International Power Australia and Loy Yang Marketing

Submission to the AEMC – Comprehensive Reliability Review

July 2006

Summary

International Power Australia (IPRA) and Loy Yang Marketing Management Company Limited (LYMMCo) make this joint submission reflecting their common views regarding the risks to market sustainability and long-term provision of reliability under the current NEM arrangements.

IPRA and LYMMCo are members of the National Generators Forum (NGF) and broadly support the detailed submission made by the NGF on their behalf; however IPRA and LYMMCo seek to address some specific issues in greater detail and emphasis in this submission.

This submission reviews the performance of the market from a reliability perspective and in terms of investment sustainability.

Since market inception reliability has been excellent. The current NEM arrangements have not suffered the dramatic market failures evident in other markets such as California, and indeed have led to broadly efficient outcomes. However, we are concerned that the positive outcomes that have been delivered to date have occurred as a result of initial market over-supply and the involvement of externalities in the market, and that the underlying market mechanisms for reliability and sustainability have not been tested.

The market commenced with a large capacity overhang, particularly with respect to base load in NSW and Victoria, and also the plant mix was far from optimal (for example supply demand balance is not expected to be reached for some years in NSW and Victoria and SA).

Despite this surplus supply investment has occurred in the market. Some of this (public and private) investment has occurred as a result of market price

signals; however a significant amount has occurred as a direct result of state government development agendas and subsidies which encourage renewable energy supply (Appendix 2).

We have reviewed the basis of the NEM market design and have concluded that while any investment is driven by externalities and not market price signals the NEM will never operate to provide sustainable revenues, and that these externalities may hide underlying deficiencies in the design.

This conclusion is supported by independent analysis of other energy only markets (Reference (1) - Henney and Bidwell, and Reference (8) - W Hogan), (see also Appendix 1).

Evidence that externalities are a significant distortion on NEM outcomes is demonstrated in the current lack of correlation between the 365-day rolling average pool price and regional year ahead contract prices. In most regions there was a strong correlation at market inception for a period of time; however now the correlation is reduced or non-existent in all regions (Refer Appendix 3). These externalities would include government intervention and participant strategies to manage risk (horizontal and vertical integration).

Comparison of regional contract prices with new entry prices, (Refer Appendix 4), shows that in the regions where the assets are all privately owned (Victoria and South Australia) market prices are below new entry price and are decreasing. In NSW and Queensland contract market prices are above new entrant and increasing. The lack of correlation with the pool price (above) suggests that in these latter regions this is due to externalities rather than the fundamental market drivers.

In addition we note that in the last two years NEMMCO has invoked the Reserve Trader for the Victoria/South Australia region. This action is inconsistent with the market price signals, and whether due to a fundamental disconnect between price signals and market outcomes, or conservatism by NEMMCO in ensuring reliability, still indicates a level of market failure. In passing, early action by NEMMCO increases investor risk. (This is discussed in more detail in the NGF submission).

Our submission demonstrates that the NEM's ability to deliver a reliable supply and sustainable investment is far from certain. In this regard the NEM is a fragile construct that is not robust against external intervention or lack of competitive neutrality.

We note that resolution of these problems is complex and may be beyond the scope of the AEMC to address. We note also that this issue is of considerable concern even in capacity and energy only markets in the UK and the US (some relevant references attached).

The problem is complex. However if the NEM is to be viable the following issues (some of which are outside the scope of this review) must be addressed:

1 Externalities -

- Government intervention for state development reasons;
- Competitive neutrality between public and private investment; and
- Implementation of greenhouse gas mitigation measures in a sustainable manner.

These may be addressed by the current ERIG review.

2 The governance regime in which the NEM operates is reformed to ensure

- Sustainable revenue streams (providing the “missing money”);
- Reserve Trader and NEMMCO reserve calculations are discontinued or at least revised to be consistent with market outcomes and free from intervention (see NGF Q32, 38, 39 and 42). The Reliability Panel undertakes a comprehensive and regular analysis of the reliability settings (VoLL and the CPT) to ensure that the NEM delivers sustainable revenue streams at reasonable levels of risk (see NGF Q8 and 28); and
- No government intervention.

3 If none of the above is achievable redesign of the NEM must be considered.

IPRA and LYMMCo believe that the NEM:

- Should not be reliant for ongoing customer reliability on intervention by NEMMCO and governments, yet this is currently a significant provider of reserve capacity;
- Should not be dependent only on large incumbent retailers for delivery of base-load capacity, yet these may be the only entities able to underwrite the financing of new base load capacity under current arrangements; and
- Cannot afford a design with fundamentally unsustainable attributes that will not attract independent privately-financed new entry.

Introduction

International Power Australia (IPRA) is the largest private investor in electricity generation in Australia. Loy Yang Marketing Management Company (LYMMCo) trades the largest privately-owned generator in the NEM. The partial owner of Loy Yang Power (AGL), and the owner of International Power Australia (International Power plc), one Australian, and one international, are two of the private investors that have persisted in investing in the Australian NEM while others have exited.

These two businesses have prepared this joint submission to the Comprehensive Reliability Review (CRR) because they share a common interest in the sustainability of the NEM market, and a common concern that it may not be achieved.

These specific issues relate to the broader questions of market sustainability which have been opened by the Reliability Panel, and we commend the Panel and the AEMC for assessing the reliability issues in the NEM from this broader perspective.

The NEM EOM arrangement has been in operation for seven years (although similar arrangements in Victoria and NSW existed prior to NEM). To date, the market has not experienced major failures as seen in some other electricity markets, most notably California.

Whilst the NEM arrangement appears to be delivering short term efficiencies, and new entry has appeared in the market, IPRA and LYMMCo are concerned that this apparent success is masking long term deficiencies. We make the following observations –

- Forward price curves in Victoria and South Australia typically are not at levels that support either current participants or new entrants, (Refer appendix 4) and yet NEMMCO has exercised its reserve trader role on two occasions;
- In the view of IPRA and LYMMCo, it can be argued that while peaking generation has entered the NEM market, only one base load generator (Millmerran) has entered the market without support or direction from respective state governments, and that investment is unlikely to presently be profitable;
- Other than this one generator, we are not aware of any non-government investments that have been built on a truly merchant basis; that is, in reliance on NEM spot and secondary markets alone for sufficiency. In each case, in our view, some externality has influenced the investment decision (for example government intervention, the influence of a significant retail position, or the influence of a parallel or upstream fuel position); and
- There is an increasing trend for generation investors to be seeking long-term off-take agreements for plant installed to underwrite financing.

IPRA and LYMMCo would argue that a combination of the above observations could be a signal of potentially material market failure, and

raise concerns not only about the short term implications for customers and participants, but also regarding market sustainability in the long term.

Based on the analysis presented in this submission, supported by a range of other external references outlined herein, it is our view that the energy only design of the NEM will not provide adequate supply reliability in the long term because the volatility it requires to adequately remunerate generation investments will not be permitted to occur, and because the design has no fundamental driver for provision of reserve plant.

As a stand-alone framework, the NEM is not currently delivering sustainable revenues to merchant participants. It is potentially flawed, and solutions for providing stable medium to longer term economic signalling must be explored.

Detailed response

We address these issues within the framework of the questions presented in the Issues Paper, as follows:

1 Is there now, or is there likely to be in the future, a problem with supply reliability in the NEM?

The NEM market design is based (*inter alia*) on the following principles:

- The market is intended to enable all generators and generation types to compete on equal terms;
- Competition in the market should result in suppliers offering generation close to their short run marginal costs (SRMC);
- Demand side participation via bids will result in a two-sided market where the intersection of bids and offers sets the spot price;
- As higher SRMC plant is dispatched and sets the spot price at that higher SRMC, the common pricing mechanism ensures that lower-SRMC plant receives a contribution to its fixed costs;
- VoLL is both a market cap, and the default demand bid for market customers who have not otherwise bid their sensitivity to price, thus applying at times of scarcity;
- Under scarcity conditions, the level of competition reduces, and generator offers may not be constrained to SRMC and ultimately may approach the market cap. This is particularly the case where high-SRMC plant seeks a contribution to fixed costs. The resultant price increase attracts new entry once the projected price post-new entry delivers sustainable income for the new participant;
- Scarcity, or more realistically, the threat of scarcity, prompts market customers to contract with reserve plant; and
- Hedging contract prices will be driven by the underlying spot market price, and as supply becomes short, these prices will promote either new entry to access them, or long term contracting that will support new entrants.

The NEM has not experienced significant supply shortages for plant-related reasons, despite several significant generator failures and outages of both plant and fuel supplies at critical times. In addition, the NEM has not suffered from events such as occurred in the Californian market. Nor has there been a major blackout as experienced in the US, EU and elsewhere.

However the absence of market failure to date should not be used as a guide for the future as, since inception, the market has been the beneficiary of oversupply and the influence of externalities on new investment. Consumers have been the beneficiaries of a high level of reliability which they have (for the most part) not paid for. The market has not yet been called on to deliver base load capacity (without intervention). These factors, in our view, are likely disguising the design defects.

In practice, what have we observed?

- The NEM commenced with a significant overcapacity, particularly in relation to base load plant in NSW and Victoria. This oversupply has continued as investments have occurred for a variety of reasons, some of which are externalities to the NEM market. For analysis, we have taken a view of these investments and categorised the investment that has occurred since the start of the NEM as either market price driven, low new entry price driven supply increments, or investments driven or subsidised by externalities to the market.

  There have been some notable examples of price driven investment, mainly peaking and intermediate plant (for market and other reasons). However there has also been a significant amount of investment driven by market externalities, some examples are;

  - Wind generation (government subsidy);
  - Base load in Queensland (encouraged by government agendas); and
  - Basslink (encouraged by the Tasmanian Government for drought-proofing Tasmania).

  Appendix 2 contains a more detailed summary of this analysis. While investments subsidised by externalities continue, *prima facie,* it is unlikely that the market prices will reach levels that will encourage private investment in generation (that is not otherwise underwritten), particularly the base load segment.
- There has been some incremental expansion of existing base load plant across the market where this can be carried out at a cost much less than both new entrant cost and existing forward contract prices, and hence be demonstrated to deliver a return. Refer Appendix 2, Category 2.
- The market has only delivered base load capacity with government encouragement.
- The NEM market design envisaged significant demand side response by bidding into the market, at times setting the price. For a variety of reasons demand side response has not developed to the extent envisaged and where demand response does occur it is not bid into the market. Consequently the market can be described as "one sided" where generator offers set the price, and customers' desired level of reliability largely goes un-signalled.
- There is no contracting by participants for reserve plant, and no direct market drivers to cause it to happen. Market customers can rely on Reserve Trader intervention, and in any event it is questionable what market signal would drive them to contract, because they are not faced with end consumer sanction if supply fails. In principle, the most likely to contract should be generators, covering unreliability and backing back hedge positions they may have adopted. However, the signals clearly do not encourage this behaviour[1].
- Actual scarcity of supply, even when economic, remains politically unacceptable, and scarcity pricing threatens intervention by politicians or regulators. A fundamental requirement for

[1] This may ultimately result from the fact that pool customers are partially un-hedged.

remuneration of generation investment is therefore not present, or at best muted.

- There is evidence of a decreasing correlation between spot price and prices in the wholesale contract market, implying significant externalities impacting contract prices. Refer Appendix 3 Pool Price Contract Price Correlation.
- Intervention in the market by NEMMCO has been premature as the basis of the NEMMCO calculations of the level of reserve required to meet the USE target appear to err on the side of early intervention. This issue is explored in detail in the NGF submission and the attached MMA and ROAM reports;
- NEMMCO has exercised its Reserve Trader powers twice in the past and the indications are that more intervention in the future remains likely. However, in consultation with the jurisdictions, NEMMCO has not fully delivered the target levels of reserve. This suggests that current reserve levels are specified too high.

In an energy-only market, with no externalities, revenue adequacy for generators relies on both an optimal supply/demand balance and optimal plant mix and on generators being able to exercise intermittent market power[2] at times of high demand. In practice these "ideal" conditions are unlikely to eventuate, particularly when incidences of the high prices necessary to provide the contribution to fixed costs evoke political and regulatory intervention. In short, scarcity pricing threatens intervention, and actual scarcity is not a permissible option despite these conditions being integral to sustainability of the EOM design. In our view, there will always be some "missing money"[3]. This is explained further in Appendix 1 and in the reference documents.

Further, beyond this fundamental sustainability issue, the NEM arrangements rely solely on participant response to the VoLL signal to bring forward reliability. In the absence of any overt payment to attract "insurance" supply options, supply or demand-side participants are expected to be motivated to contract to underwrite this plant, despite questionable sustainability in the underlying energy market.

Furthermore, these reliability arrangements seek to cover infrequent events (ie, the 1 in 10 year events (10% POE demand)). This means that in a number of years there will be surplus supply, and consequently low pool and contract prices and it is not clear that the infrequent extreme events will be reflected in the wholesale market to compensate for these periods of low prices. With the absence of long term contracts and the interdependence of base load, intermediate and peaking plant on revenue adequacy, it remains far from clear that independent investment will continue to be made to meet peak demand, let alone to provide reserve.

Financing of peaking or reserve plant with the prospect of 1 in 10 year or less (remuneration of reserve requires either an 'insurance contract' or failure of normally-operating plant during 1 in 10 year events) returns is unlikely, while underwriting the heavy long-life financial commitment in base load plant is even less likely. It may be that the only participants that can underwrite base load plant will be very large vertically integrated retailers,

[2] 'Market power' in this instance is the ability to offer at prices exceeding SRMC.

[3] The specific deficiency to be addressed commences with the "missing money" and hence the "missing investment signal" as discussed in papers by W Hogan (Reference 8).

though even in this case, effective commitment to 30-40 years of guaranteed market is a high risk position, when the uncertainty regarding revenue adequacy under the current market model persists.

Given the interaction of the plant mix and its sensitivity to the "top end arrangements" for revenue adequacy of all plant, it is imperative that the review of the supply reliability is a holistic process that considers the revenue adequacy of all active and reserve tranches of supply. Both IPRA and LYMMCo have faced, and continue to face, market conditions threaten sustainability of their assets.

The NEM is not the only competitive electricity market where there is a concern with supply reliability. References 4 to 7 demonstrate that the design of an electricity market that reliably produces sustainable revenues is a challenging task. These papers relate primarily addressing reliability deficiencies in market designs that included capacity payments, the solutions being proposed in some cases consider combining the best features of capacity and energy markets. Even these combinations are problematic. These papers do not provide any definitive solutions to address the issues in the NEM.

The assumption that simply increasing VoLL will increase pool and contract prices at times of scarcity and hence generate the "missing money" is problematic. Increasing VoLL significantly increases participant risk at peak times. This is highly likely to drive retailers to invest in peaking plant as an insurance policy against extreme events which may result from normal market operation or due to force majeure events such as transmission failure, well ahead of the market signalling a supply shortfall, consequently maintaining the oversupply and capping market prices. This strategy to manage risk is in part is due to the fact that the Cumulative Price threshold (CPT) is not an effective mitigator of risk which results from force majeure events where the normal market risk management mechanisms fail. Because it is set at a high threshold so it will not constrain normal market operation, it is ineffective in managing force majeure events. (This is also discussed in more detail in the NGF submission.)

7 In assessing stakeholder responses to the key Review questions, how should the Panel approach the relative importance of particular relationships?

The most important relationship to be considered is that between the reliability settings and the promotion of efficient investment, ie investment which is consistent with the market objective.

However the Panel should consider the impact of market sustainability issues beyond the technical investment drivers as they can also have an over-riding impact on reliability.

There are many additional impediments to sustainability which appear to be within the scope of the current review but outside the power of the AEMC to address such as:

- MRET subsidised generation entering the market before capacity is needed and in part stranding existing investments.
- Jurisdictional intervention in the NEMMCO reserve calculation process and the Reserve Trader role.
- Some governments are choosing to sponsor state development via the NEM (local generation). This distorts market signal and revenue adequacy in the process.

- It is likely that a cost of carbon will be introduced (tax or emissions trading). Depending on the magnitude of the impost, this can significantly alter the dispatch order and generation mix. The Panel needs to examine the "cost of carbon shocks" on system reliability and sustainability.
- Regulation of EOM (energy only markets) by regulators and jurisdictions seeking to mitigate perceived market power which has an undesired side effect of impeding the market signals essential for maintaining reliability signalling.

At the very least a process for addressing these issues should be developed if market sustainability is to be addressed.

9 Which scenarios in Appendix 2, if any, would you like to see further developed in the Panel's analysis and why?

The suggested approaches from Table 1, pp 53 need further development and assessment as follows:

- Compulsory contracting (over 5+years ahead). Broadly, IPRA and LYMMCo are against intervention into the contracts markets. The secondary financial market has been successfully developed by participants to meet there needs, and imposed solutions in this area are fraught with risk of failure often attending contrived or imposed solutions. However, we are more critically concerned with sustainability and provision of reserve, and compulsory contracting is one of the options to deliver this.
- Examine compulsory physical backing of capacity by retailers as an option.
- Provision of statutory reserve, which only operates to prevent load shedding, which is paid by a levy on consumers (thus making the capacity signal tangible, and which triggers VoLL pricing if activated (thus maintaining the underlying scarcity signal). Statutory Reserve will not necessarily solve all of the "missing money" problem.
- Changes to trading arrangements to include capacity payments to all plant (also 5+ years ahead).

25 Do the current price mechanisms encourage appropriate investment? Explain why or why not.

This issue has been largely covered in our response to Question 1 above. In summary there are three levels of concern:

1 The existing trading arrangements of an energy only market and a VoLL price cap create a situation where there is "missing money" and hence "missing incentive" to ensure sustainability of the investments necessary to supply energy. This deficiency has left generation investments in the NEM subsidising customers to their benefit in the short term, but at the same time threatens delivery of new capacity in the long term. The most capital-intensive capacity, base load, is clearly at greatest risk:

2 The EOM does not inherently reward the provision of reserve, and there are no overt drivers for market customers or suppliers to contract for it. Coupled with opportunities of order 1 in 10 (or worse

since plant failure must also occur simultaneously with 10% POE demand, investment is not encouraged without consideration of some externalities; and

3 Since externalities are potentially required under current arrangements, the investment climate becomes more tenuous, because only those able to value those externalities are able to invest (eg, large retailers and state governments). New merchant generation is unlikely to invest, and the COAG 'Competitive Neutrality' and the NEM 'low barriers to entry' objectives are not met.

30 What impact will the changing generation mix, particularly the increased use of non-scheduled generation such as wind, have on reliability outcomes? Should there be improvements to the price mechanisms to take that impact into account?

The market trading arrangement relies on a balance of demand and supply as well as a balanced generation mix. Any scheme which subsidises generation that would not enter the market based on market signals alone, such as the Federal MRET or NSW GGAS systems (on new entrants) will distort the market and its economics. This is as a result of encouraging generation ahead of when it would be otherwise needed to meet energy demand alone, and by reducing its cost structures (short and longer term). This impacts both the existing generators (defers sustainability), and potential new entrants (deferred requirement).

With respect to the wind generation, there is an added requirement for backup supply to cater for instances when wind is not generating or its output is minimal - this has a negative financial impact on existing generation and the system as a whole, since existing generation load factors (and hence energy-based revenue) are reduced, yet wind contributes little to regional system reliability. The economics of the whole system are compromised as outlined in *"Impact of wind power generation in Ireland on the operation of conventional plant and the economic implications", ESB Nation Grid, February 2004.*

Notwithstanding the policy settings that might be applied through subsidy for renewable generation (wind specifically), the presence of wind demands additional frequency control support (to accommodate its intermittency), but ancillary services payments alone are insufficient for sustainability. For a level playing field (in accordance with the NEM objectives), and for economic efficiency, wind should fund the consequences and corrections it imposes on the market.

31 Would the introduction of improved forward market mechanism contribute to reliability outcomes? Provide full details of your proposal and supporting data.

The market needs to deliver longer term supply/demand requirements as well as meeting rare events (1in 10 year type reliability events). Forward contracting to underpin any arrangements for reliability and delivery of sustainable market outcomes will clearly be required, since only with long-term contracts will sufficient certainty for investment be forthcoming.

However, as indicated above, IPRA and LYMMCo do not support interference in the secondary financial market, or requirements for forward

energy contracting in general. This would remove much of the competitiveness in the current market arrangements. The current forward market is developed by participants for participants, and to a large extent has met their needs. There is no apparent impediment to willing parties meeting mutual needs through the financial forward market. Intervention to try and externally design 'improvements' to this market is fraught with danger that the result will be the same as it is in other cases where markets are imposed. 'Improved' suggests a deficiency. We are aware of no such deficiency except perhaps lack of liquidity. However, the latter is a function of the needs of participants, and will not be corrected by intervention.

38 Does NEMMCO intervene in the market too often? Should intervention be seen as part of the 'normal' workings of the market, or should there be continued effort to treat intervention as exceptional and to expect the market to deliver investment sufficient to maintain reliability to the level of the reliability standard?

The market should deliver the short and longer term reliability requirements without relying on the Reserve Trader arrangements by NEMMCO. The Reserve Trader arrangements were intended to be the "training wheels" transition to the NEM arrangements and as such had a sunset clause.

In fact, contrary to the market design principles espoused above, the presence of the Reserve Trader arguably attenuates the risk, and hence the already-weak signals for participants to ensure reserve is delivered.

The Reserve Trader does not induce new supply into the market. Because it is invoked only months before the perceived shortfall it relies primarily on demand response and does not underpin new investment nor provide investment signals.

Unfortunately the Reserve Trader arrangements have been used on several occasions and, without a paradigm shift in the approach to reliability issues, are likely to become institutionalised.

Any intervention by NEMMCO under the Reserve Trader arrangements must be viewed as market failure and trigger a major, and holistic, review of the market trading arrangements and market sustainability which should identify the reasons for the failure and canvas a wide range of possible solutions.

Finally, the accuracy of NEMMCO demand forecasts (sourced from others as they are) has been open to criticism for being systematically too high, particularly at the 10% POE demand levels that underpin Reserve Trader intervention. These systematic biases (albeit biased as a result of the considerable pressures on those who make the estimates not to be seen to participate in load shedding) clearly will cause the Reserve Trader to be also called systematically early.

Further contact:

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LYMMCo. Roger Oakley, 03 96122211 (roakley@lymmco.com.au).

References:

1) *Henney and Bidwell, POWER UK / ISSUE 122 / APRIL 2004, "Will NEAT ensure generation adequacy?", pp10-26,*
2) *Simshauser P, 2006, "The dynamic efficiency gains from introducing capacity payments in the NEM Gross Pool",*
3) *ESB Nation Grid, February 2004, Impact of wind power generation in Ireland on the operation f conventional plant and the economic implications",*
4) *Miles Bidwell June 2005, Vol. 18, Issue 5 POWER UK, Reliability Options: A Market-Oriented Approach to Long Term Adequacy,*
5) *Crampton & Stoft April 2005, A capacity Market that Makes Sense,*
6) *Crampton & Stoft April 2006 The Convergence of Market Designs for Adequate Generating Capacity – A White Paper for the Electricity Oversight Board,*
7) *Paul Peterson et al, Synapse Energy Economics, December 2004, Kinky Curves and other Reliability options,*
8) *William Hogan, October 2005, On an "Energy only" electricity market design for resource adequacy.*

Appendix 1 – The Missing Money

The following is a synopsis of the arguments raised by W Hogan in Reference (8) and by Henney and Bidwell in Reference (1):

It can be demonstrated in a simplified electricity system in which the different plant technologies exactly match the load shape that if all generators in this system are paid the marginal running cost of the load following plant, the generators as a whole will recover only about 80% of their total costs. The peaking plants will recover their variable costs but none of their fixed costs. The missing revenue is exactly equal to the marginal capacity cost which is taken to be equal to the annual carrying charge of a new peaking plant. Thus in this perfect EOM the marginal generator when it is running must exercise market power and bid at its LRMC to allow it and other generators to recover their total annual costs.

This means that in order to provide sustainable revenues, a competitive energy only market must provide revenue in addition to the competitive energy revenues; we have called this the “missing revenue”. See also Reference 1 Box 2. In this ideal market the price cap could be set at the LRMC of the marginal plant and since demand does not vary and generators do not need maintenance or have forced outages, all generators would be reliably compensated.

It is the manner in which this missing revenue is created that is problematic in a real market.

In practice:

- Generators are not 100% reliable and have planned and forced outages so customers will experience supply shortfalls; ie, un-served energy (USE). If the actual USE exceeds the target reliability level, additional capacity must be installed to cover for the generator forced outages that create the excess USE (supply variability);
- This perfect balance between supply and demand never occurs due to variations in demand due to weather patterns and economic growth, so demand side participation or additional capacity must be encouraged, (demand variability);
- For other reasons a market may have a supply surplus;
- Even in a market with no supply surplus because of the supply and demand variability there will be periods where there is a supply surplus in excess of the optimum reserve margin.

As long as the system has a sufficient reserve margin, it will never produce at an output equal to the maximum marginal cost. In consequence, generators as a whole recover about 80% of their total costs and no plant recovers all of its costs, although mid-merit and base plants recover part of their fixed costs during periods when higher cost plants are operating at their real marginal costs.

Appendix 2 – New Investment Drivers

The following graph was developed by classifying all the increases in supply that had occurred since the start of the NEM into the following categories.

Category 1:

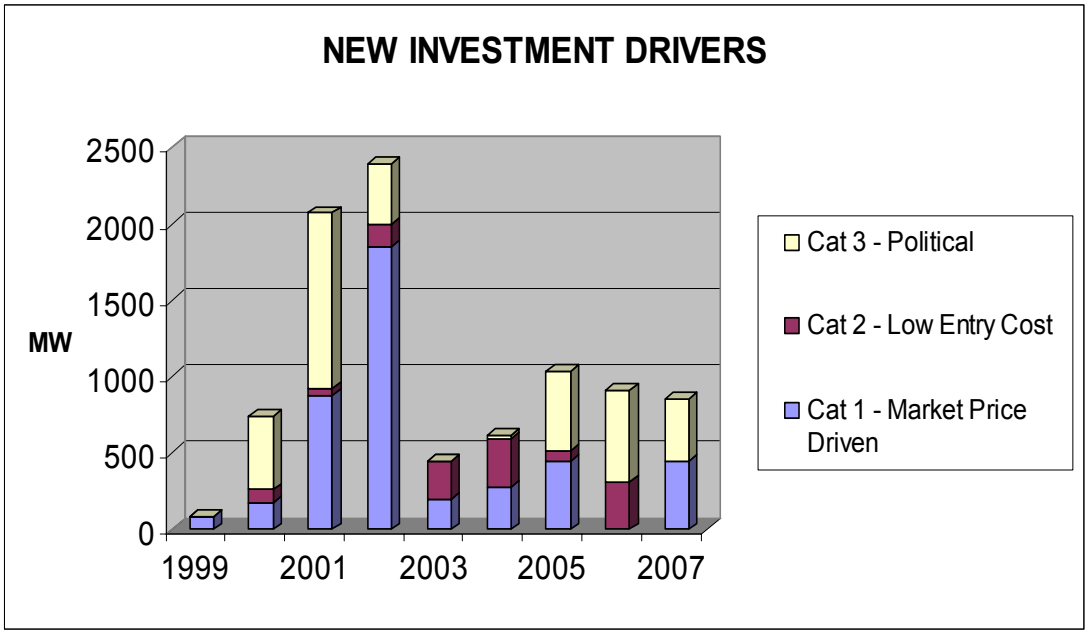
Market driven investments; ie at the time the investment decision was made wholesale contract prices were at a level that, if they continued at that level, would support a new investment

Category 2:

New investments in this category are those that commercially viable at low contract prices because their cost is well below new entry price of a greenfield plant. They may for example be driven by a low cost fuel supply, increments in capacity on existing plant which can be obtained through the normal maintenance process by the replacement of worn components with new higher performance components. (This is the sort of efficient investment that a competitive market encourages however they increase reserves and reduces forward prices). This type of investment may be short term in nature as these opportunities become harder to find in the future however the transition to a market with sustainable revenues is delayed.

Category 3:

These are investments that are driven by political imperatives external to the competitive markets such as state development agendas, or government subsidies.



It is clear that while category 3 investments continue the market prices will never reach levels that will encourage private investment. Refer Appendix 1 - The Missing Money

Appendix 3 - Pool Price - Contract Price Correlation

Figure 1 Victorian Year Ahead Contract Price V Rolling Annual Average RRP

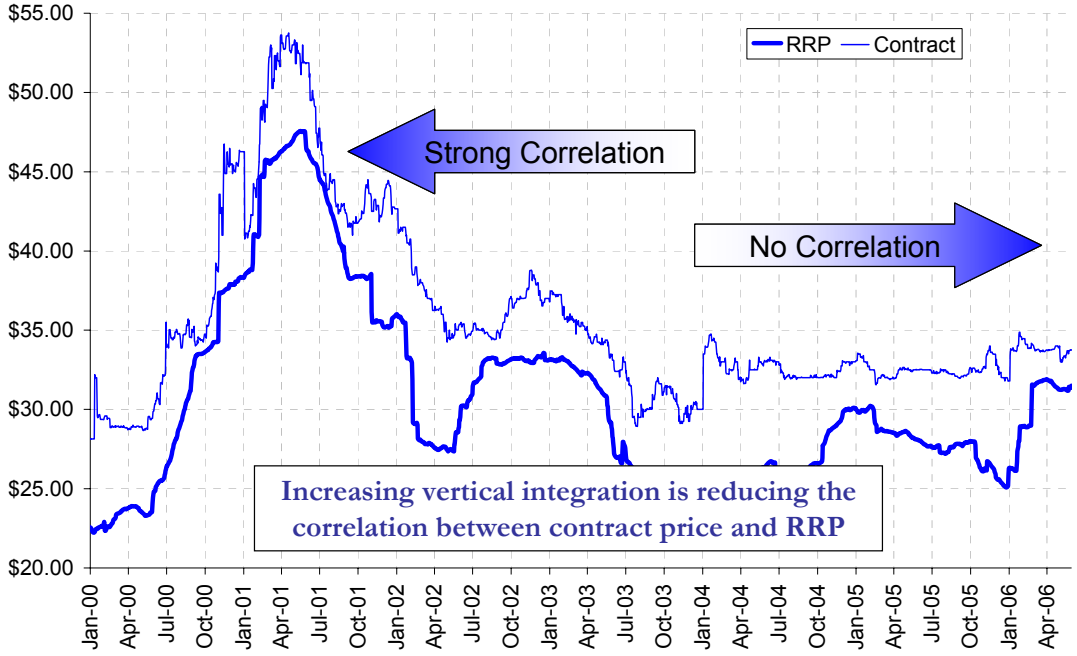


Figure 2 NSW Year Ahead Contract Price V Rolling Annual Average RRP

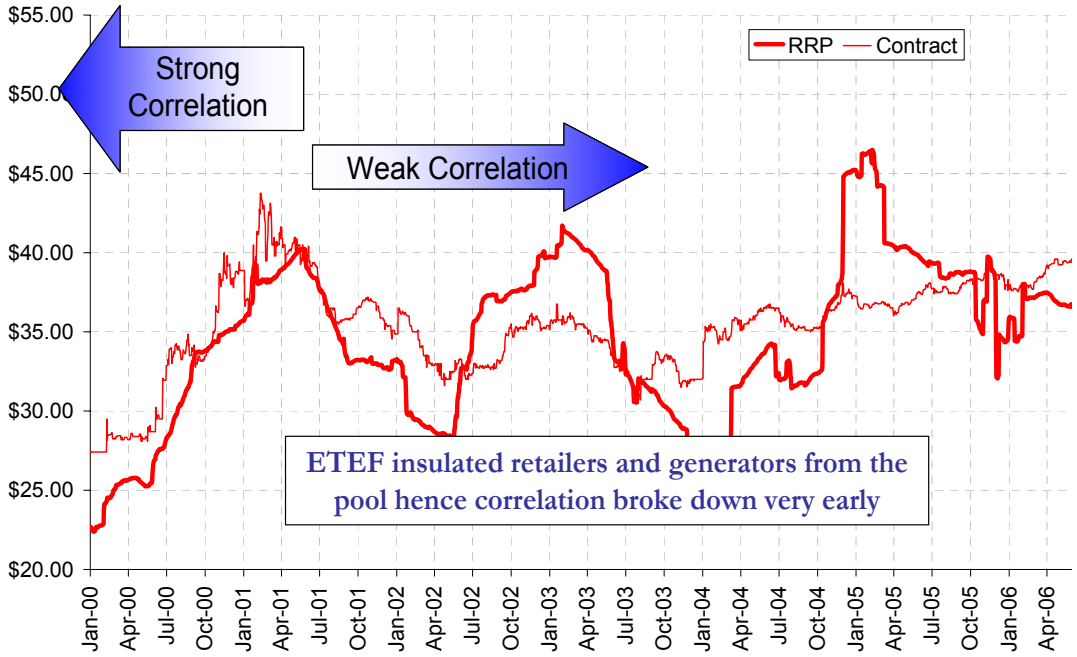
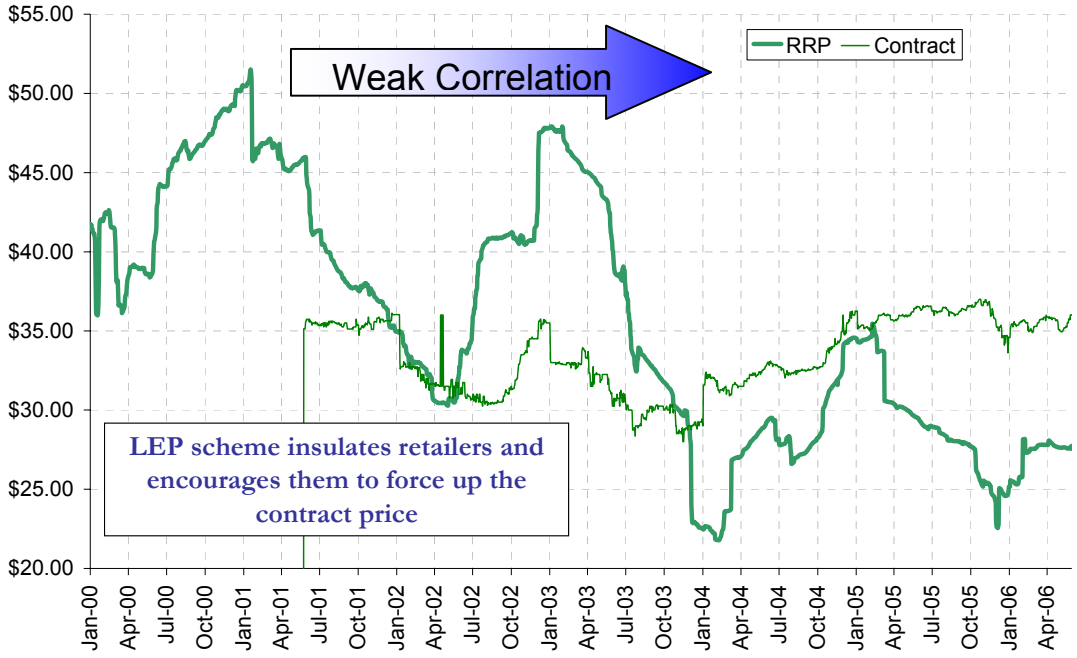
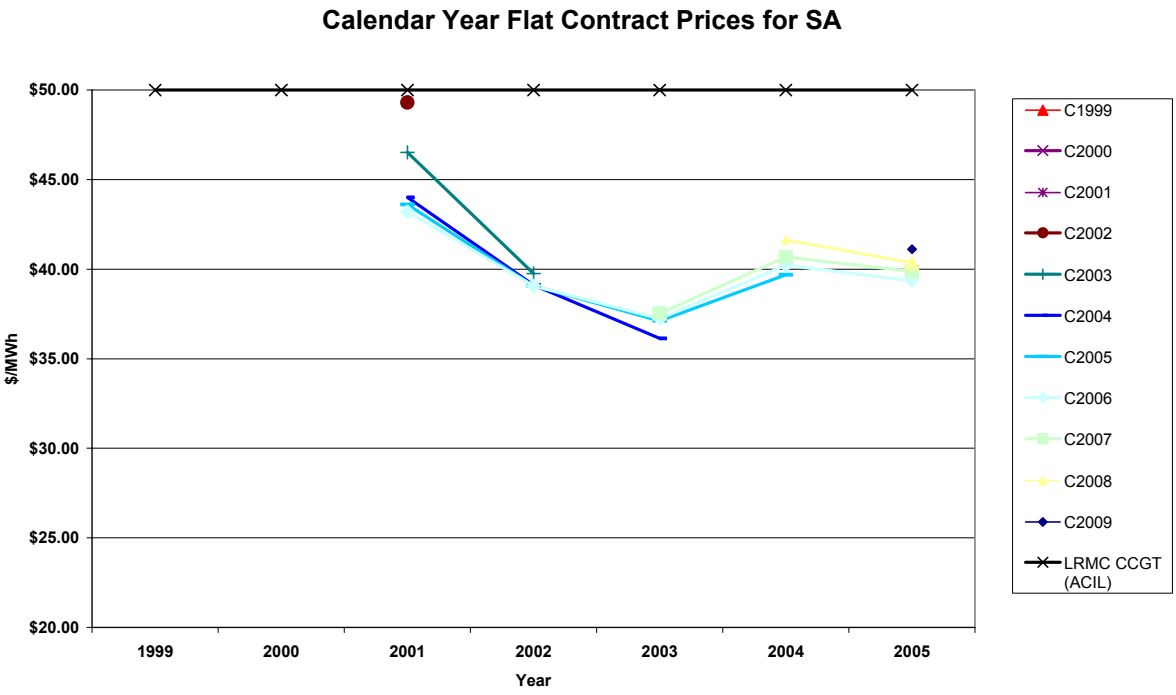
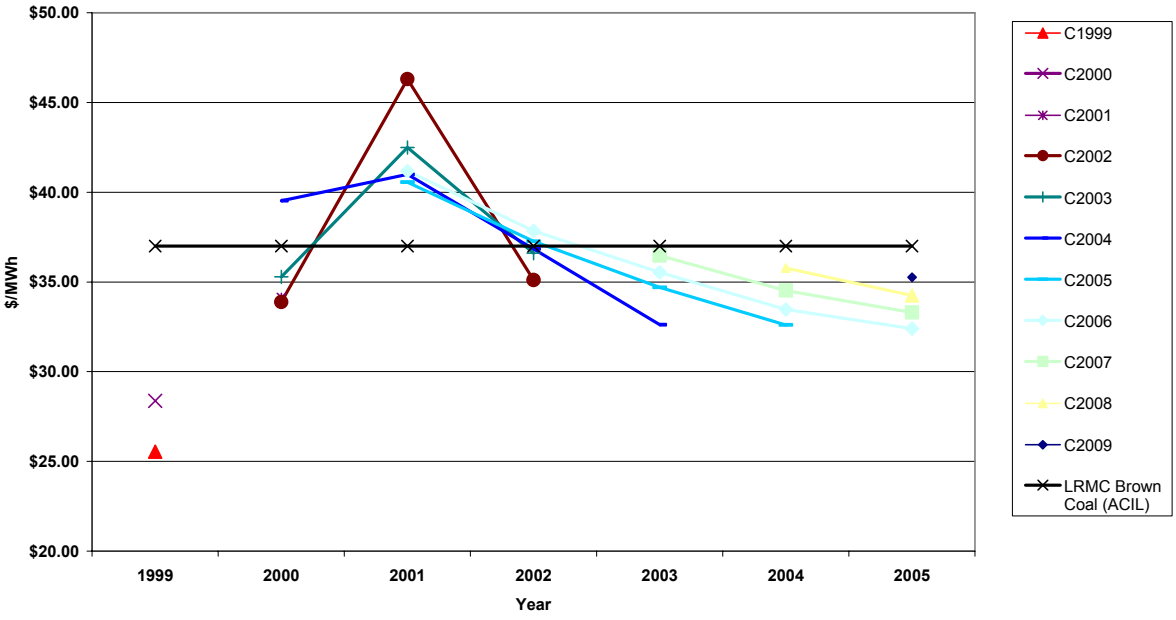


Figure 3 Queensland Year Ahead Contract Price V Rolling Annual Average RRP

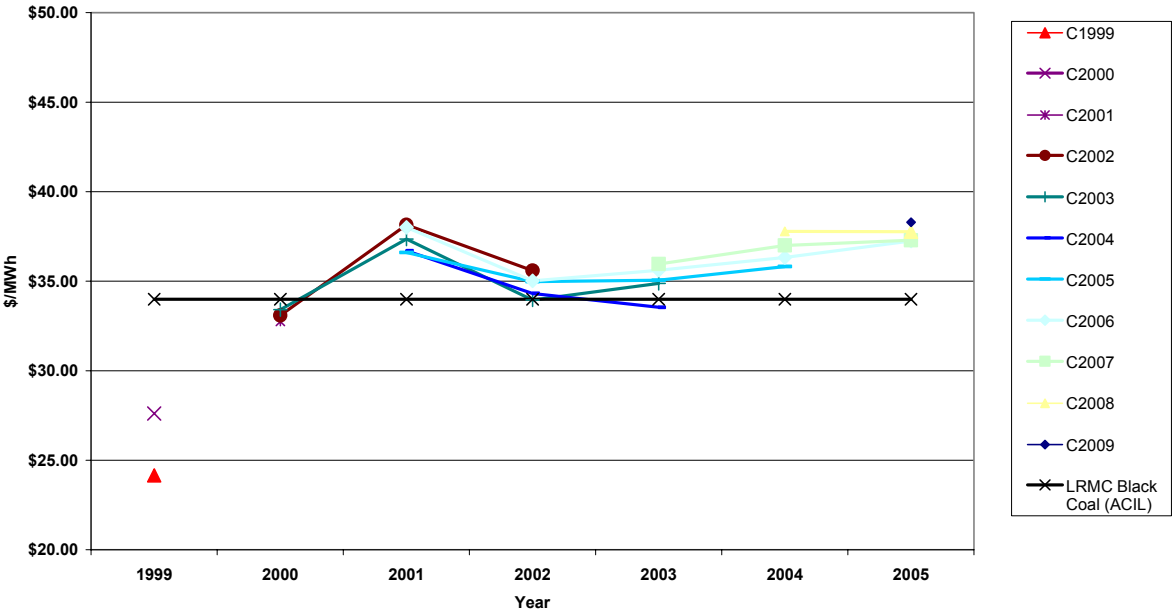


Appendix 4 – Calendar Year Flat Contract Prices & New Entry Prices





Calendar Year Flat Contract Prices for NSW



Calendar Year Flat Contract Prices for QLD