



24 February 2010

Neville Henderson
Chairman, Reliability Panel
Australian Energy Market Commission
PO Box A2449
Sydney South NSW 1235

By electronic submission: www.aemc.gov.au

Attention: Julian Eggleston

Dear Mr Henderson,

RELO034 - REVIEW OF THE RELIABILITY STANDARD AND SETTINGS - DRAFT REPORT

Origin Energy Limited (Origin) welcomes this opportunity to provide a submission in response to the AEMC Reliability Panel's (Panel) Draft Report on the reliability standard and settings to apply from 1 July 2012.

Origin agrees with the Panel's draft recommendation to retain the current 0.002% reliability standard. However, we have strong concerns with the recommendation by its consultant ROAM Consulting (ROAM) to lift the Market Price Cap (MPC) in 2012 from \$12,500 MWh to \$16,000 MWh.

Origin considers that the potential costs associated with increasing the MPC in 2012 are likely to outweigh the benefits. In particular, we argue that on the basis of existing investment and investment intentions there is little evidence to suggest the current MPC is too low to encourage the level of investment required to meet the reliability standard.

Further, the conclusions on reliability that follow from the ROAM modelling are highly sensitive to its input assumptions. We consider that a broader examination of contract market dynamics and generator bidding is necessary, as these are fundamental to driving revenue outcomes in energy-only markets.

We are concerned that a higher MPC in 2012 will lead to both higher spot prices and increased spot market volatility, with no offsetting benefit in the form of enhanced reliability.

The effect will be simply to increase market risk for retailers and associated prudential, risk capital and contracting costs. Effective retail competition is likely to suffer as a consequence and increase pricing pressure on consumers at a time when they will already face significant increases in their costs.

We discuss these issues in more detail below.



Existing investment and investment intentions

ROAM's modelling indicates that the reliability standard will be exceeded in 2012-13 in Victoria and South Australia and subsequently in Queensland in 2014-15; with the reliability standard in all regions being exceeded from approximately 2016 onwards. What is notable from ROAM's unserved energy (USE) modelling, however, is that the USE is within a tight range around the standard until perhaps the last year of the modelled period, 2018-19, when South Australia exceeds 0.003%¹.

It is instructive to compare ROAMs modelling with the AEMO Electricity Statement of Opportunities (ESOO) 2009 supply-demand outlook as summarised in Table 1 below:

Table 1 : ESOO 2009 forecast supply and demand balance

<i>ESOO 2009</i>	<i>Existing and committed plant</i>		<i>Proposed plant</i>
Region	LRC Point	Reserve Deficit (MW)	LRC Point
QLD	2014-15	34	Beyond 2018-19
NSW	2015-16	182	Beyond 2018-19
VIC & SA	2013-14	17	Beyond 2018-19
SA(local)	2012-13	68	2012-13
Tasmania	Beyond 2018-19	---	Beyond 2018-19

*Note: *VIC has reserve surplus that could meet shortfall.
Source: ESOO p.2-5 & Executive Briefing, p.5.*

While the AEMO modelling shows deficits occurring either a year earlier (in New South Wales) or a year later (in VIC-SA), importantly these inconsistencies do not mask the general conclusion that both sets of modelling forecast only small deficits over the modelling period. Strikingly when announced projects are included there is no forecast breach of the reliability standard in the AEMO modelling until beyond 2019.

ROAM's recommendation to increase the MPC by almost 30% in 2012 (and 60 % compared with the current MPC) therefore rests on the basis of alleviating small forecast reserve deficits over the modelled period (which by implication require on small increases in peaking capacity to alleviate them).

Origin considers these forecast deficits themselves rely on a narrow modelling approach, which excludes the many other important factors which drive investment outcomes, such as the level of existing risk and risk appetites in the market, access to finance, government policies and market structure. As we explain below, the contract market in particular better captures these variables and therefore requires due consideration.

¹ ROAM Consulting, "Reliability Standard and Settings Review", Draft report to the Australian Energy Market Commission, 15 January 2010, pp. 9-12. (ROAM Report)



Importance of the contract market

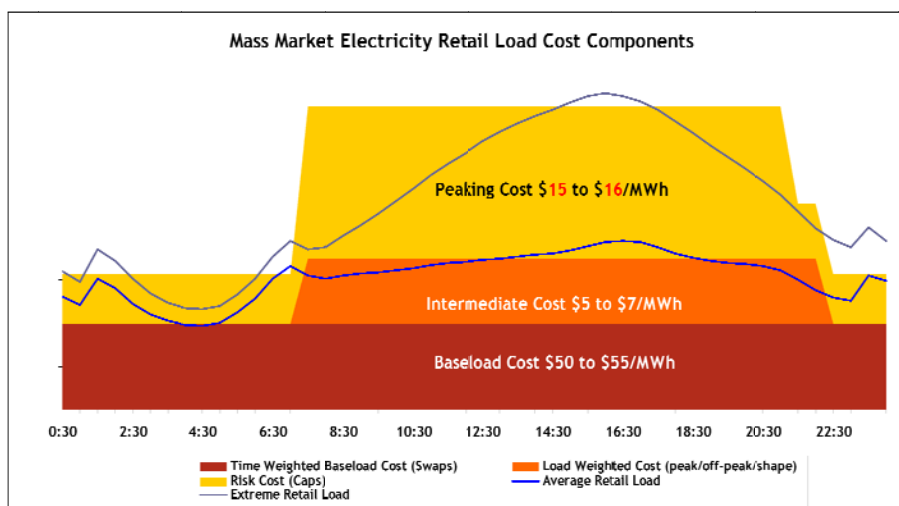
Volatility of energy-only markets

Energy-only spot markets are characterised by extreme price volatility. This is due to a number of factors including: the instantaneous nature and inelasticity of demand; the non-storability of electricity; and the fact that the MPC must be high enough to recover both the variable and capital costs of new entrants (since they would otherwise not enter the market). For these reasons, the MPC is already many times the long run marginal cost (LRMC) of the most expensive new entrant likely to enter the NEM.

The consequential variability and volatility of spot prices means that investment in new generation is driven by the contract rather than the spot market. Both generators and retailers have incentives to fix their future cash-flows in a volatile market through contracting. Importantly, financial institutions are unlikely to provide the finance needed to underpin investment without the security of such contracts.

For retailers, the desire to contract arises because being short in a market with extreme prices can very quickly lead to bankruptcy. For example, a 250 MW short position at an MPC of \$10,000/MWh for 7.5 hours causes an immediate cash loss of \$18.75 million. Retailers have strong incentives therefore to underpin the vast majority of their load with a combination of swap and cap contracts that reflect the portfolio of generation technologies required to meet the shape of their load profile (or achieve the same through physical generation build). This is illustrated in Figure 1 below.

Figure 1: Overview of contracting approach for mass market retail load



Source: Origin Energy internal modelling

The inherent volatility of energy-only spot markets is also why the contract market tends to bring forward investment in new generation ahead of any tightening of the underlying supply and demand balance: retailers do not wish to be exposed to extended periods of extreme prices that could arise as a consequence of investment arriving too late. Before this point is reached, retailers will increase their demand in the contract market,



establish a longer term Purchase Power Agreement (PPA), or invest in physical generation options, in order to ensure sufficient generation capacity is forthcoming to meet their load requirements at a reasonable cost. This natural incentive supports sustained reliability of supply for consumers.

In this regard it is important to note that most of the recent and anticipated generation projects over the next four years are either built or backed by retailers, as shown in Table 2 below.

Table 2: Recent generator investment decisions and announced projects

		2007	2008	2009	2010	2011	2012	Builder or Off Taker
QLD	Mount Stuart 3				123 MW			Origin
	Darling Downs				630 MW			Origin
	Braemar 2				519 MW			Origin
	Condamine				138 MW			AGL
	Kogan Creek A		750 MW					CS
NSW	Tallawarra			435 MW				TRU
	Uranquinty			664 MW				Origin / Built with PPA in place
	Munmorah/Colangra				668 MW			Delta
VIC	Bogong				140 MW			AGL
	Mortlake					565 MW		Origin
SA	QPS 5				120 MW			Origin

Source: AEMO generator information (existing, committed & proposed) projects.
See www.aemo.com.au/data/gendata.shtl

A key focus for examining reliability should be therefore the contracting behaviour of participants and liquidity of the contract market. For example, poor liquidity and/or sustained excessive contract prices could potentially indicate a lack of generation capacity entering the NEM.

While the contracting behaviour of retailers and generators can be observed from publicly available sources, such as AFMA, ICAP and D-cypha, they reflect relatively short contracting time-frames and limited information. They should not be solely relied upon for determining the nature and extent of contracting behaviour in the NEM.

Retailers also enter into much longer contracts through PPAs and the over-the-counter (OTC) contract market. These contracting options allow for flexibility in negotiating terms and conditions and are better suited for supporting the long term nature of generation investments.

As set out in the case study below, the most important consideration in negotiating such contracts is establishing a long term revenue stream that allows a reasonable return for the generator and a reasonable cost of meeting load requirements for the retailer over the term of the contract. Due to the variability and unpredictability of future spot prices, they only play a small role in such considerations.



The nature and prevalence of such arrangements are less transparent compared with contracts traded on public exchanges; nonetheless their importance in driving investment outcomes should not be underestimated or ignored.

Case study - Funding new generation investment

In July 2008, Origin completed an electricity hedge purchase and gas supply agreement with the Braemar 2 Partnership, which is made up of ERM Power (50%) and Arrow Energy (50%).

The agreements enabled the Braemar 2 Partnership to secure successfully all required debt financing and therefore achieve financial close for the development of a second 450 MW OCGT power station at Braemar in south-east Queensland ("Braemar 2").

To provide an underpinning revenue stream for the project, Origin agreed to purchase 300 MW of electricity hedges for a minimum of 10 years, with options over an additional 150 MW of capacity. The completion of the Braemar 2 agreements, along with a separate agreement to restructure the contractual arrangements with the owners of the Braemar 1 power station, leaves ERM Power and Arrow Energy (for Braemar 2) with a long term revenue stream and Origin with up to 825 MW of capacity from these two power stations.

In April 2005, the building of Braemar 1 was partly facilitated by ENERGEX Retail signing a 10-year commitment to purchase contracts from the power station. Origin inherited the contracts when it acquired Sun Retail from ENERGEX in February 2007.

As a further important point to note is that Braemar 2 reached financial close at the same time as a peak in power station capital costs, with OCGT costs reaching approximately \$900,000 per MW in 2008². However, as can be observed from their press release, the 10 year cap price that Braemar 2 negotiated with Origin was sufficient to cover their costs and their commercial return on their investment despite the peak in capital costs. This provides evidence that the current MPC of \$10,000 MWh results in long term contract prices that are sufficient to finance investment in peaking generation at its current and forward capital cost estimates.

A copy of the relevant press releases are provided in **Appendix A**.

Generators contract less than their full capacity

The discussion above highlights the role of volatile spot markets in driving contracting behaviour, in turn providing incentives for retailers to fund the necessary investment required to maintain the reliability standard.

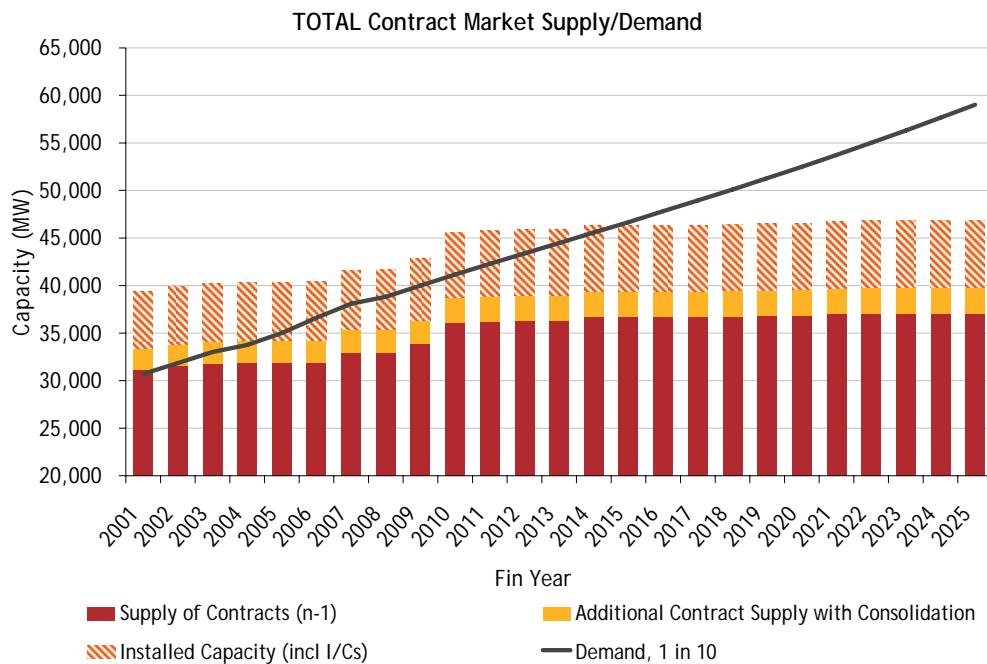
There is also a less obvious but nonetheless very important influence that reinforces this dynamic: generators tend to contract only a certain proportion of their available capacity, principally to cover themselves against outage risk caused either by transmission or equipment failures (the risk that a generator is required to purchase from a high spot market to fund their contract obligations).

² ACIL Tasman, "Fuel and capital costs in the NEM: Greenfield cost data for the calculation of the 2009/10 BRCI", prepared for Queensland Competition Authority, October 2008, p.xii. Available: <http://www.qca.org.au/files/ER-NEP910-ACIL-BRCI0910-FinalReport-1008.PDF>.



This means that at any point in time there will more generation capacity available than contracts, as can be observed in Figure 2 below:

Figure 2: Example of generator contracting capacity



Source: Origin energy internal modelling

The fact that there are less contracts available compared to actual underlying supply capacity means that the contract market tends to move into shortfall ahead of any underlying tightening of supply and demand. That is, retailers’ demand for contracts will encourage investment in generation before it is strictly needed to maintain reliability.

Ignoring contract market dynamics may therefore underestimate the degree of investment already occurring on the basis of existing market volatility and generators’ incentives, leading to an overestimation of the MPC level needed in 2012 to sustain reliability outcomes.

Importance of bidding assumptions

We believe ROAM’s bidding assumptions may further reinforce the conclusion that ROAM is underestimating potential revenues and investment incentives available under current regulatory and policy settings.

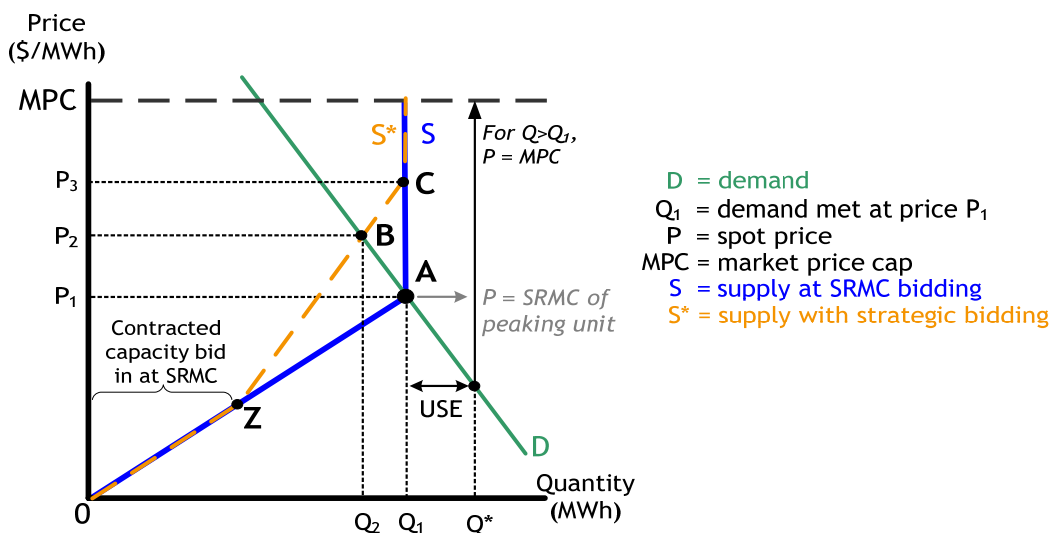
The market structure underpinning the supply of electricity is characterised by oligopoly. This means it is the strategic interaction of generators that determines price outcomes rather than the short run marginal cost (SRMC) of the most expensive generator required

to meet demand. The latter only applies in perfectly competitive markets, which is widely acknowledged to be an unrealistic construct for energy markets.³

In other words, the pricing behaviour of generation participants is at times strategic leading to price outcomes well above SRMC. Arguably this is essential in energy-only markets where generators must recover their large fixed costs as well as variable costs in the spot and contract markets.

Differing assumptions regarding how supply bids are formed can significantly alter price outcomes and forecast revenue positions of generators. This is best demonstrated in a stylistic diagram such as that presented in Figure 3 below:

Figure 3: Strategic bidding in an energy only market



The diagram represents potential spot market outcomes for a single 5-minute period.

The dashed supply curve (S) represents the industry supply curve (as reflected by generator bids in the spot market) if the market is assumed to be perfectly competitive. It comprises the SRMC of the different generation technologies called upon in any particular 5 minute interval to meet demand (D)

The supply curve (S*) represents the supply curve that would be more typical under an oligopolistic market framework such as the NEM. S and S* curves can be considered coincident for the volume of generation capacity that is under contract to retailers, which is denoted by quantity supplied up to point Z. Above Z, however, the two bid curves diverge, since it is only for uncontracted capacity that there is a pay-off to bidding strategically (that is, bidding above SRMC).

The quantity at Q₁ represents the maximum volume of generation capacity available to meet demand in any particular 5 minute period. Demand beyond this point (say Q*) sets

³ For a good discussion see Australian Gas Light Company (ACN 052 167 405) v Australian Competition & Consumer Commission (No 3) [2003] FCA 1525 (427-428).



the equilibrium spot price (P) at the MPC, since load shedding is required beyond this point. Where the intersection of the supply and demand curve is at A , supply is just sufficient to meet demand and the marginal supply unit is the peaking generator. The spot price at this point is P_1 , which in a perfectly competitive market is also equal to the SRMC of the most expensive marginal peaking unit required to meet demand ($P_1 = \text{SRMC peaking}$).

The focus in ROAM's modelling is to forecast periods where demand exceeds the level Q_1 and causes USE, and then to calculate the subsequent MPC required to recover the costs of the peaking unit, assuming it only runs at these times⁴. This provides a convenient simplification of the analysis as it avoids the need to examine bidding and price outcomes for demand outcomes at or below Q_1 .

However, the more realistic industry supply curve is S^* and not S . If S^* is assumed however, this means that for many demand periods where demand is high, but below the level at which USE occurs (such as at points A and B on the demand curve) a super peaking plant will still find it profitable to run. This is because the peaking unit achieves revenues associated with spot prices P_2 and P_3 , and not P_1 or below, as assumed if the industry supply curve is S (SRMC bidding).

While we agree with ROAM that the majority of generation capacity in the spot market is bid in at SRMC to cover contracts (point Z), generators also leave a significant proportion of their capacity uncontracted to maximise spot market revenues (and future contract revenues) and to cover themselves for the risk of outages. It is this proportion of capacity which is bid in at prices above SRMC, which will often set the price for the whole market during high demand periods.

Origin acknowledges ROAM's views that incorporating more strategic bidding into the modelling introduces complexities; however we also consider that not doing misses an important dynamic in energy-only markets. This, in turn, may lead to a significant under forecasting of potential revenues available to new generation entrants, including peaking generation. By implication, this overestimates the MPC level required to meet the reliability standard from 2012.

We note that game theoretic modelling may provide an alternative approach to test the importance of strategic interactions in determining price outcomes and the impact this has on actual revenue opportunities for peaking units.

Potential impacts of a higher MPC on spot prices and volatility

Origin is concerned that under a higher MPC, strategic bidding may lead to higher price outcomes and increases price volatility over the period under review.

Concept Economics (Concept) examined this in a paper it prepared for the Comprehensive Reliability Review⁵. They used two high priced events, one from South Australia in March 2008 and the other from New South Wales in June 2007, to illustrate how a change in the MPC and/or the Cumulative Price Threshold (CPT) could impact bidding under stressed conditions (high demand and low interconnection).

⁴ ROAM Report, p. 23.

⁵ Concept Economics " Risk Assessment of raising VoLL and the CPT", prepared for the Reliability Panel, 13 October 2008.



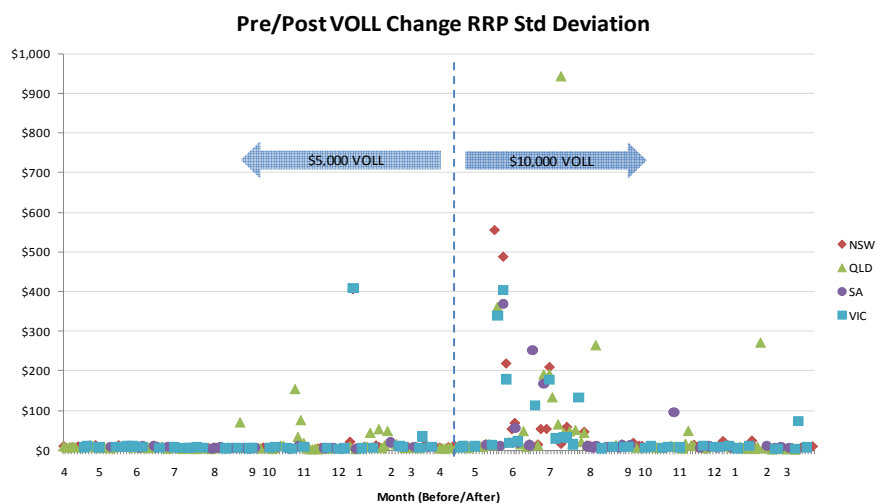
Using a game theoretic model, Concept reconstructed the bids under a higher MPC for each half hour period over the 7 days representing these incidents in each state. They found that increasing MPC from \$10,000 MWh to \$12,500 MWh and the CPT from \$150,000 to \$187,500 increased overall spot prices in both peak and off-peak periods in the representative weeks by approximately 20 % in both New South Wales and South Australia⁶.

Concept also found that raising both MPC and the CPT increased the standard deviation of prices, observing that prices are not only higher on average, but also more volatile.

Origin tested this proposition, comparing price volatility in the 12 months before and the 12 months after the last increase in the MPC from \$5,000 to \$10,000/MWh in 2002. The analysis was standardised for weather and other factors to specifically isolate the impact of a higher MPC on price volatility.

The results in Figure 4 below shows that price volatility increased significantly after the change in MPC.

Figure 4: Change in Price volatility after raising MPC from \$5,000-to-\$10,000 MWh



Note: days normalised for weather
Source: Origin Energy internal modelling

The NEM is already one of (if not) the most volatile commodity markets in the world, so it is concerning that increasing the MPC from 2012 could exacerbate this volatility even further. Origin considers this would have a number of adverse consequences for retailers, in particular.

⁶ Ibid, p. 45.

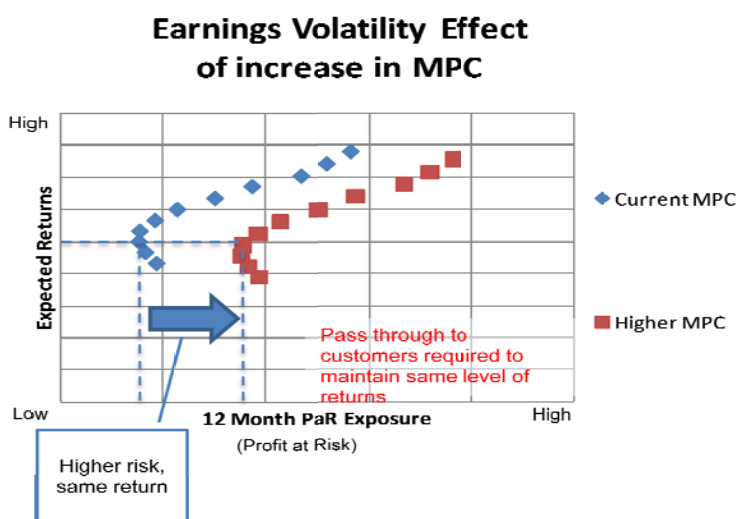


Impacts of a higher MPC on retail competition

To the extent a higher MPC in 2012 leads to higher and more volatile spot prices, this increases market risk for retailers. Retailers will face both a maximum possible exposure (\$16,000MWh rather than \$12,500MWh) and greater volatility around their returns as indicated by the Concept work and our own examination of volatility.

A higher MPC is likely to increase the potential exposure for retailers to extreme or volatile prices during the period under Review, while their expected returns remain the same. This is shown in Figure 5 below.

Figure 5: Risk versus return under current and proposed MPC



Source: Origin Energy internal modelling

This is likely to increase the prudential, risk capital and contracting costs of retailers, since the costs of managing a higher level of risk in the NEM, in turn, must necessarily also increase.

For example, the existing level of NEM price volatility is already increasing Origin's electricity prudential requirements. Following the high-priced events in December 2009 and the exit of Jackgreen from the retail market, Origin's requirements increased by 30%. Prudential increase notices may also become more frequent under a higher MPC.

In addition, there may be insufficient prudential cover available in the financial markets to meet additional demand. In Origin's experience, on some occasions the domestic bank market has already hit its natural industry ceiling for providing prudential guarantees for electricity retailers.

The voluntary administration of Jackgreen, and the subsequent Retailer of Last Resort (RoLR) event, suggests the exiting financial and cost requirements are already creating financial stress in the retail market. Jackgreen executive chairman Greg Martin commented that:



“this is an extremely difficult business for a small, tier two retailer to play in. The working capital and prudential requirements of the electricity markets in Australia have clearly become such that size and substantial financial backing are required to operate in the market...increasingly this will become a game for larger, well-capitalised businesses”.⁷

Retail price regulation may make it challenging to recover the increased costs. Raising the MPC in 2012 is likely to increase pricing pressures on consumers at the same time as a number of other factors, such as climate change policies and the need to upgrade transmission and distribution networks, also take effect.

As a consequence, effective retail competition is likely to suffer under a higher MPC. The higher costs to participate in the NEM make it less viable for smaller retailers to continue to participate competitively or enter the market. Contract market liquidity may also diminish with fewer retailers participating in the market.

Finally, and perhaps most importantly, if retailers have fewer prospects for recovering their costs, then they may be less inclined to consider supporting or undertaking generation investment options. Given the important role of retailers in driving investment, raising the MPC on 1 July 2012 could therefore undermine precisely the incentives it is intending to impart to ensure the future reliability of supply.

Next steps

If you would like to discuss any aspect of this submission, we would be happy to meet with the Panel. Please do not hesitate to contact, in the first instance, Con Van Kemenade on 02 8345 5278.

Regards,

A handwritten signature in black ink, appearing to read "D Barnes".

Dennis Barnes
General Manager
Energy Risk Management

⁷ Luke Forrester, “Jackgreen too small to play: chairman”, Australian Financial Review, 21 December 2009, p.36.



Appendix A - Copy of ASX announcements on completion of electricity hedge purchase agreement between Origin Energy and Braemar 2 Partnership

ASX Announcement



23 July 2008

Financial Close on 450 MW Braemar 2 Power Station and Origin Energy Electricity Hedge Agreement

The Directors of Arrow Energy Ltd (Arrow) are pleased to announce that the Braemar 2 Partnership (a 50:50 partnership between subsidiaries of Arrow and ERM Power Pty Ltd) has achieved financial close on a \$335 million project finance facility completing the funding requirements for the development of the 450 MW Braemar 2 Power Station. In order to provide an underpinning revenue stream for the project, the Braemar 2 Partnership has also entered into an electricity hedge agreement with Origin Energy Ltd for 300MW of electricity hedges for a minimum of 10 years, with options over an additional 150MW of capacity.

The 450 MW Braemar 2 Power Station and associated high pressure gas pipeline are being developed by the Braemar 2 Partnership at an estimated cost of \$546 million. The power station is located approximately 40 km west of Dalby in Southern Queensland adjacent to the Braemar 1 power station which was managed by ERM Power from conception through to successful construction, operation and trading. The power station is in close proximity to Arrow's Daandine and Stratheden gas fields.

Arrow has a Gas Sales Agreement with the Braemar 2 Partnership to supply 11.5 PJ p.a. of gas over a 12 year period using a pricing formula that will look through to the underlying electricity revenues. This gas will be supplied from a combined development of the 100% Arrow owned Daandine and Stratheden fields which are close to the power station site. Additional gas for the power station during 2009 and 2010 is also being sourced from Origin Energy.

ERM Power will continue to manage the project through construction and commissioning and has entered into a long term contract with the partnership to operate and to trade the power station's output.

Siemens Ltd, a world leader in design and manufacture of gas turbines and electricity generators, is supplying the power plant and is responsible for the successful commissioning of the power station. Bilfinger-Berger will be the major contractor for the power station construction and Delco is constructing the gas pipeline.

Siteworks commenced in January 2008 and construction of the power station is well advanced with the first two gas turbo-generators already on site. Full commercial operation is scheduled from the plant by mid 2009 with initial operation of the first of the three generating units expected in the first quarter of 2009.

Arrow's investment in the Braemar 2 Power Station brings the total of Arrow's net generation capacity to 370 MW and continues its stated and well defined strategy of downstream investment to enhance margins on its gas sales. These include existing electricity sales from the Daandine Power Station, acquisition of the Enertrade assets to allow Arrow power sales through the Townsville Power Station, an option for a 20% interest in LNG Ltd's Gladstone LNG plant and now the 50% ownership of Braemar 2 power station.

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F 07 3105 3401 ABRN 73 078 521 936 BRISBANE QLD 4000 ASX CODE AOE arrowenergy.com.au



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Commenting on the project, Arrow CEO Nick Davies said "The Braemar 2 Power Station will further cement Arrow's position as a fast growing integrated energy company. The development of this power station positions Arrow well to meet the growing energy demands of the fast growing Queensland economy".

For and on behalf of the Board

Paul Marshall
Company Secretary

For further information contact:

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			Website:	www.arrowenergy.com.au



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Origin secures long term Queensland electricity hedge

ASX/Media Releases
23 Jul 2008

Origin Energy today announced completion of an electricity hedge purchase and gas supply agreement with the Braemar 2 Partnership* that will support the supply of electricity products to Origin customers in Queensland.

The final agreements with Braemar 2 Partnership support the financial close and development of a second 450 MW open cycle gas-fired power station at Braemar in south-East Queensland ("Braemar 2"). Braemar 2 will commission during the first quarter of 2009.

Origin will purchase 300 MW of electricity hedges for a minimum of 10 years, with options over the additional 150 MW of capacity. Origin has also secured the right to supply a portion of Braemar 2 Partnership's gas requirements during 2009 and 2010. The completion of the Braemar 2 agreements, along with a separate agreement to restructure the contractual arrangements with the owners of the Braemar 1 power station, leaves Origin with up to 825 MW of capacity from these two power stations.

Origin Chief Operating Officer Karen Moses said the contracts enhance Origin's ability to supply retail customers and manage wholesale electricity price risk, while providing significant integration benefits for Origin's operations in Queensland.

"The electricity hedge purchase agreement enables Origin to manage price volatility during peak demand, while the gas supply agreement supports the flexibility of our Queensland gas portfolio".

"Together with Origin's current power stations and those under development, the Braemar 2 contracts will help Origin meet rising electricity demand in Queensland and support the monetisation of Queensland's extensive coal seam gas resources," she said.

"Origin is committed to lowering the emissions intensity of its energy supply chain. Fuelled by coal seam gas, the Braemar 2 power station will create significantly less greenhouse gas emissions than an equivalent coal-fired power station," she said.

*** Participants in the Braemar 2 Partnership are:**

ERM Power 50%
Arrow Energy (ASX: AOE) 50%

For more information please contact:

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About Origin Energy - Origin is Australasia's leading integrated energy company focused on gas and oil exploration and production, power generation and energy retailing. Listed in the ASX top 50 the company has over 3,500 employees, is the largest holder of gas reserves in eastern Australia and is the second largest energy retailer in Australia, servicing over 3 million electricity, natural gas and LPG accounts. Origin's strategic positioning and portfolio of assets provides flexibility, stability and significant opportunities for growth in the ever changing energy industry. Origin Energy is also the major shareholder in Contact Energy of New Zealand. The company has a strong focus on ensuring the sustainability of its operations, and in 2007 the company received the Ethical Investor 2007 Sustainable Company of the Year award.