43.0 Generation - new	Gas		Jan-02	Vic	Bairnsdale	
CS Energy	385.0 Generation - new	CSM	Jun-00	May-02	Qld	Swanbank E	$ 280
Edison Mission	300.0 Generation - new	Gas		May-02	Vic	Valley Power	$ 164
InterGen Pty Ltd	420.0 Generation - new	Coal		Jun-02	Qld	Millmerran	
Transenergie	220.0 Interconnection			Jul-02	SA/Vic	MurrayLink Redcliff to Berri	
Stanwell	7.6 Generation - new	Wind	Apr-01	Aug-02	Vic	Toora	
Hydro Tasmania	3.8 Generation - new	Wind	Feb-00	Oct-02	Tas	Woolnorth Stage 1	
Tarong/ Tokyo EP & Mitsui	450.0 Generation - new	Coal	Nov-99	Nov-02	Qld	Tarong North	$ 580
AGL	160.0 Generation - new	Gas	May-01	Nov-02	Vic	Somerton	
Transgrid/SPI PowerNet	400.0 Interconnection			Dec-02	NSW/Vic	SnoVic Upgrade	$ 44
Pacific Hydro	2.0 Generation - new	Hydro	Sep-01	Dec-02	NSW	The Drop - Mulwala canal (Berrigan)	
InterGen Pty Ltd	420.0 Generation - new	Coal		Jan-03	Qld	Millmerran	
AGL	4.4 Generation - new	cogen		Mar-03	SA	Coopers Brewery Adelaide	6.2
Tarong	12.4 Generation - new	Wind	Oct-01	May-03	SA	Starfish Hill (Rabid Bay - Fleurieu Pe	$ 65
Earth Power	3.5 Generation - new	Landfill Gas	Jun-02	Jun-03	NSW	Camellia (west Sydney)	$ 37
Macquarie Generation	20.0 Generation - upgrade	Coal		Jun-03	NSW	Liddell	
Pacific Hydro	18.9 Generation - new	Wind	Aug-01	Jul-03	Vic	Challicum Hills	$ 76
Hydro Tasmania/Duke	120.0 generation - conversion	Gas	Feb-01	Mar-03	Tas	Bell Bay	$ 200
Loy Yang	20.0 Generation - upgrade	Coal		Oct-03	Vic	Latrobe Valley	
Loy Yang	40.0 Generation - upgrade	Coal		Dec-03	Vic	Latrobe Valley	$ 65
Macquarie Generation	20.0 Generation - upgrade	Coal		Apr-04	NSW	Liddell	
Hydro Tasmania	19.4 Generation - new	Wind	Feb-02	May-04	Tas	Woolnorth Stage 2 Bluff Point	
NRG Flinders	240.0 Generation - upgrade	Coal		Sep-04	SA	Playford	$ 118
International Power	16.6 Generation - new	Wind		Nov-04	SA	Canunda -Lake Bonney	$ 93
Eastern Star Gas	12.0 Generation - new	CSM		Oct-04	NSW	Wilga Park Narrabri	
Macquarie Generation	20.0 Generation - upgrade	Coal		Dec-04	NSW	Liddell	
Transfield owns ppa to Enertrade	220.0 generation - conversion	CSM		Feb-05	Qld	Yabulu - Townsville GT	
Babcock & Brown	29.0 Generation - new	Wind		May-05	SA	Lake Bonney - Stage 1	$ 158
Hydro Tasmania	23.8 Generation - new	Wind		Jun-05	SA	Cathedral Rocks	$ 120
Meridian Energy (Southern Hydro)	91.0 Generation - new	Wind	Jul-03	Jun-05	SA	Wattle Point	$ 180
Macquarie Generation	20.0 Generation - upgrade	Coal		Jun-05	NSW	Liddell	
CSR	63.0 Generation - new	Bagasse	Sep-03	Sep-05	Qld	Brandon (south of Townsville)	$ 170
National Grid International	630.0 Interconnection			Apr-06	Vic/Tas	BassLink	$ 780
Wambo Power Ventures	450.0 Generation - new	Gas		May-06	Qld	Dalby	$ 340
Tarong	70.0 Generation - new	Wind	Jun-01	May-06	SA	MtMillar	$ 130

Attachment B:

Chart A1: NSW winter peak demands, actual and forecasts, 2000 to 2006

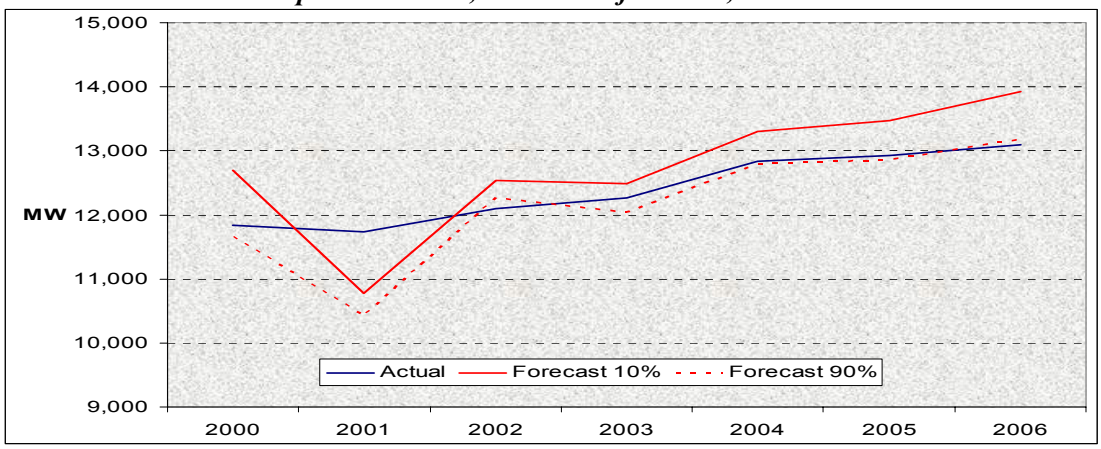


Chart A2: NSW summer peak demands, actual and forecasts, 1999-2000 to 2005-06

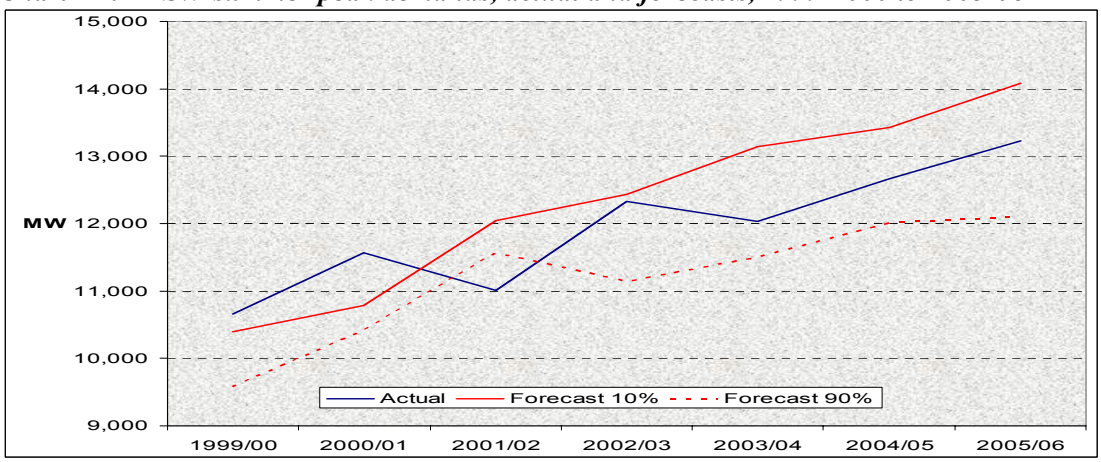


Chart A3: Queensland winter peak demands, actual and forecasts, 2000 to 2006

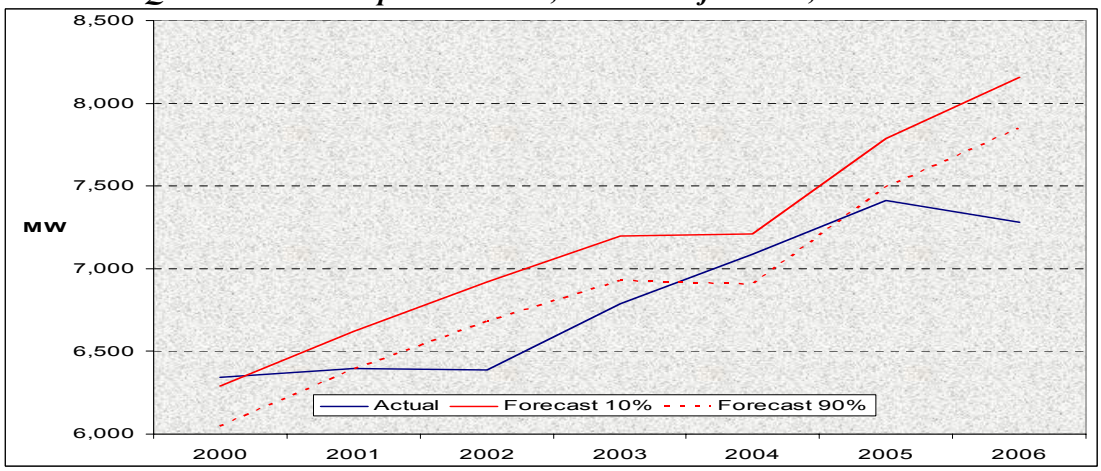


Chart A4: Queensland summer peak demands, actual and forecasts, 1999-2000 to 2005-06

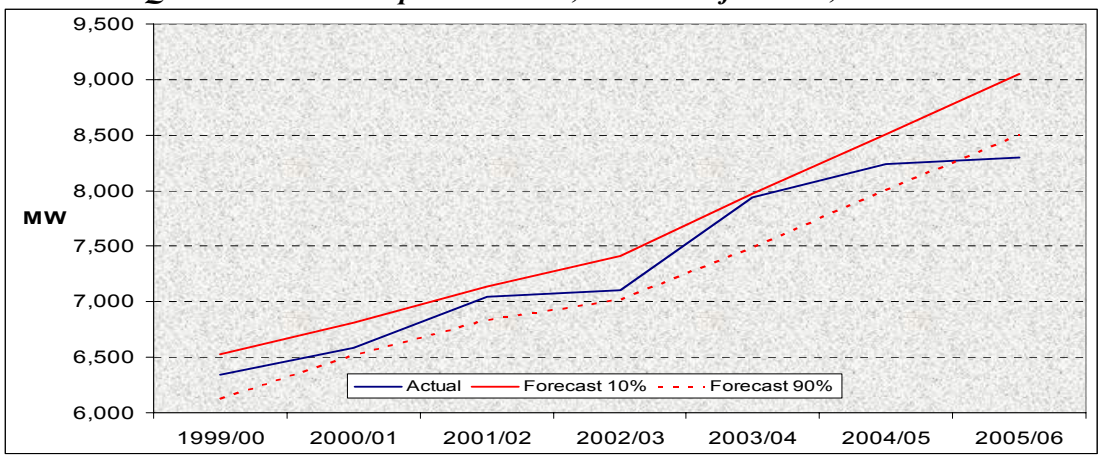


Chart A5: Victorian winter peak demands, actual and forecast, 2000 to 2006

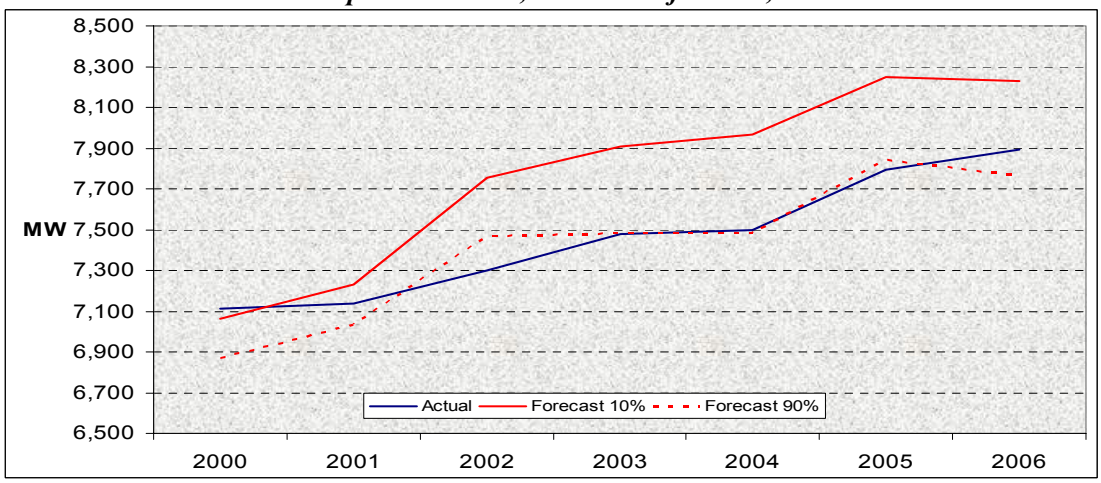


Chart A6: Victorian summer peak demands, actual and forecasts, 1999-2000 to 2005-06