

26<sup>th</sup> March 2007

Dr John Tamblyn  
Chairman  
Australian Energy Market Commission  
PO Box H166  
Australia Square NSW 1215

Submission sent electronically to:  
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Dear Chairman,

## **Supplementary Submission to Snowy Region Boundary Change and Southern Generators Rule Extension**

### **1 EXECUTIVE SUMMARY**

**This supplementary submission sets out the market problems and inefficiency that the current Southern Generators rule is creating. Snowy Hydro advocates that the current arrangements are not sustainable due to the evident problems in the spot market, have significant ongoing detrimental impact in the contracts market and should not be extended beyond 31 July 2007. This is the date specifically analysed and approved on a time limited basis. Snowy Hydro requests that only the CSP/CSC arrangement for Tumut be extended beyond 31 July 2007.**

**Snowy Hydro believes that the Macquarie Generation revised Split Region option is not practically implementable, will reduce contract market efficiency and the AEMC analysis demonstrate no additional benefit over the Snowy Hydro proposed region boundary change.**

**Implementation of the Snowy Hydro Snowy region boundary change, if approved, is achievable within the original timeframe of 4<sup>th</sup> November 2007 (or 30 December 2007). The IT/system change costs of the Snowy Region abolition are both small relative to the benefits and small in absolute terms.**

### **2 Problems evident with the Southern Generators Rule**

Serious market problems are evident with the Southern Generators rule due to its interaction with the South Morang constraint. The South Morang constraint occurs 3 times more often than the Murray to Tumut constraint and the Murray to Tumut constraint is effectively a subset of the South Morang constraint. The South Morang

constraint binds often for example on 12 January 2007, 30 January 2007, 3 March 2007 and 17 th March 2007 etc. Typically the Murray to Tumut constraint binds after the South Morang constraint binds. The impact of the South Morang constraint was largely masked by NEMMCO's intervention prior to the implementation of the Southern Generators rule and option 4 constraint formulation by NEMMCO of this constraint.

The South Morang and the Murray to Tumut constraints are directly inter-related. This is due to the incentives that the Southern Generators rule creates for Murray generation and southern generators offers. The Southern Generators rule creates the situation where the Victorian price is defined by NSW and Murray marginal offers when ever the Murray to Tumut constraint binds. Under these conditions the Southern Generators offers do not directly influence the Victorian price (there is no price volume trade off). The Southern Generators seek to maximise volume against the Victorian price set by Murray/NSW offers and thus worsen the South Morang constraint.

**Murray generation (like Southern Hydro generation) is a positive gatekeeper when the South Morang constraint binds. That is increased output increases the flow through the South Morang constraint but Murray generation under the Southern Generators rule has no incentives to generate at a high level.**

The rule incentivises southern generators (in Victoria, South Australia, and Tasmania) to offer generation that does not reflect costs due to serious mis-pricing in the Latrobe Valley. Under conditions of binding South Morang/Murray to Tumut constraint the Latrobe Valley offers do not directly influence the Victorian regional reference price, hence they are incentivised to maximise volume. As a result these generators are dispatched in a manner that worsens the South Morang constraint. Accordingly:

- Exports from Victoria to Snowy/NSW Regions are reduced (not increased as per the rationale for the rule approval) due to better co-efficients of SA generation relative to Latrobe Valley/TAS generation.
- NEMMCO is forced to intervene (for example 30 January 2007) in the market to prevent negative resides between Victoria and South Australia (the rationale for the rule approval was to remove the need for NEMMCO intervention to prevent negative residues).
- The Latrobe valley mis-pricing creates significant market inefficiency. (Most Latrobe Valley generators offered -\$1000 on 30 January 2007, which is obviously not their marginal costs. The in-inefficiencies are obvious within Snowy Hydro portfolio in comparing Murray and Valley Power offers and marginal costs).
- Customers pay a less competitive and inefficient price especially in Victoria due to the mis-pricing incentives in Latrobe Valley.

Murray generation under the Snowy Hydro Snowy region change proposal has strong and efficient signals to generate thereby relieving the South Morang constraint and thus the problems are removed.

Attachment A details the evident problems with the Southern Generators rule.

### **3 Critique of Southern Generators submission of 8 March 2007**

Snowy Hydro's submission rebuts the Southern Generators submission dated 8 March 2007. The Southern Generators attempt to refute (unsoundly) the problems that are evident as a result of the incentives under their rule introduced in 1<sup>st</sup> November 2006.

The key assumption that the Southern Generators make is that generators (including Murray and Southern Generators) make the same offers under each of the rule scenarios. Of course this is blatantly wrong (indeed, the rationale for the Southern Generators rule was to change the incentives on generators in making offers, particularly Murray). Generators make offers in accordance with how they will likely to be paid and this changes dramatically under the different rule scenarios.

The Southern Generators claim that negative generators are efficient. If negative SRAs are the direct result of mis-pricing and the generator bids not reflect cost then resulting negative SRAs and market outcomes are not efficient! Under conditions of binding South Morang constraints, Latrobe Valley generators bid down to -\$1000 while being paid \$100s or \$1000s. Clearly these bids do not reflect the marginal costs of these generators and as a result the negative SRAs are not efficient. In addition, this behaviour creates negative residues between Victoria and SA as SA generators have not being prepared to sustain negative offer/prices.

Snowy Hydro has never asserted that truncation of negative SRAs is its preferred option. Snowy Hydro preferred option is the Snowy Region boundary change proposal which creates more efficient incentives and outcomes. It previously advocated re-orientation as an interim measure.

Snowy Hydro finds it notable that the Southern Generators have advocated the Southern Generators rule for Murray pricing but for exactly the same issues associated with the related South Morang constraint and Latrobe Valley mis-pricing they have not advocated a CSP for Latrobe Valley.

Appendix B details the critique of the Southern Generators submission dated 8 March 2007.

### **4 Macquarie modified Split Region Option**

The most recent proposal by Macquarie Generation the split region option cannot be practically implemented:

- The proposed regional reference node with no load and no generation is completely at odds with accepted electricity market design principles and the NEM regional market design.
- Under the Mac Gen proposal the Victorian Wodonga load will be effectively redefined into the NSW region. A loop flow will be created between Victoria and NSW through Redcliffs, which the current version of NEMDE cannot support. Alternatives would create inconsistent region boundary definitions and non transparent and inconsistent NEMDE formulations. For example,

Wodonga load will need to be notionally excised from three major inter-regional connectors.

- The Mac Gen proposed boundaries cross locations with neither material nor enduring constraints (such as Upper Tumut/NSW) in direct contradiction of the MCE policy

The Mac Gen proposal does not solve the ‘hedging problem’. In fact the split region proposal forces Snowy Hydro to inefficiently restrict its level of contracting in neighbouring regions. In addition, inter-regional trading through the new regions will be made dramatically more complex and less transparent. As a result efficiency and liquidity in the contracts market will be reduced.

## **5 Implementation costs of Snowy Region Abolition**

We submit that the overall costs for the Snowy Hydro proposed changes are relatively small and immaterial in comparison to the benefits modelled by the Commission. In this submission we detail Snowy Hydro’s IT/system costs required to achieve the proposed changes (Snowy Hydro Generator and Red Energy Retailer) and note that these are small being less than ten thousand (\$10,000) dollars. The cost of changes required for Red Energy retail systems is zero dollars (\$0).

Snowy Hydro is the most affected participant, in that it is the only participant that has dispatch and settlement system changes flowing from the change of boundaries. Most participants only need to receive and process one new number from NEMMCO, this being the new Victoria to NSW interconnector flow.

Snowy Hydro notes that the costs, complexity and required system changes for both the Southern Generators rule and the CSP/CSC derogations were for participants greater than the Snowy Hydro proposed Snowy region boundary change

NEMMCO did not raise any cost issues before embarking on option 4 form conversion. However the general conversion of constraints to the option 4 form by NEMMCO is an order of magnitude greater exercise than the relative straight forward task of changing existing option 4 constraints to suit the new boundary.

What has not been empathised in this debate about IT and system change costs is the likely benefits of the Snowy Region abolition. There is an inter-relationship between spot price outcomes and contract prices in that they are positively correlated. A reduction in forward spot price outcome should translate to a reduction in forward contract prices. Using the lower range of spot price reduction of \$1/MWh as modelled by the AEMC, a reduction of \$1/MWh for contracts equates to \$200 million saving per year. The contract market benefits alone are substantially more material than any IT / systems costs.

## **6 Implementation of Snowy Region Abolition**

Snowy Hydro is concerned by the unfortunate recent change in advice by NEMMCO regarding its implementation timetable (despite its previous investigations prior to its

earlier advice). We note that NEMMCO also advised that the Snowy Hydro proposed change was much more straight forward than the Mac Gen alternative proposal.

It appears that the most recent program (5 March) reflects the generic region boundary change requirements and not the much simpler Snowy Hydro boundary change proposal requirements. For example NEMMCO's program allocates 3 weeks for prudential requirements, but this is only necessary for the Mac Gen change proposal. There are no settlement issues for the Snowy Hydro proposal as all necessary material metering requirements are in place. NEMMCO simply need to reallocate existing metering points in a similar manner that was used for the NSW/QLD boundary revision. As Snowy Hydro is the only affected participant in terms of settlement, a simple 'de-registration/re-registration' process is required for Murray/Tumut generation.

SRA changes can well be achieved by 4 November (or 30 December 2007) as NEMMCO does not need to change any software. The process for surrendering pre-sold SRA units is well established (e.g. Enron failure, CSP/CSC and Southern Generators rule changes).

The MMS changes are the clear critical path changes and these are well achievable by 1 January 2008 based on NEMMCO's program. System normal (only) constraint reformulations can be achieved by June 2007 (based on NEMMCO's advice) and thus allow participant trials to commence following MMS dispatch changes in May. N-1 constraint reformulation can proceed in parallel with the trial. As NEMMCO notes, constraint reformulation is an issue of resourcing. Snowy Hydro is prepared to provide for NEMMCO its constraint experts free of charge if required to meet NEMMCO's original timetable.

Differing region boundary change options will require differing implementation timeframes. We note however based on the NEMMCO advice and the potential for deployment of additional resources a timely implementation by NEMMCO of the Snowy Hydro proposed boundary change, if approved, is readily achievable by 4 November or at the very least 30 December 2007. This includes contingency provisions to ensure manageable level of risk.

## **7 Conclusion**

We urge the Commission to consider the impact on the contract market of delays and uncertainty over the region boundary definition. In our opinion this impact is adverse as it limits contract quantity, competition and liquidity. Snowy Hydro is concerned that some participants seek to extend the process and extend uncertainty in order to limit competition in the contracts market.

Additionally further delays to the Snowy Region change process impacts the spot market, whereby continuation of the current arrangements is problematic. It incentivises Southern Generators to make bids that do not reflect costs due to Latrobe Valley mis-pricing and incentivises Snowy Hydro to limit generation to maintain transmission head room.

In the light of the foregoing problems both in the contract and spot markets, we ask that the AEMC reject the recent Southern Generators rule change request and does not approve any proposed extension of the Southern Generators rule.

Incentives on both Snowy Hydro and Southern Generators with the abolition of the Snowy Region would rectify the problems we have highlighted. The change would result in increased contract liquidity in NSW and Victoria, a reduction in the South Morang constraint and hence a reduction in the problems this has presented to the market. In short, the Snowy Region abolition would increase competition in both the Spot and Contact markets.

We request that a final determination of the Snowy Hydro region boundary change proposal be made with minimal delay to the originally published timetable.

Yours sincerely,

A handwritten signature in black ink, appearing to read 'Roger Whitby', is written over a light blue rectangular background.

Roger Whitby  
Executive Officer, Trading

Attachments:

- A - Problems with the Southern Generators Rule
- B - Critique of Southern Generators submission dated 8 March 2007
- C - Snowy Hydro IT / System cost breakdown for Snowy Hydro proposed region boundary change
- D - Presentation to the AEMC of 20 March 2007

## Attachment A

### Problems with the Southern Generators Rule

Following the introduction of new option 4 constraints to Victoria (South Morang constraint on 17 August 2005, subsequently updated on 24 July 2006) and implementation of the Southern Generators rule in November 2006 serious mis-pricing is now transparent within the Victorian region and specifically at the Latrobe Valley.

This mis-pricing is of orders of magnitude greater than that seen at the Murray node and occurs three times as frequently (400 versus 121 binding dispatch periods as shown in table 1 and 2).

| <b>South Morang Constraint</b>                                | <b>Binding Dispatch Periods</b> |
|---|---------------------------------|
| Fin Year 05/06  | 26*                             |
| Option 4 Constraint<br>(from 1 January 2007)<br>V>>V_NIL_3B_R | 400                             |

Table 1.

\* Masked by NEMMCO intervention to negative residues

| <b>Murray to Tumut Constraints<br/>(including outages)</b> | <b>Binding Dispatch Periods</b> |
|--|---------------------------------|
| From 1 January 2007  | 121                             |

Table 2.

These constraints have bound on a number of occasions including 12 January 2007, 30 January 2007, 3 March 2007 and 17 March 2007.

#### 1.1 Why this problem has not been raised during Southern generators consultation?

The impact of the South Morang constraint was largely masked by NEMMCO's intervention prior to the implementation of the Southern Generators rule and option 4 constraint formulation by NEMMCO of this constraint. The change in incentives on Murray generation following the implementation of the Southern Generators rule is to reduce Murray generation. This worsens the South Morang constraints as Murray generation is a positive gatekeeper.

The Murray to Tumut and South Morang constraints are linked due to the incentives that the Southern Generators rule create for Murray and Latrobe Valley generators.

#### 1.2 Explanation of loop in Victoria

The following diagram represents flow chart of Victorian electricity network.

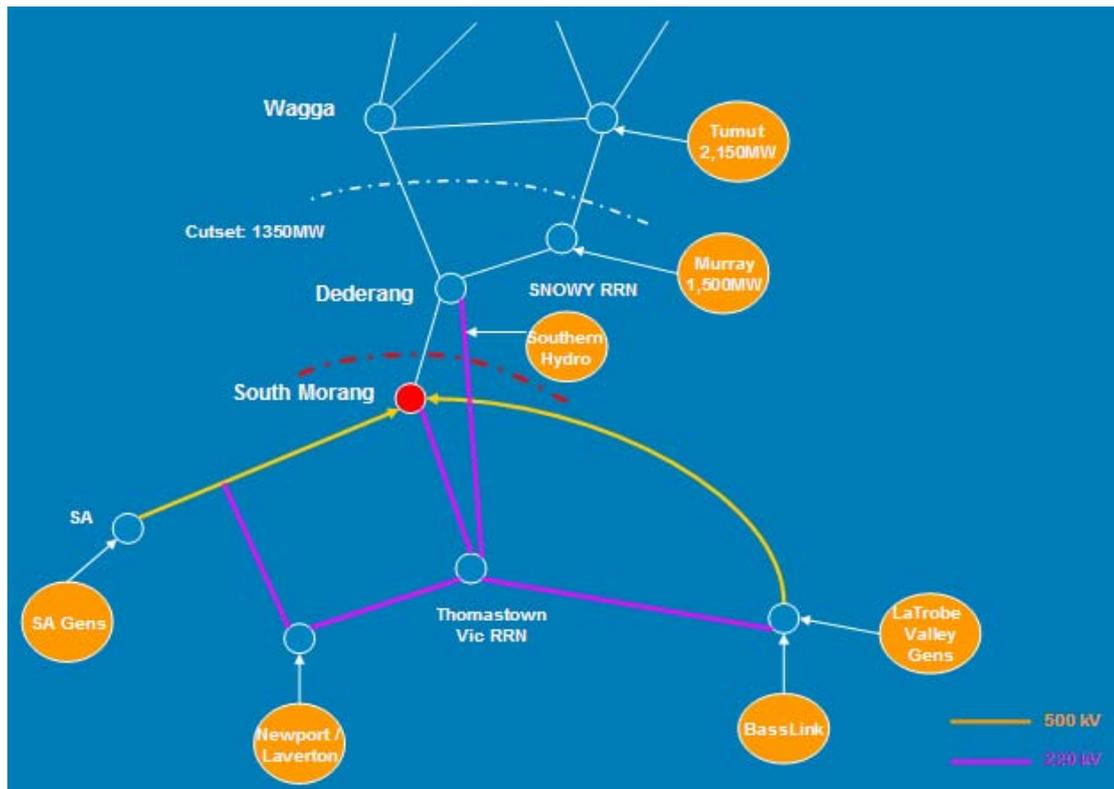


Diagram 1.

A significant amount of energy comes from the Latrobe Valley through the 500kV transmission system. Once Victorian customer demand is met, electricity is exported to Snowy/NSW through the South Morang transformer. Based on the constrain equation, for every 1MW that comes from Latrobe Valley, 1MW will pass through the South Morang transformer.

However the Victorian regional reference node is in Thomastown. If 1MW is sent from Thomastown, only 0.465 MW would go through South Morang transformer while 0.535 MW would go through the 220kV lines into Snowy/NSW.

As a consequence the Victorian Regional Reference Price at Thomastown is:

$$53.5\% * \text{Snowy/NSW} \text{ plus } 46.5\% * \text{generation behind South Morang constraints.}$$

The Murray to Tumut constraint sets the Vic Price as:

$$0.2 * \text{NSW} + 0.8 * \text{Snowy}$$

Once you factor the Murray-Tumut constraint into the South Morang Constraint, the Vic Price is set by:

$$\begin{aligned} &0.535 * (0.2 * \text{NSW} + 0.8 * \text{Snowy}) + 0.465 * \text{Gen behind South Morang} \\ &= 10\% \text{ NSW} + 43.5\% \text{ Snowy} + 46.5\% \text{ Generation behind South Morang} \end{aligned}$$

South Australia, which also supplies energy through South Morang 500kV lines, has slightly better coefficient of 0.965 (compared with Latrobe valley 1.00).

It is important to note that other generators are also miss-priced. Southern Hydro and Newport have better coefficient than Thomastown, while Laverton and APS slightly worse.

### **1.3 The effect on the market of the South Morang constraint**

As mentioned earlier the South Morang constraint has been one of the most frequently binding constraints since market start. Since 1 January 2007 it has bound for 400 increments (70 hours). This is much more frequent than the Murray - Tumut constraint that has bound for only 20 hours.

The Southern Generators rule creates the situation where the Victorian price is defined by NSW and Murray marginal offers when ever the Murray to Tumut constraint binds. Under these conditions the Southern Generators offers do not directly influence the Victorian price (there is no price volume trade off). The Southern Generators seek to maximise volume against the Victorian price set by Murray/NSW offers and thus worsen the South Morang constraint.

When the South Morang constraint binds and the price in Snowy/NSW is high, say \$300, price in Victoria cannot go lower than \$160 (assuming the marginal offer behind the constraint is equal to \$0). This is because the Victorian price is equal to 53.5% of Snowy price plus 46.5% of generation behind South Morang constraint.

For the prices to go lower than \$160, the price behind South Morang constraint (SA, Tasmania, Latrobe valley) must reach a negative value.

At a \$160 price, most of the available generation in Latrobe Valley (and Victoria) tries to get dispatched. As the Vic generators can bid low, to say a negative value, and still receive \$160 price, they can bid lower than South Australian and Tasmanian generation.

On the second occasion of a significant South Morang constraint (30 th January) all Victorian generators other than TRU Energy offered their generation well below \$0.

**In effect Latrobe Valley generators receive high Vic price IRRESPECTIVE of what they bid, hence they maximise their dispatch volume by making negative priced offers. Clearly their offers do not reflect their marginal costs in these circumstances. This creates counter price flow to South Australia and Tasmania.**

There are a number of consequences of this occurring:

- Latrobe Valley generators are significantly miss-priced, and high cost generation is used inefficiently
- Creates significant inefficient cost to Victorian customers

- NEMMCO has to intervene to avoid negative settlement on South Australia (e.g. 30<sup>th</sup> January). It is not clear how counter priced flows to Tasmania on the MNSP link will be handled by NEMMCO (e.g. 17 March 2007)
- As Latrobe Valley substitute South Australian generation it reduces transfer to Snowy/NSW (South Australia generation has better coefficient than Latrobe Valley generation, but Latrobe Valley generation can out bid SA generation due to the Latrobe Valley mis-pricing)

In our submission dated 29/01/07 we demonstrated these problems that occurred on 12 January 2007. Similarly problems occurred on 30 January 2007, 3 March 2007 and 17 March 2007.

#### 1.4 Incentives of Murray generation under the Southern Generator's rule

The Southern Generator's rule exposes Murray generation to its local nodal price when the Murray to Tumut constraint binds. Due to the loop flow effect in the Snowy Region this means the nodal price at Murray is lower than the Victorian price. Murray generation therefore has strong commercial incentives not to generate at or near it full output as it risks receiving a relatively low nodal price.

Under these conditions the Southern Generators offers do not directly influence the Victorian price (there is no price volume trade off). The Southern Generators seek to maximise volume against the Victorian price set by Murray/NSW offers and thus worsen the South Morang constraint.

The South Morang constraint name is V>>V\_NIL\_3B\_R. A description of this constraint is:

*System Normal, Limit Vic interconnectors and Vic generation to avoid post-contingency overloading the South Morang 500/330kV (F2) transformer for trip of Rowville 500/220 kV transformer.*

The constraint equation in simplified form is:

$$1 \times \text{BassLink} + 0.97 \times \text{SA-Vic} - 0.85 \times \text{Sn-Vic} + 1 \times \text{Latrobe Gens} + 0.32 \times \text{NewPort} + 0.67 \times \text{Laverton} - 0.6 \times \text{Southern Gen} \leq 6500$$

From the constraint equation and how the Victorian price is set when there are binding constraints on the South Morang and Murray to Tumut constraints, it can be seen that:

- Latrobe Valley generators worsen the constraint relative to a generator located nearer to Thomastown ie. Newport and Laverton
- Latrobe Valley generators cannot directly influence Vic price, but a high Vic price is set, hence they bid down to -\$1000 to maximise volume (and may lock ramp rates)

- By Latrobe Valley generators bidding down to -\$1000 transmission flow through the South Morang constraint is reduced due to relative coefficients with SA generators (the SA generators do not have incentives to bid down to -\$1000 and are thus reduced in dispatch).
- Generators located north of the South Morang constraint ie. Southern Hydro generators and Murray generation relieves the constraint. These generators are positive Gatekeepers.

Diagrammatically, the impact of these constraint coefficients are shown in diagram 2.

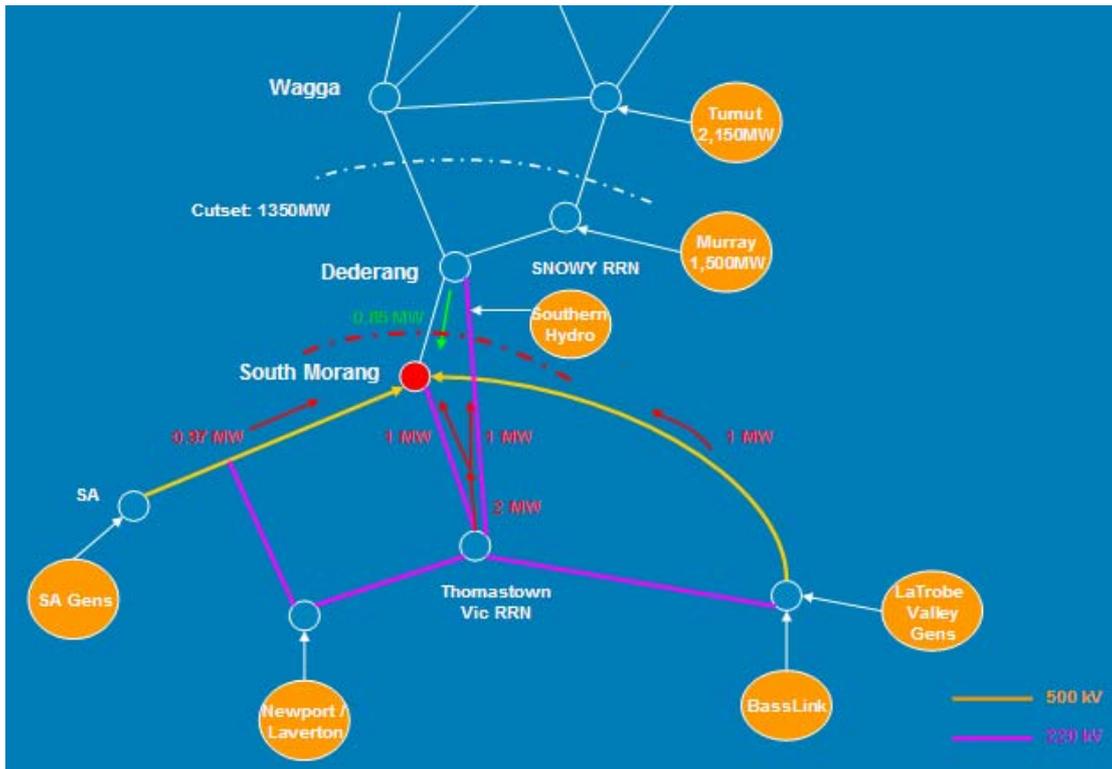


Diagram 2

From diagram 2 above Murray generation is a positive gatekeeper. 1 MW of additional output from Murray relieves the constraint by 0.85MW. As discussed earlier, the incentives under the Southern Generators rule discourages increased Murray output.

Conversely, Latrobe Valley generation worsens the constraint at South Morang. For instance, 1 MW of addition export through South Morang allows only 1 MW of additional Latrobe Valley generation versus approximately 2 MW if it were to come from Thomastown.

Hence it is established that:

- Latrobe Valley generation is the most restrictive generation for the South Morang constraint,

- The Victorian pricing outcomes under the South Morang and Murray to Tumut constraints means that Victorian generators receive a high Vic price IRRESPECTIVE of the Latrobe Valley offers. There is significant mispricing (miss match between pricing and dispatch). As consequence, Latrobe Valley generators bid low (down to -\$1000) to get dispatch irrespective of actual costs. These incentives on the Latrobe Valley generators to increase outputs worsen the south Morang constraint.
- The Southern Generators rule does not incentivise Murray generation to increase output to relieve the South Morang constraint despite it being a positive gatekeeper. In fact Murray generation is incentivised to reduce generation
- The incentives on Murray to reduce and Latrobe Valley generation to increase generation levels both actively contribute to a worsening of the South Morang constraint, hence reducing Vic to Snowy/NSW exports

These observations are evident in table 3 which shows the generation level, marginal offer, and generation capacity factor for the 12 January 2007 15:00 dispatch period when the South Morang constraint was binding.

| Generator    | Cleared Marginal Offer (\$) | Generation (MW) | Capacity Factor (%) |
|--------------|-----------------------------|-----------------|---------------------|
| Hazelwood    | -\$1000                     | 1370            | 100%                |
| Loy Yang A   | \$7.85                      | 2120            | 100%                |
| Loy Yang B   | \$8.50                      | 1050            | 100%                |
| Yallourn     | \$4.03                      | 870             | 80.5%               |
| BassLink     | \$10.20                     | 315             | 53%                 |
| Valley Power | \$0                         | 260             | 100%                |
| Murray       | \$150                       | 853             | 58%                 |

Table 3

**Murray generation under the Snowy region abolition has strong incentives to generate as it would receive the Victorian price and thereby relieving the South Morang constraint. Other problems such as reduced interconnector flows and NEMMCO intervention thus cease to be a problem.**

## 1.5 Potential issue of system security

Snowy Hydro recommends that NEMMCO reviews any potential system security issues that may result from the Southern Generators rule incentives. It is unclear how NEMMCO would resolve any required ramping capability when generators bid to - \$1000 and potentially 'lock' ramp rate bids.

On 17 March 2007 it came to our attention that system security can be potentially compromised.

When Victorian demand is relatively low (like on 17 March 2007, 5400MW) and if NSW demand was high (e.g. if the hot day had persisted on 17 March 2007), then NSW/Snowy price could have reached \$8000. Victorian price would then be automatically set at \$4000 (approx. 53.5% of \$8000) .

Under high Victoria prices and binding South Morang constraint Victorian generators have maximised volume (-\$1000 offers) and have 'locked' ramp rates. Under conditions of relatively low Victorian demand, and potentially truncated Vic to SA and Vic to TAS flows, the Victorian demand and exports may well be much less than Victorian generation levels. Despite the approx \$4000 Victorian price, there may be 'excess generation' in Victoria.

It is unclear how NEMMCO will manage the limited ramping capability particularly if controllable loads in Victoria respond to the high Vic price. Snowy Hydro believes that these incentives under the Southern Generators proposal may leave NEMMCO with a difficult operational issue to manage.

The situation may arise, similar to 16 January 2007, where Victorian generators do not want reduce their dispatch due to the high prices (that was on this occasion created by the application of the Voll override). If demand reduces in Victoria and NEMMCO does not have sufficient ramp rate or participants are not willing to off-load, NEMMCO may overload the South Morang transformer and put system security at risk.

## 1.6 How to resolve the problems

The original problem is created by the Snowy region and enforcing nodal price in Murray. The Murray-Tumut constraint leads to a Victoria price of:

$$0.2*NSW+0.8Snowy$$

Once you factor the Murray-Tumut constraint into the South Morang Constraint, the Vic Price is set by;

$$0.535*(0.2NSW+0.8Snowy)+0.465*Gen\ behind\ SM$$

$$= 0.1*NSW+0.435Snowy+0.465*Gen\ behind\ SM$$

The best way is to resolve the pricing/system security issues is to resolve the Snowy regional boundary issue. By abolishing the Snowy Region and moving Murray into Victoria, Murray will receive the Victorian price. **As noted above, Murray is the most influential generator in setting the Victorian price. Under conditions of a binding South Morang constraint, there is no constraint between Murray and Thomastown. However there is a constraint between Latrobe Valley and Murray.**

Snowy Hydro will be treated exactly as Southern Hydro and Newport. By receiving Vic price Murray will increase generation, relieve the South Morang constraint, and improve competition in both the Spot and Contracts markets.

## 1.7 Conclusion

The Southern Generators rule creates the situation where the Victorian price is defined by NSW and Murray marginal offers when ever the Murray to Tumut constraint binds. Under these conditions the Southern Generators offers do not directly influence the Victorian price (there is no price volume trade off). The Southern Generators seek to maximise volume against the Victorian price set by Murray/NSW offers and thus worsen the South Morang constraint.

As a result:

- Exports from Victoria to Snowy/NSW Regions are reduced due to better co-efficients of SA generation relative to Latrobe Valley/TAS generation (not increased as per the rationale for the rule approval).
- NEMMCO is forced to intervene (for example 30 January 2007) in the market to prevent negative resides between Victoria and South Australia (the rationale for the rule approval was to remove the need for NEMMCO intervention to prevent negative residues).
- The Latrobe valley mis-pricing creates significant market inefficiency. (Most Latrobe Valley generators offered -\$1000 on 30 January 2007, which is obviously not their marginal costs. The in-efficiencies are obvious within Snowy Hydro portfolio in comparing Murray and Valley power offers and marginal costs).
- Customers pay a less competitive and inefficient price especially in Victoria due to the mis-pricing incentives in Latrobe Valley.

## Attachment B

### Critique of Southern Generators submission dated 8 March 2007

The Southern Generators rebuttal of Snowy Hydro submission dated 29 January 2007 is based purely of the technical and physical attributes of constraints rather than the generator incentives that arise due to their Rule change. Their rebuttal does not address the key issue surrounding incentives under their Rule change and how this affects the South Morang constraint, Spot prices, and interconnector flows.

**It is important to note that incentives drive participant offers and thus market outcomes. The physical constraint equations never change (assuming option 4 form).**

The following are relevant extracts from the Southern Generator's proposal and Snowy Hydro's response:

*This attribution is not sound because the Southern Generators Rule Change relates to the Snowy network constraint only<sup>1</sup>.*

The Southern Generators Rule Change was premised on allowing higher V-SN flow and thus higher flow through the South Morang transformer. So it clearly "relates" to the South Morang transformer constraint, not just the "Snowy network constraint only".

*In summary, all of the market outcomes that Snowy have attributed to the Southern Generators Rule Change, are in fact due to a constraint lying near the centre of the Victorian region [South Morang constraint], and not the constraint to which that Rule change applies<sup>2</sup>.*

Snowy Hydro knows that the Southern Generators Rule applies on the Murray to Tumut constraint. Our point is that the incentives under the Southern Generators proposal drives Murray generation to not efficiently increase output which would help to relieve the South Morang constraint. Further, the Victorian pricing outcomes when both or either the South Morang and/or Murray to Tumut constraint binds has been shown to provide strong incentives on Southern Generators to inefficiently generate in a way the worsens the South Morang constraint. This leads to Latrobe Valley generation offers not reflecting costs, reducing competition and reducing flow between Murray and NSW.

Snowy Hydro has shown (in Attachment A) that the Murray offer is responsible for at least 50% of the MWs setting Victorian price. Given Murray has incentives to bid high under the Southern Generators rule, Murray is thus responsible for most of the Victoria price. However, with Murray receiving a lower nodal Snowy price, there is

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<sup>1</sup> Southern Generator's submission dated 8 March 2007, page 2.

<sup>2</sup> Ibid, page 2

no incentive for Murray to offer generation at efficient offer prices and thus reduce the Victorian price.

As Murray has no incentive to offer at efficient prices and reduce the Victorian price, the Victorian price stays high, thus incentivising Latrobe Valley to offer low and cause the negative residuals from Victoria to SA.

*Before dealing with the substance of these claims, we wish to clarify an aspect of the wording above that is open to misinterpretation. The expression “relevant constraint equations under the Southern Generator’s proposal” could lead a reader to an assumption that the relevant constraint equations are peculiar to the Southern Generators Rule Change. In fact, these constraint equations are necessary for system security and apply regardless of the Rule change, and furthermore would apply (in an altered form, but with the same physical and pricing effects) even if the Snowy region were abolished<sup>3</sup>.*

Snowy Hydro is not disputing that these constraint equations are necessary for system security and would have same physical effects regardless of the Snowy Region structure. Our point was that the incentives under different Snowy Region structures are very different and this influences generation, interconnector flow, and pricing outcomes. In deed, if incentives didn’t change, all rule scenarios would have the same market outcomes and thus there would be no commercial disputation between the rule scenarios.

*The prices in the market are therefore not, as Snowy asserted, “artificial”. On the contrary the prices were determined in accordance with the rules, reflecting the underlying physical realities of the market. It is also not true that the prices were unaffected by Victorian offers. An offer need not set price to have an influence in the outcome<sup>4</sup>.*

NEMMCO intervened into the market on the 30<sup>th</sup> of January 2007 truncating the SA to Vic flow and created ‘artificial prices’. Similarly –ve residues accrued on 12<sup>th</sup> January 2007 (on a five minute rather than half hour basis).

By “Artificial” Snowy is not looking at how the price was determined, but what the function of the price is. The price should send an economic signal of scarcity. The price should incentivise a generator to supply more MWs when it is high. When the Victorian price is high and is directly related to Murray generation, yet Murray generation has no incentive to increase generation when that price is high (as it receives a different nodal price). The price isn’t reflecting the true scarcity of energy; as if Murray was paid that price it would generate more, lowering that price (and thus reflect the true scarcity).

At this high Vic price, the incentives on Southern Generators is to maximise output, to the extent that generation offers grossly do not reflect costs. We have shown that this behaviour leads to inefficient outcomes.

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<sup>3</sup> Southern Generator’s submission dated 8 March 2007, page 3

<sup>4</sup> Ibid, page 4.

*In the absence of the Southern Generators Rule Change, NEMMCO would have been entitled to re-formulate a constraint to limit or prevent the counter-price flow between Victoria and Murray. ....*

- *The power flow from Victoria, South Australia and Tasmania towards NSW would be limited to about zero (value chosen by NEMMCO)<sup>5</sup>*

The Southern Generator's compare the flow on the Vic-Snowy interconnector relative to NEMMCO's practice of interconnector truncation. This is the wrong comparison and Snowy Hydro has never advocated this approach. The interconnector flows under the Southern Generator's rule should instead be compared against interconnector flow that would occur under the Snowy Region abolition.

*With the same set of offers and the same constraints on physical power flows, the dispatch process under different region boundaries would result in the same prices<sup>6</sup>.*

*It appears highly hypocritical for Snowy Hydro to attack the Victorian price that arises from application of the market rules, and then seek by a region boundary change to be rewarded at this price, which is much higher than the true value of its production at Murray.*

*In the circumstances of 12 January, the abolition of the Snowy region would result in increased payment for Murray generation with no related saving elsewhere, and hence increased cost to be ultimately paid by customers.*

*This assumes an unchanged offer for Murray generation. However, Snowy could further enhance its position by taking advantage of being protected (by the changed region boundary) from the effect of its actions on the true value of its production<sup>7</sup>.*

Responses to references 7 and 8 are related. One thing is certain is that with Snowy Region abolished Snowy Hydro's offers would not be the same as under current derogation. Murray generation would have no basis risk when contracting in Victoria and Tumut generation would have no basis risk when contracting in NSW. The AEMC's modelling verifies decreases in Spot prices which should lead to decreases in contract prices. As a result there would be an increase in both Spot and Contract market competition.

Murray generation (being the most influential generator on the Vic price) would likely offer efficiently to increase generation, as it now responds to the higher Victorian price signal and Murray would have different contract levels that it would be driven to defend. Thus the Victorian price WOULD NOT be the same.

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<sup>5</sup> Southern Generator's submission dated 8 March 2007, page 4.

<sup>6</sup> Ibid, page 5

<sup>7</sup> Southern Generator's submission dated 8 March 2007, page 5

Snowy hydro is NOT looking to get rewarded at this Victorian price, but to respond to it. Also while the Victorian price may be higher than the true cost of Murray production (which is why Murray would respond to it, offer efficient prices, and the Victorian price would be more efficient), its cost of production is higher than the brown coal generators in Victoria, who currently receive that price. This just highlights the extent of mis-pricing for Latrobe Valley generators.

The Snowy Region abolition increases competition in both Victoria and NSW and the ultimate beneficiaries are Victorian and NSW customers.

*The outcome described is a small reduction in flow from Victoria to Snowy, which occurred while the flow remained strongly positive (i.e. northward).*

*In relation to the Southern Generators Rule Change, the proper basis for comparison is with the situation with NEMMCO clamping the flow to near zero, as discussed above<sup>8</sup>.*

The incentives on Latrobe Valley generators and Murray generation under the Southern Generators rule has been shown to reduce exports through South Morang and exports from Murray node through to NSW. We have shown that Murray generation has no incentives to generate to alleviate the South Morang constraint as it receives a low local nodal price. We also note that without Murray generation the maximum possible export from Victoria to NSW is 1100MW and not 1350MW. That is, Murray generation needs incentives to generate the additional 250MW for the market to have access to the full 1350MW Murray to Tumut capability.

As stated earlier, Snowy Hydro has never advocated NEMMCO interconnector truncation as the benchmark. Snowy Hydro has always advocated the abolition of the Snowy Region as the appropriate long term solution. Any comparison of the export capability from Victoria to Snowy/NSW should compare current incentives under the existing Derogation with the outcomes that would occur under Snowy Region abolition.

Please note that NEMMCO intervened on the 30 th January 2007 to truncated the SA to Vic flow as a result of the Southern Generators rule incentives.

*As noted in Section 1 above the counter price flows and market outcomes that Snowy have attributed to the Southern Generators Rule Change, are in fact due to a constraint lying near the centre of the Victorian region, and not the constraint to which that Rule change applies<sup>9</sup>.*

Snowy Hydro acknowledges that counter-price flows when generation offers reflect costs are efficient (in terms of narrowly defined spot market efficiency i.e. ignoring contact market efficiency). This does not apply in relation to the Southern Generator's rule and the incentives it places on generation offers.

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<sup>8</sup> Ibid, page 6

<sup>9</sup> Southern Generator's submission dated 8 March 2007, page 7

We have shown that the Southern Generators rule results exaggerates the extent of mis-pricing of Latrobe Valley generators. We have also shown that in conditions of binding South Morang and/or Murray to Tumut constraint(s) that Victorian pricing outcomes are predominantly determined by NSW and Murray prices. Therefore, Victoria generators receive a high Vic price almost irrespective of their own offers. This has resulted in offers that have reached -\$1000 in the Latrobe Valley which has then wound back interconnector flows from SA to Vic to a point where there was counter-priced flows. Counter-price flows under these conditions are inefficient since then are a result of generation offers not reflecting costs.

In summary, Snowy Hydro has demonstrated in this supplementary submission that:

- Southern Generators critique is based purely of the technical and physical constraints rather than **generator incentives**. Most if not all Market Participants know that there will be no physical changes with whatever arrangements are in place to manage the relevant physical constraints.
- Their critique does **not** address the incentives on Murray generation due the price it receives under the Southern Generator's rule. They also ignore the very relevant fact that Murray generation is the most influential generator in setting the Victorian price (it is closer to the Vic RRN than the Latrobe Valley generation) but is not currently incentivised by the Victorian price. Incentives and behaviour are the crux of what determines generation levels and prices. Their rebuttal does not address incentives on Murray generation and how this then impacts the South Morang constraint, and prices in Victoria.
- the Southern Generator's compare the flow on the Vic-Snowy interconnector relative to NEMMCO's practice of interconnector truncation. This is the wrong comparison and Snowy Hydro has never advocated this approach. The interconnector flows under the Southern Generator's rule should instead be compared against interconnector flow that would occur under the Snowy Region abolition.

As a result of these factors, the desired benefits (and the rationale for the approval of the Southern Generator's rule proposal) have simply not been delivered to the market and due to the mis-pricing of Latrobe Valley, increased costs to end users have resulted. The current arrangements are untenable and additional short term measures would be required to address the mis-pricing issues over next summer.

## Attachment C

### Snowy Hydro IT / System cost breakdown for Snowy Hydro proposed region boundary change

Snowy Hydro is the most impacted participant (only participant with dispatch and settlement changes for its generation units) and our internal assessment for both Generation and Retail (Red Energy) IT change cost is immaterial at < \$10k. We have assessed that the retail cost is zero dollars as there are no retail impacts. The breakdown of these costs are:

| <b>Critical IT Changes</b>            | <b>Cost</b> |
|---------------------------------------|-------------|
| Bidding System                        | \$0         |
| Scada/Real Time Systems               | \$0         |
| Market data displays                  | \$1,200     |
| Database Changes (due to MMS changes) | \$1,300     |
|                                       | \$2,500     |

| <b>Discretionary Changes</b>  | <b>Cost</b> |
|---|-------------|
| Check of existing systems   | \$2,200     |
| Change displays   | \$3,100     |
| Change of internal calculations (ie. SRA calculation changes due to removal of Southern Gen rule and Tumut CSP/CSC) | \$2,100     |
|   | \$7,400     |

**Total Costs: \$9,900**

The benefits of the Snowy Region abolition as modelled by the AEMC are substantially more material than any IT / systems costs.

The Commissions modelling suggests lower spot prices due to more competitive outcomes under the Snowy Region abolition. It is widely accepted that more competitive spot market outcomes is positively correlated with more competitive contract markets. Hence it is anticipated that contract prices would be lower.

The lower bound of price reduction as modelled in the Snowy Region abolition was approximately \$1/MWh. A reduction of \$1/MWh for contracts in the NEM equates to \$200 million saving per year. We believe the competitive benefits of the Snowy Region abolition far out-weigh the IT / system change costs.



Abolition of Snowy Region  
&  
Unsustainable Southern Generator rule

20 March 2007

# Presentation Outline

- Southern Generator's proposal
  - Market Problems and Consequences
- MacGen revised Split Region option
  - Problems – not implementable?
- Region change implementation
  - Timing and Costs

# What's changed since SG rule implemented?



- Southern Generator's rule implemented on 1 Nov 2006
- South Morang constraint has become more problematic after the introduction of new option 4 constraint (24/7/06) & SG rule

| South Morang Constraint                            | Binding Dispatch Periods      |
|--|-------------------------------|
| Fin Year 05/06                                     | 26 NEMMCO Intervention Masked |
| Option 4 Constraint<br>V>>V_NIL_3R_R               | 400                           |
| Murray to Tumut constraints<br>(including outages) | 121                           |

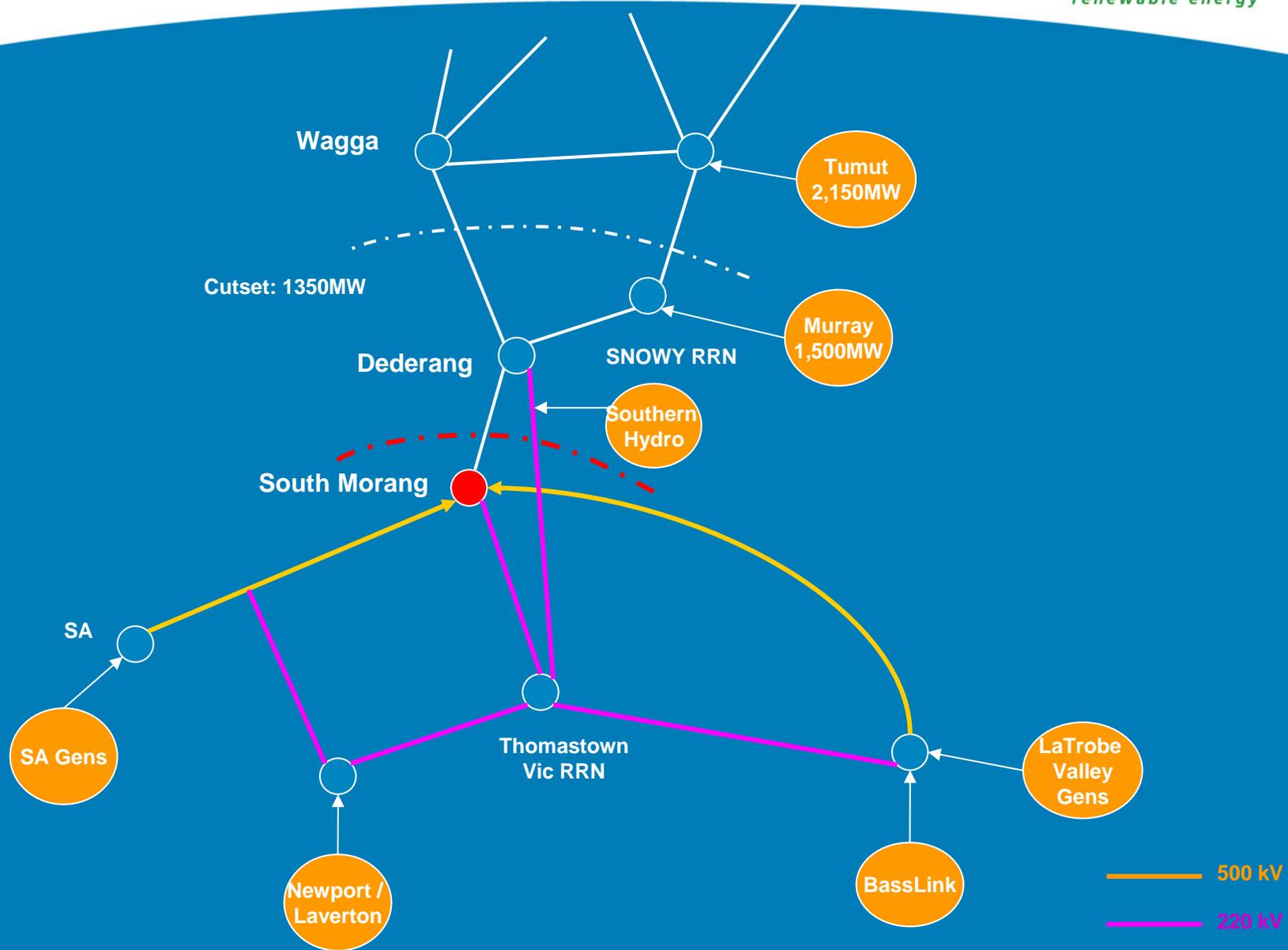
South Morang constraint binds 3 > Murray to Tumut

South Morang Constraint binds >> Murray to Tumut Constraint

## What are the problems that the SG Rule creates?

- Serious mis-pricing in the La Trobe Valley generators now transparent (>> Murray mis-pricing)
- Under low Victorian demand conditions, Victorian generator bids cannot directly influence price – as a consequence bids don't reflect costs
- Reduces inter-regional flow
- Creates negative SRAs on other links
- Induces NEMMCO market intervention (eg 30 th Jan)
- May create system security intervention – unclear basis
- Inefficient dispatch outcomes
- Inefficient and artificially high spot prices under relatively low Victorian demand conditions – the only scenario where exports can occur

# Simplified Transmission Diagram



## South Morang Constraint Equation

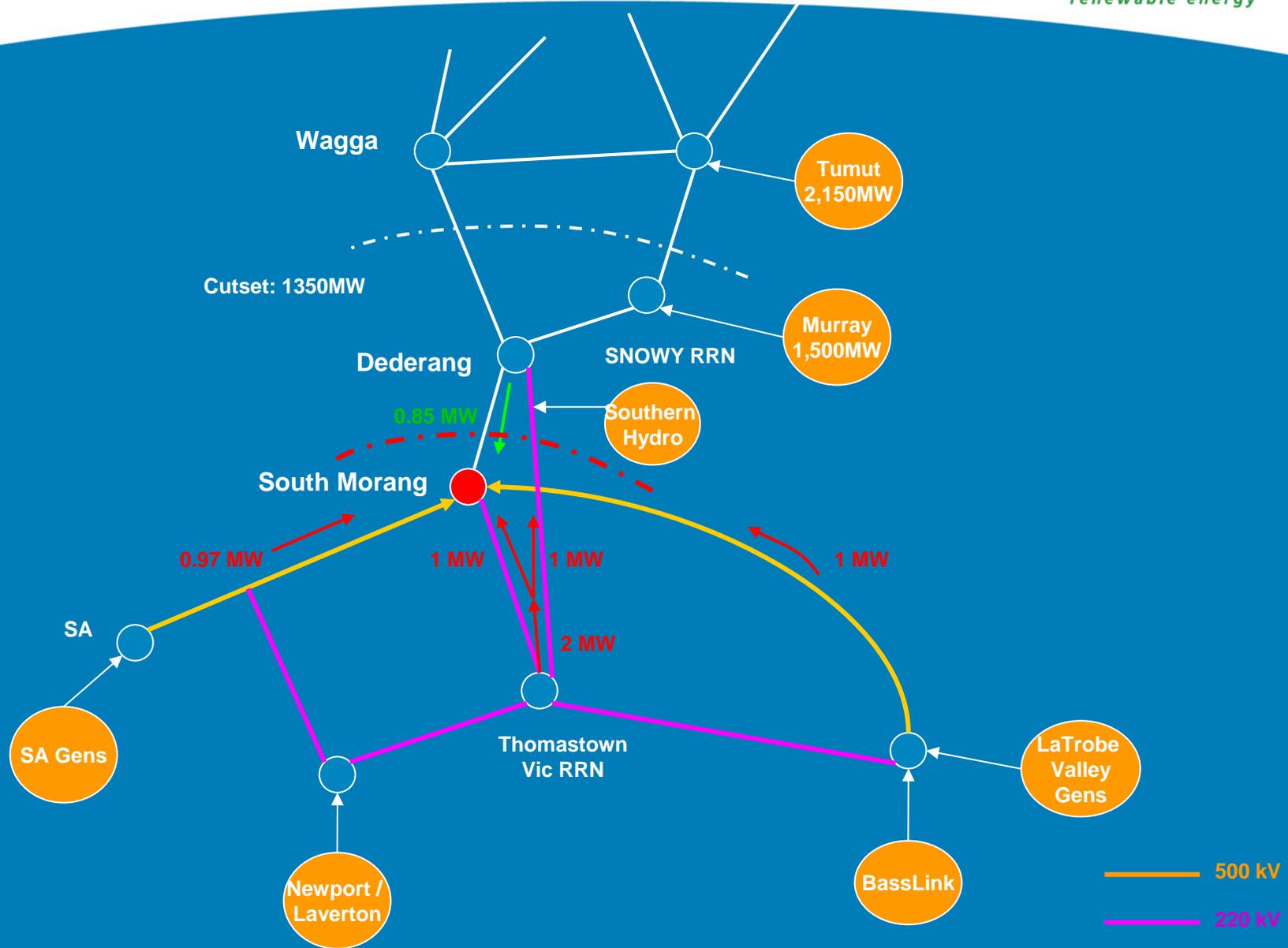
- Constraint Equation Name,  $V \gg V\_NIL\_3B\_R$
- Description :

System Normal, Limit Vic interconnectors and Vic generation to avoid post-contingency overloading the South Morang 500/330kV (F2) transformer for trip of Rowville 500/220 kV transformer.
- Basic Equation:
$$1 \times \text{BassLink} + 0.97 \times \text{SA-Vic} - 0.85 \times \text{Sn-Vic} + 1 \times \text{La Trobe Gens} + 0.32 \times \text{NewPort} + 0.67 \times \text{Laverton} - 0.6 \times \text{Southern Gen} \leq 6500$$
- Simplified form for Vic Price:
$$0.1 \text{ NSW} + 0.43 \text{ Murray} + 0.46 \text{ 'Marginal price south of South Morang'}$$

## What does the **Constraint** mean?

- The constraint bound on 12<sup>th</sup> January, 30<sup>th</sup> Jan, 3<sup>rd</sup> March, 17<sup>th</sup> March
- Latrobe Valley generators worsen the constraint relative to a generator located nearer to Thomastown ie. Newport and Laverton
- Latrobe Valley generators cannot directly influence Vic price, but a high Vic price is set, hence they bid to \$-1000 to maximise volume (and may lock ramp rates)
- By Latrobe Valley generators bidding -\$1000 transmission flow through the South Morang constraint is reduced due to coefficients.
- Generators located north of the constraint ie. Southern Hydro Generators and Murray generation relieves the constraint

# Impact of Constraint Coefficients



## Pricing Implications

- With the South Morang constraint binding, La Trobe Valley generators can NOT effectively set the VIC RRN price.
- Vic price can be set by :  
 $0.1 \text{ NSW price} + 0.43 \times \text{Murray price} + 0.46 \times \text{marginal price south of South Morang constraint}$
- In effect La Trobe Valley generators receive high Vic RRN IRRESPECTIVE of what they bid, hence volume bidding war to get dispatch.

Serious La Trobe Valley mis-pricing >> Murray mis-pricing

## Pricing Implications

- Murray generation could relieve the South Morang constraint (ie. Coefficient of -0.8538) but has commercial incentives to reduce output because it receives a low nodal price
  - Snowy Hydro is commercially driven to (inefficiently) generate at Valley Power and Laverton rather than Murray generation
- The Basslink coefficient (1) is worse than the SA-VIC coefficient (0.9677) hence the Vic-Sn interconnector winds back (as to date Tas Hydro has been prepared to sustain -\$1000 price whereas SA generators have not)
  - NEMMCO as a consequence is forced to intervene to manage negative settlement residues on Vic to SA link (eg 30<sup>th</sup> January)

Southern Gens proposal has resulted in reduced interconnector flow (Vic to Snowy) and NEMMCO intervention (to prevent Vic to SA -ve residues) which is in direct contradiction to their original justification for the rule change.

## The nub of the issue

- South Morang constraint occurs 3 times greater than Murray to Tumut constraint but was masked by NEMMCO intervention
- Murray generation (like Southern Hydro gen) is a positive (not -ve) gatekeeper when the South Morang constraint binds ie. Increased output increases the flow through South Morang
- Due to Vic gens receiving a high Spot price irrespective of their bid price, their bids do not reflect costs and they maximise volume at -\$1000 – Exports reduce! and NEMMCO intervenes (elsewhere)!
- Murray generation under the SGen rule change has no incentives to generate high
- Murray generation under the Snowy region abolition has strong incentives to generate thereby removing the South Morang constraint
  - Other problems such as reduced interconnector flows and NEMMCO intervention cease

Snowy Region abolition removes the problems associated with South Morang constraint binding

## Security Implication?

- Under high Victoria prices and binding South Morang constraint Victorian generators have maximised volume (- \$1000 bids) and locked ramp rates.
- On 30 th Jan all Vic Gens other than TRU bid -\$1000
- In the future events TRU may realise that their Victorian bids doesn't effect the Vic price and decide to run. Newport will increase the Vic to Snowy export but make the Latrobe/SA/Tas mis-pricing much worse
- It is unclear how NEMMCO will manage the limited ramping capability particularly if controllable loads in Victoria respond to high Vic price

NEMMCO should analyse system security implications

# The Revised Mac Gen Proposal

- Completely at odds with accepted electricity market design –
  - RRN has both no load and no generation
- Inconsistent region boundary definitions and loop flow issues
  - Wadonga load will need to be excised from NSW
  - NEMDE formulations will be completely non transparent & unverifiable
- Increases the complexity of trading between Sydney and Melbourne
  - Increased uncertainty, increased transaction costs and reduced liquidity
- Does not remove incentives for Tumut (and Murrumbidgee) to withhold generation to maintain transmission headroom which reduces competition

# The Revised Mac Gen Proposal

- Pre-empts real potential network upgrades that have / may further remove congestion:
  - Fault level issues resolved at UT (CT upgrades) – 64 line in service ( up 150 MWs)
  - Capacitor banks installed at Canberra, Yass switch yard rebuilt
  - Recent 5 minute service on the Tumut to NSW lines - transfer to NSW up by 200MW
  - Dederang fourth transformer/Transgrid line surveys Snowy to NSW lines potential
- Boundaries are technically incorrect. Located across network elements that can't normally constrain
  - For example Upper Tumut to Canberra cannot constrain system normal
- Constraint north of Tumut and south of Murray are NOT either Material or Enduring

At odds with accepted electricity market design, radical, and less competitive medium term solution.

# Region Change Implementation

- NEMMCO revised timetable predicated on “generic” Snowy Region change
- The revised timetable is unduly conservative – the real critical patch is the MMS changes and these are well achievable by 1 January
- Snowy Hydro is the most impacted party and our internal assessment for both Generation and Retail (Red Energy) IT change cost is immaterial at < \$10k. Retail cost is zero!
- SRA & Settlement changes are not issues for Snowy region abolition
- The NEMMCO constraint formulation is not on the critical path. This can be managed to deliver the original timetable.
- The benefits of the Snowy Region abolition as modelled by the AEMC are substantially more material than any IT / systems costs. A reduction of \$1/MWh for contracts equates to \$200 million saving per year.

NEMMCO original implementation date of November 2007 (or 1 Jan 2008) can be achieved. The benefits of the Snowy Region abolition far out-weigh the IT / system change costs.

# Conclusion

- Recommend the AEMC fully analyse and or engage consultant to analyse the issues associated with South Morang/Southern generators rule
- Extension of Southern Generators rule is not sustainable beyond 31 July 2007 (extend the Tumut CSP/CSC derogation only)
- Request final determination of Snowy Hydro region boundary proposal be made with minimal delay to the originally published timetable