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National Electricity Amendment (Management of Negative Settlement Residues by re-orientation) Rule 2006

This letter provides Snowy Hydro's submission to the AEMC consultation on the Snowy Hydro re-orientation rule change proposal taking into account the draft AEMC Rule determination on the Southern Generators proposal.

On 6 June 2006, the AEMC released its draft Rule Determination on a proposal by the Southern Generators for the management of negative settlement residues. The AEMC also released a statement on its approach to managing inquiries and rule changes related to congestion management.

1 Executive Summary

Snowy Hydro considers that, when compared to the Southern Generators' proposal, Snowy Hydro's re-orientation proposal:

- *is more consistent with the MCE long term policy*
- *is likely to lead to more efficient dispatch*
- *is likely to lead to lower prices in Victoria; and*
- *will strengthen the ability of all generators and other participants to manage inter-regional price risk.*

In our view, the fact that the AEMC's modelling (as employed to produce its draft Rule determination) does not reconcile with Snowy Hydro's is due to the AEMC's use of a very wide assumption set relating to Snowy Hydro's (and other generators') contracting positions and bidding behaviour, and subsequent averaging across the modelled outcomes. We believe that, if the focus is concentrated on the most likely outcomes (which are supported by empirical analysis and consideration of commercial drivers on Snowy Hydro's bidding behaviour, as discussed in detail herein), the AEMC's modelling would produce results that support Snowy Hydro's proposal.

As discussed in detail below, assumptions relating to Snowy Hydro's behaviour need to reflect the practical realities of establishing and subsequently adjusting contracting positions. As an established market participant, Snowy Hydro has a portfolio of contracts that are reasonably inelastic in the short-term. It is therefore unrealistic to base modelling analysis on a wide range of contracting scenarios.

2 Introduction

Both the Southern Generators' and Snowy Hydro's proposals recognise that the current treatment of negative settlement residues is inefficient. We believe that Snowy Hydro's re-orientation proposal is superior to the Southern Generators' proposal in terms of meeting the AEMC's assessment criteria.

Both proposals contemplate mechanisms that would be interim measures. It is important that the mechanism supported by the AEMC be consistent with the longer term development of the market. This should include as a priority a change to the Snowy Region boundaries, and implementation of the MCE policy settings with respect to the regional framework of the market.

The Southern Generators' proposal would move towards nodal pricing for Murray. The reorientation proposal is effectively a dynamic change to the regional boundary. The reorientation proposal is more consistent with the MCE policy of evolution of the regional framework of the market, rather than its replacement with nodal pricing.

When there are high prices in New South Wales and high flows into New South Wales, Tumut is bid to ensure the transmission lines are fully loaded, while ensuring they do not constrain. Analysis has been performed on historical data that substantiates this assertion. As a result, neither proposal would materially affect dispatch in New South Wales.

The Southern Generators' proposal could lead to substitution of generation at Tumut and Murray by generation in Victoria. This will generally be inefficient as discussed in Section 4 below.

The reorientation proposal would enable a higher level of output by Tumut and Murray. This will generally lead to more efficient market outcomes as described in Section 4 below.

There will be no increase in flows into New South Wales and hence no impact on pricing. The Southern Generators' proposal is likely to lead to a substantial reduction in output by Murray and hence higher prices in Victoria. The reorientation proposal would not have this effect.

The Southern Generators' proposal would improve the ability of generators south of Snowy to hedge inter-regional price risk into New South Wales. However, it would substantially reduce the ability of Snowy Hydro to hedge inter-regional price risk into both New South Wales and Victoria.

2.1 Timelines

The AEMC recognises that issues of boundary location in Snowy region are of more immediate significance than elsewhere in the NEM, and notes that the priority to address congestion management in the Snowy region is widely accepted. Snowy Hydro welcomes the explicit recognition of the problems in the Snowy region and the priority that needs to be placed on resolving them.

Snowy Hydro also welcomes the AEMC's intention to address the issues in an integrated manner consistent with its longer-term policy objectives. However, we would be concerned if that led to delays in change to the Snowy regional boundary. The absence of changes to the poorly defined Snowy regional boundary has exposed Snowy Hydro to substantial financial cost and risk. The current short term management – through the CSP/ CSC trial – partially alleviates some of those problems but does not provide a long term solution.

Snowy Hydro considers that there is a strong case for a regional boundary change for the Snowy region from 1 July 2007. If the AEMC does not reach a final decision until March 2007, this will not provide sufficient time for NEMMCO to implement a regional boundary change by 1 July 2007.

Snowy Hydro would welcome the adoption of measures that avoid any unnecessary further delay. This might include the AEMC requesting NEMMCO to undertake preparatory work in the event of a decision in favour of a regional boundary change. Alternatively, the AEMC might seek a boundary change from 1 January 2008.

2.2 Options to be considered

Snowy Hydro agrees that the management of negative settlement residues through clamping is a sub-optimal solution, and that alternatives should be considered.

Snowy Hydro has previously argued that reorientation is a better interim solution than the Southern Generators' proposal (in our letter of 10 February 2006). In our letter of 2 March 2006, we provided further analysis to support this position. We also noted that reorientation should not require a rule change, however, we did include possible wording for a rule change in case the AEMC considered this was required.

Snowy Hydro is pleased that its proposal for reorientation is now being considered as an alternative to the Southern Generators' proposal. We assume, given the approach adopted by the AEMC to date, that no other alternatives will be considered unless formal rule change proposals are submitted.

In view of the apparent consensus that clamping is a sub-optimal response to the issue of negative settlement residues, we maintain that the Snowy Hydro proposal is superior to the Southern Generators' proposal in terms of its likely satisfaction of the AEMC's NEM objectives. This submission sets out Snowy Hydro's assessment. We have used the criteria in section 6 of the AEMC's draft Rule determination. However, we start with long term implications. As both proposals are clearly interim measures, we believe consistency with the long term solution should carry substantial weight.

3 Long term position

The AEMC draft Rule determination (page 48) states:

“The short term gains in the market [from the Southern Generators proposed Rule] are consistent with the Commission’s long term view of the appropriate direction for progressive reform of the market – that is, positive incremental changes such as this will progressively deliver material improvements in competition and efficiency and establish an improved investment environment in the NEM.”

Although Snowy Hydro agrees that positive incremental changes are desirable in isolation, our view is that such changes should not be contemplated if they are inconsistent with the desired longer-term evolution of the market. For these proposals, we consider the relevant policy to be that which relates to the evolution of the congestion management and regional boundary framework.

The MCE has set out that policy framework. The key elements are continued reliance on a regional structure and rejection of nodal pricing; a desire for stability and a staged introduction of any change to regional boundaries; and a desire for regions to include major load, supporting, as the AEMC has stated, a general recognition that there is a case for more rapid and comprehensive change to the definition of the Snowy region.

This policy position is consistent with the structure of the market since its inception. There are also strong reasons for endorsing the position. A regional approach, with regions designed to ensure low levels of intra-regional constraints, represents a reasonable trade-off in ensuring that the market provides incentives for dispatch efficiency, reasonable levels of risk, and liquid financial markets.

The problem has always been with implementation of the design – and in particular the lack of amendment of the Snowy regional boundaries – not the design itself. The MCE endorsement of a regional framework is, in Snowy Hydro’s view, a sound policy position, as is the continued focus on how best to implement that, and to ensure static and dynamic efficiency within that structure.

A key question is then which of these two proposals is more consistent with the long term framework. We consider the answer to be clear:

- Under the Southern Generators’ proposal, Murray would be priced nodally, while all generators outside the Snowy region are priced regionally.

Under Snowy Hydro’s reorientation proposal Murray would be priced against Dederang (and so close to the Victorian price) when this was necessary to avoid counter-price flows. This would effectively be a dynamic boundary change, and more consistent with the long term solution.

- The Southern Generators’ proposal would increase the ability of generators south of the Snowy region (referred to below as ‘southern generators’) to

hedge inter-regional price risk, but substantially reduce Snowy Hydro's ability. This seems a further step away from the policy position that all regions should include major load. Not only would the Snowy region include no load, it would also have reduced access to regions with load.

In contrast, the reorientation proposal would enable both the southern generators and Snowy Hydro to hedge into the NSW market. While Snowy Hydro supports the desire of the Southern Generators to avoid their arbitrary exclusion from the NSW market under the status quo, this is best achieved by the reorientation proposal.

The choice is between an interim measure which moves towards nodal pricing for Murray, and an interim measure which moves towards a regional boundary change for Snowy Hydro. The choice is also between an interim measure which restores the southern generators' ability to hedge into NSW but substantially reduces Snowy's ability to hedge into both NSW and Victoria, and an interim measure which enables both to hedge. **Reorientation is consistent with MCE policy. The Southern Generators' proposal is, in our view, inconsistent with MCE policy.**

Other market participants could reasonably question the rationale for the CSP/CSC trial for Tumut, given the arguments above. We would stress that this trial is not, and never has been, Snowy Hydro's preferred approach. It was simply a response to the delay in implementing policy with respect to the regional design of the market. Our preference remains the rapid implementation of that original design, and of existing policy, to implement an appropriate change to the Snowy regional boundary.

Conclusion: both rule change proposals are interim measures. While the two competing proposals offer similar benefits, we believe that Snowy Hydro's proposal stands alone in being consistent with the MCE long term policy position, and has a greater positive effect than merely producing an incremental positive impact relative to the status quo (which is the most that the Southern Generators' proposal appears to achieve).

4 Economic efficiency of dispatch

The AEMC has addressed the possible impact of the proposal on dispatch efficiency through modelling. We welcome this analysis and recognise that the issues involved are complex. The AEMC's attempts to formulate them clearly and model their impacts should assist in developing clarity, and building a consensus on the likely impacts.

We have provided a fuller description of the factors affecting dispatch efficiency in our Rule change proposal. The points are briefly summarised here. Our intention is to provide any assistance we are able to offer to the AEMC in narrowing down the modelling to a smaller set of realistic scenarios, and in using these assumptions to derive commercially realistic and robust results.

The following sections focus on key modelling assumptions that potentially skew the published results as shown in the Southern Generators Rule Draft Determination. We

have provided a more detailed critique of other modelling assumptions and the reasonableness of the modelling outputs in Appendix 1.

Figure 1 shows generating capacity and transmission limits for northward flows:

- Transmission northward into NSW from Tumut is around 3,000 MW
- Upper and lower Tumut can generate 2,150 MW. Combined with flows across the Snowy region, this means that, depending on its bidding behaviour, Tumut can ensure the lines into NSW are either constrained, fully loaded, or lightly loaded.
- Transmission capacity across the Snowy region (Murray to Tumut) varies from 1,250 to 1,350 MW. The capacity is higher when generation at Murray is at low levels, and lower when Murray generates at high levels.

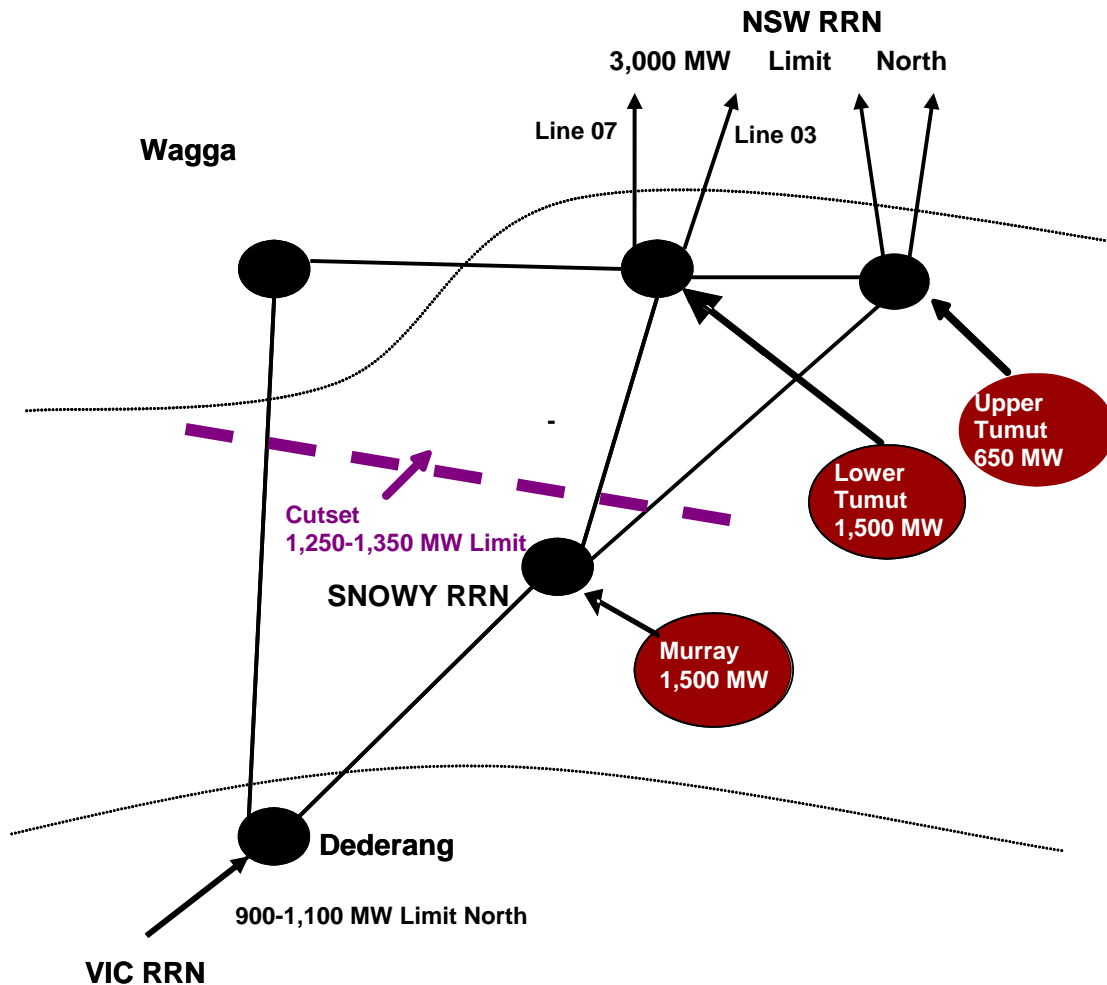
Both Rule change proposals would affect northward flows. We have separately considered the possible impacts on dispatch of generation in NSW, Tumut and Murray, and Victoria to illustrate the possible impacts of the two rule change proposals.

The Southern Generators' proposal would also affect southward flows. The reorientation proposal would leave the status quo unchanged. Again, the impact is described below.

The AEMC's modelling work assumes an extremely wide range of Snowy bidding strategies, with anything from 0% to 100% of capacity being bid at SRMC. This results in a wide dispersion of possible impacts, and in our view it would not be reasonable to assume that a linearly averaged result is a reasonable approximation. Such an approach may be appropriate when assessing a long term change (because Snowy Hydro and other market participants would have time to adjust its contract portfolio to whatever market design outcome eventuated), but not a short term measure. More weight should be given to realistic scenarios that reflect observed outcomes and Snowy Hydro's likely future behaviour in terms of contracting outcomes.

Both the proposals are short term measures. There is limited ability to change contract positions in the short term, and current behaviour provides the best guide for future modelling. The modelling work should therefore be based on existing bidding strategies for Tumut. Our rule proposal provides information to demonstrate that Tumut bids to use all available capacity into NSW, but maintain around 50 MW of head room to ensure it continues to receive NSW prices at times of high northern flows and high prices in NSW. That information is not repeated here, but we do describe the impacts.

Figure 1: Snowy region generation and transmission, for northward flows



4.1 Impact on dispatch in NSW

The flows across the cutset in the Snowy region are affected by dispatch at Murray, and vary between 1,250 and 1,350 MW. When Murray is generating at high volumes the flow is less, and vice versa. The two Rule change proposals differ in their impact on likely generation at Murray. This means that they differ in the likely flows across the cutset. For reasons described below, the Southern Generators' proposal is likely to lead to lower output at Murray, and so higher flows across the cutset, than the reorientation proposal.

The impact of this on flows into NSW depends on generation at Tumut. The sum of flows across the Murray to Tumut and Wodonga to Jindera cutset and generation at Tumut exceeds the transmission capacity into NSW. The loading of the transmission lines is dependent on Tumut's bidding strategy and dispatch. If Tumut bids to ensure the lines are fully loaded, then it will not be possible to provide additional supply to NSW.

The AEMC has recognised this in its discussion of security of supply, where it states:

“At times when the constraint [Murray to Tumut] is binding, it would be expected therefore that increasing the flow on the VIC-Snowy interconnector relative to Murray generation would allow a greater flow of power to NSW from Murray/southern region generators, subject to any interconnector limits in NSW [underlining added].”¹

As we have shown in our Rule change proposal, during high price periods in NSW Tumut currently bids to ensure the maximum dispatch without constraining the lines.

Under both the Southern Generators’ proposal and the reorientation proposal, pricing at Tumut is unchanged. Tumut continues to be subject to a nodal price (the CSP). When lines into NSW are unconstrained on northward flows, this price is close to the price at the NSW RRN. When lines into NSW are constrained, the Tumut price is almost invariably the Murray price, and well below the NSW price.

Our conclusion is that Tumut will continue its current bidding strategy and the lines into NSW will continue to be loaded as they presently are. As a result, a change in flows across the Murray to Tumut cutset will not lead to additional flows from Victoria/Snowy into New South Wales at times of high prices in NSW

Further, since there is no customer load in the Snowy Region, an increase in the transmission flow from Victoria would not provide any efficiency benefit.

Conclusion: under both rule change proposals, Tumut’s generation would be bid to maintain a small amount of headroom on transmission lines into NSW at times of high prices and high flows into NSW. There would be no change in the loading of the transmission lines, and so no additional flows into NSW would result under either proposal.

4.2 Impact on dispatch at Tumut

Under both rule change proposals, pricing at Tumut is unchanged, and consistent with the status quo. In addition, under both rule change proposals clamping would no longer be required.

During times of high demand in New South Wales, baseload plant in Victoria will generally be operating at full capacity. This assertion was analytically demonstrated in the Victorian load duration curve analysis that accompanied the re-orientation Rule change proposal. The only feasible substitution is to replace Tumut generation by high cost gas-fired or hydro generation in Victoria. This would generally reduce dispatch efficiency.

A reduction of dispatch efficiency in this way appears likely. The Southern Generators’ proposal could lead to an increase of up to 100 MW in flows across the cutset. Tumut has to bid to ensure that it does not constrain lines into NSW. As a

¹ Draft Rule Determination, page 32

result, this 100 MW increase in flows from the South **will only displace Tumut generation.**

Conclusion: the Southern Generators' proposal is likely to lead to substitution of generation at Tumut by gas-fired or hydro generation in Victoria. This would reduce dispatch efficiency.

4.3 Impact on dispatch of Murray

The impact on dispatch of Murray could be much more significant:

- Murray is the only regional reference node located on a transmission loop flow. When prices are very high in New South Wales and moderate or high in Victoria, and the Murray-Tumut line is constrained, the Snowy price falls to low levels due to the loop effect
- The Southern Generators' proposal exposes Murray to these price impacts, while simultaneously reducing Snowy's ability to hedge price separation between the Snowy and NSW regions
- The reorientation proposal protects Murray from these price impacts by pricing Murray against the Dederang node during the relevant periods.

This is the main difference between the two proposals. The Southern Generators' proposal would expose Murray to price risk. As Murray would be unable to hedge this risk, it would be obliged to manage it physically through ensuring the Murray to Tumut line was not constrained. This requires Murray to keep its generation down to around 240 MW². The result would be a significant substitution of Victorian generation (probably gas-fired) for Murray generation.

Proponents of this rule change may regard that as efficient: it is after all a response to a price signal at Murray. If generation at Murray worsens the constraint on northward flows, it may seem self-evident that generation will be more efficient if Snowy Hydro responds to the resulting price signals.

This is however a simplistic argument:

- The price signal at Murray reflects the impact of its generation on northward flows across the cutset. In effect, the National Electricity Market Dispatch Engine (NEMDE) treats generation at Murray as if it is affecting flows into NSW when, as discussed, it does not. **As a result, the price signal is misleading. It has no impact on consumption as there is no load in Snowy.** The price signal at Murray has a negative impact on dispatch efficiency (generally substituting gas-fired generation in Victoria for hydro generation at Murray) rather than being the efficient substitution of high cost generation in NSW.

² Murray would also have an option of generating above these levels, driving down prices but receiving very low or negative prices, and so partially protecting its contract position. For simplicity, we have focused on the impact of withholding.

- The introduction of nodal pricing at Murray would create incentives for inefficient dispatch to manage the resulting price risk. Northward flows from Victoria vary from 900 to 1,100 MW. In order to ensure the Murray to Tumut line did not constrain as those flows varied, Murray would need to withhold additional capacity, in exactly the same way that Tumut does, to ensure lines into NSW are not fully loaded to manage its own nodal price risk,
- The scale of the withholding, and so impact on competition, is major. If Snowy Hydro's response to the risk it faces under the Southern Generators' proposal was to ensure the Murray-Tumut line was unconstrained, Murray would need to withhold around 1,250 MW of generation. This would increase flows across the cutset by 100 MW, and not affect flows into NSW
- The Southern Generators' proposal would significantly reduce Snowy Hydro's ability to hedge contracts in both NSW and Victoria. Murray generation would not be available to hedge against high prices in both NSW and Victoria. As discussed below, this could have significant price increase impacts on Victorian customers, and
- If there were merits in the Southern Generators' argument, it should immediately be extended to generators in central and southern Queensland, the Western ring generators in NSW, and generators in the La Trobe valley. However, this would be directly contrary to the regional design of the market and to the policy direction set by the MCE.

Conclusion: the Southern Generators' proposal would lead to a significant reduction in generation at Murray, and an increase in generation in Victoria in comparison with either the status quo or the reorientation proposal. This would increase generation costs and reduce dispatch efficiency.

4.4 Southward flows

The Southern Generators' proposal would alter the current approach to southward flows. At present, Murray is reoriented to Dederang when the Murray-Tumut line constrains on southward flows. Under the Southern Generators' proposal, it would receive a higher price.

We consider that the dispatch impacts of this are likely to be minimal. During these periods, Murray is already receiving high prices. It has incentives to generate both to defend contracts, and because spot prices are above its SRMC. These incentives do not materially change under the Southern Generator's proposal. As a result, we consider both proposals will deliver dispatch efficiency for southward flows.

4.5 Modelling dispatch efficiency

We note that the draft Rule determination estimates production cost savings of \$1.1M or less, and states:

“In our view, the overall savings in production costs were small because the ultimate modelled impact of the Southern Generators’ proposal was a substitution between brown coal and black coal generation at various times rather than avoidance of higher cost gas-fired generation.”³

This seems surprising. Brown coal generation is usually fully operating during the periods in question. It is unclear how there could be inter-temporal substitution. Moreover, it seems improbable that dispatch efficiencies of this order could be achieved, even allowing for the maximum possible additional flow over the maximum possible periods when NEMMCO would otherwise clamp. For a detailed explanation of these issues please refer to Snowy Hydro’s re-orientation rule change proposal, Attachment 2, Section 3.

Snowy Hydro’s re-orientation Rule change proposal estimated (based on historical hours of binding constraints from Murray to Tumut) that a generous productive efficiency gain of only \$300k may be possible.

5 Price impacts

The discussion above has provided the basis for assessing likely price impacts.

An assessment of the pricing impacts requires consideration of the impact of contracting positions on bidding strategy and pricing. To keep our analysis manageable, we will use the working assumption that, when generators are contracted, they are likely to bid at SRMC. The bidding assumptions used in the AEMC’s modelling are set out on page 66. They assume that the Southern Generators bid 70% to 90% of capacity at SRMC (90% being a relatively high figure, considering the need to allow for loss of a unit). They also allow for Murray and Tumut to bid anywhere between 0% and 100% of capacity at SRMC.

This range will produce a wide distribution of results. We believe that this is of limited assistance when considering the impact of these transitional measures. We consider it would be more appropriate to base the modelling on observed behaviour, as a more realistic predictor of future behaviour that is consistent with the commercial incentives facing Snowy Hydro.

For Tumut, the observed behaviour is to bid in a way which maximises loading on the lines into NSW, while ensuring the lines are unconstrained. **This is inconsistent with the AEMC modelling assumption that Tumut is relatively uncontracted.** If Tumut was relatively uncontracted, Tumut would have incentives to withhold capacity and drive up the price.

Assuming bidding behaviour by Tumut which aims to maximise the loading on the lines into NSW, under both the Southern Generators and the reorientation proposals there will be no additional flows into NSW and no material impact on prices in NSW.

³ Draft Rule Determination, page 73

We note that the AEMC has concluded that average annual prices in NSW will be reduced by \$2-4/MWh. It states that:

“The source of these price reductions is intuitively obvious. When NEMMCO clamps the interconnector, this limits the choice of generators that NEMMCO can use to meet demand. The smaller group of generators.....have an incentive to bid higher prices.”⁴

We believe the starting assumption of this argument to be incorrect. As we have demonstrated above, Tumut’s bidding behaviour has been to ensure that lines into NSW are fully loaded, while also ensuring they do not constrain. As a result, there is no change in the generation available to NEMMCO to meet demand in NSW. The high price impacts (under interconnector clamping) modelled by the AEMC appear to be a result of assumptions regarding Tumut’s behaviour that are inconsistent with actual operating practice.

Murray’s bidding behaviour will also be affected by its contract position. Murray is presently protected from low prices in the Snowy region by the imposition of the clamp (subject to NEMMCO’s performance in managing negative residues). Under the Southern Generators’ proposal that protection would be removed. This would leave Murray with two options:

- Withhold up to 1,250 MW of generation, to ensure the Murray-Tumut does not constrain. Under this scenario, prices would equalise across Victoria, Snowy and NSW. As there is no additional competition in NSW, that equalisation would be achieved through higher prices in Victoria, or
- Generate at higher levels, and reduce prices in the Snowy region. Under this scenario, Snowy Hydro would have to bear the risk associated with lower prices, and its lack of cover into both the NSW and the Victorian markets. However, this strategy would to a degree protect Victorian contracts by keeping down prices in Victoria to a level that remains high but is less than the very high level under the first option.

Under the reorientation proposal, Murray would not face these risks. As a result, it would not be incentivised to withdraw capacity or to offer capacity at below SRMC in order to manage NEMMCO intervention risk. As a result the level of competition would be higher and prices in Victoria would generally be lower.

The AEMC has concluded that under the Southern Generators’ proposal, prices in the Victorian region will increase by up to \$0.30 MWh. We consider this likely to be a significant underestimate. We have previously stated that the commercial behaviour for Murray generation under the Southern Generator’s proposal would be to withhold generation and ensure that the Murray to Tumut intra-regional constraint is not constrained thereby aligning the Snowy price with the NSW price. Under this probable scenario the Victorian price would rise to approximately the Snowy price under high northerly flow/High NSW price scenarios. Snowy Hydro modelling indicates an average annual Victorian spot price increase of the order of \$6/MWh.

⁴ Draft Rule Determination, page 24

In summary, during NSW high price periods, Murray will be obliged to back off its generation to ensure the Murray-Tumut line is not constrained. As a result, prices will be at similar levels in NSW, Snowy and Victoria. This is recognised by the Southern Generators, who state in a presentation to the AEMC⁵:

- “By not having the threat of NEMMCO intervention, the commercial motive does not exist to offer Murray generation at zero cost.
- The transfer may never actually be used in practice, because its existence defeats its necessity!”

What the Victorian generators are saying is that they expect Snowy Hydro to withhold a large volume of Murray generation to align the Victorian price to NSW price.

The modelled assumptions on the level of Snowy Hydro’s contracting relative to the contract exposures of other major generators are unrealistic (refer to attachment 1). To facilitate more robust and accurate analysis, the modelling inputs need to be adjusted as discussed in the attachment. These critical assumptions need to be confined to tighter bounds, and modelling outcomes should be tested for consistency with current behaviour under the status quo arrangements.

While Snowy Hydro does not believe that the modelling assumptions and therefore modelling results will be influential in the AEMC determination between the status quo and the Southern Generators’ proposal, they are likely to be important to the relative consideration of Southern Generators’ proposal versus the re-orientation proposal.

Conclusion: Adoption of the Southern Generators’ proposal is likely to lead to significant increases in Victorian spot prices with zero or negligible likely impact on NSW spot prices. Re-orientation would lead to more competitive outcomes in Victorian spot prices with no material impact on NSW spot prices.

6 Inter-regional trading

The AEMC assesses the impact of hedge markets on the ability of retailers to exercise price discrimination, and on entry into the retail and wholesale markets. We believe that this approach complicates the analysis and obscures the cost of risk, in particular with respect to the cost of volatility and inter-regional exposures. Other things being equal, approaches that reduce volatility, either directly or through facilitating hedge markets, lower costs. These should be preferred to approaches that leave market participants unable to effectively hedge risk at a reasonable cost.

All proponents recognise that the status quo arrangements should be changed. Generators located south of the Snowy region have a substantial reduction in their ability to hedge inter-regional price risk when the clamp is imposed. While this is the major cost, it should also be borne in mind that Snowy Hydro faces a significant lack

⁵ Southern Generators presentation to the AEMC, page 22.

of firmness in its hedge into NSW, due to the uncertainty over NEMMCO's operational behaviour in imposing the clamp.

The two proposals differ in their performance against this criterion:

- The Southern Generators' proposal would strengthen hedge markets between Victoria and NSW, but significantly reduce the firmness of hedges between Snowy and both regions
- The reorientation proposal would ensure a firmer hedge market for all participants.

The AEMC concludes that the Southern Generators' proposal would reduce the complexity of inter-regional trading. This is true with respect to the status quo. It is not true with respect to the alternative of reorientation.

Conclusion: reorientation provides a firmer inter-regional hedge for all participants than the Southern Generators' proposal, and should facilitate inter-regional trade.

7 Power system security and reliability

We agree with the AEMC's conclusion that the Southern Generators' proposal will not materially affect reliability of supply to NSW, and consider this also applies to the reorientation proposal.

8 Good regulatory practice

We concur with the AEMC's view that the uncertainty associated with the status quo can be regarded as poor regulatory practice. Both alternatives would provide higher and equivalent certainty.

9 Revenue adequacy

We concur with the AEMC's view that revenue adequacy for the Southern Generators' proposal should generally be achievable. We note it would not be guaranteed under certain transmission outage conditions, which have the potential to have significant funding impacts. The reorientation proposal does not face any problem of revenue adequacy.

10 Implementation

Snowy Hydro has nothing further to add to the points made in draft Rule determination.

11 Conclusion

Our conclusion is that, when compared to the Southern Generators' proposal, reorientation is more consistent with the long term policy settings; likely to lead to more efficient dispatch; will lead to lower prices in Victoria; and will strengthen the ability of all generators and other market participants to manage inter-regional price risk. On that basis it should be preferred.

We would be pleased to assist the AEMC with further information if and as required, and thank the Commission for the opportunity to comment on this import market rule consideration.

Yours sincerely,

A handwritten signature in black ink, appearing to read 'Roger Whitby', with a large, sweeping flourish at the end.

Roger Whitby
Executive Officer, Trading

Attachment 1: Comments on approach to modelling

(a) AEMC approach

It is our understanding that the AEMC's approach to modelling is as described below. The AEMC has analysed historic data between 7 August 2004 and March 2006. The analysis covers each period when NEMMCO imposed the clamp, and six hours prior to the imposition of the clamp. The key findings are:

- **Clamping:** most clamping interventions are when there are northerly flows, during times of high demand and high prices in NSW. Price differentials between Victoria and NSW tend to be relatively low prior to the clamp, and high during periods of clamping. Causation is uncertain. Northward flows from Snowy to NSW have generally not fallen after the imposition of the clamp. Again, causation is uncertain.
- **Generation:** the analysis discusses changes in southern northern and Snowy generation since the introduction of the CSP/CSC trial. The analysis also concludes that during periods of clamping Snowy generation is substituting for southern generation.

The AEMC has then modelled prospective dispatch and price outcomes, using SPARK, Frontier Economics' game theoretic wholesale market model. The base case includes the CSP/CSC trial and NEMMCO clamping in accordance with its operating procedures, and reorientation to avoid negative settlement residues on southward flows.

The modelling has examined two alternative scenarios:

- **Southern Generators' proposal:** negative settlement residues on VIC-Snowy interconnector are funded from positive residues on the Snowy-NSW interconnector. Clamping is not used for northward flows and reorientation is not used for southward flows; and
- **Reorientation:** the Snowy price is set equal to the nodal price at Dederang at times of both northward and southward constraints between Murray and Tumut.

For the status quo and both scenarios, dispatch is modelled on the basis of SRMC and a strategic bidding scenario. Under the second scenario, Snowy Hydro and key thermal generators are assumed to bid strategically.

The strategic bidding analysis included the following assumptions on generator bidding behaviour:

- major thermal generators bid a proportion of their capacity at SRMC, and the remainder at VOLL. Our understanding is that this was intended to reflect their contract position, with an assumption that generators would bid at SRMC for contracted capacity. The proportion of capacity bid at SRMC was 80/90%

for most major thermal generators; 70/80/90% for International Power and Macquarie Generation; and 70/90% for QPTC;

- Murray and Tumut were assumed to offer anything from zero to 100% at \$1/MWh, in increments of 12.5%, producing a very broad distribution of results for these two generators. The model assumes that Murray and Tumut can adopt independent bidding strategies.

Given the importance of contract positions for bidding strategy, a number of contracting cases were modelled. These allowed for differing levels of contract cover; holdings of IRSRs by Snowy Hydro; and the split of Snowy Hydro's contract volumes between Victoria and New South Wales.

The AEMC then modelled 15 scenarios. These scenarios differed with respect to the constraint regime adopted, the contracting assumptions, and the split of the Snowy Hydro contracts between Victoria and New South Wales. A number of additional modelling assumptions are set out in the draft Rule Determination.

The model examined changes from the status quo for:

- *annual production costs*; the modelling indicated a reduction in annual production costs of \$1.1M or less from adoption of the Southern Generators' proposal compared to the base case. The paper states that "In our view, the overall savings in production costs were small because the ultimate modelled impact of the Southern Generators' proposal was a substitution between brown coal and black coal generation at various times, rather than avoidance of higher cost gas-fired generation". The reorientation proposal yielded a very minor additional gain in production costs;
- *Generator outputs*; overall, under the Southern Generators' scenario Snowy Hydro generated more during the peak summer period, displacing thermal generation. This results in lower summer costs and higher winter costs, compared to the status quo. Under both the Southern Generators' and the reorientation scenarios, Tumut generates more in summer peak and Murray less. The AEMC attributes this to a view that, under the status quo, Murray 'over-generates' to induce clamping. The changes in output by southern and northern generators are more minor;
- *interconnector flows*; the model forecast slightly higher flows into NSW under the Southern Generators' proposal, but no other significant changes; and
- *annual regional prices for each region in the NEM*. The model concluded that under most contracting scenarios the Southern Generators' proposal reduced prices in NSW by \$2-4/MWh, and increases in Victoria of up to \$0.30/MWh, with prices in other regions little affected. This price impact appears to be the most significant conclusion from the modelling.

The analysis also considered the impact on risk. It concluded that under the Southern Generators' proposal, southern generators may be more willing to enter contracts against the NSW regional reference node; NSW generators may be a little less willing

to enter contracts against the Victorian regional reference node; and generators located in the Snowy region may be slightly more willing to contract in Victoria and slightly less in NSW.

(b) Comments on the modelling assumptions

Both the Southern Generators' proposal and the reorientation proposal are short term measures, prior to implementation of a regional boundary change. It is not reasonably feasible to make major adjustments to contract positions in the short term. As discussed above, we consider that realistic contract position for major generators and Snowy Hydro should be used as the basis for the AEMC's modelling. The use of a wide distribution of theoretically possible contract positions, including some which are not commercially viable, results in a wide distribution of outcomes of which the average outcome is not representative of the most likely outcome.

We consider that a more realistic modelling outcome would be achieved if the AEMC made the following adjustments to its assumptions on contracting:

- **contracting behaviour that is reasonably consistent between Snowy Hydro and other generators, rather than a much lower contracting level for Snowy Hydro in many scenarios.** As the AEMC has commented (page 89), Snowy Hydro must hold higher contracting levels than other generators to achieve the same level of revenue certainty
- **contracting assumptions for other major generators should be adjusted, and, in general, reduced.**

Southern generators are in most cases willing to contract a maximum of 75% of their capacity to allow for unit failure (and we note this leaves little capacity to support additional contracts in NSW after allowing for demand in Victoria. Given the 6,000MW of normal underlying demand and only 6,400 MW of 'base load' Victorian generation, the ability of the Victorian generators to offer substantial contract volume written against the NSW node is not does not exist in practice).

Around 33% of NSW load is covered by the ETEF. Accordingly it is unrealistic to model contracting levels of the major NSW generators above 60 to 65% of capacity. The ACCC and others have produced commentary to support this point (which we would be happy to supply if required).

- **the Snowy Hydro contract split between NSW and Victoria is not realistic and needs to be adjusted.**

The split needs to reflect the physical realities and risks of inter-regional trading such as the relative inter-regional transmission capacities (a maximum of 3,500MW to NSW vs 1,900MW to Vic), number of effective major transmission lines (five to NSW vs two to Vic and the associated impact on transmission capabilities under outage conditions) and relative value of contracting in NSW vs Victoria (NSW contact prices currently trade very materially in excess of Victorian contact prices), and

- **the model should assume that Tumut is contracted to the point where its bidding behaviour will ensure the maximum achievable flows into NSW,** given the transmission capacity and the need to avoid price separation.

This last point is critical to modelling the impact of the Southern Generators' proposal. It is supported by data, not just assertion. As we have shown, Tumut bids in a way which ensures the maximum flows into New South Wales, while maintaining around 50 MW of headroom to ensure the line does not constrain. This means that any increased flows across the cutset during northward flows will simply lead to a displacement of Snowy Hydro generation by southern generation, and will not lead to additional flows into NSW.

The feasibility of relative contract positions between the status quo, the Southern Generators' proposal and re-orientation needs to be re-examined to ensure that it is reasonable. The AEMC applies the same assumptions of contract levels to each of the three cases. For the purposes of modelling, we recognise that the AEMC can hardly do otherwise, however the AEMC in its considerations of the results needs to examine the feasibility of those assumed contract positions for the key modelling participants. In particular, a high assumed contract position may be feasible under one case and not the other(s) and therefore the modelled outcome may be unrealistic.

The AEMC's assumptions regarding Snowy Hydro's energy constraints are not realistic. Snowy Hydro is unique in the sense that it has multi-year water storage capability and its major storages have a 5 to 10 year storage cycle and a flexible water operating regime. Accordingly, Snowy Hydro does not operate to pre-determined annual energy budgets. Its water flexibility can be extended by its substantial pumping capability. The Tumut 3 Pumping assumption "dispatch when economic" is also not supported by observed behaviour.

We note that the AEMC modelling concludes that the Southern Generators' proposal will result in higher inflows into NSW compared with the base case under most scenarios. That is inconsistent with Tumut's bidding strategy, as revealed in market data for northward flows into NSW during high price periods. It is also inconsistent with the AEMC's historical analysis which clearly demonstrates that there is no reduction in flows into NSW after clamping is imposed.

We believe that the AEMC's modelling assumptions should be modified to ensure that forecasts are consistent with historical data; i.e. by comparing actual clamping outcomes with modelled clamping outcomes. In our view, if the AEMC modelling does show additional flows into NSW from the Southern Generators' proposal, then this suggests that the scenarios being used are not being modelled realistically, and should not be used in the analysis.

The assumption on Snowy Hydro's offer price is also unrealistic. The AEMC considers that Snowy Hydro is offering capacity at \$1/MWh to induce counter-price flows and clamping. This is not an accurate assumption. The workings of the loop flow mean that (in the absence of clamping) the price in the Snowy region has to drop to low levels when prices are high in NSW and medium in Victoria. When these circumstances arise, Snowy Hydro faces considerable uncertainty about when the

clamp will be imposed. It has adopted a strategy of bidding at a fixed low price in order to provide a clear signal to the market operator that it would be appropriate to impose the clamp in line with its operating procedure. The purpose is not to induce the clamp, but to attain greater certainty over the timing and extent of its imposition.

Our understanding is that the AEMC assumes that Snowy Hydro will offer capacity at \$1/MWh for all contracted capacity under all scenarios. As discussed above, the sole purpose of offering at \$0/MWh is to reduce uncertainty over the behaviour of the market operator. In the absence of this need, and under both the Southern Generators' and the reorientation proposal, it would be more realistic to consider that Snowy Hydro will offer capacity to support contracted volumes at SRMC. This is the opportunity cost of water. Snowy Hydro suggests a value at the top end SRMC for black coal or the lower end of SRMC for gas-fired generation.

The form of contracts (and associated strike prices) is potentially a critical assumption with respect to outcomes for the type of modelling performed by the AEMC. Generally speaking, swap contracts would be reasonable for base-load generators, but unreasonable for peaking generators and particularly energy constrained peak generators. This may significantly affect modelling outcomes yet it is unclear to us what has been assumed and how this may have impacted the outcomes.

Model treatment of SRA position holdings may also be a critical determinant to modelled outcomes. We presume that the Frontier Economics model treats SRA holdings as a 'sunk investment'. That is, the holder of the SRA units does not face a strategic decision in bidding to either constrain or not constrain inter-connectors. For Snowy Hydro this is a critical issue as all trading is effectively inter-regional, and the ability to inter-regional hedge is a key consideration. As SRA units must be purchased on an ongoing basis, and real time SRA revenue accumulations feed directly into future SRA unit purchase costs, there is a strong driver not to allow inter-connectors to constrain unnecessarily. Hence it is inappropriate to assume SRA holdings are a 'sunk investment' for modelling purposes of major players.

Considering the points we have raised above, our view is that the AEMC's conclusions are affected by the following:

- The modelling shows additional flows into NSW under the Southern Generator' and reorientation proposals. As noted above, this is inconsistent with historical data and market data on transmission line loadings. Snowy Hydro considers that the AEMC results are likely to have resulted from unrealistic assumptions regarding the relative level of contracts held by Snowy Hydro and other major generators.
- The AEMC considers that dispatch efficiencies are being achieved through substitution of brown coal for black coal. Snowy Hydro believes this to be unlikely. Aside from the inability to increase flows into NSW during the periods in question (refer to Snowy Hydro's Victorian load duration analysis in our re-orientation rule change proposal), brown coal is likely to be fully dispatched in Victoria and there is unlikely to be any possibility of additional output. In addition, the AEMC's analysis of the historical data concluded that "In short, it appears that Snowy region output has been substituting for

Southern Generators' output at clamping times since the trial began." This supports our conclusion that removing clamping will lead to a substitution of Southern generation (gas fired or hydro) for Snowy Hydro output.

- The AEMC modelling concludes that prices will fall by an average of \$2 to \$4 per MWh in NSW, and rise by around 30 cents/MWh in Victoria. We do not believe that the AEMC would have reached these conclusions if realistic contract positions and commercial incentives with respect to either constraining or not constraining inter-regional transmission lines were taken into account. As shown above, there will be no additional flows into NSW during high price periods. As a result, there can be no significant impact on NSW prices. Further, a price reduction of \$4/MWh for a very high assumed 50 Hrs of intervention requires a NSW price reduction for these periods of \$700/MWh. Our view is that this would be unlikely to occur in practice. However, the removal of clamping may oblige Murray to withhold up to of the order of 1,200MW of generation (a point demonstrated in our reorientation proposal). As a result, there will be a large substitution of Southern Generation for generation in the Snowy region. Snowy Hydro's modelling shows that the impact on NSW prices is immaterial; however, the impact on prices in Victoria could be as great as \$6 per MWh. We consider that the AEMC results are likely to have resulted though the use of assumptions regarding the relative level of contracts held by Snowy Hydro and other major generators that do not accord with actual practice.

As discussed above, the modelled price outcomes reductions of \$2 to \$4/MWh for NSW do not appear to be achievable once Snowy Hydro's actual contract level and commercial incentives are taken into account. If the price decreases are occurring only on relatively very high NSW price events (assuming 50 hrs of otherwise interconnector clamping), this would require an average \$700/MWh price reduction to achieve a flat \$4/MWh annual price reduction. Such an outcome is only credible if it is assumed that Tumut withholds capacity. Under Snowy Hydro's own market modelling, such a high NSW price reduction for the Southern Generators' proposal (relative to the status quo) can only be achieved if Snowy Hydro is assumed to hold unrealistically low contract levels. This then results in Tumut generation being withheld under high NSW price events. However, this same modelling generates high increases in Victorian price.

The modelling does not appear to produce price outcomes that support the inferences and conclusions drawn from the study. For example, Table A8: Annual average prices (time weighted) by scenario (\$/MWh) on page 80 of the draft determination presents some surprising results:

- All scenarios except 14 show a Snowy region price higher than both the NSW and Victorian prices. This is a questionable result in that it has never happened in the history of the market. With Snowy Hydro's own modelling, such an outcome can only be generated by assuming an unrealistically low level of contracts held by Snowy Hydro, and relatively high levels held by other major generators.
- All cases other than 14/15 show the Victorian price aligning with the NSW price. This appears to support the Snowy Hydro argument that it will lead to

reduced competition in Victoria and higher Victorian prices but it is unclear how this results in an increase of only \$0.30 / MWh in expected prices in Victoria.

- All NSW price outcomes (except for 14/15) are relative low and between \$25 to \$36. Market expectations such as AFMA forward prices are much higher. This suggests that the AEMC modelling assumptions on the general level of contracts held by major generators are much higher than the inferred market expectation.
- Snowy Hydro highlights the price differences between case pairs 7/9 and 14/15. In summary the results show that a 10% reduction in Snowy Hydro contracts result in a 10% increase in NSW price outcomes. Snowy Hydro would welcome the opportunity to consider this impact with the AEMC's modellers. If the Southern Generators' proposal is finally approved, Snowy Hydro will be forced to reduce contract levels. Snowy Hydro asserts that southern generators cannot reasonably substitute the reduced Snowy Hydro contracting. Further, we believe that the absolute maximum increased flows to NSW that could be achieved (assuming that Tumut did withhold) is only 100 MWs.

(c) Modelling of inter-regional risk

The AEMC's draft Rule determination on the Southern Generators' proposal also states that it will consider the extent to which the proposal enhances the opportunities for inter-regional trading. Snowy Hydro considers that a better overall basis for assessment of proposals would be to consider their impact on risk in the NEM.

The greatest source of unmanageable risk in the NEM at present is the existence of the Snowy Region, with its substantial generation but no load. This exposes Snowy Hydro to a very high level of risk, as all of its output is exposed to basis risk from inter-regional price separation.

At present, southern generators face great problems in managing inter-regional price risks between Victoria and New South Wales due to NEMMCO's practice of clamping. However, the overall impact on the southern generators' businesses is marginal at worst, as the substantial bulk and opportunity for their trade is regional, not inter-regional.

On the other hand the impact of the Southern Generators' proposal on Snowy Hydro is very detrimental as all of Snowy Hydro trade is inter-regional. This more than offsets in Snowy Hydro's opinion "the commission considers that participants trading out of the Snowy Region have a wider range of tools available for managing inter-regional risks than other market participants..".

Snowy Hydro considers that any benefit from marginally increased inter-regional trading by the southern generators under the Southern Generators' proposal will be more than offset from reduction of inter-regional trade by Snowy Hydro. Snowy Hydro's reorientation proposal enhances the level of inter-regional trade for all market participants and reduces the overall levels of risk in the NEM by enabling all market participants the ability to inter-regionally hedge.

Snowy Hydro believes that the AEMC's modelling of the impact of inter-regional trading would benefit from broadening the scope of the analysis to consider more fully the overall impact on the level of risk faced by all participants in the NEM.

(d) Summary of comments on AEMC modelling

The modelling assumptions regarding the level of contract cover employed by Snowy Hydro and the other major generators are problematic in that they are inconsistent (in their assumed treatment of Snowy Hydro compared to the other generators) and assume that Snowy Hydro contracts and bids contrary to the commercial incentives it faces. We would welcome the opportunity to work with the AEMC to develop a more realistic assumption set and, in particular, focus on narrowing the range within which critical assumptions are allowed to vary. We consider that a useful starting point for this exercise would be to develop a modelling environment in which the status quo is able to be replicated with sufficient accuracy. This would provide an ideal foundation for scenario-based analysis.

While Snowy Hydro does not believe that the modelling assumptions and therefore modelling results will affect the AEMC's preference between the status quo and the Southern Generators' proposal, the assumptions are likely to be important in the consideration of the relative merits of the Southern Generators' proposal compared to Snowy Hydro's reorientation proposal.