10th February 2006

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

Submission sent electronically to: john.tamblyn@aemc.gov.au
and to submissions@aemc.gov.au

Dear John

## Submission to consultation: Management of negative settlement residues in the Snowy Region

Snowy Hydro welcomes the opportunity to make a submission on the Rule change proposal, Management of negative settlement residues in the Snowy Region. We have some serious concerns with the Rule proposal and our analysis clearly shows that it is not in the long-term interest of consumers or the market to ratify the proposal.

### EXECUTIVE SUMMARY

Snowy Hydro's submission acknowledges the complexity of Snowy regional boundary issues. These issues have been a major problem in NEM since the beginning of the market. To date these problems have not been fully resolved.

Our submission defines the problems associated with the Snowy Region boundary. It must be recognised that this is an important step in identifying solutions. We believe the LYMMCO Rule change proposal only narrowly defines the problem. The current problems through the Snowy region that the LYMMCO proposal seeks to rectify are a manifestation of broader problems in the Snowy region. This narrow focus on resolving the funding on negative settlement residues fails to address the root problems associated with pricing and incentives placed on Tumut & Murray generation. As a result the LYMMCO proposal simply ignores these root problems and thus will simply fail to provide a real solution to the problems that it seeks to address. For clarity purposes, Snowy Hydro is not saying, "don't fix a narrow problem due to the broader issues", but rather "the narrow proposal won't work due to the broader issues".

Snowy Hydro has proposed a solution that genuinely resolves the key issues and in conjunction the transitional solution of re-orientation to Dederang offers the best holistic solution.

It should be noted that Snowy Hydro does not see the transferring of settlement residues from one interconnector to another as the main detractor to the LYMMCO proposal. We believe so long as such a transfer was done in a transparent manner it is not the key issue with the proposal per se. Snowy Hydro opposes the proposal because it does not address the key problems with the Snowy Region

and the proposal creates strong incentives for artificial pool prices which are shown to be inefficient and not in the interest of electricity consumers.

The LYMMCO proposal is reliant on 2 key assertions:

1. Nodal price for Murray generation = efficient price = efficient broader market; and
2. Increased cut-set flow through the Wodonga-Jindera and Murray-Tumut cut-set equates to increase flow through to the NSW region.

Both these assertions are false.

The first assertion is a direct contradiction to the MCE ratified policy direction of a regional market design with large stable load regions.

The second assertion is false as we highlight in our submission that the implementation of the LYMMCO proposal does not increase flow to the NSW region (and in fact marginally reduces it). As such, NSW customers are not the asserted beneficiaries. On the other hand the Victorian/SA customers are the distinct dis-beneficaries.

In addition to these two false assertions, there are at least six significant nodes between Thomastown (Vic) and Sydney West (NSW) and a number of loops including around Southern Hydro. The proposal conveniently chooses to ignore the significant effects of these.

Snowy Hydro has in this submission outlined a number of assessment criteria that was used to assess the merits of the LYMMCO proposal. In summary, these criteria and our assessment of the proposal against each criteria are:

1. Does the proposal provide additional supply?

   The LYMMCO proposal does not increase generation supply into NSW. In some incidences it marginally reduces supply available to NSW customers;

2. Does the proposal increase system reliability?

   As a consequence of reduced supply into NSW, the proposal will reduce supply reliability into NSW;

3. Does the proposal increase generation competition?

   By materially disadvantaging Murray generation, the LYMMCO proposal will effectively reduce generation competition in Victoria and South Australia (SA) and as a result pool prices in these states will increase;

4. Does the proposal reduce costs to customers?

   With increased pool prices in Victoria and South Australia, customers in these states are clearly disadvantaged, while there is no additional supply to NSW (hence no benefits to NSW customers);

5. Does the proposal increase efficiency of the market?

The proposal will introduce transparent and blatant generation dispatch inefficiencies as marginally more expensive gas plant in Victoria/SA are operated ahead of marginally cheaper Murray generation and the proposal achieves no other benefit. This is an inefficient outcome as the lowest marginal cost plant in the market is displaced by the highest;

6. Does the proposal improve dispatch accuracy (nodal pricing) and is the proposal consistent with the policy direction (for regions) set by MCE?

The proposal is self serving and totally inconsistent with Victorian generators' own positions on Nodal versus regional market pricing during the MCE consultation process. If the Victorian Generators consistently applied the logic for their proposed Rule change to the Latrobe Valley the resulting "local" pool price for the Latrobe Valley generators would be significantly less than the Victoria regional reference price in Melbourne.

In addition the proposal is totally inconsistent with the MCE ratified policy direction.

Our submission demonstrates that the LYMMCO Rule change proposal does not resolve any problem associated with the Snowy Region, but would in fact creates a number of additional problems.

Snowy Hydro is very disappointed with the proposal by LYMMCO. It is only a matter of months since the multi year market consultation and MCE policy review with the resulting clear rejection of full nodal pricing in favour of stable large load regions. This outcome was supported by LYMMCO (and a number of its associated proponents). Now with the policy position locked in (and having secured for themselves customer load access for at least 5 years), they are in effect simply attempting to enforce full nodal pricing at a single point to the competitive detriment to their major competitor.

We believe the best solution to the management of negative settlement residues in the Snowy Region that is in the long-term interest of consumers is to modify the existing Snowy Region boundary. Appendix 1 contains a copy of Snowy Hydro's Rule change proposal that will fully resolve the issues sought narrowly to be addressed by the LYMMCO proposal and would not create the material disbenefits that exists with the LYMMCO proposal.

Snowy Hydro believes that all current options to deal with loop flows in the Snowy region (interconnector truncation, re-orientation to Dederang) are unsatisfactory. However, we believe the best interim solution for the problem identified by LYMMCO is reorientation of constraints around the Snowy Region to Dederang.

**PROBLEMS THAT ARISE AS A RESULT OF THE SNOWY REGION**

The NEM is based on a regional market design. It is generally accepted that a regional market design will have inherent market inefficiencies from a pure generation dispatch sense. However, these inefficiencies are generally traded off against other benefits of a regional market. However with a regional market design (due to manifestly poor regional boundary definitions) where generators who receive a local price (effectively receive 'pay as bid') compete directly against generators who receive a regional market price (common clearing price) major market inefficiencies will result. This is examined in more detail in Appendix 2.

It is clear that the Snowy Region has been ill defined from start of the market and this problem has yet to be properly addressed. This ill definition gives rise to market inefficiencies discussed in the above paragraph, and is one of the more transparent examples of this type of problem in the NEM.

Negative settlement residues in the Snowy Region are a direct result of the ill-defined Snowy Region. Unfortunately, LYMMCO's proposal does not deal with any of the issues associated with this ill-defined Snowy region boundary.

The following diagram 1 presents the network configuration around the Murray node. The loop occurs around the Wagga Wagga load area and additionally includes the West-NSW load (for the northern flow constraint case). Supply from Dederang (via Victoria) due to different impedances distributes 20% more flow through the Wagga Wagga area than in comparison to Murray generation. This is obvious from diagram 1 due to topography of the network.

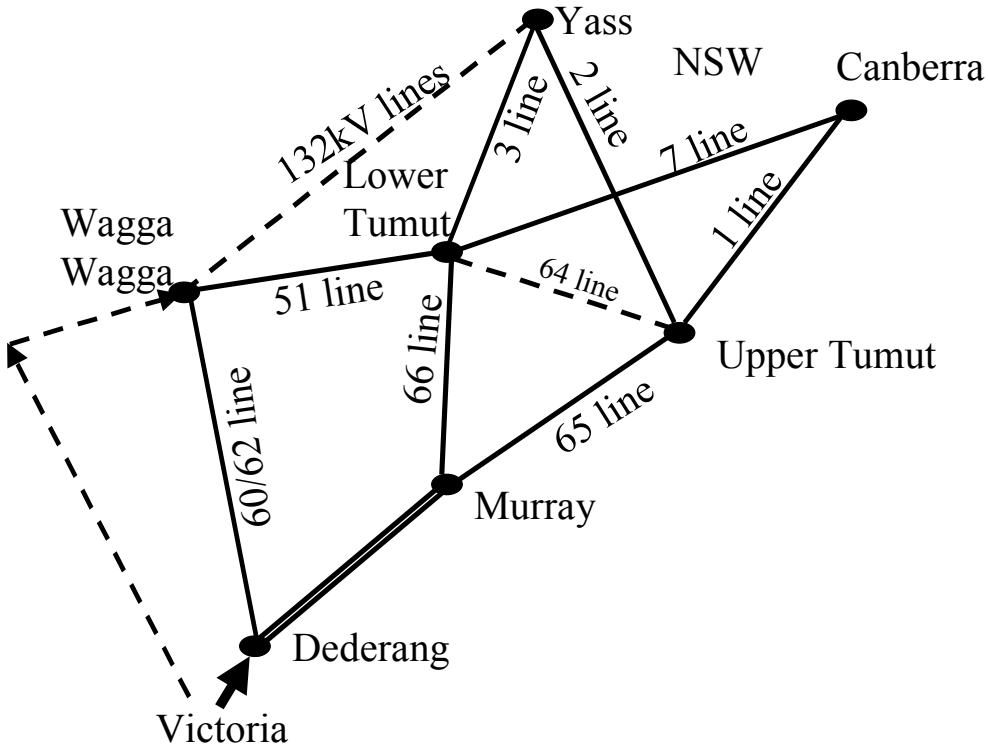



**Diagram 1**

By taking a more holistic view of the market and the interactions between generators located in different pricing regions it can be demonstrated that the LYMMCO Rule proposal is narrow in focus and does not consider wider competition issues associated with the Snowy Region. In particular,

- It only looks narrowly at Murray pricing and does not address other inter-related problematic issues. Snowy Hydro highlights that the constraints on the 81/82 lines from the western NSW and Hunter Valley group of generators "western ring generators" places incentives on these generators to bid at very low prices (down to -$1000) and still be immune to their very low local price (since they receive the Sydney West (NSW) price). These incentives place Tumut generation in a situation where it needs to withhold generation capacity to align the TUMUT price with the NSW price to hedge contractual exposure to the NSW node. In these situations, Tumut generation is essentially pay-as-bid, while 'western ring' generators are paid the NSW common clearing price. This is an inefficient outcome as explained in APPENDIX 2.

- When a constraint occurs between Murray and Tumut with a northerly flow, the market uses the following constraint equation:

    - Vic price = 0.8 Snowy price + 0.2 NSW price

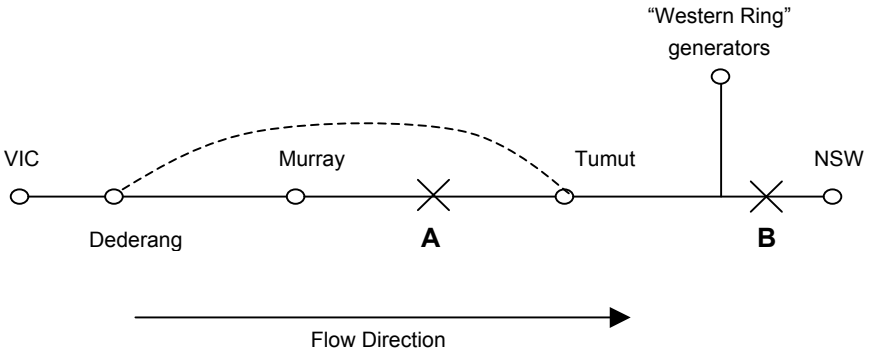
    but in reality:

    - Vic price = 0.8 Murray price + 0.2 **Lower Tumut** price.

    That is, with Lower Tumut generation forced to re-price capacity from the market, the Tumut local price is held artificially high. This means that the Victorian price is artificially high with the end result being inefficient since Victorian customers pay an artificially high price for their energy. While it is clear that this perversely benefits the Victorian generators, it also clearly creates a market inefficiency and dis-benefits Victorian/SA customers. It is emphasised that the western ring generators are oblivious to bidding low at their local node because they receive the high Sydney West price but in fact bid down to -$1000.

These issues highlight the problems associated with inconsistency between pricing and dispatch in a regionalised market model where market pricing regions do not align with material congestion points. The major problem occurs due to misplacement of Tumut generation and inability to compete with NSW 'western ring' generators on equal terms. This is clearly inefficient and not in the interest of electricity consumers as there exist in excess of 500MW spare and under utilised capacity at Tumut power stations. The problems associated with Tumut miss pricing is then transferred south to Murray and Victoria.

The following line diagram is used to explain how problems associated with the Snowy region and Tumut miss-pricing manifest to problems on competition through the Victoria to Snowy interconnector.



With high northerly flows through the Snowy region the constraint (A) between Murray and Tumut binds. As explained above, under these conditions negative settlement residues can result due to loop flows. Under the existing Snowy Region definition, Tumut generation has strong incentives to withhold capacity to the Snowy – NSW interconnector. This is a logical commercial incentive that allows Tumut to effectively receive the NSW price and thereby hedge contractual exposure on contracts written on the NSW node. As a result constraint (B) is managed such that it does not constrain. This is an inefficient outcome as surplus Tumut generation could be dispatched to meet NSW demand.

Hence it can be seen the root cause of the problems around the Snowy Region is that Tumut should be in the NSW region.

With Tumut in the NSW region, Tumut incentives change to maximising generation at all times. As a result constraint (B) would bind. With constraint (B) binding, the constraint (A) would not bind. **As a result there would be no loop flows in the Snowy region and hence no negative settlement residues. Further still, with Tumut maximising generation at all times, the local Lower Tumut price is no longer artificially high, thus resulting in reduced Victorian pool prices.**

In conclusion, Snowy Hydro believes the root problem is Tumut should be in the NSW region. With Tumut in NSW the ratification of the LYMMCO proposal to deal with negative residues in the Snowy region is simply not necessary. Further, ratification of the LYMMCO proposal would create a number of material market and customer disbenefits as explained below.

## ASSESSMENT OF LYMMCO'S PROPOSAL

In order to assess the merits of the LYMMCO rule proposal, Snowy Hydro has derived six assessment criteria. These six criteria are:

1. Does the proposal provide additional supply?
2. Does the proposal increase system reliability?
3. Does the proposal increase generation competition?
4. Does the proposal reduce costs to customers?
5. Does the proposal increase efficiency of the market? and
6. Does the proposal improve dispatch accuracy (nodal pricing)?

1. Additional supply

It is important to note in the following summer period, total supply into NSW is likely to be:

- From Tumut, Murray and Victoria/South Australia (SA), the combined export is in the order of 2850MW.
- 1500MW of that flow can only be supplied from Tumut.
- Victoria/SA can supply a maximum of 1150MW (during the day periods this maximum supply is a lower number).
- From the combined Murray and Victoria/SA generators, supply to NSW (through Tumut) can vary from 1250MW to 1350MW depending on the generation distribution (mainly from Murray).

With Victoria/SA only able to supply 1150MW versus 1250MW to 1350MW from the combined generation of Murray and Victoria/SA the obvious conclusion is, THERE IS **NO** ADDITIONAL SUPPLY

FROM VICTORIA/SA INTO NSW under the LYMMCO proposal. There is only substitution of Tumut generation with Victorian/SA generation. Hence, contrary to LYMMCO's claims, NSW customers are not the beneficiaries of this Rule change as there is no additional supply.

In addition if Murray generation is withheld (as it is incentivised to do under the LYMMCO proposal), supply to NSW is in fact reduced.

**Conclusion: The LYMMCO proposal does not increase supply to NSW but in fact actually marginally reduces supply to NSW customers.**

2. Supply reliability

While this point is not significant in magnitude, it is worth noting in the case of scarce supply into NSW (e.g. as seen by dispatch outcomes during load shedding incident on 1/12/04) Murray generation will be supplying more MWs to NSW due to fact that lines 03 and 07 (Lower Tumut to Yass & Canberra) were constrained while lines 01 and 02 (Upper Tumut to Canberra & Yass) were not fully utilised.

**Conclusion: The LYMMCO proposal will (marginally) reduce supply reliability into NSW.**

3. Increase in competition

It has been established in the above sections that there will be no additional supply into NSW under the LYMMCO proposal. Does the proposal increase generation competition?

As explained earlier, (Vic price = 0.8 Murray price + 0.2 Lower Tumut price), due to the region pricing requirement for Tumut to avoid constraints into NSW (by withholding available generation) while in competition with 'western ring' generators, the equation shows that Victoria can supply additional MWs to constrain the link between Tumut and NSW. Under this scenario the LYMMCO proposal assumes that Murray will supply just enough additional necessary MWs to constrain the '60,65,66 cutset'.

However, there is no any additional MW supply to NSW especially not from Victoria/SA!

The LYMMCO proposal would in effect increase Victorian generation (thereby driving up Victorian pool prices) and as a result drive down the Snowy region (Murray price). As a consequence Murray generation would have strong incentives to not generate. The net effect of implementing the LYMMCO proposal would be to increase Victorian prices without adding any incremental MWs to the NSW demand and in some incidences it reduces the supply into NSW due to the 01 & 02 line sharing.

As shown earlier with Tumut assigned to the NSW region there are no negative residues on the Dederang-Murray-Tumut-Wagga-Dederang loop as Tumut generation would have strong incentives to bind the Tumut to NSW interconnector (ie. maximise generation at all times) and hence the constraint on Murray to Tumut will unbind. This results in no loop flows (ie. no negative settlement residues) and hence the problems raised by LYMMCO in their Rule change proposal are rectified.

Effectively LYMMCO's rule change proposal is a request to:

"If the Rules do not allow Tumut generation to compete (on equal terms) in NSW, the Rules should be set to prevent Murray generation competing with Victorian generation on equal terms."

**Conclusion: The LYMMCO proposal will reduce the effective generation competition in Victoria and SA by materially disadvantaging Murray generation.**

4. Cost to customers

It has already been shown that the LYMMCO proposal will artificially keep Tumut price high (by not addressing the real problem) and will force Murray generation to be cut in preference to more expensive generation located in Victoria/SA. The end effect is that the proposal will significantly increase cost to Victorian/SA customers without any additional benefit. Further more there are no additional benefits to NSW customers.

**Conclusion: The LYMMCO proposal will increase costs to Victorian and SA customers.**

5. Efficient operation of the market

The LYMMCO proposal will also, from a behavioural/incentive prospective create inefficient market operation.

Because Snowy Hydro has two gas/oil-fired power stations in Victoria, Snowy Hydro will be actively encouraged (incentivised) to withhold generation on Murray (to avoid '60,65,66 cutset' constraining) and generate on its gas/oil fired plant located in Victoria. Effectively zero cash cost marginal price generation (Murray) would be displaced by the highest margin cost generation available.

Additionally, in conditions of reasonably high demand in South Australia resulting in Murraylink high flows and very high demand in NSW, a perverse outcome that could occur is the backing off of Murraylink and diverting this generation to the higher priced NSW region. This is an inefficient outcome as:

- High marginal cost plant in South Australia will start-up and run (increasing SA prices); and
- The diversion of Murraylink generation supply will force Tumut generation to further withdraw generation into NSW.

Hence, under the LYMMCO proposal the perverse incentive will be to utilise gas/oil plant with much higher start-up cost and short run marginal cost. Such incentives ultimately result in increased costs to electricity consumers.

**Conclusion: The LYMMCO proposal will introduce blatant and transparent market inefficiencies.**

6. Dispatch accuracy (nodal pricing) and consistency with the policy direction (for regions) set by MCE

The only real issue that LYMMCO's derogation is raising is the accuracy of dispatch. Fully accurate dispatch accuracy can only be achieved with nodal pricing.

The LYMMCO proposal in effect imposes nodal pricing on one specific location of the market. This clearly demonstrates LYMMCO lack of consistency in applying nodal pricing across the whole market. The market as a whole has dismissed full nodal pricing and hence we believe this demonstrates that the LYMMCO proposal is totally self-serving and inconsistent with a regional market design.

While fully accurate dispatch/pricing can be achieved through nodal pricing there are two important points that proponents need to consider:

- Are market Participants changing their view about nodal pricing? That is, should nodal pricing be introduced for the whole market? In the last MCE transmission and region boundary review it appeared that market Participants were not supporting a full nodal market structure;

- It is obvious that in the LYMMCO proposal if Latrobe Valley stays in the Victorian node, the effective nodal price in Latrobe Valley can be as low as $4 (if there is constraint between Latrobe Valley and Thomastown), but Victorian generators still propose they receive the much higher Thomastown price. However, with the LYMMCO proposal Victorian generators are effectively arguing that Murray generation should receive a local nodal price.

**Conclusion: The LYMMCO proposal is totally inconsistent with their position on Nodal versus Regional market structure and the MCE ratified policy direction.**

Central to the LYMMCO proposal is the idea for transferring settlement residues from one interconnector to another. It should be noted that Snowy Hydro does not see the transferring of SRAs from one interconnector to another as the main detractor to the LYMMCO proposal. So long as such a transfer was done in a transparent manner it is would not be the key issue per se. Snowy Hydro opposes the proposal because it does not address the key problem with the Snowy Region (ie. Tumut generation should be in the NSW region), the proposal does not improve the supply into the NSW region, and the proposal creates strong incentives for artificially high pool prices in Victoria and South Australia which are inefficient and not in the interest of electricity consumers.

**Transitional Solution**

NEMMCO rejected the Dederang re-orientation primarily on the basis that there was no consistent support across all market Participants and that NEMMCO were worried about non-Rule compliance. NEMMCO already re-orient to Dederang for southerly flow on the basis that it is economically efficient to do so. Snowy Hydro advocates that although re-orientation to Dederang for northerly flow is not the ideal solution it is the most appropriate transitional solution. The LYMMCO objection to this solution on the basis of introducing a deliberate pricing error cannot be legitimately considered since there are numerous other locations in the NEM where there are deliberate pricing errors in comparison to the Regional Reference Node price. Snowy Hydro believes that these mismatches between pricing and dispatch are the direct result of a regionalised market design, which the majority of market Participants have supported as the desired market design. Hence we advocate that the AEMC rules that re-orientation to Dederang can be applied for both northerly & southerly flows and therefore absolve NEMMCO of any Rules compliance issue for the interim period (prior to the implementation of our proposed full solution).

**OVERALL CONCLUSION**

Snowy Hydro appreciates the opportunity to put forward this submission on LYMMCO's Rule change proposal. The following should be noted:

LYMMCO has further highlighted a big problem in NEM that needs to be addressed.

**LYMMCO's Rule change does not address the problems associated with the Snowy region, but in fact it reduces competition, increases cost to customers, creates incentives for inefficient market operation, and reduces supply to NSW (in scarce supply situations). Due to these serious deficiencies the LYMMCO Rule change proposal should be rejected.**

**Snowy has attached in (APPENDIX 1) an alternative Rule change proposal that will fully address the issues and problems raised by LYMMCO and without the disbenefits of the LYMMCO proposal.**

Snowy Hydro still believes that in the interim before a permanent solution is implemented, the best transitional solution is reorientation to Dederang.

Snowy Hydro appreciates the opportunity to put forward our views on the LYMMCO proposal. To discuss this issue further, I can be contacted on (02) 9278 1885.

Yours sincerely,

Roger Whitby
Executive Officer, Trading

**APPENDIX 1 – COPY OF SNOWY HYDRO RULE CHANGE PROPOSAL**

11th November 2005

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

Letter sent electronically to: john.tamblyn@aemc.gov.au

Dear John

## RULE CHANGE PROPOSAL / DEROGATION PROPOSAL FOR SNOWY REGION: REVISION OF TRANSMISSION CONNECTION NODES

Snowy Hydro notes the recent rule change request from the MCE published on AEMC's website (Reform of Regional Boundaries). The time frame for addressing regional boundary changes under the MCE requested rule change proposal is such that meaningful region boundary reform cannot occur before 2010. The Snowy Hydro rule change proposal detailed below does not in any way interfere with the MCE request but complements it by addressing the long-standing and very problematic market inefficiencies associated with the current Snowy region boundary in a timely manner. The implementation of the Snowy Hydro rule change proposal provides a sound basis of region boundaries for future implementation of the MCE rule change request. Further, without the implementation of the Snowy Hydro proposal, the MCE request will enshrine very serious and disruptive continuing market inefficiencies that will seriously disadvantage market customers until at least 2010.

### SUMMARY

The AEMC is currently considering three inter-related Rule change proposals, these being:

1. NEMMCO's - Recovery of negative inter-regional settlement residues;
2. Macquarie Generation's – Review of Snowy regional boundary; and
3. LYMMCO's – Loop flows and negative residues.

Snowy Hydro believes that consideration of all these proposals at the same time is an appropriate and practical approach rather than considering each Rule proposal in isolation from the other proposals. However, the three proposals do not represent the entire spectrum of plausible solutions. Accordingly, Snowy Hydro believes there is a need to holistically assess all viable options.

Snowy Hydro Limited believes that a fourth Rule change proposal should also be considered as part of the AEMC consultation process. This proposal is based on revising the Transmission Connection Nodes ("TCNs") for the Snowy region.

Snowy Hydro believes there is a need to revise the TCNs located the Snowy region. Review of the region boundary is required under the current market rules and according to the region criteria recommended by CRA's Transmission Region Boundary structure study. All market participants

recognise the market problems associated with the current Region Boundary definition. Most importantly however is the reduced market efficiency of the current arrangements.

**STATEMENT OF THE ISSUE CONCERNING THE EXISTING RULES**

The NEM is a based on a regional market design. It is clear that through past consultations on alternative market design most Participants have rejected a full nodal market model.

In a regional market design, Charles River Associates (CRA) have highlighted that market regions are to reflect material congestion pinch-points in the transmission network. CRA succinctly state in their report[1],

> *"Region boundaries in the NEM allow wholesale market prices to reflect the effect of significant "pinchpoints" that lead to congestion in the transmission network.*
>
> *Pricing the congestion creates commercial incentives for generators and loads to make efficient decisions about the location of their production and investment activities.*
>
> *A consequence of the regional design of the NEM is that only "inter-regional" network congestion is explicitly priced. As a result the effect of "intra-regional" regional congestion is not reflected in the price and hence the spot market does not contribute directly to commercial incentives for generators and loads to relieve the congestion. To date there is no evidence of manifestly poor decisions as a result, although some pricing outcomes have been perverse in the short term. In the longer term, however, poor pricing of congestion is likely to reduce the certainty that investors can have in the integrity of the NEM pricing and contribute to illtimed or inappropriately located investments. Consequently it is important that the region boundaries do not undermine the basic rational for creating them, that is to create incentives for production and investment activity in more efficient locations (emphasis added)."*

Two issues come to mind in considering CRA's comments.

1. Region boundaries (and region pricing) are needed to create incentives for efficient production and investment activity.

2. Intra-regional congestion is not reflected in the market region price.

Both these issues adversely impact market efficiency, system security, and system reliability.

The Murray to Tumut transmission flow is indisputably the most problematic intra-regional constraint in the NEM. Since 2002, the Murray-Tumut constraint has bound for a significant number of hours. Since these lines are located in the sensitive Kosciusko national park, there is basically limited prospect of transmission investment to alleviate this congestion problem.

The above facts support the need for a region boundary change to address this intra-regional constraint. However, despite these facts, a review of regions under clause 3.5.1 (Determination of

[1] CRA, NEM – Transmission Region Boundary Structure, Sept 04, pp 1-2.

regions and regional reference nodes) of the National Electricity Rules (previously the Code) has not been undertaken in the last 3 years.

On 15 June 2005, the ACCC authorised a derogation amending the Code, which was entitled "Dispatching the Market: CSP/CSC trials at the Tumut Nodes" (the "Tumut derogation"). The Tumut derogation is in effect a dynamic region boundary change for Tumut generation. This derogation restores the correct incentives for Tumut generation and in doing so improves market efficiency, system security and reliability.

However, this derogation expires on 31 July 2007. In addition, the Tumut derogation does not address issues associated with Murray generation. Please note that the CSP/CSC derogation does not address the issue of intra-regional constraints deeper in the NSW network that effect Tumut and the 'western ring' generators.

In addition, according to the proposed region boundary criteria proposed by CRA in their Transmission Region Boundary Structure report, the current Snowy Region boundaries should be reviewed.

In summary, a moratorium by Jurisdictions on the application of clause 3.5.1 of the Rules has created the need to address the problematic Murray to Tumut intra-regional constraint. There is a need to address this problem prior to any review of the regional boundaries, by a Rule change that would deem the Tumut and Murray transmission connection nodes to be assigned to the NSW and Victoria regions respectively until a review of the Snowy regional boundary was completed.

## HOW THE PROPOSED RULE CHANGE WOULD ADDRESS THE ISSUE

During the Tumut derogation consultation, Market Participants acknowledged the problems associated with the intra-regional constraint in the Snowy region. Before outlining how Snowy Hydro's Rule change proposal will address these problems, there is a need to assess the merits of the three existing Rule change proposals currently before the AEMC. In assessing these merits the following shortcomings are observed.

### 1. NEMMCO's - Recovery of negative inter-regional settlement residues

While Snowy Hydro believes NEMMCO's proposal has merit, it is not directly related to the Snowy Region issue, or any other region boundary issues. Further, the NEMMCO proposal only deals with the cash flow recovery (and risks) of participants rather than the process of managing negative settlement residue accumulation itself.

### 2. Macquarie Generation's – Review of Snowy regional boundary

Macquarie Generation's initiative is commendable. They recognise the current situation is problematic and that based on either economic or technical criteria, the Murray-Tumut constraint represents the most significant intra-regional congestion problem in the NEM.

Snowy Hydro does not have an issue with the intent of the Mac Gen proposal that is, a fast track, one off review of the Snowy region boundary using the existing regional boundary change criteria. However the proposal as drafted uses the existing region boundary technical criteria that have been effectively superseded by more economic criteria.

However, the timing issues associated with the Macquarie derogation mean that an outcome arising from this derogation would not be able to be implemented in under 2 years. Allowing at least another 6 months for the AEMC consultation process on this Rule proposal effectively means that any Snowy

Region change recommendations would not be implemented until July 2008. This is an exceedingly long period to address such serious problems and resulting market inefficiencies

### 3. LYMMCO's – Loop flows and negative residues

This Rule change proposal does not address the root cause of the intra-regional constraint between Murray and Tumut. It is simply a value transfer from Victorian customers to Victorian generators resulting from the incorrectly defined region boundary around Lower Tumut. Please refer to Appendix C for further details on the shortcomings of the Rule change proposal.

### Snowy Hydro's Rule Change Proposal

Most Market Participants have stated a regional boundary change is the most appropriate long-term solution. There are three general options for changed boundary configuration options as follows:

1. Tumut nodes to be redefined into NSW region and Murray redefined into Victoria (Snowy Region removed)
2. Tumut nodes assigned to new "Tumut" region with Murray remaining in Snowy Region
3. Create south western NSW load region (with Tumut and 'western ring' generators) and northern Victorian load region (with Murray and Dederang connected generation)

While Option 3 is a good solution it is not viable in the short to medium term due to the profound market disruptions to most participants such a change would impose.

Option 2 does not satisfy the new (proposed) criteria for region boundaries (i.e. it does not contain any customer load). CRA stated customer load as an important economic criteria, and Snowy Hydro supports this view. CRA also recommended that nodal pricing would not achieve any benefits in the current state of market development.

Option 1 is the most viable configuration option. The merits associated with changing the transmission connection nodes for Tumut to be re-classified in NSW; and Murray to be re-classified in Victoria are:

- The disruption to hedging contracts would be minimised; and
- Snowy Hydro is the sole Participant directly affected by the change.

A draft Rule change proposal is set out in Appendix A.

Snowy Hydro suggests the following timetable be applicable to its Rule change proposal.

- 6 months AEMC consultation period;
- Rule change determination by 1 July 2006;
- 1 year implementation period (NEMMCO loss factor adjustment, system changes etc); and
- Rule change commences 1 July 2007.

The Snowy Hydro proposal represents a Rule change that could be expediently endorsed by the market and implemented post 31 July 2007 when the Tumut derogation is due to expire.

Please note that Snowy Hydro believes that in the future, Constraint Support Pricing/Constraint Support Contracts (CSP/CSC) arrangements will need to be implemented in the broader network including Tumut and western ring generators and Murray, Southern Hydro and other Victorian generators.

## HOW THE PROPOSED RULE CHANGE WOULD CONTRIBUTE TO THE ACHIEVEMENT OF THE NATIONAL MARKET OBJECTIVE

The national electricity market objective is,

> "to promote efficient investment in, and efficient use of, electricity services for the long term interests of consumers of electricity with respect to price, quality, reliability and security of supply of electricity and the reliability, safety and security of the national electricity system."

Snowy believes that its Rule change proposal will achieve this market objective. The benefits associated with its proposal in particular are:

### a. Reduced Cost to Customers

The inappropriate regional boundary definition of the Snowy region causes inefficiency and ultimately increases cost to customers. This inefficiency still exists with the introduction of the Tumut derogation, although to a lesser extent than in the absence of this arrangement.

Under the Tumut derogation arrangement, Tumut has combined generation of 2200MW (with ability to upgrade and get close to 2400MW with relatively low cost). Tumut has 1600 to 1700MW of unconstrained access to NSW. However due to the Snowy regional boundary it does not compete on equal footing with "western ring" generators. While the "western ring" generators can bid negative or very low prices as they receive the high Sydney West (NSW RRN) price, Tumut generation receives its bid price (local nodal price) and therefore has incentives to bid at the lower end of its available capacity of 1600MW in order to secure access to NSW price and mitigate any basis price risk with contracts written on the NSW RRN. In these circumstances customers south of Tumut (VIC and SA) effectively pay higher prices as in excess of 600MW of available generation from Tumut has effectively been removed from competition. This is clearly an inefficient outcome and is a direct result of an inappropriate Snowy region boundary.

Without the Tumut derogation, the situation is even worse for customers, because without this derogation, whenever the Tumut short run marginal cost (SRMC) is higher than the Murray or Vic/SA generation (SRMC), Tumut generation has no incentives to generate at all (since it receives the lower Snowy (Murray) RRN price.

Both these scenarios (with and without the CSP/CSC derogation) demonstrate that the Snowy Regional Boundary is unsustainable. These observations are consistent with the CRA finding that no region should exist without sufficient load ie. at least 200MW. Without customer load in the region, there are no customers to benefit from low local prices and generators in the region without load have no incentives to increase generation. Exactly the opposite incentives exist, to withdraw generation and align prices to the adjacent regions with load.

### b. Efficient New Investment

By adjusting regions to align with significant pinch points of congestion in the transmission network, pricing signals are transparent and reflect the actual physical situation. As a consequence of these transparent pricing signals, efficient new generation and transmission investments may occur (please refer to Appendix B for specific examples). Conversely with incorrectly defined region boundaries inefficient new investment can and will occur.

### c. More Efficient Loop Flow Handling

Snowy Hydro believes that in a regionalised market design, loop flow handling can materially impact the efficiency of the market. Incorrect policy setting and procedures to deal with loop flows in the transmission network can potentially cost electricity consumers millions of dollars per hour and create incentives for inefficient long term investment both in generation and transmission.

A good example of these issues is created by the Murray and Lower Tumut loop. A detailed explanation is given in Appendix C. It is important to note that reducing the Murray price (due to mispricing Lower Tumut) will not benefit a single customer. However by reducing the Murray price, Murray generation will be incentivised to withdraw generation, and as a consequence prices for customers in Victoria will be artificially increased.

Snowy Hydro's rule change proposal will in effect remove the impact of loop flows when the Murray to Tumut constraint binds.

## CONCLUSION

Snowy Hydro appreciates the opportunity to put forward its Rule change proposal. To discuss this issue further, or if you require any additional information or analysis I can be contacted on (02) 9278 1885.

Yours sincerely,

Roger Whitby
Executive Officer, Trading

APPENDIX A – DRAFT RULE CHANGE

Amendment to the National Electricity Rules

New clause []

Draft dated 15 December 2005

**Chapter 3**

A new clause [*] is to be added to Chapter 3 of the National Electricity Rules as follows:

a) Despite any other provision in clause 3.5, for all purposes under the Rules including without limitation, *central dispatch* under clause 3.8, the determination of *spot prices* under clause 3.9 and settlement of *spot market transactions* under clause 3.15, the regions recommended by NEMMCO and approved by the AEMC in accordance with clause 3.5.1 must not include:

   i. a *region* entitled "Snowy"; or

   ii. a *regional reference node* for such a *region*.

b) NEMMCO must amend the document entitled "List of Regional Boundaries and Marginal Loss Factors":

   i. to reflect the prohibition on the existence of a region entitled Snowy under subclause (a);

   ii. to assign the *market network connection points* for the Tumut Generating Units and the Guthega Generating Units to the New South Wales region;

   iii. to assign the *market network connection points* for the Murray Generating Units and the Jindabyne Pump to the Victoria region; *and*

   iv. to make all necessary amendments arising from the reassignment of the *market connection points* in subclauses (ii) and (iii) above, including without limitation, amendments to *regions*, *inter-regional loss factors*, *intra-regional loss factors*, *metering points*, *network constraints*, *interconnector limits* and *regional reference nodes*.

   (Capitalised terms in this subclause are references to those terms as defined in the document entitled "List of Regional Boundaries and Marginal Loss Factors").

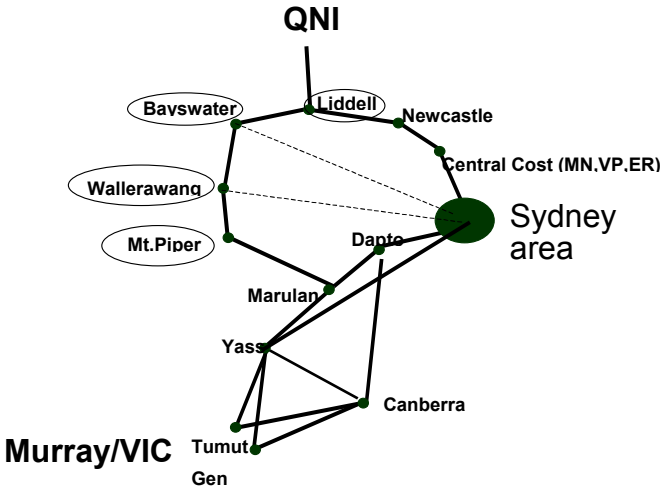
c) This clause [*] comes into effect on 1 July 2007.

d) This clause [*] ceases to have effect on the date on which the review by NEMMCO or the AEMC, as contemplated by the MCE statement of 20 May 2005, of all *regions*, *regional reference nodes* and the *region* to which each *market connection point* is assigned comes into effect under clause 3.5.3(b).

e) This clause [*] will be taken into account by the *AEMC* in any future Constraint Support Pricing/Constraint Support Contracts determination that the *AEMC* may make."

APPENDIX B – AN EXAMPLE OF PROBLEMS ASSOCIATED WITH THE CURRENT MARKET STRUCTURE

The following real example shows the inefficiency and problems associated with the current market structure. The diagram below presents NSW network as described in Transgrid's Annual Planning Report[2].




Four big generators (circled on diagram, the "western ring" generators) and Tumut generation compete for access to the Greater Sydney load area. Additional energy is coming from QNI and Murray/VIC area. The major transmission constraints are between Liddell/Newcastle (81/82 lines) and Marulan/Dapto (8/16 lines). Please note that the central coast generators, Munmorah, Vales Point, and Eraring are on the other side of the constrained lines and hence are unaffected.

**Inefficient network investment**

As a consequence of this regional structure and the incentives placed on Tumut generation plant to manage price divergence risks between the Snowy and NSW region prices, a constraint between Tumut and NSW is not transparent to TNSPs, or new generation investors. That is, Tumut plant is incentivised to limit generation availability such that a transmission constraint on the Snowy to NSW interconnector rarely occurs. In our view this may create a perverse incentive for a transmission service provider (in this case Transgrid) to try and increase supply from North NSW by proposing to upgrade the Liddell to Marulan 500kV ring to allow more power flow from Liddell/QNI to balance the Marulan/Dapto constraint. This investment is simply not needed if Tumut generation receives appropriate incentives and put in exactly the same competitive position as other NSW generators. That is, given the correct region definition, Tumut generation has sufficient surplus generation capacity to push more energy through the 8/16 lines and thereby balance the 81/82 constrained lines.

In summary, a potential 500kV ring upgrade will not change supply into the Sydney area. With Tumut placed in the NSW region and without the 500kV ring upgrade, exactly the same benefits are achieved in balancing the Liddell/Newscastle and the Marulan/Dapto constraints.

[2] Transgrid Annual Planning Report 2005, page43.

**Inefficient generation investment**

An additional factor is that after the release of Transgrid's needs statement for the Newcastle, Sydney, and Wollongong load area, a 500kV transmission upgrade option may provide a perverse opportunity for an investor to build new generation in the Marulan area. By Transgrid proposing a 500kV ring upgrade, a new generator may become financially viable since it would receive deferral benefits of delaying the proposed new transmission upgrade. However this new generator would not provide any additional energy (MWs) to the Sydney load area. This would clearly be an inefficient outcome, as there already exists surplus capacity to achieve the same objectives of the 500kV transmission upgrade option.

**Summary**

In the last two sections, it has been demonstrated that both transmission and generation may be built inefficiently due to inappropriate regional boundaries and unresolved transmission congestion issues.

Please note that these new investments may not be actual outcomes of the Transgrid consultation on the emerging network limitations in the Newcastle, Sydney, and Wollongong load area. However, without clear resolutions on regional boundaries, there are reasonable incentives for these perverse new investments to occur.

## Appendix C – Problems associated with the Victorian generator proposal

The Victorian Generator Rule proposal (LYMMCO's – Loop flows and negative residues) only addresses the symptoms and does not correct the cause of negative residues in the Snowy region.

In the following, Snowy Hydro highlights the serious deficiencies associated with the Victorian Rule change proposal.

### Narrow in focus and does not consider wider issues

The Rule proposal is narrow in focus and does not consider wider competition issues associated with the Snowy region. In particular,

- It only looks narrowly at Murray pricing and does not address other inter-related problematic issues. Snowy Hydro highlights that the constraints on the 81/82 lines from the western NSW and Hunter Valley group of generators "western ring generators" places incentives on these generators to bid at very low prices (down to -$1000) and still be immune to their very low local price. These incentives place Tumut generation in a difficult situation where it must withhold generation capacity to align the Snowy region price with the NSW price to hedge contractual exposure to the NSW node.

- The market sees:

    - Vic price = 0.8 Snowy price + 0.2 NSW price

    but in reality:

    - Vic price = 0.8 Murray price + 0.2 Lower Tumut price.

    That is, with Lower Tumut generation forced to reprice capacity from the market, the Tumut local price is artificially high. This means that the Victorian price is artificially high with the end result being inefficient since Victorian customers pay an artificially high price for their energy. While it is clear that this benefits the Victorian generators, it also clearly creates a market efficiency disbenefit to Victorian customers. It is emphasised that the western ring generators are oblivious to bidding low at their local node because they receive the high Sydney West price but in fact bid down to -$1000.

These issues highlight the problems associated with inconsistency between pricing and dispatch in a regionalised market model where market pricing regions do not align with material congestion points. This was a key conclusion from the ACCC's consideration of the Tumut pricing derogation. The Victorian rule proposal does not address this wider competition issue brought about through the inappropriately defined Snowy region.

### Tumut local generation versus "western ring" generation

Supply to NSW (specifically Sydney load centre) is equal whether it's from Vic generators versus from Lower Tumut generators.

But, Tumut must withhold generation to align with NSW price while "western ring generators" bid down to-$1000 and receive high NSW (Sydney west) price.

If Tumut generation and “western ring” generations are on same footing, that is, they are both paid the NSW regional reference price (or in the future a western/south-west NSW node), then as a result there would no difference in pricing for Murray and Victorian generators. That is, no counter price flow from Victoria to Snowy would exist.

**Victorian customers lose out**

As highlighted above, the Victorian generator proposal does not place the appropriate incentives on Tumut to maximise generation. As a result Victorian customers pay increased cost due to paying Tumut local price versus the “western ring” generator price. In essence, Victorian customers pay less for energy if Tumut is in NSW region.

**Inappropriate long-term incentives on Snowy Hydro**

Under the Victorian proposal, the long-term incentive for Snowy would be to withhold Murray generation (to unconstrain the Murray to Tumut flow) and ensure that the Snowy price is aligned with the NSW price. As a consequence, there are artificially higher prices in Victoria.

**NSW reliability is worst off under the Victorian proposal**

NSW reliability is better served under scenarios of potential load shedding in NSW when Murray generation is given preference over Victorian generation. This is due to the fact that Murray generation can support more load into the main Sydney load centre through better utilisation of the transmission capacity on the 01 and 02 lines. In comparison Victorian generation has less access to the Sydney load centre since power flow predominantly goes through the Wodonga-Jindera-Wagga lines and then through to the already fully utilised 03 & 07 lines.

As a separate note, resolution of the fault level at Upper Tumut (only requires replacement CTs) will allow 64 line back in service at times of high Tumut generation. The constraint into NSW will further shift into NSW network and not the lines from Tumut into Yass and Canberra (01, 02, 03, 07).

**APPENDIX 2 - COMMON CLEARING PRICE VERSUS PAY-AS-BID CLEARING MECHANISM**

The following extracts from Kahn et al[3] (2001) succinctly highlight the advantages of uniform pricing versus pay-as-bid clearing.

"*Under the present uniform-pricing rules, suppliers in an effectively competitive market have every reason to bid approximately their marginal opportunity costs for energy in each of the blocks of power that they offer. They know that if any of those bids is rejected because there are sufficient lower bids to satisfy the demand, they will be better off, because they will not have committed themselves to sales at prices that fail to cover their avoidable costs. More important, they know also that on their accepted bids they will receive the full benefit of whatever price above that level is necessary to equate demand and supply in the market, regardless of the level of their own bids, permitting them to pocket the difference between their avoidable costs and the market-clearing price as a necessary contribution toward recovery of their fixed charges and profits.*

*Just as with the economic dispatch of power practiced by power pools - dispatching power, that is to say, in merit order of generators from lowest to the highest marginal cost output necessary to meet demand -* ***the consequence is that power is supplied at the minimum cost, at each point in time*** (emphasis added).

*The naive expectation of advocates of a shift to pay-as-bid is, of course, that since all the infra-marginal bids - the ones below the highest marginal cost output necessary for the sum total of accepted bids to satisfy market demand - will under uniform pricing receive more than their bid prices (by margins successively larger as the accepted bids range downward from the marginal, highest to the lowest cost), the change in the rules would simply wipe out those markups; that the average price purchasers will have to pay under pay-as-bid will incorporate no markup above marginal costs at all.*

*For example, if the successful bids for a particular hour were of equal blocks of output with incremental costs, successively, of $30, $40, $50, $60 and $70 per MWh, the market clearing price of $70 will under the uniform price system bestow on the successful bidders markups above marginal costs of $40, $30, $20, $10 and zero, respectively, and pay-as-bid will reduce those markups all to zero: the block bid at $30, reflecting avoidable costs of $30, will receive a price of only $30; and so on.*

*The critical assumption is, of course, that after the market rules are changed, generators will bid just as they had before.* ***The one absolute certainty, however, is that they will not*** (emphasis added). *Knowing that unless they changed their bidding practice under the new system they would receive only their avoidable costs on their successful bids - yielding them no contribution to their fixed or common costs, let alone profits - they obviously will* ***universally change their practice immediately, bidding instead at what they expect will turn out to be the market-clearing price - $70*** (emphasis added) *in the foregoing simple example.*

Kahn et al (2001) also highlight other adverse effects of pay-as-bid, these being:

1. Pay-as-bid introduces some inevitable reduction in efficiency as generators find themselves forced to depart from bidding their marginal costs if they are to receive any compensation for their fixed costs or contribution to profits.

[3] Kahn, Cramton, Porter, and Tabors (2001), Pricing in the California Power Exchange Electricity Market: Should California Switch from Uniform Pricing to Pay-as-Bid Pricing?

2. Another inefficiency inescapably introduced by moving to pay-as-bid would be the cost of forecasting market prices that it would impose on all participants.

3. Finally, and in a sense worst of all, it is likely to discourage competition.