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

Mr Neville Henderson
Chairman
AEMC Reliability Panel
PO Box A2449
SYDNEY SOUTH NSW 1235

Email: www.aemc.gov.au

Dear Mr Henderson

RELIABILITY STANDARD AND SETTINGS REVIEW

The AEMC Reliability Panel released its Draft Report on the *Reliability Standard and Settings Review* on 23 December 2009. Macquarie Generation welcomes the opportunity to comment on the report.

Reliability Standard

Macquarie Generation supports retaining the current NEM Reliability Standard of less than 0.002% unserved energy for each region and for the NEM as a whole. While the setting of the standard is largely a result of history rather than an explicit assessment of the economic value of reliability, the NEM gross pool design has achieved competitive price outcomes with high levels of reliability. There has been little need for external intervention such as the enactment of "reserve trader" mechanisms.

Macquarie Generation agrees with the Panel's view that it is difficult to assess whether the reliability settings are working effectively in achieving the USE target.

- Compliance over the previous ten year period should act as guide rather than a hard target. It would make no sense to adjust the reliability settings to attract or deter new investment in the short term in order to correct for events that took place five or ten years earlier.
- Future forecasts of demand and supply conditions are invariably based on a probability distribution, meaning that low probability events can contribute significantly to single year results. The occurrence of a low probability, high impact event in one year should not mean that the AEMC needs to tighten reliability settings for future years.

We agree that it is more important that the AEMC and the Reliability Panel look at the reasons for load interruptions and consider whether there are possible changes or improvements to the process of modelling and setting the reliability parameters. The reliability settings should be set on a prospective basis with the aim of bettering the USE target given reasonable expectations about market conditions.

Reliability settings

The ROAM modelling exercise applies "two complementary approaches" to calculate an MPC that will achieve the Reliability Standard:

- Approach 1: install sufficient capacity such that the marginal peaking generator remains profitable given a set MPC and assess the resulting USE;
- Approach 2: install sufficient capacity to achieve the Reliability Standard in each region in each year of the modelling periods and assess the associated MPC.

Through this iterative process, ROAM calculates the number of hours that the "extreme peaking generator" would operate to achieve the Reliability Standard and the MPC necessary for this new open cycle gas turbine to earn an adequate rate of return on the investment given those running times. The hypothetical new entrant is assumed to earn all revenues from the spot market.

Macquarie Generation accepts that the ROAM approach is a reasonable way of modelling the MPC necessary to attract new investment to the NEM for reliability reasons. Like all modelling exercises, it is necessarily a simplification of real-world behaviour in a market with many interacting forces. By withdrawing capacity from some regions to create periods of unserved energy to then calculate the MCP needed to attract investment, the modelling methodology is by design an artificial approach that does not take into account actual levels of supply reliability and the other drivers of investment behaviour.

Macquarie Generation considers that the ROAM approach is likely to overstate the level of MPC necessary to ensure the NEM continues to perform well against the Reliability Standard. Importantly, the Panel should give due consideration to the role of the forward contract market, particularly the role of cap contracts, in providing the signal and financial underpinning for new investment in peaking plant.

Current market settings are delivering robust reliability outcomes

The NEM has delivered significant new investment in generation capacity over the period 1996-97 to 2008-09. Despite significant surpluses of existing generation stock in New South Wales and Victoria when the market commenced, the increase in stalled capacity in the NEM has exceeded the increase in peak demand (see Table 1). A significant share of the new investment has gone into new gas-fired plant – 78% in New South Wales, 50% in Victoria, 43% in Queensland and 44% in South Australia.

Investors have announced a range of major investment projects in fossil fuel plant planned for the NEM. Macquarie Generation is aware of some 10,000MW of major new plant that could come on line at some stage over the next five years (see Table 2). We have also collated market reports and announcements for proposed new wind projects that would add an additional 11,000MW of installed capacity. As these projects have not passed the AEMO test for a committed project, they were not included in the Electricity Statement of Opportunities 2009 analysis of the supply and demand balance for each region. Nevertheless, these projects are all at some stage of planning, approvals and environmental consent.

The Panel's Comprehensive Reliability Review 2007 (p.18) demonstrated that the then NEMMCO SOO process routinely forecast supply shortfalls in each region in the order of two to four years into the future. History has shown that investors have proceeded with proposed projects within these timelines and the NEM has avoided breaches of the Reliability Standard.

Table 1: Mainland supply and peak demand growth 1996-97 to 2008-09

	Increase in installed capacity*	***Increase in peak load***	***Ave annual increase in peak load***
New South Wales (MW)	2,176	3,536	272
Victoria (MW)	1,425	3,237	249
Queensland (MW)	5,410	2,769	213
South Australia (MW)	1,527	715	55
Total (MW)	10,538	10,257	

Note: assumes 36% capacity factor for new wind.

The proposed projects in each region would absorb many years of peak load growth in that region – 23 years in New South Wales, 7 years in Victoria, 7 years in Queensland and 16 years in South Australia.

Table 2: ESOO proposed generation projects

Project	**Region**	**(MW)**	**Fuel type**
Braemar Stg 3	Qld	462	Gas
Braemar Stg 4	Qld	434	Gas
Spring Gully	Qld	1,000	Gas
Leaf Gully	NSW	360	Gas
Bamarang	NSW	780	Gas
Marulan	NSW	750	Gas
Mt Piper Unit 3	NSW	1,000	Coal
Mt Piper Unit 4	NSW	1,000	Coal
Wellington	NSW	896	Gas
Buronga	NSW	120	Gas
Parkes	NSW	120	Gas
Tomago	NSW	750	Gas
Tarrone	Vic	500	Gas
Mortlake Stg 2	Vic	470	Gas
Shaw River	Vic	500	Gas
Arckaringa	SA	560	Gas
Pelican Point Stg 2	SA	300	Gas
Total		10,002	

The ROAM presentation at the Melbourne stakeholder forum on 12 February 2010 indicated that the modelling required the withdrawal of capacity in all regions apart from South Australia over the period 2012-13 and 2013-14 in order to model periods of unserved energy and the MPC necessary to elicit an investment response. Given that the MPC is increasing to $12,500MWh from 1 July 2010 and the modelling shows that the Reliability Standard is likely to be met in most regions over the near term, the Panel should not rely on the modelling results alone when forming its recommendations. The reported shortfall in South Australia was modest and seems at odds with other ROAM modelling work indicating significant periods of binding interconnector constraints from South Australia to Victoria as a result of increased renewable investment in South Australia.[1]

[1] ROAM Modelling, *Network Augmentation and Congestion Modelling*, Report to the AEMC, June 2009

New generation investment is driven primarily by the contract market

The decision to invest in new plant is almost always driven by one or more of the following factors relating to the contract market.

- The ability to lock in forward sale contracts to underwrite the project. A merchant investor in an open-cycle plant gas plant would look at the current and forward price of flat cap contracts when weighing up the decision whether to proceed with a project. No investor would rely on spot market revenues as the only revenue stream to finance a standalone project.

- An existing generator may look to expand their generation portfolio to capture other benefits. It may make financial sense for a baseload plant to invest in peaking assets to offset the risk of unplanned outages during a high priced event. A generator may want to have assets in more than one region to take advantage of higher contract prices in that region. This would also make it easier for a generator to sign contracts against different regional reference nodes with a greater number of retailers.

- As a natural hedge for a retail position. Investing in peaking capacity would enable a retailer to earn revenues from the wholesale market at times of high demand and high prices, thus providing a physical hedge to offset or match the exposure for the retail load. The retailer would need to consider the cost of purchasing contracts for this peak load against the costs of building a peaking plant.

Peakier demand is providing an investment signal for new peaking plant

Over the last decade the 'peakiness' of load has increased (see Table 3). For example, the load factor, calculated by dividing average load by maximum load, has declined from 71% to 66%. The number of hours within two standard deviations above the average load has increased from 208 hours to 414 hours. Consequently, the number of half hours in which peaking generation is required to operate, and is able to recover fixed and variable operating costs, has increased. As noted above, the market has responded to this signal by investing in new gas-fired generation.

Table 3: NEM loads and load factors

	1998-99	***2003-04***	***2008-09***
Maximum load (MW)	25,713	29,702	34,169
Average load (MW)	18,356	21,116	22,552
Standard deviation (MW)	2,460	2,700	3,260
Load factor	71.4%	71.1%	66.0%
Hours above average + 2 standard deviations	208	282	414

The trend towards a peakier load is likely to continue in coming years resulting in an increase in the number of periods of high and volatile prices. The phase out of electric hot water systems and the installation of solar hot water systems and heat pumps will reduce overnight loads relative to peak periods. On the supply side, the Renewable Energy Target and other renewable subsidy schemes will increase the quantity of intermittent generation in the NEM. When the output of solar and wind plant is low, the NEM will require gas-fired generation plant to support the output of baseload plant. Retailers will have an incentive to ensure that they have contract cover for the high prices that are likely during these periods from non-renewable suppliers. This demand for contract cover provides the signal for existing or new participants to underwrite additional peaking plant.
Macquarie Generation has calculated the optimal plant mix for the NEM based on the historical load curve and the costs of various generation technologies (see Table 4). Our estimates show that the

NEM still has an excess of baseload generation of almost 3,900MW, the equivalent of some 8 years of baseload demand growth. The excess of intermediate plant is some 600MW or around 4 years of load growth in the shoulder periods. The NEM has always operated with a deficit of peaking plant, which we estimate to be in the order of 1,400MW in 2008-09. The excess of baseload and intermediate spinning reserves is more than adequate to offset the shortage of peaking plant.

Table 4: NEM mainland optimum plant mix

	1998-99	***2003-04***	***2008-09***	***Currently installed***
Baseload (MW)	20,800	23,800	25,800	29,700
Intermediate (MW)	3,700	4,000	4,900	5,500
Peaking (MW)	6,000	6,800	8,600	7,200

Macquarie Generation is of the view that the quantity of installed gas-fired generation will increase over the next few years. Gas prices are likely to remain below international levels over this period, and greenhouse gas abatement policies are likely to rule out large scale investment in new coal plant. The number of gas projects in the planning and consent phases is evidence that investments can proceed at short notice.

Generator outage risks

Generation businesses constantly review their forward contract risk profile. Generators model various scenarios using sensitivities based on movements of spot prices, contract prices, fuel costs and plant availability. Carbon price risk will dramatically complicate production and contracting decisions.

A higher MPC increases the financial risks associated with unplanned plant outages. If a generator is unable to operate and earn the RRN during an MPC event it may not be able to cover its forward contract position. The negative impact on margins can build quickly depending on the extent of the shortfall and the level of the MPC.

An increase in the MPC would force generators to revisit their forward contracting strategies. Generators face two alternatives. The first is to seek a higher contract premium from counter-parties for the additional financial risks of contracting; a cost that would be borne by retailers and end-users. If a generator does not consider that contract premiums are sufficient to offset the potential losses of unplanned outages, it would reduce the number and volume of forward contracts that it is willing to sell. Less contracting is likely to add to price volatility in the market and result in more variable returns for generators.

Macquarie Generation is of the view that the costs and risks associated with a more volatile market, for both existing participants and potential entrants, should be taken into account by the Panel when setting the MPC. This would suggest setting a market cap at a level below that reported in the modelling work.

Demand side response

The ROAM modelling assumes that Reliability Standard is achieved at the margin by an incremental addition to installed capacity in the NEM. The modelling does not take account of the potential contribution of a more active demand side response during periods of high pool prices.

We understand that ROAM incorporated the *AEMO Electricity Statement of Opportunities 2009* estimates for committed demand side response in the modelling work. Macquarie Generation considers that these figures understate the level of demand side response that is participating in the market during periods of high prices. We have observed a trend in recent years for significant load

reductions in response to high pre-dispatch prices that cannot be explained by temperature changes alone.

Demand is likely to become more responsive in future years for a number of reasons: more customers are becoming aware of the benefits of offering load flexibility; the number of demand-side aggregators is increasing; the further rollout of 'smart meters' and time-of-use pricing; and the increase in the MPC to $12,500/MWh provides an additional financial incentive for customers to enter into load varying contracts.

Generators are obliged by the NEM Rules to report their commitment decisions through the PASA process and their day-ahead bids. There is no commensurate obligation on market customers. Macquarie Generation supports the AEMC's *Review of Energy Market Frameworks in Light of Climate Change Policies 2009* recommendation for AEMO to explore options for greater reporting of demand-side capability information and to allow AEMO to make probabilistic assessments of demand-side response at times of peak demand. Better information on the real level of demand-side response in the NEM would show up in the modelling results as a lower MPC.

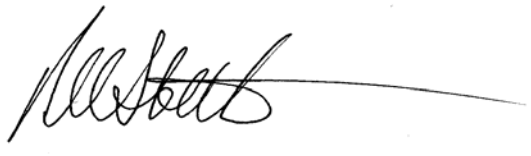
Summary

Macquarie Generation does not support increasing the MPC above $12,500MWh in 2012-13 and 2013-14.

The NEM has attracted investment in response to demand growth and the balance of peaking plant has improved. The regions have enjoyed high levels of supply reliability and the forecasts of supply shortfalls, generally against highly conservative demand forecasts, have never materialised. There are many projects in the planning and development stages that should ensure that investment continues to match or outpace load growth and that the NEM remains competitive.

New investors focus on the returns that could be achieved from the contract market or the benefits of matching a retail load with a physical exposure to the pool market. While the MPC has an indirect influence on contract prices, no investor would commit to a project that relied primarily on high spot price outcomes. We believe that the ROAM approach is not without merit, but it should only be one input to the process. It artificially constrains the analysis by withdrawing capacity to create periods of unserved energy. It does not take account of the real world drivers of investment, the scope for a more active demand side market and the risks for participants of high price events and the impact this may have on contracting and investment decisions.

Yours faithfully



RUSSELL SKELTON
MANAGER MARKETING & TRADING

23 February 2010