30th April 2007

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

Submission sent electronically to:
submissions@aemc.gov.au

Dear Dr Tamblyn,

# Executive Summary - Draft Rule Determination – Abolition of Snowy Region Rule 2007 and Alternative Proposals for the Snowy Region

Snowy Hydro welcomes and supports the draft determination for the Snowy Region abolition. Snowy Hydro commends the thorough analysis of the issues conducted by the Commission. The Commission has outlined a set of criteria for evaluating the competing alternatives. We support this assessment framework and criteria. Further, the Snowy Hydro proposed Snowy region abolition rule change is consistent with the MCE proposed region boundary change rule for material and enduring constraints with no viable prospects for transmission build out.

We support the Commission's modelling in assessing the dispatch efficiency. Snowy Hydro's view is that all three alternative options for the Snowy region are very similar from a dispatch efficiency perspective (with demonstrated improvement from the base case for the Snowy Hydro proposal) and any potential small differences in modelled outcomes can be attributed to modelling uncertainty as a result of assumptions used to model hydro plant in a competitive market (see section 4.2 of this submission). We believe this difference is immaterial when compared to the impact of the competing alternatives to the Contracts market. We show later in this submission that the Roam modelling (commissioned by the Southern Generators) in not comparable with and inferior to the Commission's modelling, and hence it is not appropriate to draw any conclusion from this work.

All participants have made it clear in various submissions (please refer to the NGF's covering letter to the Congestion Management Review Directions Paper and Retailers previous submissions) that the Contracts market in the NEM must be given more or at least equal significance to dispatch efficiency in consideration of congestion management in the NEM.

We believe the key to assessment of competing alternatives with the Snowy Hydro proposal comes down to comparing the trade-off of an increase in granularity of pricing which potentially improves dispatch efficiency, and how this impacts the contracts market (refer the entire section 4 in this submission).

The Snowy Hydro abolition proposal is far more superior then the competing alternatives in terms of contract trading as it allows Snowy Hydro and others to be more competitive in the Contracts market. The Snowy Region abolition would increase Contracts competition and liquidity in both the Vic and NSW Regions and hence reduce prices to consumers (please note the NGF highlighted less granular pricing, ie. reduction in regions, increases Contract competition[1]).

We show in this submission that under the competing alternatives Snowy Hydro ability to contract is reduced as SRAs are a very imperfect tool for inter-regional trading. The Snowy Hydro proposal also increases the firmness of interconnectors between the Vic and NSW regions which would then facilitate inter-regional trading by other Participants. The Snowy Region abolition also reduces transaction costs.

Snowy Hydro has commissioned an independent study by Firecone to assess the "Impacts of changes to the Snowy Region on the Contract Market". The Firecone report concludes that inter-regional trading risk is high and the instruments available to hedge it are weak. The report highlights the size of the Contracts market and how the Snowy Region abolition would facilitate an increase in Contract market competition.

The recent alternative rule change proposal by the Southern Generators to permanently embed the Southern Generators Rule and the Tumut CSP/CSC trial is inferior to the Snowy Hydro proposal and thus should be rejected.

We have demonstrated to the Commission the significant problems that these current arrangements give rise to as a result of the South Morang constraint in our submission dated 26th March 2007. Rather than re-iterating the problems raised in the 26th March 2007 submission, Snowy Hydro asks that the Commission to refer to that submission and regard it as an important part of this submission to the Snowy Region abolition and other competing proposals. We believe continuation of the Southern Generators rule would require significant additional fixes including a CSP for the Latrobe Valley.

From a good regulatory practice perspective the current CSP/CSC derogation was always treated as a temporary arrangement. The current CSP/CSC trial/Southern Generators rule is only a partial implementation of a full CSP/CSC arrangement by the trial design. Any permanent implementation would require a full implementation which is much broader in scope. The Southern Generators rule proposal performs very poorly in terms of its impact on contracts competition and liquidity. It also performs very poorly from a regulatory consistency perspective as it seeks to implement on an ongoing basis a set of arrangements for the Snowy region that is inconsistent to all other locations in the NEM. The Roam modelling (commissioned by Southern Generators) is not comparable with and inferior to the Commission's modelling, and hence it is not appropriate to draw any conclusion from this work.

[1] NGF submission dated 13 April 2007 to Congestion Management Review – Directions paper.

The recent alternative rule change proposal by Macquarie Generation (Mac Gen) the modified split region proposal is inferior to the Snowy Hydro proposal and thus should be rejected. The Mac Gen proposal seeks to increase the number of generation only regions without load and thus has material detrimental impact on contracts competition and liquidity. It proposes regional boundaries for locations that do not have material nor enduring constraints. The proposal treats Upper Tumut and Lower Tumut the same despite the significant electrical difference (Upper Tumut is one of the firmest generators in the NSW region).

The Mac Gen proposal creates a number of regional market design anomalies and non transparencies. It is inconsistent with the MCE policy on region boundary changes. It also performs very poorly from a regulatory consistency perspective as it seeks to implement on an ongoing basis a set of arrangements for the Snowy region that is inconsistent to all other locations in the NEM. No other generators in the NEM are in generation only regions without load. It is unclear how the new Wagga gas fired generation would be treated under this proposal if built. Similarly, the proposal creates anomalies with the treatment of Southern Hydro generation.

Snowy Hydro notes that both the Southern Generators and the Mac Gen alternative proposals seek to uniquely impose fine granular pricing (nodal pricing) for both Murray and Tumut generation. This is in direct contradiction to the policy position that these same generators advocate (for example as part of the recent NGF submission to the AEMC congestion management review directions paper). Snowy Hydro concludes that the positioning of theses generators in relation to the Snowy region boundary change proposals is driven solely by their commercial self interest to limit contract market competition and liquidity in their respective region 'home' markets.

The NEM region market design recognises the trade-off between dispatch efficiency and contract market liquidity. The NEM market design is very much a reflection of the underlying physical structure of the NEM. Major electricity loads are largely centred around the major capital cities with remotely located generation relative to loads. There is only 'thin' interconnection between major load centres and the electricity system is meshed and loop flows exist in many NEM locations. The physical structure of the NEM is unlikely to substantially change in the medium term.

In our view the Snowy Region is inconsistent with the NEM market design and thus material problems have occurred. Resolving the Snowy region problems by abolishing the region would resolve a considerable portion of the congestion management problems in the NEM.

Abolition of the Snowy Region would successfully provide a long term solution to the problems in the Snowy Region. Snowy Hydro's proposal introduces competitive discipline on all generators; improves competition and liquidity in the Contracts market; removes negative residues (under system normal conditions); removes the need for NEMMCO intervention; improves transparency and SRA firmness. As a result inter-regional hedging will be much firmer than at present and much firmer than many other links in the NEM (see section 5.2.3).

The Snowy Hydro solution also lays the foundation for further broad based reforms on regional structure and congestion management (if deemed appropriate by AEMC and MCE).

Snowy Hydros submission elaborates on the reasoning for the proposed location of Guthega and Jindabyne within the NSW/Victorian regions (see section 5.1.1). Snowy Hydro drafted its Snowy Region abolition rule change with the express intention that the 'Snowy Restricted SRA Bidding' provisions falls away (see section 5.1.2) as the rational for the restriction no longer applies under the proposal. If there are demonstrated problems then good regulatory practice would require any such proposed restrictions should be applied generally to all generators in similar positions (noting there are a number of generators in directly comparable positions).

There is little market disruption associated with the abolition of the Snowy Region. Contrary to recent assertions by other participants, the costs of the Snowy Hydro region boundary change are small relative to the modelled benefits and relatively small in absolute terms.

The major obstacle to speedy introduction is NEMMCO's very recent suggestion that the change cannot be introduced until July 2008, against its earlier estimate of November 2007. We believe NEMMCO's revised estimates are very conservative and in part reflect accommodation of implementing a generic Snowy Region boundary changes that may involved the Mac Gen proposal. The Mac Gen proposal as indicated by NEMMCO to be a much more complex implementation option than in comparison to Snowy Hydro's proposal.

We believe with more effective project management and access to additional resources (which Snowy Hydro is willing to provide) NEMMCO can in fact achieve the original implementation date of 4 November and in any case a revised implementation date of 30 December 2007 for the Snowy Region abolition proposal. An implementation date before next summer 2007/08 is important due to the potential detrimental impacts flowing from the interaction of the South Morang constraints and the current arrangements.

Snowy Hydro appreciates the opportunity to comment on the Draft Determination on the Snowy Region abolition and alternative proposals for the Snowy Region. Please contact me on (02) 9278 1885 if you would like to discuss the issues outlined in this submission.

Yours sincerely,

Executive Officer, Trading

# Draft Rule Determination

# Abolition of the Snowy Region and

# Alternative Proposals

# for the Snowy Region

Submission from
Snowy Hydro Limited

30th April 2007

# 1 Introduction

The constraint between Murray and Tumut is material and enduring with no feasible prospect of transmission investment to build out the congestion. NEMMCO's analysis of historical congestion between Victoria, Snowy, and NSW regions confirms the durability and materiality of this constraint[2].

Snowy Hydro has shown that the current short term derogations have been tested and the Southern Generators rule has been shown to create serious market problems and are ultimately unsustainable (refer to our submission dated 26th March 2007). The current time limited derogation has manifested from the original Tumut CSP/CSC derogation through additional modifications from the Southern Generators. We show that the original derogation was a partial CSP/CSC trial with limitations that limited the effectiveness of the derogation. In short, the original CSP/CSC trial did not assign CSCs to Tumut generation to the NSW region, and it did not assign CSCs to Murray generation to access the Vic region.

The Southern Generators modification of the Derogation further reduces the efficiency of the original derogation. Hence, we have shown that the Southern Generators proposal to entrench the Derogation is inefficient and not in the interest of consumers.

The Split Region proposal is seriously flawed as there are no material or enduring constraints between Tumut to NSW and Murray to Victoria. This option entrenches the inter-regional basis risk that Snowy Hydro generators would face in trying to access the load centres in the NSW and Vic regions. In short we show that this reduces competition in both the NSW and Vic regions to the detriment of consumers in these regions.

The problems in the Snowy Region requires a long term solution through a boundary change as there are no prospects for transmission build out of the Murray to Tumut constraint. The Snowy Region abolition achieves the trade-off balance between dispatch efficiency and the ability to hedge. Since it is recognised by all market participants that the contract market is the key market in the NEM, our solution increases overall competition in the NEM. Customers are the ultimate beneficiaries.

The AEMC draft determination has established the approach that the AEMC intends to undertake in considering the proposals, and the conclusions that it has drawn. Our submission addresses these issues in turn – that is, the approach and the conclusions. Finally, we discuss the implementation of the AEMC's preferred approach.

# 2 AEMC Approach

## *2.1 The AEMC's Overall framework*

The AEMC has considered this rule change proposal within an integrated program for reviewing the approach to congestion management, and for congestion related rule

[2] See Appendix D of the Snowy Region Abolition Draft Determination.

change proposals. The AEMC's statement of approach of December 2006 set out its approach to ensuring integration.

We support the AEMC's release in March 2007 of the Congestion Management work program update which states that the Commission will release the final determination on the Snowy Hydro abolition by August 2007 in co-ordination with the release of determinations on other rule changes and reviews related to congestion in the Snowy Region and congestion management in the NEM in general.

The AEMC has assessed the nature of the problems arising from the current region boundaries for the Snowy Region. The AEMC has also confirmed that building out the congestion does not appear to be a viable alternative and in the absence of a regional boundary change lead to material dispatch inefficiencies. Further Snowy Hydro strongly believes that our proposal should be implemented immediately through the current Rule change process. Any delay or deferral of the problems in the Snowy Region to the wider congestion management could entrench the problems for at least another 18 months. Further the out-workings of the congestion management review are a reference report to the MCE with no guarantee that the MCE would put a rule change to fix the Snowy Region. These views have substantiated by Commissioner Carver[3] who stated,

> *… and you have to remember that the congestion management reference is a reference for a report to the MCE. Our role is to report to the MCE on these matters, and the extent to which any rule changes arise from that report is a matter for the MCE. In the event the MCE did think it was appropriate to put rule changes to us a consequence of the congestion management review, one would assume that would occur sometime in 2008.*
>
> *So the likely time frame for resolution of the broader question of the appropriate congestion management regime for the NEM is something that is going to take at least 18 months to work its way through. That begs the obvious question: why didn't we wait in respect of the Snowy proposal? In large part we didn't wait because of the submissions we received. As I indicated a few moments ago, a fairly overwhelming theme of the responses we received was that (a) congestion in the Snowy region is material; (b) it's enduring; (c) it's unlikely to be built out; and (d) absent some form of intervention, it was going to give rise to, as history has shown us, quite material dispatch inefficiencies.*

The AEMC has established criteria, based on the NEM Objective, to assess this proposal and the alternatives. The analysis undertaken by the AEMC has considered two alternatives:

- Business as usual, that is the position in the absence of the rule change being adopted. In the absence of the rule change being adopted, the region boundary will stay unchanged and existing derogations will lapse, and

[3] Commissioner Liza Carver, consultation forum 22 February 2007, Transcript of proceedings, p-9 (paragraph 20).

- The 'Split Region Option', which would split the Snowy region into two. At the release of the Draft Determination there is no formal proposal for this rule change, however Mac Gen have subsequently revised their original proposal to mimic that of the Split Region Option. We believe the revised Mac Gen proposal is inappropriate, technically flawed, and would result in reduced contract market volume and liquidity.

The Southern Generators have since lodged a Rule change to entrench the current arrangements. We assume that the Commission would use its established framework to assess the merits of the Southern Generators proposal.

We discuss below the rationale for the AEMC consideration of these alternatives.

The AEMC has then assessed these alternatives against the criteria. The assessment has drawn on quantitative modelling. Given the complexity of the issues, and the difficulty in modelling them, the modelling results provide one but not the sole input into the assessment. The AEMC has also recognised that there may be trade-offs – that is, options may perform better against the criteria in some respects and worse in others – and that it has to exercise its discretion and judgement in conducting the assessment.

***This overall framework is sound, consistent with the AEMC's regulatory obligations, and consistent with its approach to other rule change proposals.***

### *2.2 The Southern Generators Roam Consulting Modelling*

The Southern Generators modelling claimed that Commission's Business as Usual base case was better than the Snowy Hydro proposal. Snowy Hydro disagrees with the Southern Generators findings. More importantly, the modelling outcomes from Frontier Economics and Roam Consulting highlight in our view the inherent uncertainty in placing too much weight on dispatch efficiency as the main determining criteria.

In our view, the production savings associated with all options are immaterial when assessed against the efficiency impact arising from the ability to hedge in the contract market under the different options. We show that the Snowy Hydro proposal is the only proposal that can be stated with a significant degree of certainty that would increase competition in the contracts market. This would also flow through to increased competition in the Spot market.

Based on the paper released on AEMC website regarding the modelling done by ROAM consulting in can be concluded the **ROAM consulting modelling is significantly different than the Frontier modelling and thus cannot be used for comparison purposes.** We observed the following differences in the Roam modelling compared to the Commission's modelling:

- ROAM does not use any game theory modelling. There is no game theory since only one Participant (Snowy Hydro) is allowed to bid "strategically";

- Roam did not model strategic behaviour of any other participant in the market;

- Roam are only performing volume/price trade-offs for Snowy Hydro generators;

- Roam use an inappropriate set of assumption for Snowy Hydro bidding in the volume/price trade-off. The volume/price trade-off is a simple problem that can be easily optimised (For example, Snowy Hydro has a dynamic programming application that achieves this). An optimal solution can be found for the one Participant if this Participant is the only one that can adjust the volume / price trade-off. It is important to note that same model can be used for any other participant as anybody can optimise volume/price trade-off with static demand/supply curves.

- Roam did not include and modelling the impact on behaviour of contract levels for any participants. Our contention is that the participants contracting level would significantly affect their behaviour;

- Roam did not keep Snowy Hydro energy level constant in direct contrast to the Frontier modelling. This is an important element of any comparative modelling.

***With the exception of using the same physical data, ROAM and Frontier modelling does <u>not</u> have anything in common. Hence, any findings from the Roam modelling can not be used in a meaningful way in the analysis of the competing Snowy Region proposals.***

### 2.2.1 Major flaws in ROAM consulting modelling

There are two major flaws in Roam Consulting's modelling:

**Flaw 1- Fixing everybody else's bids except Snowy Hydro Limited's**

By fixing everybody else bids, Roam effectively moved to a centrally planning system mode, and moved away from how a market might operate. Relaxing only one variable (Snowy Hydro output) does not need to be done through offers. By changing offers for only one generator, Roam was performing a number of simulations that are more or less meaningless.

It depends on what Roam wanted to show, as under Roam's modelling framework it is very easy to find the optimal operation of Snowy Hydro (assuming it is maximising revenue for Snowy Hydro with all the other participant generator offers fixed and with no contracts in place). If Roam performed this optimisation they would have found that the optimal revenue for Snowy Hydro generators would be much higher and the NEM cost would significantly increase. However Roam would come to same results if they use any other participant generators instead of Snowy Hydro generators since the shape of the static demand/supply curve does not change.

It is very interesting to see this type of modelling used as number of similar modelling exercises were performed in the early 1990's by central planners and engineers to show that electricity market cannot work and the electricity market would increase cost to customers. These modellers performed exactly the same modelling as ROAM, except they repeated runs for number of participants, and showed that each of the participant generators can increase the total cost. These modellers concluded that all participants would be driven to move the price to a very high level (to maximise their profit) and hence on this basis proclaimed the electricity market was doomed to failure.

However the central planners in 1990's as well as ROAM consulting in the modelling done for the Southern Generator's did not model contracting, competition and strategic behaviour in **multi participant interaction** and hence Roam's modelling is totally different and inconsistent to the modelling performed by Frontier.

Coming to any conclusion from the ROAM modelling would then lead to the conclusion that the whole electricity market is wrong and that we should move back to central planning.

**Flaw 2 - Changing energy available from Snowy Hydro**

This is the probably the most significant flaw. Modifying hydro output was also used in the 1990's modelling in similar fashion to that used by Roam except that Roam increases Snowy Hydro output to show dispatch savings. Previous studies concluded that it would be more beneficial for hydro plant to spill water and reduce energy production and increase market prices and therefore profit. However in this Roam modelling due to fact that they needed to show some production savings Roam decided to increase energy production for Snowy Hydro. It is very obvious that if you change energy that costs $1/MWh (or in the past use $0/MWh) and substitute that energy with higher cost energy, then production / dispatch savings will be produced. The Roam Consulting report explains this fact in the report[4]:

> *The above table shows that NEM efficiency improves with strategic bidding of Snowy Hydro, however this is primarily due to the increased utilisation of Snowy Hydro plant, with the optimisation allowing an increase of 300GWh from 4600GWh to 4900GWh. The additional generation at Snowy, costed at $1.00/MWh, displaces various other higher cost generation, thereby lowering overall production costs.*

The increase of energy was intentionally used to create perception that some production savings were achieved. Once when you normalised the energy the only conclusion you are coming back is highlighted in flaw 1 described above, where a generator participant can increase their profit and market cost by offering their output at higher prices. This would be applicable for all generators not just for Snowy Hydro generators. The modelling undertaken by Roam does not include any effect of

[4] Roam Consulting, Analysis of the AEMC Draft Rule Determination to Abolish Snowy Region – Appendix A Modelling, 3 April 2007, page 10-11.

competition between generators, and contracting levels and how these would influence Spot market behaviour.

Based on the above explanation the following can be concluded about the Roam consulting modelling:

- The only partially valuable part of the modelling was the SRMC run without 'optimisation'. It showed that if everybody (except peakers) bid at SRMC then the current Snowy region structure needs to be changed. SRMC modelling may be appropriate for central planning purposes, however history shows that participants do not bid their output at SRMC and this is the reason why game theory modelling is more appropriate;

- Roam showed that with static demand/supply curves one generator participant can perform volume/price trade-off to maximise their revenue. Please note that if this was the basis of market operation then revenue maximisation can be achieved for any other participant (e.g. TRU Energy, LoyYang, IP, MacGen, Delta, Hydro Tasmania etc);

- Roam showed that if you substitute 300GWh of expensive energy with cheap energy priced at $1/MWh then energy production savings will be achieved (regardless of whether that energy is available);

- Roam did not perform any optimisation of Snowy Hydro (or any other participant) generation offers; and

- Roam used a set of generation offers (out of context) combined with additional GWh of generation of Snowy Hydro generators at no cost to claim some production savings under the business as usual scenario.

The Roam Consulting modelling does not provide any relevant conclusion for direct comparison with the AEMC modelling. Roam's major conclusions is that a single participant generator with a static demand/supply curve can perform volume/price trade offs with its generation and by substituting 300GWh of energy at a cost above $20/MWh with generation priced at $1/MWh, production savings can be achieved regardless of whether the additional energy is available for use in the first instance. The Roam modelling approach is inconsistent with the game theory modelling undertaken by Frontier and hence their findings are not relevant in assessing the merits of the Snowy Region change proposals

***Based on the above observations the ROAM consulting modelling is irrelevant for comparison with AEMC modelling and is irrelevant for any consideration about regional boundary change proposals.***

## *2.3 Implementing a regional change*

### 2.3.1 Need for a boundary change

The problems in the Snowy Region are familiar, and we have not repeated previous arguments. However, the need for a change is increasing due to instability associated with current arrangements.

To date the problems in the Snowy Region have been partially addressed through piecemeal short term fixes.

- The Tumut CSP/CSC intentionally only addressed Tumut locational pricing incentives but did not address the inefficient incentives to withhold generation during northward flows into NSW or the loop-flow issues associated with Murray.

- The Southern Generators proposal attempted to address the narrowly-defined issue of the negative residues on the Vic to Snowy link without attempting to resolve the contractual certainty/load access issues for Murray generation.

Serious problems are evident with the current short term arrangements following the introduction of the Southern Generator's proposal. Our submission dated 26th March 2007 details the problems and inefficiencies arising from the Southern Generator's proposal. In short the Southern Generator's proposal has transferred the problems in the Snowy Region to other locations in the NEM and has not resolved the problems in the Snowy Region (contractual certainty/load access for Murray generation).

As we demonstrated that the short term arrangements through the Southern Generators rule are resulting in:

- *Inefficient pricing in Victoria*: On the following days 12th January, 23rd January, 30th January, 3rd March, and 17th March 2007 that prices in Victoria are being set by offers in other regions. As a result Victorian generators are bidding in at -$1,000, confident that they will still receive high prices. This pricing inefficiency is occurring in a region with load, and so has a direct impact on electricity consumers (in contrast to any mis-pricing in the Snowy Region).

- *Reduced flows across the interconnector*: other regions are also bidding in low in an effort to get dispatched. When Tasmanian generators are successful in this bidding war, flows across the interconnector have been reduced, due to the impact of the relevant constraint equations

- *Negative settlement residues*: when Victorian generators are bidding large volumes at low prices, confident that this will not alter the Victorian price, it has led to negative settlement residues between South Australia and Victoria, and intervention by NEMMCO, and

- *Increased uncertainty*: the new arrangements have resulted in unexpected outcomes in regional prices, generator dispatch and interconnector flows. All

of these significantly increase the difficulty in pricing inter-regional risk, and so undermine the contract market.

These outcomes are highly undesirable resulting in less efficient prices in a large region with load (ie. Victoria), reduced interconnector flows, increased intervention by NEMMCO, and increased uncertainty. We do not consider this position is sustainable. Extending these short term arrangements will therefore require a further short term fix. The logical next step would be CSP pricing arrangement for the Latrobe Valley, given the problems arising from the high degree of mis-pricing at that location.

A further change of this kind would mean that major decisions on market design were emerging through a sequence of short term decisions in response to short term problems. This would be highly undesirable. It would be far preferable to resolve the current problems through the abolition of the Snowy Region, and to address market design issues through the congestion management review.

In contrast to the problems under these short term arrangements, abolition of the Snowy Region would restore efficient market incentives on all generators and as a result improve market efficiency. In particular we have shown that that the Snowy Region abolition it would:

- Increase contractual certainty for Snowy Hydro and other participants;

- Snowy Hydro plant would no longer be exposed to basis risk when contracting in NSW with Tumut plant and Victoria with Murray plant. With Snowy Hydro's internal contracting limits remaining unchanged it is clear that the Snowy Region abolition eliminates basis risk and hence contracting volumes and liquidity would increase in NSW and Victoria. This increased competition in the key contracts market would lead to more competitive contracting outcomes;

- More competitive contracting outcomes would lead to more competitive spot market outcomes as Snowy Hydro has strong commercial incentives to generate to hedge sold contracts;

- Allows efficient utilisation of Murray versus other gas generation. For example the proposal provide commercial incentives for Murray to increase output and at the same time for Snowy Hydro's gas turbines in Latrobe Valley to reduce output with the net effect of helping to increase the interconnector flow on the Victoria to Snowy interconnector;

- Restore competitive discipline on Southern Generators and so promote more cost reflective bidding;

- Allow efficient Victorian price outcomes and access for other generators in other regions; and

- Remove the need for NEMMCO intervention to manage negative SRA on the Victoria to South Australia interconnector.

***The current arrangements are inefficient and unsustainable, lending added urgency to the need to implement rapid change to the regional boundary.***

### 2.3.2 Use of the rule change process

The Southern Generators have argued that it is poor regulatory practice to implement regional boundary change through the rule change process. Their argument appears to be that this approach does not allow consideration of all available options.

We consider this is a weak argument. There is a material and enduring constraint which is unlikely to be built out, and Snowy Hydro has trialled alternative pricing arrangements, consistent with MCE policy. Snowy Hydro argued in its submission that the staged approach for boundary change set out in the MCE rule change proposal would lead to prolonged delay, and continuation of the high level of inefficiency and disruption resulting from the present regional boundary.

To the best of our knowledge, the MCE has not made a submission, or otherwise communicated with the AEMC, to suggest that the process is inconsistent with their policy framework for regional boundary change.

It is also unclear why this approach precludes consideration of options. Nothing prevents market participants from suggesting alternative options in their submissions, or from submitting rule change proposals where relevant.

More importantly, this argument appears to reflect a gaming of the process. The proposed use of the rule change process to change the Snowy Region boundaries has been in the public domain since November 2005. Macquarie Generation has made an alternative proposal.

No party suggested at the start of the process that it was invalid for the AEMC to consider implementing a boundary change through the rule change proposal to our knowledge. A suggestion at this late stage that the process is invalid might suggest that market participants are willing to engage in an AEMC rule change process only provided that it provides the outcome that they want. Accepting this would result in a high level of regulatory uncertainty.

The Snowy Hydro boundary change proposal is a direct result of past failures to follow and implement the region boundary review and rule change provisions in the National Electricity Code. Mac Gen correctly characterises the Snowy region change has a "one-off" regional boundary change to address known and material problems[5]. Mac Gen state:

> *The one area of concern is the design of the Snowy Region. The Snowy Region presents a unique, one-off problem as it is complicated by the presence of loop flows, significant tidal flows of electricity, no load in the area and the one generation company controlling flows across a significant intra-regional*

[5] Macquarie Generation submission dated 17/4/07 to the Congestion Management Review – Directions Paper.

*constraint. The AEMC is currently working to resolve the Snowy Region problem.*

The Snowy Hydro boundary change proposal is thus a once off boundary change to address these significant legacy issues that will allow a solid foundation to apply the new consistent region boundary change process as proposed by the MCE. This one off region boundary change proposal was not disputed by other participants at the beginning of the process in November 2005.

AEMC has set out its timing and the approach that it is taking to modelling the issue. The proposal to use the rule change process to implement a change to the Snowy Region has been known to the market for over 2 years.

***The use of the rule change process to change the Snowy Region boundary is consistent with MCE policy to address material and enduring constraints through a boundary change. Market participants have indicated their acceptance by engaging in that process.***

## *2.4 Options to be considered*

### 2.4.1 Business-as-usual (without time limited CSP/CSC derogation)

The AEMC has compared the Snowy Hydro proposal with a base case business as usual (BAU) scenario. The scenario assumes the current regional structure remains in place, and that the derogation for the CSP/CSC trial, and the related derogation for the treatment of negative settlement residues (the Southern Generators proposal), end on 31 July 2007.

The AEMC has however assumed that parts of the existing Part 8 network constraint derogation apply in the BAU scenario. These parts allow for NEMMCO to develop and apply fully optimised constraint equations and for NEMMCO to intervene to avoid significant counter-price flows.

An alternative would be to treat continuation of the existing derogations as the BAU scenario. However, there are two arguments against this:

- It would be inconsistent with the MCE policy position on region boundaries. This policy clearly states that a region boundary change is required in the absence of transmission investment to build out a material and enduring constraint such as the constraint between Murray and Tumut.

- It would be inconsistent with due process to extend the existing arrangements. Those arrangements were explicitly short term, and are not a reasonable comparison to, or substitute for, a long term solution.

These views were articulated in a very clear way by Commissioner Carver[6] who stated:

[6] Commissioner Liza Carver, consultation forum 22 February 2007, Transcript of proceedings, p-8 (paragraph 30).

> *Because we think that Snowy is correct when they characterise their proposal as a long-term solution to congestion in the Snowy region, and as the trial is a trial and modified in a time-limited manner through a derogation, we did not regard what is currently the status quo as in a legal and regulatory sense the appropriate base case.*

Snowy Hydro believes that to incorporate the current short term arrangements in the BAU would effectively pre-empt the outcomes of the congestion management review and be a permanent entrenchment of a time limited and partial trial. This view was also supported by the AEMC as Commissioner Carver[7] who stated:

> *We then also formed the view that it was potentially inappropriate for us to pre-empt our congestion management review by taking as the alternative option to the Snowy proposal the permanent entrenchment of the trial. Now, quite aside from what I hope I've just explained is reasonably sensible reasoning we went through in selecting our base case, as a lawyer I can't help myself but make the obvious observation that the current status quo is not something that we can legally implement in any event in the absence of a rule change proposal before us, or in the absence of the completion of our congestion management review and the consideration of our report in that respect by the MCE.*

The existing derogations lead to very significant changes:

- Under the derogations, generation in the Snowy Region is priced on a nodal basis. This contrasts with the regional framework for spot market pricing in all other regions in the NEM; and

- The main instrument for hedging inter-regional price risk is the purchase of settlement residues. Under these derogations, the treatment of settlement residues across the Snowy Region differs from that in all other regions, giving Snowy Hydro much reduced access to load centres in the NSW and Vic regions.

These derogations therefore have to be considered as material and major changes. They establish arrangements for one region in the NEM which are sharply different from arrangements for the other five regions.

It would not be consistent with the regional design of the NEM to simply extend such material derogations which are partial and incomplete (as CSCs are not fully allocated to Snowy generators), and which have been shown to create serious market problems and inefficiencies (see Snowy Hydro submission dated 26th March 2007.

As a further point, the derogations were put in place as short term rather than long term arrangements. The proposal for the CSP/CSC trial was short term. It did not establish any basis for introducing long term change on the basis of experience under the trial. This is made clear in NECA's report to the ACCC on the derogation. We

[7] Commissioner Liza Carver, consultation forum 22 February 2007, Transcript of proceedings, p-9 (paragraph 25-35).

have quoted from this at some length, since it makes clear that the trial was regarded as a short term solution, and that it was adopted because more effective solutions – such as the abolition of the Snowy Region – were not available:

> *"In considering the proposed derogation, NECA notes that:*
>
> ♦ *it is generally accepted that the current regional structure in the Snowy region creates significant problems;*
>
> ♦ *a change to the regional boundary could be a durable and effective solution to these problems. It would also be consistent with the recommendations in the CRA report of the use of* ***CSP/CSCs as an interim measure, and of a regional boundary change for sustained and material congestion*** (empathise added)***.*** *A boundary change, however, is likely to be delayed due to the current moratorium, the policy hiatus before the new institutions are developed, and the processes required in the Code; and*
>
> ♦ *the Snowy proposal will provide earlier assistance with the problems experienced in the Snowy region. It will also provide some insight into the application of the CSP/CSC proposal,* ***but it cannot be seen as a comprehensive trial of that proposal*** (empathise added).
>
> *NECA approves the proposed derogation as a means of responding to the continuing problems in the Snowy region, and of testing some aspects of the CSP/CSC proposal. However, it recommends to the MCE that it should consider whether the trial should be combined with steps to progress an expedited regional boundary change."*[8]

The Southern Generators rule change proposal was explicitly tied to the CSP/CSC trial. It can therefore also be regarded as a short term change.

In section 3.3.6 of this submission we highlight the issues that were not addressed as part of the implementation of the partial CSP/CSC trial.

Finally, as a pragmatic matter, the current arrangements are creating significant stress in the market. This is described below. We consider these current arrangements to be problematic and inefficient and do not consider these arrangements would be sustainable in the long term.

***The business-as-usual case should allow for the expiry of the current derogations. The current arrangements result in inconsistent treatment of the Snowy Region; and they are not sustainable in the long term.***

#### 2.4.2 Snowy Hydro Proposal

The Snowy Hydro proposal is a one-off change to address a market anomaly that is inconsistent with the region market design with generators located in regions with load, it is creating significant market problems, and the constraint cannot be built out.

[8] NECA, report to the ACCC, February 2005

Hence, consistent with a staged approach to transmission investment and region boundaries, a boundary change is required to fix the problem.

The Snowy Hydro proposal explicitly recognises the trade-off between dispatch efficiency and the competitiveness of the contracts market. The proposal is comparable to the competing alternatives on dispatch efficiency. The proposal is far more superior to competing alternatives in relation to its pro-competitiveness to the Contracts market, and since the contracts market is the key and main market in the NEM with direct consequence to the final prices consumers pay for their electricity we believe the Snowy Region abolition is the best solution.

### 2.4.3 Split Region Proposal

In its submission on the Snowy Hydro and Macquarie Generation rule change proposals, Eraring Energy put forward an alternative proposal, which would split the existing region into two. The AEMC has used it as a comparator in its analysis. Mac Gen has since radically modified their original proposal to adopt the comparator as their revised rule proposal.

Whilst we have concerns on how Mac Gen have radically modified their proposal after realising that its original proposal would not be preferred, we consider there is value in analysing this 'split region' option. It enables a clearer analysis of the spot market and contract market impacts associated with different approaches to the regional boundary. This assists with clear analysis of the other existing proposals. It may also assist with the longer term congestion management review.

We note major weaknesses with the Mac Gen Split Region option:

- This option pre-empts potential network upgrades that may remove congestion between the new regions to the NSW and Vic regions. Snowy Hydro has shown that with recent network upgrades, the newly introduced network support arrangements on the Snowy to NSW transmission lines and potential upgrade works on these lines that the risk of constraint on these lines is negligible. Upgrades on the Murray to South Morang lines would have the same effect;

- Analysis by the Southern Generators and Mac Gen have used 3000MWs as the nominal Snowy-NSW interconnector flow. We believe this is factually incorrect as shown in our analysis in Appendix 1 that shows the flow to be in excess of 3250MW.

- NEMMCO's historical analysis[9] shows that constraints to the north of Tumut and south of Murray are immaterial under system normal conditions.

- The Commission's forward modelling shows that constraints north of Tumut and south of Murray occur for immaterial hours. It would be inconsistent with MCE policy to introduce a boundary change at points without material

[9] See Draft Determination on Snowy Region Abolition, Appendix D.

nor enduring congestion and with prospects for any congestion that does exist to be built out, and

- The Split Region with Dederang as the reference node for Murray region is completely at odds with Electricity market design to have a regions regional reference node (RRN) in a location without major load or major generation;

- The Split Region with Dederang as the node would deliberately mis-price Murray generation. This was the Southern Generators central argument for implementing their rule change proposal and one of the Commissions reasons for preferring the Southern Generator rule over the re-orientation rule. However, to adopt the Split Region option with the Murray Region node at Murray node instead of Dederang would require additional patches to manage negative residues due to loop flows.

Snowy Hydro therefore considers that there are strong arguments, both on process on the substance of the analysis, against considering these Split Region option. Snowy Hydro only supports further analysis of the 'split region option' by the AEMC to allow a counter factual comparison to the Snowy Hydro rule change proposal.

Finally Snowy Hydro makes the observation that both the Southern Generators and the Mac Gen Split Region proposal seek to impose nodal pricing for Snowy Hydro's generation while keeping regional pricing for themselves. It is noted that these same generators have argued strongly against nodal pricing, for example in the MCE review of transmission/region boundaries, and more recently in the Congestion Management Review directions paper. For instance at direct quote from the NGF is:

> *The mis-match*[10] *between the hypothetical local price and the regional reference price (called mis-pricing by D. Biggar) is an outcome of the NEM design that was accepted by the designers of the market. This pricing mis-match is sometimes acceptable because a move closer to theoretically pure nodal pricing for generators will increase basis risks and therefore the risk premiums customers pay for hedge contracts.*
>
> *The NGF*[11] *acknowledges that more granular pricing of generation may increase trading risks associated with the basis risk between the generator nodes and the regional reference nodes. In simple terms an assessment of increased generation nodes could be considered in terms of a balance between the costs of increasing the number of regions against the benefits of reduced dispatch inefficiency – refer diagram below.*
>
> *The optimal number of regions could well be the current structure with adjustment for outcomes of the Snowy regional boundary review.*

We believe that this apparent inconsistency is motivated by the commercial desire of these generators to limit competition and liquidity in the contract markets in NSW and Victoria to the ultimate dis-benefit of end consumers and long term market efficiency.

[10] NGF submission to Congestion Management Review – Directions Paper, section 6.
[11] Ibid, section 6.

***The Split region proposal is an alternative proposal whose primary purpose is to limit the competition in the Spot and Contracts markets.***

### 2.4.4 Southern Generators Proposal

The current arrangement for managing the Snowy Region problems through a short term derogation have been tested, have been shown to create serious market inefficiencies, and are not sustainable. Therefore the problem in the Snowy Region requires a long term solution through a boundary change. The solution and the steps taken to reach it are consistent with the MCE policy on transmission and regional boundaries.

The current arrangements, after the introduction of the Southern Generator's rule change, are leading to significant instability in the market. As we have documented in previous submissions[12], this has resulted in inefficient pricing in Victoria, negative settlement residues between Victoria and South Australia, and reduced flows across the Snowy region. Additionally the current derogation with the Southern Generators rule reduced the level of spot and contract market competition.

The Southern Generators 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 Southern Generator are incentivised to maximise volume. As a result these generators are dispatched in a manner that worsens the South Morang constraint. As a consequence:

- Exports from Victoria to Snowy/NSW Regions are reduced (not increased as per the rationale for the rule approval) due to better coefficients 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-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.

[12] Refer to Snowy Hydro's submission dated 26th March 2007 that highlights the problems associated with the Southern Generator rule.

Murray generation under the Snowy Region abolition has strong and efficient signals to generate thereby relieving the South Morang constraint and thus these problems highlighted above are removed.

The Southern Generators rule together with the partial CSP/CSC trial applies a set of rules which is inconsistent with any other region or location in the NEM. The introduction of more granular pricing through for instance the CSP has been strongly opposed by the NGF in the most recent Congestion Management Review directions paper. The fact that these generators are imposing a set of arrangements to apply to their own generation and then contradicting this belief by imposing these arrangements on Snowy Hydro generation is a strong testament and proof that the current arrangements are reducing the level of competition in the NSW and Vic regions.

The Southern Generators response to Snowy Hydro's critique of the current arrangements in our submission dated 26th March 2007 has been entirely based on three wrong assumptions:

- The Roam modelling which showed marginally better dispatch efficiency for the current arrangements. The Roam modelling assumptions and modelling framework is inconsistent and inferior to the game theoretic modelling undertaken by the Commission. Hence, we have shown this modelling to be irrelevant as a comparison to the Commissions modelling;

- Dispatch efficiency is the key assessment criteria. This clearly isn't the key assessment criteria as the Southern Generators through the NGF submission to the Congestion Management Review directions paper has shown that the Contracts market should be the primary and key consideration of alternative congestion management arrangements. The Southern Generators and the NGF clearly stated that there is a trade-off in dispatch efficiency (correcting mis-pricing) and Contract market efficiency. In our assessment potentially and marginally better dispatch efficiency through implementation of the Southern Generator rule or the Split Region option would have a materially adverse impact on the efficiency of the Contracts market; and

- Current arrangements are working. We have clearly demonstrated in our submission dated 26th March 2007 that these current arrangements are **not working** and would be potentially much worse next summer 2007/08 with tighter supply / demand across the NEM.

***We strongly believe entrenching these inefficiencies through extending the current short term arrangements would not be consistent with due process and good regulatory practice. It would also be unsustainable, and is likely to require further short term modifications. Ultimately customers would be worst off under current arrangements as the level of competition in the spot and more importantly the contracts market are reduced leading to less competitive outcomes.***

# 3 AEMC Analysis

This section provides further comments on the Commission's modelling analysis and conclusions. These issues have already been extensively debated and we have not repeated points previously made.

## *3.1 The Snowy Hydro proposal*

### 3.1.1 Dispatch efficiency

- Snowy Hydro agrees with Frontier Economics that the productive efficiency benefits are small. Hence, other criteria should be given more weight in the decision making process.
- Demand point 29 (high NEM demand) represents over 50% of the productive efficiency benefits and hence is representative of incentives on Tumut and Murray to make generation available when it is needed most in peak demand periods. The Commission's analysis shows that the Snowy Hydro proposal performs better than the Split Region Option in these critical periods.

### 3.1.2 Pricing outcomes

- Pricing outcomes depend on the level of contractual exposure (i.e. the extent to which market participants are bidding at SRMC to defend contracts). Contractual exposure depends on access to SRAs to allow inter-regional hedging.
- Snowy Hydro demonstrates below that under the Split Region option the SRAs are less firm than under the Snowy Hydro proposal. This would reduce the level of contracting possible under the Split Region model and lead to higher prices than was indicated from the modelling results for the Split Region option.

### 3.1.3 Inter-regional trading and risk management

- As discussed above, the current arrangements are resulting in significant disruption and uncertainty. This is likely to increase transaction costs in the contract market and reduce inter-regional trade
- The Split Region option with Murray as the RRN for the Murray Region would result in negative SRAs. This will require intervention by NEMMCO and again impede inter-regional trade.
- Due to the generation withholding incentives in both the Split region and Southern Generator proposals which does not exist in the Snowy Region abolition proposal we show that the Snowy Hydro proposal would result in firmer SRAs.

### 3.1.4 Power system security

- We agree with the Commission's assessment that the Snowy region change proposals do not impede power system security.

### 3.1.5 Good regulatory practice

- The current arrangements for the Snowy Region are inconsistent with the other regions in the NEM. Maintaining this inconsistent treatment

would create uncertainty for all market Participants as to how the Commission would address congestion at other locations in the NEM.

- The Split Region option with Dederang as the RRN for Murray region is inconsistent with good electricity market design since the RRN does not have major load or major generation. The Dederang RRN would also mis-price Murray generation.
- The Split Region option with Murray instead as the RRN for Murray region would result in NEMMCO having to intervene to manage negative settlement residues whereas the abolishing the Snowy Region does not present this problem for NEMMCO to manage. This was a **key criterion** used by the Commission to assess the relative merits of the proposals by the Southern Generators and by Snowy Hydro (re-orientation) to deal with negative settlement residues in the Snowy Region. Snowy Hydro believes this remains a key point of difference between the Mac Gen/Split Region and the Snowy Hydro proposal.

## *3.2 Split Region proposal*

We provide further comments below on the split region proposal, against the same criteria.

### 3.2.1 Dispatch efficiency

- The split region option does not remove incentives for Tumut and Murray to withhold generation.
- The split region option provides dispatch efficiency benefits that are comparable with abolition of the Snowy Region option. However, the materiality of the dispatch efficiency differences is immaterial relative to the contract market impacts of the competing alternative options.

### 3.2.2 Pricing outcomes

- The withholding incentives will reduce competition and drive up contract prices.
- Tumut and Murray do not have incentives to withhold under the Snowy Hydro proposal

### 3.2.3 Inter-regional trading and risk management

- Frontier's risk modelling uses a portfolio optimisation approach. A portfolio optimisation approach involving more variables to optimise (in this instance, interconnector links) would always find more optimisation with an increasing number of links. However this approach does not recognise the practical difficulties and risks associated with acquiring the required number of SRA links at an acceptable price. These practical trading constraints increase with increasing interconnector links (ie. regions) and hence limit the ability to use SRAs to inter-regionally trade across multiple regions.
- The modelling has been well conducted and has greatly increased the transparency of the process. However, the modelling did not intend to consider transaction costs in the contract market. It assumes that

participants with an inter-regional exposure can forecast the SRA link price, purchase the SRA units and attain the required number of units.

This substantially understates the difficulty of trading under the split region option. In practice:

- SRAs are imperfect instruments whose hedging qualities are strongly dependent on generator behaviour and transmission availability.
- The SRA product presents a mismatch in time duration (3 months duration out to a maximum of 1 year) to market contracting (which can be go beyond 10 years)
- There is a very limited secondary market for SRAs, largely limited to Victoria and NSW for inter-regional hedges
- There is no certainty of securing required SRA units, and potential for strategic purchasing of importing units by large generators.

- The split region option would substantially increase the complexity of assessing, pricing and managing inter-regional risk. It would be unrealistic to rely on SRAs as a means to manage this risk. While the linked bid option supports execution, it does not address the other more material issues raised above. The NGF[13] recognised this fact by stating:

> *Mitigation measures which are predicated on the assumption that congestion and prices can be forecast perfectly are destined to fail.*

#### 3.2.4 Power system security

- We do not consider that this option would impede power system security.

#### 3.2.5 Good regulatory practice

- Consistency with MCE policy requires that regional boundary change should be considered in response to material and enduring constraints, in the absence of transmission investments to build out the constraints.
- The constraints north of Tumut and South of Murray are not material and enduring. The Commissions forward modelling confirms that the hours concerned are not material.
- There are numerous network upgrades that will build out any congestion north of Tumut and South of Murray. For example, we highlight recent Snowy to NSW upgrades:
  - 64 line current transformers;
  - Capacitor installations
  - Yass switchyard rebuild
  - Utilisation of 5 minute scheme
  - Recent line surveys and further upgrade potential
- The export limit into NSW is now a minimum of 3300 MWs in summer, and 3500 MWs in winter under system normal conditions. In

[13] NGF submission to Congestion Management Review – Directions Paper, section 3.

effect this means the lines north of Tumut cannot constrain. Please refer to Appendix 1 for data to support this assertion.

- The split region option with Murray as the RRN for the Murray region would result in an increased level of negative residues. This will require a higher level of NEMMCO intervention. The AEMC has placed weight on this issue in its approval of the Southern Generators rule change. Consistency requires that this is a significant argument against the split region option.
- We note that AGL's Southern Hydro generators which are allocated in the Vic region are electrically and physically very close to Murray generators. Yet the Split Region would impose a separate region for Murray generation. This outcome would highlight the regulatory inconsistency if the Split Region was approved since the Southern Hydro generators are the largest generators located nearest to the Dederang RRN but would NOT be included in the new Murray region.
- 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. In summary, the Split Region option is inconsistent with the accepted electricity market design principles and the NEM regional market design.

### *3.3 The Southern Generator Proposal*

The Southern Generator's (SGen) proposal imposes nodal pricing on Snowy Hydro generators and hence would experience similar inefficiencies to those outlined for the Split Region proposal. We also outline additional deficiencies associated with this proposal.

#### 3.3.1 Dispatch efficiency

- The SGen option does not remove incentives for Tumut and Murray to withhold generation to NSW and Vic regions respectively.
- The SG option provides similar dispatch efficiency benefits in comparison with abolition of the Snowy Region.

#### 3.3.2 Pricing outcomes

- The withholding incentives will reduce competition and drive up contract prices.
- Tumut and Murray do not have incentives to withhold under the Snowy Hydro proposal

#### 3.3.3 Inter-regional trading and risk management

- The SGen option subjects Snowy Hydro to basis risk unlike any other generator that contracts with Retailers in their own

region. SRAs as noted are imperfect hedging tools and access to these units assumes that Snowy Hydro can forecast the SRA link price, purchase the SRA units and attain the required number of units.

- The SGen option substantially increases the complexity of assessing, pricing and managing inter-regional risk for Snowy Hydro. It would be unrealistic to rely on SRAs as a means to manage this risk. Under this option contracting for Snowy Hydro is an inherently risky exercise that ultimately reduces Snowy Hydro willingness to offer contracts. The SGen also ignore transaction costs in the contract market.

### 3.3.4 Power system security

- We consider that the SGen option may adversely impede power system security as it has been demonstrated that under this option when the relevant South Morang and/or Snowy constraints binds Vic generators receive a high Vic price regardless of their offers. This creates incentives for Southern Generators to offer generation in such as way (ie. low ramp rates, offering inflexibility) which adversely impedes NEMMCO's ability to manage the system in a secure state.
- We believe NEMMCO should investigate its ability to manage the system if the SGen proposal was approved as this may become a serious problem for the market.

### 3.3.5 Good regulatory practice

- Consistency with MCE policy requires that regional boundary change should be considered in response to material and enduring constraints, in the absence of transmission investments to build out the constraints.
- The constraints north of Tumut and South of Murray are not material and enduring. The Commissions forward modelling confirms that the hours concerned are not material.
- There are numerous network upgrades that will build out any congestion north of Tumut and South of Murray, these were highlighted under assessment of the Split region option.
- The export limit into NSW is now a minimum of 3300 MWs in summer, and 3500 MWs in winter under system normal conditions (see Appendix 1). In effect this means the lines north of Tumut cannot constrain and that Tumut generation should be allocated to the NSW region.
- The constraints south of Murray are immaterial. Murray generation acts as a positive gatekeeper when the South Morang constraint binds. Hence, Murray should be allocated in the Vic region to increase the export from Vic to NSW.
- The SGen option results in negative residues on Sa to Vic interconnector. This will require NEMMCO intervention. The AEMC had placed weight on reducing NEMMCO's intervention in the market in its approval of the Southern

Generators rule change over the re-orientation proposal. Consistency requires that this is a significant argument against the SGen option in comparison to the Snowy Hydro proposal.

### 3.3.6 History behind the Tumut CSP/CSC Derogation

This section outlines the background to the Tumut CSP/CSC derogation. CRA had first introduced the CSP/CSC concept as part of their study into transmission and regional boundaries which was conducted for the MCE in 2003. The Snowy constraint at the time were becoming more problematic and the moratorium on region boundary changes effectively meant the CSP/CSC mechanism was the only means to address the problems in the Snowy Region.

Snowy Hydro initially designed a complete CSP/CSC scheme for the Snowy constraints. The complete CSP/CSC scheme would have included:

- A CSC for Upper Tumut and a CSC for Lower Tumut to the NSW Region. This would have recognised that the Tumut generators were positive gatekeepers that allowed the full utilisation of the Snowy to NSW interconnector;

- A CSC for Murray to the NSW region. This would have recognised that Murray generation was a positive gatekeeper to the Murray to Tumut constraint thereby increasing exports from Victoria to NSW;

- It was recognised that the CSP/CSC trial as proposed did not include voltage constraints, outage constraints, and constraints associated with transmission in South-West NSW.

- Due to a number of reasons it was pragmatically recognised that only a partial trial of the CSP/CSC concept could be implemented.

Hence the current derogation does not address the inefficient incentives to withhold Tumut generation during northward flows into NSW in order to maintain transmission headroom.

The Southern Generators rule attempts to address the narrowly-defined issue of the negative residues on the Vic to Snowy link without attempting to resolve the contractual certainty/load access issues for Murray generation into the Victoria region. This is inefficient and anti-competitive as it removes Murray generation from supply and contract competition in the Vic region.

The NGF also highlights the need for CSC allocation in a CSP/CSC regime. The NGF[14] state:

[14] NGF submission dated 13 April 2007 to the Congestion management review – directions paper, section 9.

*As part of the process to thoroughly assess the costs and benefits of these types of scheme the NGF is of the view the following implementation issues, in relation to CSC or residue allocation need to be resolved;*

*a. Would there be a threshold of congestion materiality on a constraint cut-set that would result in a congestion management scheme being implemented or would a scheme be applied automatically whenever a constraint equation was binding?*

*b. How the allocated CSCs or residues are impacted by the incremental development of the transmission network.*

*c. How negotiated transmission augmentations that are funded with the express purpose of reducing material congestion fit with an implemented congestion regime.*

*Unless the major implementation issues of congestion support pricing regimes are solved then* ***CSP/CSC and CBR remain exercises in theoretical economics*** (empathise added).

***It is clear that the current CSP/CSC derogation is partial and incomplete. It would be inefficient and inappropriate to entrench the current arrangements.***

## 4 Discussion and Comparison of Proposals

This section discusses the overarching themes that need to be considered in assessing the merits of each alternative proposal. These overarching themes must be considered in the conjunction with the Commissions assessment criteria in order to determine the most appropriate and efficient solution.

### *4.1 Abolition of the Snowy Region is Consistent with NEM design*

The NEM market design is very much a reflection of this underlying physical structure of the NEM which consists of:

- Major electricity loads largely centred around the major capital cities
- Remotely located generation relative to loads
- 'Thin' interconnection between major load centres
- The electricity system is meshed and loop flows exist in many NEM locations

The physical structure of the NEM is unlikely to substantially change in the medium term. The NEM region market design recognises the trade-off between dispatch efficiency (mis-pricing) and contract market efficiency. In our view the Snowy Region is inconsistent with the NEM market design and thus material problems have occurred. Resolving the Snowy region problems by abolishing the region would resolve a considerable portion of the congestion management problems in the NEM.

### *4.2 Market modelling confirms that Dispatch Efficiency is Comparable across a range of Options*

Modelling of hydro plant in a competitive electricity market is very complex as it relies on a highly uncertain set of modelling assumptions, such as:

- Perfect knowledge of future prices as hydro generators in practice aims to generate at the opportunity cost of the marginal generator. Modelling assumptions which assume a fix marginal (opportunity cost) for hydros are by definition not reflecting what happens in practice;

- The Commission's models Hydro Tas as a 300MW generator when historical data shows Basslink can go upto 500-550MW in either direction; and

- Snowy Hydro and Hydro Tas plant are directly substitutable to each other as they have similar marginal / opportunity costs.

Leaving aside the uncertainty associated with modelling hydro generators, we believe the Commission has done a good job of modelling hydro generators. What is clear is that the Commissions modelling conclude that all competing alternatives improve dispatch efficiency from the business as usual base case. Hence a solution is needed to current problem in the Snowy Region.

The Commissions modelling confirms that dispatch efficiency is comparable across the three competing options. We believe this difference is immaterial when compared to the impact of the competing alternatives to the Contracts market.

### *4.3 Contract Hedging is the Key to Facilitate Competition*

Snowy Hydro believes that the contract market is the main market in the NEM, with both generators and retailers having financial requirements to secure cash flows as part of their business and hedge inherent volatility. The Spot market is basically a balancing market. There are a number of studies that suggest the level of generator contracting is of the order of 80 to 90%.

The ability of remote generators to sell contracts at major load centres is subject to price basis risk and volume (dispatch) risk. For a generator selling a contract in its own regional node there is no basis risk. Volume (dispatch) risk is a function of transmission availability and capability.

For a generator to inter-regionally contract trade the settlement residue auction (SRA) units are a mechanism that partially hedges the basis risk. It has been well articulated by ERIG that the SRAs are very imperfect/non-firm hedging tool. There is some scope for incremental enhancements to the SRA instrument design but it will never the less remain a very imperfect instrument due to the fundamental uncertainties. For these reasons, SRAs support in general only incremental inter-regional trade. SRAs are very unsatisfactory in comparison to the relative certainty provided for a generator to contract within its own region under the NEM region market design.

There is a major market design trade-off between spot market dispatch efficiency (improved by finer 'granularity') and contract market liquidity (improved by certainty of smaller number of regions).

Dispatch efficiency is primarily driven by finer or more granular locational pricing. This could be implemented through an increase in the number of regions, introduction of CSPs, or generator nodal pricing. However, with more granular pricing there exists increased basis risk for the relevant generators. Basis risk then impacts the level of contracting and liquidity. Hence, the more granular the pricing the less liquidity and less competition exists in the contract market. The regional market design strikes a balance between these two efficiency impacts. Another way of expressing the trade off is the 'mis-pricing problem' verses the 'hedging problem'.

There is in our view potential merit in decreasing granularity with respect of hedging major load centres (for example removing the current anomalies of the region market design implementation by abolishing the Snowy Region) in order to achieve substantial benefits in the hedging market. That is, the small 'mis-pricing' problem is swamped by the much larger 'hedging problem'. It is well known theoretically and empirically that enhancing contract trading by increasing contract liquidity and availability will increase overall competition.

In our view, any moves to increase granularity of pricing (for example introducing CSPs) without addressing the associated hedging and load access issues (by for example allocating CSCs) will significantly decrease market efficiency due to the hedging market impacts.

We also note that increasing granularity simply leads to more withholding in both the spot and contracts market as generators are incentivised to access the load price. This increases both spot and contact prices due to reduced competition, purely as a function of the market design.

Both the Split Region and current arrangements with the Southern Generator rule imposes nodal prices on Tumut and Murray generator. In the existing Snowy Region without load and coupled with the fact the SRA are an unreliable mechanism to facilitate significant inter-regional trade it is shown that both these proposals are inefficient.

### *4.4 Regulatory Certainty*

Good regulatory practice requires consistency of application of congestion management framework. Inconsistent application simply creates regulatory uncertainty and sovereign risk for participants leading ultimately to market inefficiency due to necessary increased risk premiums to compensate for higher risk and investment uncertainties. This point is particularly pertinent in the NEM given the physical features of electricity supply as articulated above. Similarly, 'time limited' arrangements must indeed be applied in a manner that is consistent with staged approach to transmission and regional boundaries. The Murray to Tumut constraints are both material and enduring and transmission upgrades

are not viable. Hence a region boundary change consistent with the NEM region market design is required.

***In short, we advocate abolition of the Snowy Region which is in keeping with the NEM market design where generators are located in regions with load.***

### *4.5 Comparison of Proposals*

With the overarching themes articulated in the sections 4.1 to 4.4, the following table summarises the competing proposals against the Commissions assessment criteria.

| **Assessment Criteria** | **Snowy Region Abolition Option** | **Split Region Option** | **Southern Generator Option** | **Conclusion** |
|---|---|---|---|---|
| Dispatch Efficiency | In critical periods (ie. demand point 29) this proposal performs better than the Split Region | Across a wide range of modelling scenarios this option results in marginally better dispatch efficiency | Modelling should show results similar to the Split Region option as this proposal imposes nodal pricing on Snowy Hydro generators | **Marginal** differences across three options and taking modelling errors into account this criterion should be given less weight |
| Pricing Outcomes | This option results in **lowest prices for Vic** region. Prices for NSW are mostly lower than the BAU case. | Results in lowest modelled price outcome for NSW region. | Modelling should show results similar to the Split Region option | Pricing outcomes heavily dependent on level of contracts sold. Snowy region abolition would result in Snowy Hydro and other generators being able to sell more contracts inter-regional thereby the modelled pricing outcome of the Abolition proposal is understated (ie. not low enough) |
| Inter-regional trade and risk management | No basis risk for Tumut to NSW and Murray to Vic. Firms up SRAs on Vic/NSW link to allow other Participants to inter-regionally trade. | Basis risk for Snowy Hydro in regions without load. Modelling does not factor in practical difficulty of acquiring SRA units. SRA units are imperfect hedge tool which acts to limit inter-regional trade and reduce competition. | Similar inefficiencies to Split region option. CSP/CSC trial is **partial** and no load access via CSC allocation to Snowy Hydro would limit inter-regional trade and reduce competition. | Snowy region abolition is the only proposal likely to substantially increase contract market volume and liquidity and hence increase competition in the NEM. |
| Power system security | Not an issue. | Not an issue. | Pricing outcomes under the SGen proposal may | No system security issues with the Snowy |

| | | | | |
|---|---|---|---|---|
| | | | create some potential system security issues for NEMMCO. | Region abolition. |
| Good regulatory practice | Snowy constraints are material and enduring and without transmission building prospects to alleviate the constraint the Snowy region abolition is consistent with good regulatory practice. | Constraints north of Tumut and south of Murray are neither material or enduring. Hence the boundaries proposed by the option are inconsistent with MCE policy. This option is inconsistent with the Region market design. The regions are without load and the regional reference node for Murray region contravenes good electricity market design. | The CSP/CSC is incomplete and is a trial only. The derogation is not as transparent as a region boundary change since it involves post dispatch settlement adjustments. The current arrangements are complex and not transparent. The SGen rule is problematic and inefficient. To entrench the current derogation would not be good regulatory practice. | Snowy Region abolition resolves known and legacy problems. To implement the abolition solution is good regulatory practice and lays the foundation for future regulatory reform of transmission and region boundaries. |

Snowy Region abolition is equivalent to or superior to the alternative options on all assessment criteria. Additionally, as it recognised by the majority of Retailers (ie. eA and Origin) and recognised by the NGF that the contract market is the key market in the NEM, the Snowy region abolition would therefore increase competition in the contract markets. We strongly believe it is the best solution that would increase overall competition in the NEM.

# 5 Implementation

In this section we consider the details of the proposed Snowy Region abolition rule change; the impact on contract and SRA markets, the impact on Participant IT systems, and timelines for implementation.

## *5.1 Detailed design of the rule change*

### 5.1.1 Regional location of Jindabyne Pumps and Guthega Generation

Currently both Jindabyne Pumping Station (JPS) and Guthega Power Station (GPS) are 'normally' switched to Murray Switching Station (MSS). However GPS is switched to Munyang (SE NSW load area) under conditions of high NSW demand and high transfers from the Snowy region into greater NSW.

JPS pump load is hydraulically coupled to Murray generation (and indeed registered in this sense under the NEM rules and under the MRET legislation). The pump load cannot be fully supported from Munyang/SE NSW due to insufficient reactive capability to enable full pumping load. Accordingly Snowy Hydro proposed that JPS

be allocated to the expanded Victorian region under the Snowy Hydro region boundary change proposal.

GPS on the other hand is not hydraulically coupled to JPS or Murray generation, and operates independently. GPS can only 'effectively' supply greater NSW load. At the extremes, GPS increases physical exports to greater NSW as it avoids the 330 KV network constraints between Murray & Tumut (by directly supplying SE NSW and Canberra). Again at the extremes, Murray generation can just fully satisfy the Murray to Victoria transmission capability and hence GPS cannot add to exports to greater Victoria. In addition GPS directly supports SE NSW load and the ski fields under loss of supply conditions when the radial supply from Canberra is lost. Accordingly Snowy Hydro proposed that GPS be allocated to the expanded NSW Region under the Snowy Hydro region boundary change proposal.

In its draft determination the AEMC invites comments on whether the proposed boundary is 'closed' or 'islanded'. Snowy Hydro proposes that the region boundary (NSW/Vic) be located at the Guthega 132 KV bus section isolator (JPS allocated to Vic, GPS allocated to NSW). Such a boundary location would yield 'closed' regions and no 'islanding'. Indeed, for small investment a remotely operated isolator could implement JPS normally switched to MSS and GPS normally switched to Munyang.

### 5.1.2 Restriction on Snowy Hydro procurement of "inwards" IRSR Units

The restriction on Snowy Hydro purchasing "inward" IRSR Units was originally imposed by the ACCC following a rebidding incident. This was well prior to the rebidding debate and subsequent rebidding rule changes. The rational used by the ACCC was that the Snowy region was a generation only region with no load, hence the restriction was warranted.

Snowy Hydro has not pursed the provisions in the rule to have the restriction revoked. Snowy Hydro is permitted to participate in the purchase of "inward" IRSR units to the extent of its demonstrated needs, and these demonstrated needs have always been sufficient from Snowy Hydro's commercial perspective.

Under the Snowy Hydro region boundary change proposal the Snowy Region is abolished and hence the associated restriction on Snowy Hydro purchasing Snowy "inbound" IRSR units is also effectively abolished (that was Snowy Hydro's intention).

Under the Snowy Hydro proposed region boundary change, Tumut generation is located in the expanded NSW region and Murray in Victoria. Accordingly Snowy Hydro generation is no longer located in a generation only region with no load. Hence the rational used by the ACCC for the restriction no longer applies. Should the Snowy Hydro region abolition be implemented, there is simply no basis for any specific restriction on Snowy Hydro from purchasing "inwards" IRSR Units and Snowy Hydro would strongly oppose any such specific restriction. Should the region change abolition be implemented there are however very legitimate reasons for purchasing "inwards" IRSR units including pumping, trading, cross hedging plant reliability and transmission risk management etc.

If there is a demonstrated problem with generators purchasing "inwards" IRSR units then the AEMC should implement a general restriction to all generators. If there is a demonstrated problem with a single generator company owning generators on both sides of a region boundary then again a general restriction should apply to all such generators (of which there are a number of examples) purchasing IRSR across the relevant boundary.

### 5.1.3 Dynamic versus marginal loss factors

NEMMCO verified at the Consultation Forum that historical factors that influenced the 1997 Snowy Region boundary consideration was the difference in dispatch based on the use of dynamic and static marginal loss factors. This outcome was largely influenced by the modelling inputs that assumed short run marginal bidding.

The NEM has evolved since 1997 and bidding strategies are influenced by many factors including short run marginal cost. Hence, Frontier Economics' use of game theoretic modelling to stimulate equilibrium market behaviour is a far superior and more accurate analysis of the likely impact on dispatch efficiency of using dynamic versus static marginal loss factors.

Frontier Economics results show positive dispatch efficient benefits in the abolition of the Snowy Region option and negligible dispatch efficiency differences in the comparison of the Split Region Option with the Snowy Hydro proposal. Hence, the use of marginal loss factors in the abolition of the Snowy Region proposal is not a material issue as it results in positive dispatch efficiency benefits.

The percentage of time the issue of dynamic versus static loss factors may be relevant is very low (< 1%) and only material when prices are very high, and it is these circumstances where loss factors are NOT a key determinant in decision making.

Hydro plant must define its marginal cost ex-ante, therefore you must come to a view of a very uncertain future market, estimate uncertain medium term inflows, and then decide where your going to price your opportunity cost relative to other plant. The errors in pricing the opportunity costs are orders of magnitude larger and more significant that errors in dynamic versus marginal losses.

Effectively hydro plant has to dynamically adjust the opportunity cost to market variables which are much more significant than the use of dynamic versus marginal loss factors.

Latrobe Valley flows are tidal (1000MW swings on Basslink and 800MWs of fast start plant) hence the use of static loss factors in this location is much more problematic.

The issue of static loss factors is also much more relevant with similar cost plant (ie. Brown coal generators) as the relative difference in marginal costs between these plants are smaller and well definable. Hence the use of marginal versus static losses would change the relative merit order of these plants.

## *5.2 Contract market impacts*

### 5.2.1 Impact on existing contracts

The abolition of the Snowy Region would result in minimal and immaterial impacts on electricity contracts. This view is supported by the AFMA Electricity Committee[15] that has recently determined that,

> "whilst this might technically be a Market Disruption Event for Snowy contracts (and hence may flow on to NSW deals) the Committee believes it is extremely doubtful that the change is a material change in the underlying market structure".

Snowy Hydro therefore believes there would be no material impacts on electricity contracts.

### 5.2.2 SRA instrument imperfections and transaction costs

Snowy Hydro agrees with the findings from the Anderson, Hu and Winchester (AHW) study. The AEMC[16] noted that: We believe the study more accurately reflects the use of SRA for inter-regional trading in the NEM.

> *The AHW survey found that the auctioning of IRSR units does not operate effectively to encourage inter-regional contract trading. Almost all the participants said that they tried to arrange contracts between counterparties in the same region, so as not to be exposed to inter-regional trading (basis) risks. When such basis risk was taken on, the participants reported that they often hedged them through an inter-regional product (a swap based on the difference between the RRPs), rather than IRSR units and many participants stated that they were not actively involved in the SRA. The paper concluded that it seemed that a significant part of the trade in IRSR units was speculative rather than carried out for hedging purposes.*

These study results does not surprise Snowy Hydro. We are the most inter-regional exposed generator in the NEM and the purchase of SRA has been our primary mechanism to inter-regionally trade. We have found from experience that the SRA units are inherently risky instruments whose firmness is subject to a number of exogenous variables outside the company's control. These instruments are purchased through a competitive process where the intentions of fellow market participants in acquiring the units may not be for the purpose of inter-regional trading. We have strong suspicions to conclude that generators in the inbound links purchase these SRAs to deter contracting in their own region. This issue has also been highlight by Joskow and Tirole[17] who showed the purchase of inbound residues by generators in the importing region can prevent contracting in that region by generators outside that region.

This similar conclusion was reached by Darryl Biggar and ERIG[18]:

> *For the units to be a fully financially firm instrument, inter-regional price divergences must only occur when interconnector flows are at their expected limit (and there is no risk of the interconnector limit being de-rated). If price differentials*

[15] AFMA Electricity Committee minutes, Meeting on Thursday 8 February 2007.
[16] AEMC, Congestion Management Review – Directions paper, page 26.
[17] Paul Joskow and Jean Tirole, 'Transmission rights and market power on electric power networks', RAND Journal of Economics Vol.31, No3, Autumn 2000, pp450-487.
[18] AEMC, Congestion Management Review – Directions paper, page 24.

*open up at other times, the resulting settlement residues will not be sufficient to hedge an equivalent interregional contract exposure. Indeed, analysis undertaken for the ERIG Energy Financial Markets Discussion Paper shows that this is often the case.*

Danny Price[19] highlighted the difficulty in hedging contracts inter-regionally.

> *there's a whole bunch of risks that we haven't accounted for. We've broadly defined it as execution risk, and that captures a lot of things in that sort of term, and I note people have said, "Well, there's no executive risk because you can buy pairs or any combinations of IRSRs." That's true, we understood that, but it really relates the additional complexity and risk of (1) being able to predict the appropriate price and (2) being able to secure the quantity so you can achieve that risk position. It becomes harder and harder every time you have to go through an additional region to do that, which is why nodally-price markets are so illiquid generally. It's because people can't predict once you go through to our three regions.*
>
> *It would be like, for example, South Australian generators selling into New South Wales or Queensland into Victoria. I'm sure it happens, and I know that it does happen,* ***but it's actually pretty rare, because of the difficulties of trying to predict the price differences and secure the appropriate pairs quantities of IRSRs*** (empathise added)**.**

The NGF's response to the congestion management review directions paper is insightful as it reveals how generators in the NEM few the prospect of finer granular pricing through region boundaries and the use of SRAs to facilitate inter-regional trade.

With respect to the region market design, basis risk and risk premiums on hedge contracts:

> *It[20] is apparent in the discussion of fundamental congestion management options that the significance of the derivative market, whilst understood, is understated compared with the physical market. A high proportion of the physical electricity supply in the NEM is covered by hedge derivatives of various forms. Contract trading risk can be mitigated by schemes that support the purchase of zonal price differential residues. However, the cost of access to the residues and any residual risk will be quantified as premiums on hedge contract purchased by retailers. The simple question to be answered is whether the proposed increase in price zones for generators will reduce dispatch inefficiencies by more than the cost of increased consumer prices.*
>
> *The problem[21] of generator "mis-pricing" is really a natural outcome of a decision to adopt a regional market design. Given the MCE's policy decision in relation to nodal price this outcome is inevitable and not, as may be implied, an outcome of the abuse of market power by generators. The regional market is a compromise between pure*

[19] Danny Price, AEMC Consultation Forum – Abolition of Snowy Region – Transcript of proceedings, page 22.
[20] NGF submission dated 13 April 2007 to Congestion Management Review – Directions Paper, covering letter.
[21] Ibid, section 3

*pricing and effective trading in a market with limited physical inter-meshing, eg. managing hedging risk.*

*The mis-match[22] between the hypothetical local price and the regional reference price (called mis-pricing by D. Biggar) is an outcome of the NEM design that was accepted by the designers of the market. This pricing mis-match is sometimes acceptable because a move closer to theoretically pure nodal pricing for generators will increase basis risks and therefore the risk premiums customers pay for hedge contracts.*

With respect to more granular pricing[23]:

*The NGF acknowledges that more granular pricing of generation may increase trading risks associated with the basis risk between the generator nodes and the regional reference nodes. In simple terms an assessment of increased generation nodes could be considered in terms of a balance between the costs of increasing the number of regions against the benefits of reduced dispatch inefficiency – refer diagram below.*

*The optimal number of regions could well be the current structure with adjustment for outcomes of the Snowy regional boundary review.*

With respect to using SRAs to inter-regional trade:

*Mitigation[24] measures which are predicated on the assumption that congestion and prices can be forecast perfectly are destined to fail.*

The following quotations were in relation to Constraint Based Residuals but they are equally applicable to SRA units.

*These risks[25] are mitigated by the purchase of CBRs but the potentially large residual risk can only be quantified into contracting premiums to retailers.*

*There[26] is no consideration of the need to be able to forecast zonal prices and transmission capacity. For CBR units to be effective, participants must be able to forecast with some certainly the likely price differentials and levels of congestion.*

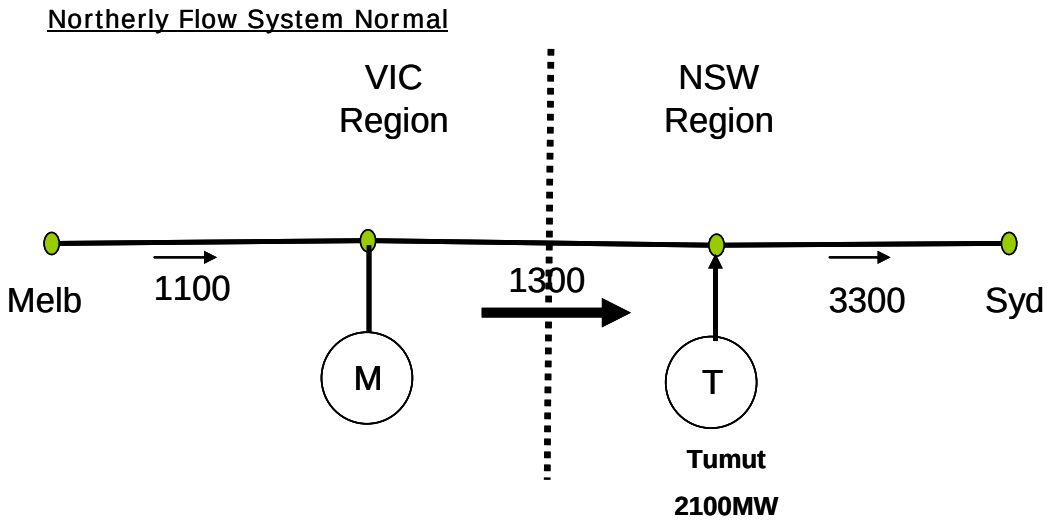
***In summary the more granular pricing through more regions or a CSP/CSC arrangement increases the basis risk for generators. Utilising SRAs to trade across regions is problematic as it requires the hedger to forecast prices and purchase sufficient amounts of SRA units. In short, increase granular pricing reduces contract volume and liquidity and this is a factor in driving up contract prices.***

[22] NGF submission dated 13 April 2007 to Congestion Management Review – Directions Paper, section 6.
[23] Ibid, section 6.
[24] Ibid, section 3.
[25] Ibid, section 9
[26] Ibid, section 9

### 5.2.3 SRA Firmness under Snowy Region Abolition

There has been a lot of misconception on the firmness of the NSW/Vic SRAs under the Snowy Region abolition. This section demonstrates that the Snowy Region abolition would result in firm SRA units for the Vic/NSW interconnector. Analysis on the SRA firmness under this option is undertaken for both the northerly flow and southerly flow direction through the Snowy constraints.

The following diagram shows the nominal northerly flows through the Snowy constraints under system normal conditions.




If Tumut generates its full output of 2100 MW, only 1200 MW (ie. 3300 – 2100) can flow across the Vic to NSW interconnector. The 1200MW flow is a reduction of only 100MW form the nominal Vic to NSW maximum flow rating of 1300MW.

The firmness of the Vic to NSW SRAs under this "worst" case condition in summer when Tumut is at maximum output is:

$$\frac{1200}{1300} = 92\% \text{ firm}$$

In winter, the Tumut to Sydney (NSW) limit is 3500MW, hence if Tumut was a full output of 2100, the combined Vic to NSW plus Tumut output is:

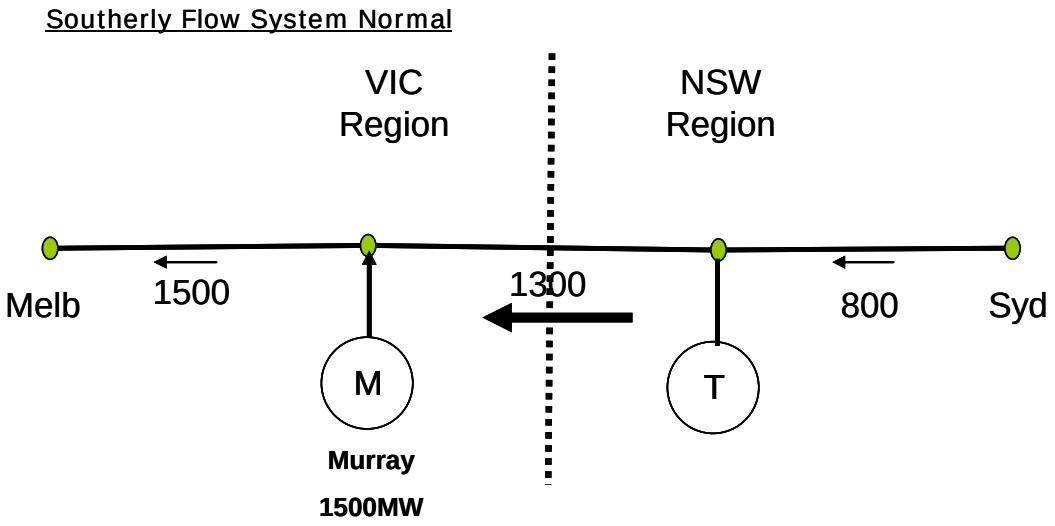
1300MW + 2100MW = 3400MW < 3500MW rating, hence 100% firm.

Hence the Vic to NSW SRAs is 100% firm in winter.

This analysis excludes the fact the incremental upgrades of transmission capability are possible from Tumut into Sydney. Therefore, the firmness of the Vic to NSW SRAs is likely to increase in the future.

**In conclusion, the Vic to NSW interconnector would be the <u>firmest</u> interconnector in the NEM. This means <u>full SRA access</u> for Victorian generators wishing to inter-regionally contract in the NSW region.**

The following diagram shows the nominal southerly flows through the Snowy constraints under system normal conditions.




The effective NSW to Vic export capability is only 800MW in the absence of Tumut generation which is a positive gatekeeper. With Tumut generation the full 1300 NSW to Vic interconnector flow is available. Hence, when assessing the firmness of the NSW to Vic SRA units the reference or nominal interconnector capacity is 800MW.

If Murray generation was a full output ie. 1500MW, then the maximum flow from NSW to Vic is 1900 – 1500 = 400MW. This represents a firmness of a least 50% ie. (400/800)

However, the sustainable output of Murray generation is well below 1500 and is more like 1300MW. Using the sustainable output of Murray at 1300, the firmness of the NSW to Vic SRAs is:

$$\frac{1900 - 1300}{800} = \text{At least 75\% firm.}$$

This analysis does not take into account that future incremental upgrades on the rating from Murray to Victoria is possible thereby increasing the firmness of the NSW to Vic SRAs.

***In conclusion, there is reasonable access for NSW generators wishing to inter-regionally trade to the Vic market. We also note that at least one NSW generator has publically stated that they do not inter-regionally trade.***

#### 5.2.4 SRA Auction process

NEMMCO through consultation with the Settlement Residues Committee (SRC) have been transparent about the affected SRA units. For Snowy Hydro the fact that the Snowy Region has no load means that we are a major participant in the Settlement

Residue auctions. Snowy Hydro has been satisfied with the transparency of the SRA process.

We note that there are a number of options to deal with the affected units in 2007Q4 and these options are being discussed by NEMMCO and the SRC if the final determination has a start date of 4 November 2007.

### *5.3 IT System Changes and Costs*

The Snowy Region abolition would result in a small change to market and trading systems to allow the processing and display of one new interconnector flow (Vic to NSW). We believe these IT changes to participants systems are minor and would require much less work and expense than comparison to the CSP/CSC trial & the Southern generators proposal.

#### 5.3.1 NEMMCO IT Changes

We set out in detail in our submission dated 26th March 2007 in Attachment D why we believe the Snowy Region abolition rule change is achievable by 4 November 2007, despite NEMMCO's most recent advice dated 5 march 2007. 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. More importantly, it would be inappropriate if the NEMMCO's systems are not flexible enough to accommodate region boundary changes, given that the original market design and the current regulatory arrangements require flexibility to cater for potentially annual boundary changes.

We summarise our assessment of the Snowy Region abolition implementation timeframe as:

**Constraints**

It appears based on NEMMCO's letter and the attached critical patch schedule that the key determinate of the NEMMCO recommended timing of 1 July 2008 was constraint reformulation.

Importantly system normal constraints are only required for commencement of the 'trial' and this is readily achievable based on NEMMCO own estimates. For example, only 280 constraints need to be reformulated prior to the trial. Accordingly a trial can commence in late June.

In parallel with the trial NEMCO can work on the n-1 constraints prior to changes being implemented in production.

NEMMCO does not currently have defined double outage constraints for the current boundary definitions.

In addition, NEMMCO can apply additional resources (and if necessary outside help) if required to achieve a much shorter timeframe if they lack sufficient resources and competencies.

Please also note that FCAS constraints around Snowy do not require any network modelling.

Further while not a critical point, it is not strictly necessary for NEMMCO to have completed all n-1 constraints for the commencement of the implementation.

Hence we believe constraint formulations are not on the critical path in meeting the original 4 Nov 2007 implementation date.

**Market System Changes**

According to the NEMMCO's program all changes including testing/trailing is achievable by 1 January 08. MMS Stage 2 Changes (PASA) is not on the critical path for participant trials.

Only one participant (Snowy Hydro) is directly affected in dispatch trials and that is simply a simple settlement change.

**Pre-production Trials**

Pre-production trials can commence as soon as system normal constraints are completed. Determination of relevant constraints is on the critical path for preproduction trials. As only system normal (not n-1 constraints) are required this can be achieved by end of June 2007.

Pre-trail tests can be prepared well in advance. Participant aspects of trial is trivial in comparison to Tasmanian entry (settlement only changes to Snowy Hydro's generator units only)

**Loss Factors**

Loss factors can be pre-determined (commencing now) and are not on the critical path. NEMMCO have demonstrated that determination of relevant alternative loss factors is a relatively short duration exercise as part of the current Millmerran dispute.

**SRAs**

Irrespective of arguments of relative minor changes required for a 4$^{th}$ November implementation (already discussed and potential process agreed at the Settlement Residue Committee) an implementation by 30 December 2007 would require no system or rule changes and could be readily achieved. Such changes are far simpler those changes implemented by CSP/CSC and southern generators rule implementations which were achieved in 2 months? NEMMCO's current plan

now show 7 months needed for simpler software changes. No changes to NEMMCO SRA unit auction software are required as it is generically specified. CSP/CSC and Southern generators rule changes required changes in SRA calculations. The region change requires only database points naming changes.

Process are well established and previously used for surrender/resale of any affected units. A market communication has already been issued suspending sale of potentially affected units.

**Metering, Settlement & Prudential's**

Revenue metering is already in place at all substantial metering points (eg Murray for 65/66 Lines or UT/LT for 65/66 Lines and current boundaries further west).

Region boundary changes have previously been achieved in northern NSW/South Queensland that required metering changes.

Only one participant (Snowy Hydro) has any direct settlement changes. There are no prudential changes as no load is affected, nor retailers affected. With respect to settlement, changes required are simply the equivalent of de-registering Snowy generation and re-registering in NSW/Vic.

Metering & Settlements Analysis Tools, Testing & Verification can commence immediately and is not on the critical Path.

**Review of Critical Path Schedule**

In reviewing the above NEMMCO nominated problem areas, it is readily apparent that the critical path program to achieve a potential region boundary change by 4th November or 30 December 2007 is MMS changes and these are well achievable by 1 January 2008. System normal (only) constraint reformulations can be formulated by June 2007 and thus allow participant trials to commence following MMS dispatch changes in May. N-1 constraint reformulation can proceed in parallel with the trial. By the information provided by NEMMCO these dates can be achieved with contingency and therefore at a manageable risk.

***After detailed assessment of NEMMCO's most recent advice we are of the view a timely implementation by NEMMCO of a region boundary change if approved is readily achievable by 4 November or at the very least 30 December 2007 by applying project management principals. This includes contingency provisions to ensure a manageable level of risk.***

### 5.3.2 Market participants

Other than NEMMCO, Snowy Hydro is the most impacted market participant 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. The breakdown of these costs are:

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

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

**Total Costs: $9,900**

Whilst this has been an internal exercise we would anticipate that the likely IT costs for other Participants would be similar. Additionally the cost of the implementing these changes to other participants impacted by the Snowy Region abolition should be similar to Snowy Hydro's and reflectively small given the flexibility inherent in modern IT systems and software. We also make the point that the IT system costs should be benchmarked to best industry practice and not benchmarked to the worst (most rigid) Participant IT system. This would be consistent with normal benchmarking exercises. We believe, in aggregate these costs are not material relative to the efficiency benefits under the Snowy Hydro proposal.

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.***

## 6 Conclusion

The constraint between Murray and Tumut is material and enduring with no feasible prospect of transmission investment to build out the congestion. All participants acknowledge this fact.

The Commission has outlined a set of criteria for evaluating the competing alternatives. We support this assessment framework and criteria. However, we believe the key to assessment of competing alternatives with the Snowy Hydro proposal comes down to comparing the trade-off of an increase in granularity of pricing which improves dispatch efficiency, and how this then impacts the contracts market.

We support the Commission's modelling in assessing the dispatch efficiency. We show in this submission that the Roam modelling in not comparable and is inferior to the Commission's modelling and thus it is not appropriate to draw any conclusion from this work. Snowy Hydro's view is that all three alternative options for the Snowy region are very similar from a dispatch efficiency perspective and any potential small differences in modelled outcomes can be attributed to modelling error as a result of assumptions used to model hydro plant in a competitive market.

All participants have made it clear in various submissions that the Contracts market in the NEM must be given more or at least equal significance to dispatch efficiency in consideration of congestion management. The Snowy Hydro abolition proposal is by far more superior then the competing alternatives as it allows Snowy Hydro to be more competitive in the Contracts market.

We show in this submission that under the competing alternatives Snowy Hydro and other participants ability to contract is reduced as SRAs are an imperfect tool for inter-regional trading. We believe the Snowy Hydro proposal increases the firmness of interconnectors between the Vic and NSW regions which would facilitate inter-regional trading. The Snowy region abolition also reduces transaction costs.

In short, we believe the Snowy Region abolition would increase Contracts competition and liquidity in both the Vic and NSW Regions and hence reduce prices to consumers.

From good regulatory practice perspective the current CSP/CSC derogation was always treated as a temporary arrangement (in this submission we highlight the initial full set of conditions for a full solution to the Snowy constraints using the CSP/CSC framework). Further to this the current arrangements are complex, not transparent, and have been shown to create significant problems involving the South Morang constraint.

The Split Region proposal does not recognise that there are no constraints from Upper Tumut to NSW and creates a region with the Regional Reference Node without generation and demand, contravening good electricity market design.

Abolition of the Snowy Region would successfully provide a long term solution to the problems in the Snowy Region. Snowy Hydro's proposal:

- Introduces competitive discipline on all generators;
- Improves competition and liquidity in the Contracts market;
- Removes negative residues (under system normal conditions);
- Removes the need for NEMMCO intervention;
- Improves transparency and SRA firmness. As a result inter-regional hedging will be:
  - Much firmer than at present; and
  - Much firmer than many other links in the NEM; resulting in
  - Reduced complexity and a more liquid contract market.

The solution also lays the foundation for further broad based reforms on regional structure and congestion management (if deemed appropriate by AEMC and MCE).

Snowy Hydro advocates that this solution be introduced urgently as tightening supply and demand and the roll off of ETEF means that the Snowy Region abolition would increase spot and contract market competition in the Victoria and NSW regions.

With respect to IT changes, we have shown that Snowy Hydro is the most affected participant but our internal assessment of IT change costs is below $10k. In aggregate we believe IT change costs across the NEM would be immaterial in comparison to the efficiency benefits to the Contracts market from the snowy Region abolition.

There is little market disruption associated with the abolition of the Snowy Region. The major obstacle to speedy introduction is NEMMCO's very recent suggestion that the change cannot be introduced until July 2008, against its earlier estimate of November 2007.

We believe NEMMCO's revised estimates are very conservative and in part reflect accommodation of implementing a generic Snowy Region boundary changes that may involved the Macquarie Generation proposal. The Mac Gen proposal as indicted by NEMMCO is a more complex implementation option than in comparison to Snowy Hydro's proposal.

We believe with more effective project management and the access to additional resources (which Snowy Hydro is willing to provide) NEMMCO can in fact achieve the original implementation date of 4 November 2007 or by 30 December 2007 for the implementation of the Snowy Region abolition proposal.

**Appendix 1 – Market Data on Snowy to NSW Interconnector Flow**

The data below shows 60 dispatch periods in January 2007 when Snowy to NSW interconnector flow was over 3100MW.

And in all occasions, only the Murray-Tumut was binding, NOT the Tumut-NSW constraints, so the actual export capability from Tumut to NSW is more that the Flow Limit. We suggest that our previous analysis on the maintenance of transmission headroom from Tumut to NSW showed that on average 50 to 100 MWs of transmission headroom is maintained to avoid price divergence.

Of this data set the maximum flow of **3272 MW** occurred on 30/01/07. With 50 to 100MW headroom, this limit would approximately be **3322 to 3372 MW**. Additionally, these flows are within a summer period. The equivalent flows during winter periods would be approximately 200MW more that these actual flows, bringing the limit to **above 3500MW**.

In summer, the actual flows on Snowy to NSW interconnector is **well in excess** of the 3000MW limit which has been used in the Southern Generator's and Macquarie Generation's analysis.

| SETTLEMENTDATE | SNOWY1 FLOW | SNOWY1 EXPORTID_5MIN |
|---|---|---|
| 12/01/2007 12:45 | 3103.54 | H>>H-NIL_A |
| 12/01/2007 12:50 | 3108.54 | H>>H-NIL_A |
| 12/01/2007 12:55 | 3138.1 | H>>H-NIL_A |
| 12/01/2007 13:00 | 3125.02 | H>>H-NIL_A |
| 12/01/2007 13:05 | 3144.32 | H>>H-NIL_A |
| 12/01/2007 13:10 | 3134.68 | H>>H-NIL_A |
| 12/01/2007 13:15 | 3144.16 | H>>H-NIL_A |
| 12/01/2007 13:20 | 3154.07 | H>>H-NIL_A |
| 12/01/2007 13:25 | 3148.31 | H>>H-NIL_A |
| 12/01/2007 13:30 | 3147.41 | H>>H-NIL_A |
| 12/01/2007 13:35 | 3150.15 | H>>H-NIL_A |
| 12/01/2007 13:40 | 3156.57 | H>>H-NIL_A |
| 12/01/2007 13:45 | 3150.86 | H>>H-NIL_A |
| 12/01/2007 13:50 | 3134.74 | H>>H-NIL_A |
| 12/01/2007 14:00 | 3135.63 | H>>H-NIL_A |
| 12/01/2007 14:05 | 3157.24 | H>>H-NIL_A |
| 12/01/2007 14:10 | 3147.4 | H>>H-NIL_A |
| 12/01/2007 14:15 | 3150.99 | H>>H-NIL_A |
| 12/01/2007 14:20 | 3153.04 | H>>H-NIL_A |
| 12/01/2007 14:25 | 3149.69 | H>>H-NIL_A |
| 12/01/2007 14:30 | 3126.34 | H>>H-NIL_A |
| 12/01/2007 14:35 | 3139.57 | H>>H-NIL_A |
| 12/01/2007 14:40 | 3163.68 | H>>H-NIL_A |
| 12/01/2007 14:45 | 3154.97 | H>>H-NIL_A |
| 12/01/2007 14:50 | 3137.57 | H>>H-NIL_A |
| 12/01/2007 14:55 | 3134.93 | H>>H-NIL_A |
| 12/01/2007 15:00 | 3129.34 | H>>H-NIL_A |
| 12/01/2007 15:05 | 3132.46 | H>>H-NIL_A |
| 12/01/2007 15:10 | 3147.79 | H>>H-NIL_A |
| 12/01/2007 15:15 | 3166.3 | H>>H-NIL_A |
| 12/01/2007 15:20 | 3162.07 | H>>H-NIL_A |
| 12/01/2007 15:25 | 3140.15 | H>>H-NIL_A |
| 12/01/2007 15:30 | 3142.1 | H>>H-NIL_A |
| 12/01/2007 15:35 | 3138.31 | H>>H-NIL_A |
| 12/01/2007 15:40 | 3112.09 | H>>H-NIL_A |
| 12/01/2007 15:45 | 3113.48 | H>>H-NIL_A |
| 12/01/2007 15:50 | 3129.4 | H>>H-NIL_A |
| 12/01/2007 15:55 | 3126.45 | H>>H-NIL_A |
| 12/01/2007 16:00 | 3147.26 | H>>H-NIL_A |
| 23/01/2007 15:15 | 3121.22 | H>>H-NIL_A |
| 23/01/2007 15:20 | 3149.98 | H>>H-NIL_A |
| 30/01/2007 14:40 | 3147.98 | H>>H-NIL_A |
| 30/01/2007 14:55 | 3180.91 | H>>H-NIL_A |
| 30/01/2007 15:00 | 3157.55 | H>>H-NIL_A |
| 30/01/2007 15:10 | 3199.37 | H>>H-NIL_A |
| 30/01/2007 15:15 | 3255.4 | H>>H-NIL_A |
| 30/01/2007 15:20 | 3264.88 | H>>H-NIL_A |
| 30/01/2007 15:25 | 3255.97 | H>>H-NIL_A |
| 30/01/2007 15:30 | 3190.39 | H>>H-NIL_A |
| 30/01/2007 15:35 | 3247.46 | H>>H-NIL_A |
| 30/01/2007 15:40 | 3261.73 | H>>H-NIL_A |
| 30/01/2007 15:45 | 3251.56 | H>>H-NIL_A |
| 30/01/2007 15:50 | 3272.24 | H>>H-NIL_A |
| 30/01/2007 15:55 | 3270.54 | H>>H-NIL_A |
| 30/01/2007 16:00 | 3270.67 | H>>H-NIL_A |
| 30/01/2007 16:05 | 3254.99 | H>>H-NIL_A |
| 30/01/2007 16:15 | 3210.2 | H>>H-NIL_A |
| 30/01/2007 16:20 | 3172.35 | H>>H-NIL_A |
| 30/01/2007 16:25 | 3126.75 | H>>H-NIL_A |
| 30/01/2007 16:30 | 3152.61 | H>>H-NIL_A |