30 March 2006

The Chairman
Australian Energy Markets Commission
PO Box H166
AUSTRALIA SQUARE NSW 1215
(Att: Ms Anna Brakey)

Dear Dr Tamblyn

Re: AEMC Review of the Snowy Regional Boundary National Electricity Rules (NERS) Change Proposal by Snowy Hydro Ltd

The Energy Users Association of Australia (EUAA) appreciates the opportunity to provide a submission to the Australian Energy Markets Commission (AEMC) on the above rule change.

The EUAA is a non-profit organisation focused entirely on energy issues on behalf of its members. Members determine EUAA policy and direction. The EUAA represents a wide spectrum of end-users in all Australian States and have over 80 Members, predominantly business end-users with activities across all states and many sectors of the economy. EUAA activities cover both national and sub-national issues. [See http://www.euaa.com.au/ for more information on the EUAA]

The Murray-Tumut intra-regional constraint has been a major source of concern over the last five years of the NEM's operation, with typically 100 hours a year of impact on prices and inter-regional trade between Victoria, Snowy and NSW regions.

The EUAA considers that the Macquarie Generation proposal to form two new regions from Snowy is ikely to provide the best option to align regional boundaries with transmission constraints and minimises the need for special arrangements to manage intra-regional constraints. The analysis in our submission, in which we have been assisted by McLennan Magasanik Associates, suggests that the best results for customers will come from appropriately defined regional boundaries that simplify the cost of defining and managing constraints so that IRSR revenue streams are more stable and inter-regional trading is minimised for their retailers.

If you have any queries regarding our comments, please do not hesitate to contact EUAA's Director Policy and Regulation, Robert Davenport, on telephone number (03) 9898 3900 or e-mail bob.davenport@euaa.com.au.

Yours sincerely

Roman Domanski
Executive Director

AEMC REVIEW OF THE SNOWY REGIONAL BOUNDARY NATIONAL ELECTRICITY RULES CHANGE PROPOSAL BY SNOWY HYDRO LTD

24 March 2006

This submission was prepared by the Energy Users' Association of Australia with assistance from McLennan Magasanik Associates. Funding assistance was provided by the National Electricity Consumers' Advocacy Panel. All views expressed are those of the EUAA

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The problem

The Murray-Tumut intra-regional constraint has been a major source of concern over the last five years of the NEM's operation with typically 100 hours a year of impact on prices and inter-regional trade between Victoria, Snowy and NSW regions. Problems arise because of the two transmission paths between Lower Tumut in NSW and Dederang in Victoria, via Murray or Jindera. When power flows through the Snowy region sufficient to constrain the Murray-Tumut limit at about 1300 MW, negative inter-regional settlement residues (IRSR) can arise on the Snowy-Vic path between Murray and Dederang, even if the dispatch and pricing are efficient. Because of the way in which the total NEM settlement residue is split into intra-regional and inter-regional components, NEMMCO is unable to fund negative IRSR and cannot recover them from participants, so it must distort pricing or dispatch to reduce its exposure to negative IRSR.

Constraint Support Payments and Contracts for Tumut

The loop flow when the Murray-Tumut constraint applies also results in low prices at Tumut with import to NSW, which can result in insufficient support to the NSW region. To address this inefficiency, NEMMCO has implemented a trial of Constraint Support Pricing and Constraint Support Contracts (CSP/CSC), which will run to 31 July 2007 by which time revised arrangements are expected for the Snowy region. This trial was based upon recommendations made by Charles River Associates in 2004.

The effect of the trial is to give Tumut NSW based prices when power is flowing north, and power flow between Murray and Lower Tumut and Upper Tumut is constrained. This gives Snowy the incentive to generate at Tumut under such conditions and to gain the benefit of the higher NSW price rather than the lower price at Murray, which would otherwise apply at Tumut, as adjusted by the transmission loss factor. The funding under the CSP is provided from the Snowy-NSW IRSR under these conditions, which is equivalent to raising the price at Lower Tumut and Upper Tumut by means of redistributing a portion of the IRSR from the Snowy-NSW interconnector.

However, these arrangements only offer a temporary solution to the problems and do not adequately manage NEMMCO's exposure to negative IRSR. There is evidently a need to review the Snowy boundary and to rationalise the treatment of transmission capacity constraints affecting the Snowy region and trading between Victoria and NSW.

Objectives

To restate the essential problem, the regional boundaries that define financial transactions in the NEM do not adequately correspond to the physical boundaries determined by

transmission capacity limits. This creates trading risk and anomalies that currently need to be addressed with *ad hoc* arrangements. The best outcome for energy users is likely where the management of transmission constraints encourages efficient dispatch and pricing for the available generation resources, and mitigates market power under high priced conditions.

The current arrangements for managing the Murray-Tumut constraint have been shown to produce satisfactory dispatch and pricing outcomes in the NEM on two occasions – on 7 December 2005 and 19 January 2006. However, the measures to introduce Constraint Support Payments and Contracts (CSP/CSC) should be only regarded as temporary because they are *ad hoc* in nature, subject to change and costly to maintain from a regulatory point of view.

Evaluation of Proposals

Three proposals have been offered to address the immediate concerns and to provide a long-term solution prior to the current AEMC review of congestion management in the NEM. These proposals and MMA's assessment is as follows:

1. The Loy Yang Group which represents five NEM participants recommends that NEMMCO use positive inter-regional settlement residues (IRSR) from one interconnector to subsidise the negative IRSR on the other. This option could be implemented with minimal lead time, as it only requires a change to the calculation and distribution of IRSR. This would not distort dispatch and pricing if generator bids remained the same because it only amounts to redistribution of the total settlement residue. It would reduce the need for NEMMCO to intervene in the market. However, depending on the entitlement to IRSR held by Snowy, it could still provide gaming opportunities for Snowy that could lead to a change of bidding and higher prices for customers. In particular, when Snowy has access to the Snowy-NSW IRSR, it may bid Murray at higher prices and reduced volumes so as to reduce negative IRSR on the Vic-Snowy interconnector. Some detailed quantitative market analysis would be needed to confirm the magnitude of this risk to energy users.

2. Snowy Hydro has proposed that the Snowy region be abolished and that Murray be assigned to the Victorian region and that Lower Tumut and Upper Tumut be assigned to the NSW region. This would result in the Vic-NSW regional boundary being aligned with the Murray-Tumut constraint and the need for CSP/CSC to manage this constraint would finish. This procedure could be managed quite readily but would require substantial consultation, and would require time to allow market participants to renegotiate and amend their contract positions.

3. The Snowy proposal is unlikely to stand as a long-term solution because there are other transmission constraints south and north of Snowy that affect power flow to the Melbourne/Sydney load centres. Abolishing the Snowy region may only bring

to the fore other intra-regional constraints that would require CSP/CSC management. For example, Southern Hydro's operation affects the capacity from Snowy to Melbourne and the addition of the new Bogong unit in 2008/09 would enhance the impact of intra-regional constraints. It could therefore only be considered as an interim solution.

4. The Macquarie Generation proposal is to form two new regions from Snowy, Northern Victoria and South-west NSW. The EUAA considers that this option provides the best means to align regional boundaries and financial transactions with transmission constraints, and minimise the need for special arrangements to manage intra-regional constraints. There may remain some residual problems with loop flows, but these should be much less frequent and lower in magnitude than observed in the Murray-Tumut constraint.

5. The lead time to implement new regions is significant because of the potential impact on market participants and the need for thorough analysis of the economic benefits and the operational implications of the change, including on market power. However, since properly designed regional boundaries generally simplifies trading arrangements, reduces long distance (inter-regional) trading risk and facilitates competition, the Macquarie Generation proposal is regarded by the EUAA as the best option from the viewpoint of energy users overall for the long-term. There may be some customers who end up paying slightly higher prices after the change due to the difference between static marginal loss factors and dynamic loss factors applied to interconnections. However, more efficient regional price signals should eventually lead to more efficient patterns of generation and transmission investment that would lead to a lower delivered cost of electricity for the great majority of users and energy delivered. These impacts should be confirmed by the AEMC as part of their review.

6. A potential benefit of well defined regions is that they would provide customers for Snowy that could be contracted without the additional inter-regional trading risk that afflicts the current arrangements. This should lead to lower trading costs for retailers and their customers. Additional regions in northern Victoria and southern NSW may provide more economic incentives for local generation, including cogeneration, thus leading to lower losses and lower prices for customers. Some of these benefits would be offset with the additional cost of trading through more regions and therefore the basis for regional boundaries needs to be carefully evaluated as part of the AEMC review of congestion management during 2006.

The preferred approach is to define stable NEM boundaries that reflect relatively unconstrained groups of load centres and generators that can share a reference node; and with well defined constraints with other regions. Boundaries would be set so that inter-regional constraints are simple to quantify in terms of measurable power flows across the boundaries. Any market power impacts would also need to be considered. Since careful

planning and consultation is needed to achieve regional boundary changes in the NEM there are substantial lead time constraints involved.

Actions Recommended

Therefore the immediate action should be to:

- set in train an economic assessment of regional boundaries that should apply to the Snowy region and its environs to address the Vic – Snowy –NSW constraints with say a ten year horizon. This is consistent with the Macquarie Generation proposal.
- give consideration to abolishing the Snowy regional boundary as soon as possible by allocating Murray to Victoria and Tumut to NSW subject to an assessment of the impact on other intra-regional constraints that may become material in the period until new regions are enacted. This is the Snowy Hydro proposal but it is only suitable as a medium-term solution because of the risk of other intra-regional constraints taking effect. The benefits of abolition of the Snowy region as an interim stage might well be minimal in which case this stage would be skipped.
- continue with the CSC/CSP trial with careful monitoring to ensure that dispatch and pricing outcomes are efficient. This trial could cease when the boundaries have been realigned.
- consider adopting the redistribution of IRSRs as proposed by the Loy Yang Group but only as a temporary short-term measure until either the Snowy region is scrapped or new regions enacted. This proposal is expected to provide efficient outcomes providing Snowy Hydro purchases most of the IRSR for the Snowy-Vic and Snowy-NSW interconnections.

The potential gaming of inter-regional settlement residues (IRSR) by Snowy for different ownership shares of the IRSR corresponding to each interconnector from Snowy and for differing contract positions at the Victorian and NSW nodes may warrant some quantitative analysis. Such work would be associated with the congestion management review being undertaken by AEMC during 2006.

1 INTRODUCTION

1.1 Statement of the Problem

This submission has been prepared by the Energy Users Association of Australia (EUAA) ,with assistance from McLennan Magasanik Associates (MMA), as a contribution to the consultation by the Australian Energy Markets Commission (AEMC) concerning proposals to amend the National Electricity Rules (NER) in respect of the Snowy Region. The critical issue at stake is that the 330 kV Murray – Upper Tumut and Murray – Lower Tumut transmission line has an effective capacity of about 1300 MW resulting from a number of constraints. These lines occasionally constrain power flow between Victoria and NSW in either direction when pool prices are high in either Victoria or NSW and much lower in the other region. According to a letter published by Macquarie Generation[1] and its subsequent submission to AEMC[2], the constraint has bound in recent calendar years:

- 2002 – 100 hours
- 2003 – 111 hours
- 2004 – 35 hours (33 hours in October to December period)
- 2005 – 103 hours (27 hours January to September; 76 hours October to December)
- 2006 – 55 hours to 31 January

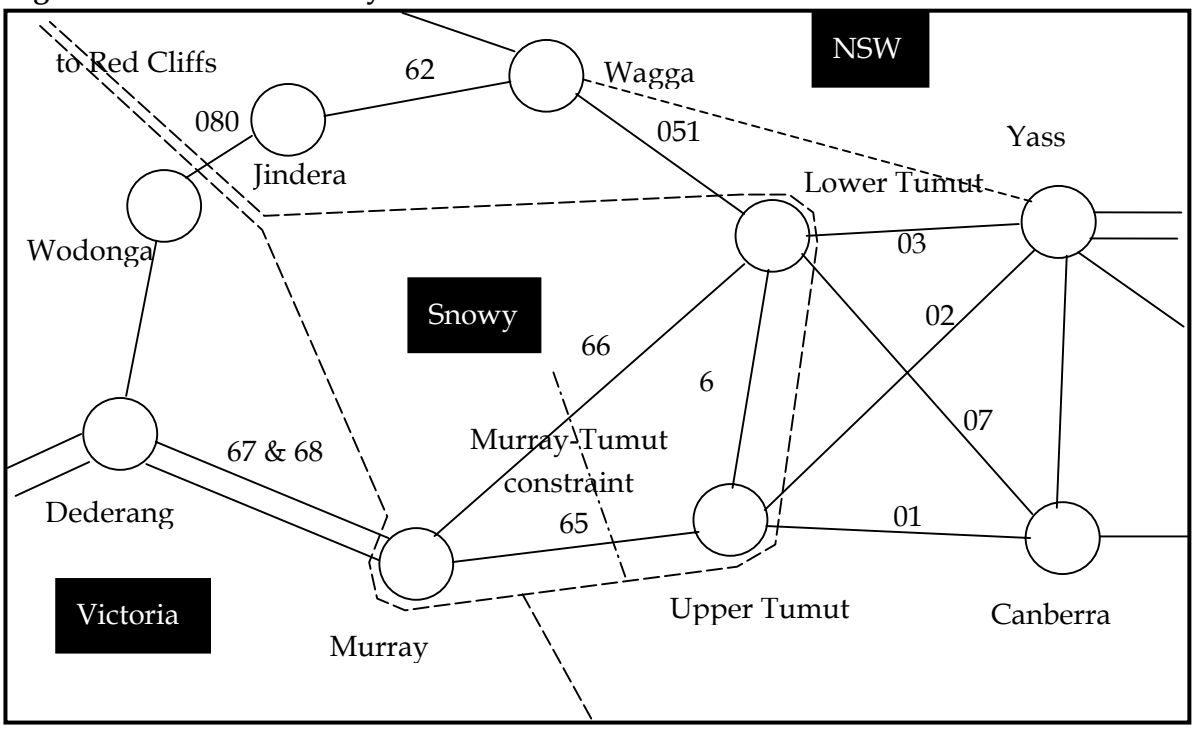
This constraint is described as an "intra-regional" constraint because it does not span the NEM Snowy regional boundary as shown in Figure 1.1. The National Electricity Code originally proposed that new regional boundaries be formed where intra-regional constraints occur for more than 50 hours per year. Such arrangements have not been altered in the replacement National Electricity Law and Rules pending the AEMC review of congestion management in the NEM. That has not happened due to the delays in the review of congestion management with the changeover from NECA to MCE and AEMC. Depending on how it is managed, the Murray-Tumut constraint can cause a number of distortions and inefficiencies in the market that affect the dispatch of Snowy Hydro resources and the resulting spot energy prices in NSW and Victoria. This has been an on-going concern among NEM participants for many years since the constraint became binding more frequently in 2002.[3]

The constraint also has the potential to create negative inter-regional settlement residues (IRSR) because power flow to or from Snowy can be opposite to the direction of price increase. This arises because there are two paths between Victoria and NSW, one from

[1] Ref(1)
[2] Ref(2)
[3] We understand that the reason that the constraint has bound more frequently is the growth in NSW summer demand and the reliance on peaking resources from the south to support the transfer of power from Snowy to NSW under summer peak demand conditions.

Dederang – Murray – Upper Tumut – NSW and the other loop Dederang – Wodonga – Jindera – Wagga – Lower Tumut – NSW as shown in Figure 1.1. It is not related to inefficient pricing or market gaming.[4] It results directly from the parallel transmission loop that bypasses the Murray – Tumut constraint. The diagram shows the Snowy region boundary as a dotted line and the main interconnection line components. The NSW lines are numbered for convenient reference.

Figure 1.1 Victoria – Snowy – NSW Interconnection



When there is a constraint within the Snowy system, say between Murray and Upper/ Lower Tumut (lines 65 and 66) with power flowing north, the Victorian price at Dederang will be between the NSW price at Wagga and a lower price at Murray which is the Snowy reference node. The Victorian price is defined by marginal transmission loss factors around the loop from Murray – Dederang – Wodonga – Jindera – Wagga having regard to the constraint between Murray and Lower Tumut.

This price setting arises by the following means:

- A high price in NSW and lower price in Snowy and Victoria causes power to be scheduled to flow north to minimise the market costs.
- If the power flow on lines 65 and 66 is constrained, then there is price separation between Murray and Lower Tumut and the prices at Murray and Dederang are set by the marginal transmission loss factors through the Wodonga/Jindera loop and the constrained flow through the Murray – Upper Tumut route. This causes the Dederang price to be greater than the Murray price despite the fact that power normally flows from Dederang to Murray under these conditions, especially if the Murray bid is less

[4] Refer to the Biggar Report for a detailed explanation (Ref 11)

than the Victorian price as referred to Dederang according to its marginal transmission loss factor.

- The settlement surplus allocated to the Vic – Snowy interconnection includes a negative component on the Dederang – Murray lines because the power flow is opposite to the direction of price increase. There is also a negative component across the Wodonga – Jindera line at Wodonga where there is a Vic-Snowy boundary for that power flow as well. The negative component is cancelled by the corresponding Snowy to NSW positive component at the same metering point for the purposes of the total NEM settlement residue.

Previously it has been identified that the generation at Upper and Lower Tumut may need to be constrained on to meet supply requirements in NSW because of the effect of the Murray – Tumut constraint. To address this requirement, a Constraint Support Payment / Constraint Support Contract (CSP/CSC) regime has been recommended by Charles River Associates and has been trialled by NEMMCO. It has the effect of paying approximately the difference between the Snowy price and the NSW price at the Tumut nodes when the Murray – Tumut constraint takes effect. The difference payments made to Snowy under these conditions effectively provide access to the NSW price for Tumut generation, which provides incentive for the higher output required from the Tumut power stations on an economic basis to respond to the higher prices in NSW. The NSW price equivalent is achieved by diverting funds that would normally be allocated to the Snowy-NSW IRSR component.

In effect, this creates a local and temporary case of nodal pricing so as to provide the correct incentives for the Snowy generation under the constrained conditions. NEMMCO has published two examples of where this mechanism was active on 7 December 2005 and 19 January 2006. On both occasions the results appeared to be in accordance with the design objectives of the scheme.

If there were no price support, then Tumut would receive the lower prices according to the Snowy region reference node at Murray and this would undermine the NEM's objectives of efficient dispatch and maximising supply reliability. This regime is applied when power is flowing north, but it has not been applied when power is flowing south under constrained conditions on Murray-Tumut. Under those conditions, NEMMCO modifies the constraint definitions in the NEM dispatch so that the Snowy region (at Murray) is temporarily merged with the Victorian region to avoid negative settlement residues allocated to the Vic – Snowy interconnection. This is similar in effect to the CSC/CSP for Tumut in that it provides pool revenue at the higher price related to that of the importing region.

1.2 The concerns

Under the current arrangements without any permanent mitigation there are a number of concerns:

- When NSW prices are high, Snowy has an incentive to restrict Tumut generation so as to maintain the constraint on the Murray – Tumut line flowing north and to keep the Snowy price at the Murray node related to the NSW price so as not to constrain power flows across the Snowy – NSW interconnector. Tumut has bid more volume at higher prices to achieve this objective to maximise its income from the market. This represents an inefficient dispatch. The Constraint Support Payments and Contracts, as proposed by Charles River Associates and currently being trialled, are intended to address this concern.
- When the Murray – Tumut constraint applies, the Murray price can be less than the Victorian price but power can flow around the Murray - Dederang – Wodonga – Lower Tumut loop. This creates negative settlement residues because the power flow from Dederang in Victoria to Murray in the Snowy region is from a higher price to a lower price. The mechanism for creating negative residues is explained in detail in a paper prepared for NEMMCO by Darryl Biggar, an economic consultant to the ACCC, in a paper entitled "Managing Negative Settlement Residues on the Vic-Snowy Interconnector". [5] In the report it is made clear that negative residues relate only to the occurrence of the constraint even if dispatch is efficient. The major issue to be resolved is the efficient allocation of the negative settlement residue associated with the Snowy interconnections.

For the existing arrangements and alternative mechanisms:

- Energy users are unclear what gaming opportunities Snowy would have under the various alternative proposals to maximise prices in the NEM. This is of even greater concern now that Snowy has control of peaking plant in Victoria at Valley Power and the soon to be commissioned new capacity at Laverton North in Victoria.
- Energy users are concerned about which of the regional boundary proposals would provide the best competitive outcomes and lower delivered electricity prices in the NEM.
- Energy users are exposed to the risks of inter-regional trading indirectly because their retailers incur additional risks in trading financial instruments across boundaries that are not accurately aligned with the underlying physical constraints. This mismatch can result in *ad hoc* trading arrangements and interventions that increase the risk in trading inter-regional financial instruments. The costs in managing such risk are likely to passed onto customers.

1.3 Scope of the Submission

This submission considers the proposals that have been forward by Snowy Hydro, Macquarie Generation and the Loy Yang Group from the energy users' viewpoint. EUAA has not conducted any quantitative analysis of these options. Rather it has reviewed the available consultation documents and drawn conclusions about the value of these

[5] Darryl Biggar's paper can be found at http://www.nemmco.com.au/dispatchandpricing/179-0241.pdf, Ref(11)

proposals for energy users and the concerns that would need some quantitative evaluation to allay energy users concerns.

In particular, the potential gaming of inter-regional settlement residues (IRSR) by Snowy for different ownership shares of the IRSR corresponding to each interconnector from Snowy and for differing contract positions at the Victorian and NSW nodes, may warrant some quantitative analysis. Such work would desirably be associated with the congestion management review being undertaken by AEMC during 2006.

2 THE ISSUES

2.1 Proposals

There have been three proposals put forward to the AEMC to address these issues by Macquarie Generation, by Snowy Hydro and by Loy Yang Power on behalf of a group of generators and NEMMCO. The key elements of doing nothing and these alternative proposals are as follows.

- "Do nothing" means that NEMMCO would constrain interconnector power flows when necessary to avoid creating negative IRSRs that it could not recover from market participants under the current market rules. This has the potential to result in inefficient dispatch and higher prices for customers than if dispatch is efficient and gaming opportunities are limited.
- The current trial being conducted by NEMMCO introduces the Constraint Support Payments and Contracts. These arrangements are designed to ensure that Tumut and Murray generation is commensurate with an appropriate nodal price rather than the depressed Snowy price set at the Murray reference node when the Murray-Tumut constrain is active. A review presented by NEMMCO to the EUAA suggests that events on 7 December 2005 with power flow to NSW and on 19 January 2006 with power flow to Victoria produced outcomes that were compatible with the design objectives.
- The current CSC/CSP does not solve all the problems. It does not address conditions for southerly power flow when Murray-Tumut constrains in the southerly direction. That situation stills leaves NEMMCO with the obligation to constrain dispatch and pricing so that Murray is effectively placed in Victoria during the constrained periods to avoid the negative IRSR. The Loy Yang proposal to reallocate IRSR is intended to avoid that problem for NEMMCO and avoid the need to influence dispatch and pricing.
- Snowy Hydro proposes that, in the interim until the regional boundaries are reviewed, Murray be assigned to the Victorian region and that the Tumut nodes be assigned to the NSW region by 1 August 2007. This would effectively remove the Snowy region temporarily and remove the occurrence of negative settlement residues. It would obviate the need for Constraint Support Payments and Contracts for Tumut and would put Tumut on the same footing as the "western ring" generators at Wallerawang and Mt Piper with respect to competition for supply into Sydney from the south. This is an important issue to Snowy Hydro because there are times when the western ring generators can bid at low or negative prices to maximise their own generation volume whilst receiving the NSW price and constraining alternative supply from Tumut.
- What is not clear about the efficacy of the Snowy proposal is whether other new intra-regional constraints between Tumut and Yass/Canberra and between

Murray/Dederang and South Morang/Shepparton/Mount Beauty, for example, might require new constraint support arrangements, when that could be, and with what frequency and impact on the market.

- The Loy Yang Group proposes that the problems can be simply resolved by funding the negative settlement residues on one Snowy interconnector when they occur from the associated positive settlement residues on the other Snowy interconnector. There is no need to constrain dispatch and NEMMCO does not need to intervene in the market to constrain power flows to avoid negative residues. Artificial constraints bring the risk of increased prices in the importing region and lower prices in the exporting region. No doubt Loy Yang Power, the sponsor of the Group, is probably concerned about unnecessarily lower prices in the exporting region.
- Macquarie Generation proposes that there should be a fast-track process to review the Snowy region boundaries using the existing Market Rules criteria. Macquarie Generation proposes abolishing the Snowy region and creating two new regions in Northern Victoria and South-west NSW. Both regions would include part of Snowy Generation capacity on either side of the Murray-Tumut constraint, as well as regional load centres. This solution to the problem has the disadvantage of requiring a great deal of consultation and analysis to define the optimal boundary having regard to long-term economic costs to the parties affected, including customers. It has the long-term advantage of better characterising and more efficiently managing the constraints between Melbourne – Dederang – Snowy/Wagga – Yass/Canberra – Sydney. It would result in fewer intra-regional constraints requiring special measures. This approach would add to the complexity of inter-regional trading but make it less risky for most participants.
- The Macquarie Generation proposal for new regions also has the advantage of providing a clearer basis for assessing the economic value – and value to customers – of uprating or augmenting the 132kV, 220kV and 330kV transmission lines in the region.

Table 2.1 provides a detailed analysis of the arrangements developed from the consultation commentary on these proposals. The referenced documents are listed in APPENDIX A .

2.2 Evaluation

The analysis in the table shows that apart from constraints on lead time and without the benefit of forward looking economic analysis:

- The best results for customers can come with appropriately defined regional boundaries that simplify the cost of defining and managing constraints so that IRSR revenue streams are more stable and inter-regional trading risk is minimised for their retailers. A close alignment between the basis for financial inter-regional risk management products and the underlying physical boundaries simplifies trading

arrangements and reduces the risk of the need for *ad hoc* arrangements to address intra-regional constraints, as has occurred with Murray-Tumut. Well defined regions

Table 2.1 Analysis of Proposals

Issues	Do Nothing – Continue CSP/CSC	Snowy Proposal - Allocate Murray to Victoria and Tumut to the NSW region.	Loy Yang Group proposal -Reallocate positive IRSR to cancel negative IRS on Snowy Interconnectors	Macquarie Generation Proposal - Abolish the Snowy Region and create two new regions
Lead Time	Nil – extend existing arrangements beyond 31 July 2007 until next regional review.	GOOD: This proposal could be implemented quickly because of its simplicity. Consultation period could extend to mid 2007 when CSP/CSC Trial is due to finish	GOOD: Consultation period could extend to mid 2007 when CSP/CSC Trial is due to finish.	POOR: Could take 2-3 years to redesign the boundaries and evaluate the economic and competition consequences thoroughly. Delays about which loads are in and out of the new regions could create dispute and delays.
Ensuring efficient dispatch and pricing	CSP/CSC covers the Murray-Tumut constraint. Concept might need to be extended if other constraints such as Lower Tumut - Wagga have unintended consequences as load grows on south-west NSW. Darryl Biggars' paper (Ref 11) argues that Snowy Hydro owning the Snowy-NSW IRSR would provide the correct price signal for Murray. However, there is nothing to require Snowy to acquire the Snowy-NSW IRSR.	Would eventually create new intra-regional constraints between the border and Melbourne and Sydney and the regional cities that create negative settlement residues. This may not be a major problem for several years. Southern Hydro expansion at Bogong could enhance intra-regional constraint issues.	This proposal reduces the need for NEMMCO to intervene in setting artificial constraints in relation to Snowy. The analysis in Table 2.2 shows that whether the outcome is efficient or not depends on Snowy's acquisition of IRSR on the Snowy-Vic and Snowy-NSW interconnections. This is a weakness of the proposal. This proposal does not solve intra-regional constraints that affect Southern Hydro.	BEST: New regions with generation and load that reflect the major transmission constraints would best facilitate efficient dispatch and inter-state trading. This measure would also address other intra-regional constraints in southern NSW and northern Victoria.
Incentive for Snowy to generate under constrained conditions	CSP/CSC provides the right incentive for Murray and Tumut generation under high levels of power transfer between Victoria and	This option would provide sufficient incentive for several years unless new intra-regional constraints emerge, such as with expanded capacity of	POOR: The incentive is only strong if Snowy owns entitlement to the IRSRs where they might be negative. If they only own the positive IRSRs, then	BEST: Separate regions provide proper incentives. Having load attached to Snowy generation directly would simplify bidding processes and constraint monitoring required by

	NSW.	Southern Hydro.	Snowy might bid higher if that would reduce negative IRSRs that would otherwise subtract from their positive IRSRs.	Snowy and be most likely to ensure efficient dispatch.
Avoidance of opportunities for exercise of market power	POOR: Current arrangements give Snowy the incentive to hold back capacity to support Snowy prices up to Vic or NSW prices and no further if Snowy holds the entitlement to IRSR. Snowy having peaking plant in Victoria exacerbates the potential for abuse of market power.	GOOD: In the short-term the incentive to deliver power is good. If new intra-regional constraints arise between Murray, Dederang and South Morang, then bidding to withhold capacity may again be beneficial to Snowy, especially with ownership of Victorian peaking plants.	POOR: This proposal only mitigates market power if Snowy owns the IRSR out of the Snowy region.	BEST: New regions will give better incentives for generation in southern NSW and northern Victoria and likely improve competition and reduce Snowy's dominance in the region. The new regions may also reduce the market power of Southern Hydro during high power transfers to Victoria.
Price benefits for customers	This represents the *status quo,* which implies no change to current circumstances.	GOOD: Provides reasonable incentive for Snowy to compete with interstate resources until such time as other intra-regional constraints have greater influence.	POOR: Benefits depend on Snowy owning the IRSR rights. This proposal does not address other intra-regional constraints that could become more important between Victoria and NSW.	BEST: The more efficient regional boundaries should create lower prices for the big cities and attract appropriate distributed generation and network developments for the regional towns.
Reliability benefits for customers (Minimal Impact)	POOR: No change from current interim arrangements	GOOD: Incentive to maximise generation at Murray and Tumut would maximise system reliability.	POOR: No change from current interim arrangements as it does not change price received by Tumut.	BEST: New regions could improve the management of definition of constraints, make them less conservative and thereby marginally improve reliability. May provide some incentive for economic transmission development that would improve supply reliability locally.

will increase competition across the NEM and has the best prospect of minimising delivered prices for customers. The proposal that best fits this objective is a proper review of the Snowy regional boundary, including consideration of new regions in Northern Victoria and Southern NSW as proposed by Macquarie Generation. This option has the longest lead time.

- The Macquarie Generation proposal provides the best option to align regional boundaries and financial transactions with transmission constraints; and minimise the need for special arrangements to manage intra-regional constraints. There may remain some residual problems with loop flows, but these should be much less frequent and lower in magnitude than observed in the Murray-Tumut constraint.
- This proposal is attractive to Macquarie Generation as it is likely to lower the cost of Macquarie trading across the NSW/Victoria border because the cash flows from the IRSR would be more easily quantified. This is vital to Macquarie Generation because it faces increasing competition from low cost imported power from Queensland and will increasing seek to trade with southern customers as the supply surplus is eroded in Victoria and South Australia.
- The Loy Yang Group proposal is rather more minimalist and could be enacted for a short period whilst the other arrangements are being established. This would not distort dispatch and pricing if generator bids remained the same because it only amounts to redistribution of the total settlement residue. It would reduce the need for NEMMCO to intervene in the market. It would temporarily solve the problem of dispatch if Snowy had access to the IRSR's that cancel out in the transfer across interconnections. In such a case, it would not matter if IRSR's are taken from one side of Snowy on one interconnection to cancel out negatives on the other interconnection.
- However, if Snowy does not have access to the IRSRs and is trading mostly on the local spot price, it may create gaming opportunities when Murray-Tumut is constrained to increase the price on the receiving side of the constraint to the extent of not constraining one Snowy interconnection and controlling the generation on the sending end of the constraint to maintain that constraint, as analysed in Figure 2.1, Figure 2.2 and Table 2.2. Snowy would be expected to bid its assets in such a way as to reduce the leakage of IRSR away from the Snowy-NSW interconnector when it has the IRSR rights. This would involve reducing output from Murray and lifting prices. Thus energy users cannot be certain that the Loy Yang Group proposal will produce efficient outcomes because of possible adverse incentives for Snowy and it should not be supported as other than a temporary solution until NEM boundaries are realigned.
- Since there are lead-time considerations that mean that some time will have to elapse before new regional boundaries can be established, an interim arrangement is needed and the immediate choice therefore seems to lie between the Loy Yang Group and the Snowy Hydro proposals.

Table 2.2 Impact of Snowy Access to IRSR ex Snowy Region under Loy Yang Group Proposal

	Snowy has full access to Snowy-NSW IRSR	Snowy has some access to Snowy-NSW IRSR	Snowy has no access to Snowy-NSW IRSR
Snowy has full access to Snowy -Vic IRSR	This gives Snowy access to both the other regional nodes and the negative IRSR is cancelled by the positive IRSR. Snowy could still game the other regional prices by withholding capacity to maximise value of the spot price/volume combination. Lesser incentive to hold up prices on the sending end of the M-T constraint because any negative reside is cancelled out. This should produce efficient dispatch and prices.	Partial access to the Snowy-NSW IRSR would reduce the incentive to hold back Murray generation because some of the negative IRSR on Snowy-Vic would be refunded back to Snowy.	Under NSW import conditions, the Snowy – NSW IRSR would be discounted by the funding of the negative IRSR on the Victorian side. Therefore, Snowy would be likely to maximise the Murray bid price to only just constrain M-T and to minimise the negative IRSR on the Victorian side. Snowy would receive near the NSW price at Tumut under the CSP and would not need to bid up Tumut to match the NSW price. Tumut generation would be maximised and Murray generation minimised. This may have some advantage to Latrobe Valley generators with higher export volumes to Snowy. The higher volumes would arise because Murray's output could be reduced. The Dederang price and hence the Victorian price would be higher because it would depend on the Lower Tumut and Murray prices which would be higher because Snowy has no access to the Snowy-NSW IRSR.
Snowy has some access to Snowy -Vic IRSR	Partial access to the Snowy-Vic IRSR would produce more efficient outcomes and lower prices than no access because the incentive to hold up Murray prices during Victorian import would be reduced.	Partial access to all IRSR reduces Snowy's incentive to bid its capacity efficiently. It would want to minimise its exposure to transfer of IRSR away from its entitlement.	Refer to box below ▼

	Snowy has full access to Snowy-NSW IRSR	Snowy has some access to Snowy-NSW IRSR	Snowy has no access to Snowy-NSW IRSR
Snowy has no access to Snowy-Vic IRSR	Under Victorian import conditions with M-T constrained, Tumut's generation would be minimised to maximise the net value to Snowy of the higher NSW price and the import from NSW and hence the IRSR on the NSW-Snowy flow. The positive IRSR from NSW-Snowy would be diluted by the payout to the negative IRSR on Snowy to Vic interconnector. Therefore Snowy would want to minimise the Murray volume bid so as to only just constrain T-M and thereby minimise the loss to the negative IRSR. This could result in higher prices in Victoria.	Refer to box at right ►	CSP/CSC is critical to obtain sufficient pool revenue on the receiving side of the M-T constraint. However, NSW customers are disadvantaged with higher network charges because the auction value of the IRSR is reduced by the cash flow lost to Victoria to make up negative IRSRs during NSW import periods. In the immediate future, the imports to NSW would be greater than constraining imports to Victoria, so NSW customers would be worse off than Victorian customers.

Note: "M-T constraint" and "T-M constraint" refers to the Murray-Tumut constraint in the respective direction.

Figure 2.1 Price Profiles for IRSR / Bid Gaming with Constraint Support at Tumut and Funding of negative IRSR from other Interconnector with Victorian Import

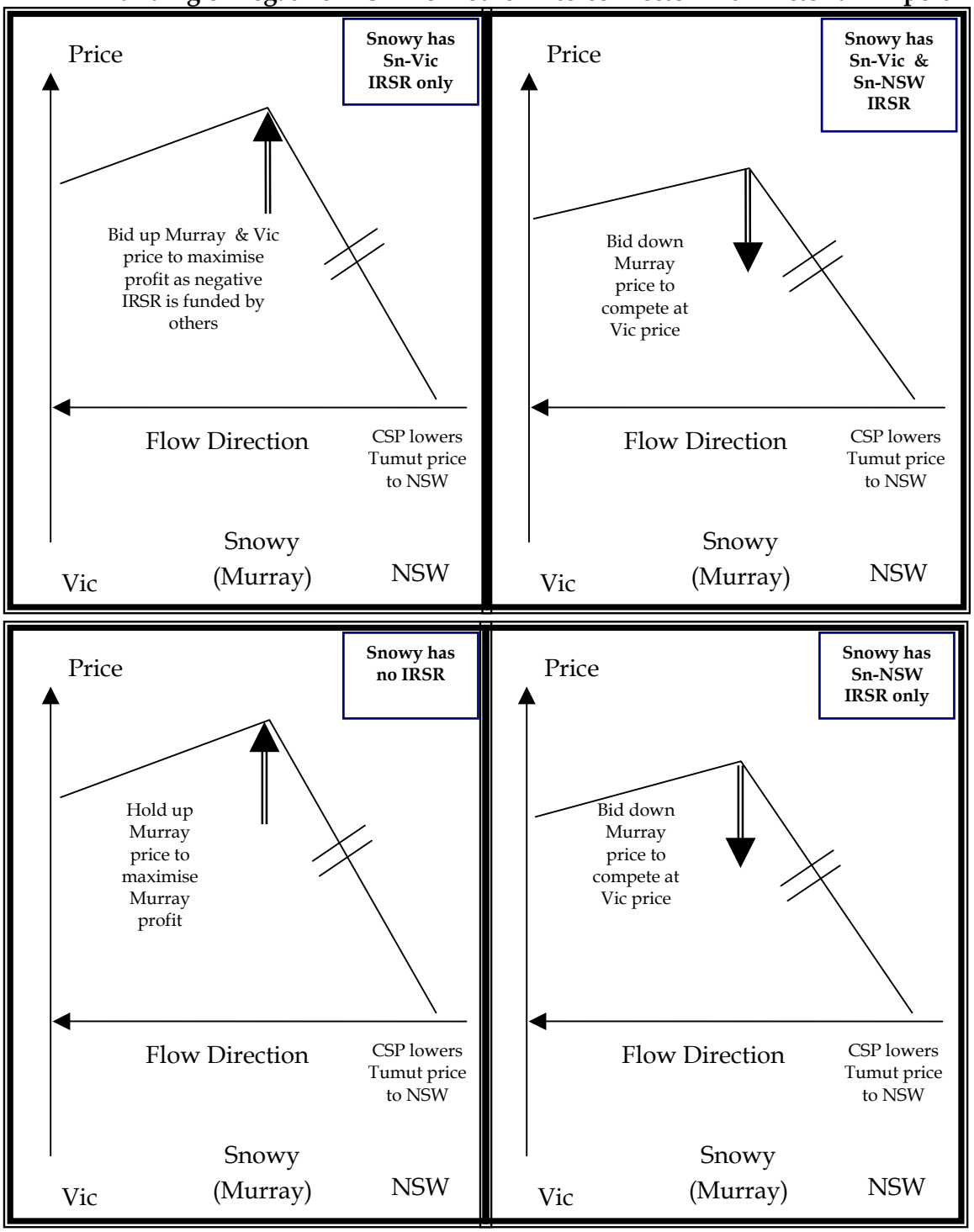


Figure 2.2 Price Profiles for IRSR / Bid Gaming with Constraint Support at Tumut and Funding of negative IRSR from other Interconnector with NSW Import

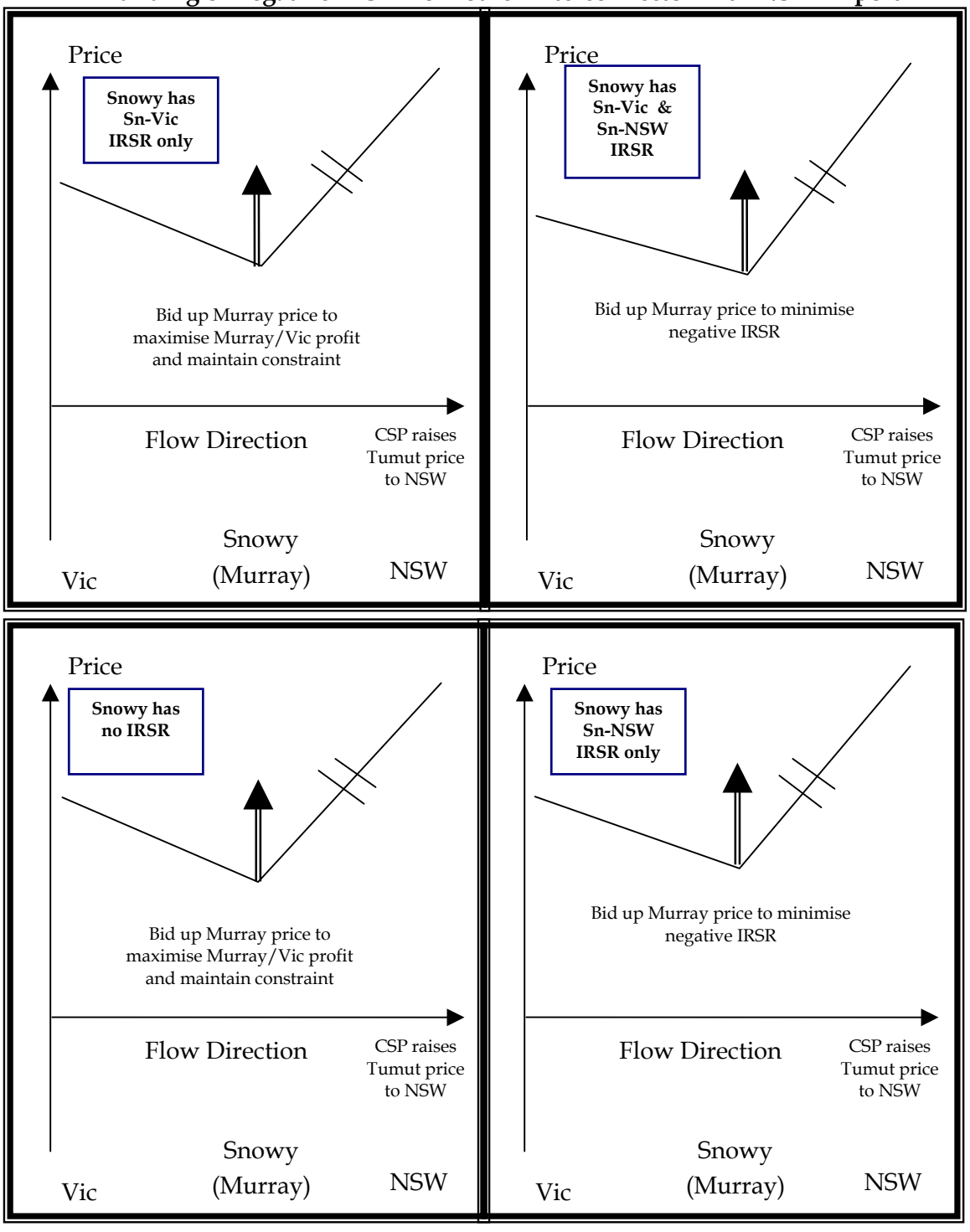


Table 2.3 Analysis of Gaming options for Snowy with Murray-Tumut Constrained and Reallocation of IRSR on Snowy Interconnections

Direction of Power Flow	Snowy holds Snowy-Vic IRSR	Snowy holds Snowy-NSW IRSR	Incentive for Snowy	Option for Gaming
To Victoria	No	No	Not exposed to loss of IRSR on Snowy-NSW so can hold Murray price high to maintain M-T constraint. Negative IRSR on Murray-Dederang funded by other parties holding Snowy-NSW IRSR so Snowy may restrict Murray generation to maximise profit at Murray. Tumut is strongly competing with NSW exports and largely unaffected.	Strong at Murray depending on Vic contract position
	Yes	No	Negative IRSR on Snowy-Vic is funded by others so profit maximising behaviour at Murray is effective. NEMMCO does not link Murray to Vic price. No IRSR received on Snowy-Vic so Murray may take advantage of market power depending on contract position.	Strong at Murray depending on Vic contract position
	Yes or No	Yes	Snowy funds the negative IRSR on Snowy-Vic according to the share of Snowy-NSW IRSR held. Creating more negative IRSR at Murray by raising the Murray price takes away from the positive IRSR on Snowy-NSW. This means that Murray is effectively trading at a Victorian price and Tumut at the NSW price so the price/volume leverage of the Murray bid is reduced.	Lower at Murray
To NSW	No	No	CSP for Tumut gives Tumut the NSW price from the proceeds of the IRSR on Snowy to NSW and encourages high Tumut output to compete in NSW. Snowy can then lift the Murray bid price whilst maintaining the M-T constraint and support the Vic and Snowy prices to maximise profit. This has extra value with peaking capacity in Victoria and provides an incentive to lift the Vic and Snowy prices to follow the NSW prices.	Strong at Murray depending on Vic contract position.
To NSW	Yes	No	As for box immediately above ▲ on previous page. Negative IRSR on Snowy-Vic would be funded by Snowy-NSW interconnector with no loss to Snowy. Incentive remains to support Vic and Snowy prices to maximise profit.	Strong at Murray depending on Vic contract position
	Yes or No	Yes	CSP for Tumut gives Tumut the NSW price from the proceeds of the IRSR on Snowy-NSW and encourages high Tumut output. Negative IRSR created on Snowy-Vic subtracts from the IRSR on Snowy-NSW. Therefore, depending on contract position in Victoria, Snowy has the incentive to minimise the negative IRSR on Snowy-Vic by lifting the Murray price and reducing Murray generation, which would also lift the Victorian price and thereby replace the generation reduced at Murray.	Strong at Murray depending on Vic contract position

- From a customer's perspective the Snowy Hydro proposal is preferred as a short-term option[1] because it simplifies the trading arrangements and provides Snowy with incentive to generate to meet demand in NSW up to the limit of the 01 and 02 lines to Yass and Canberra. Since it is understood that Snowy holds the rights to most of the IRSR from Snowy to NSW, whether they receive that income by means of direct pool revenue at the NSW price, or from revenue at the Snowy price plus IRSR settlements based on the difference between the Snowy and NSW price, does not make any significant difference to energy users. In the end, the value to customers from this is driven by efficient dispatch and sufficient competition to deliver prices that are cost reflective at the major load nodes. Assigning the Murray node to Victoria and the Tumut nodes to NSW is a simple way of removing the need to allocate negative settlement residues, providing incentive for more efficient generation at Tumut.

[1] Nenad Tufegdzic of Snowy Hydro conceded that Snowy's proposal for the constraint support payments was a short-term fix at the ACC Pre-Determination Conference on 10 May 2005 (Ref 10).

3 RELATIONSHIP TO BOUNDARY REVIEWS

The consideration of the Snowy intra-regional constraints also needs to be considered in the context of the process for reviewing the definition of regional boundaries in the NEM.

3.1 MCE Request to Change the Basis for Boundary Reviews

The Federal Energy Minister, the Hon Ian Macfarlane – for the Ministerial Council on Energy (MCE) – has written to Dr John Tamblyn, the Chair of the Australian Energy Market Commission, providing the basis for the process of reviewing regional boundaries in the NEM. Charles River Associates had been engaged to review the process of reviewing and reforming regional boundaries and the Minister confirmed that the MCE had accepted CRA's recommendations as shown in Exhibit 3-1 which was extracted from the Minister's letter to AEMC Chair (Ref 5)

Exhibit 3-1 The CRA Findings and MCE Response.

In 2004 the MCE commissioned an independent economic study by Charles River Associates (CRA) to develop the criteria and process for boundary changes and initial boundary change options. The report provided by CRA is publicly available on the MCE website. On 20 May 2005 the MCE issued a statement on electricity transmission setting out its views on regional boundaries, based on the findings by CRA, as follows.

- The MCE agreed that the regional structure for the wholesale market should be stable, based on current boundaries and with robust economic criteria to support incremental change as required.
- The MCE accepted CRA's advice that no material efficiency benefits would be gained from a nodal pricing approach at this stage of market development.
- The MCE supports giving advanced notice of a boundary change to allow registered participants the opportunity to adjust their contract trading positions and minimise their commercial risk.
- The MCE notes the relationship between regional boundary review/change processes and the regulatory test, congestion management and the Last Resort Planning Power.

Source: Ref(5)

As a result of this review, the AEMC has been requested to amend the market rules so that boundaries are reviewed on application rather than having a periodic review which may create unnecessary cost and uncertainty in the electricity market. The Minister's letter stated the basis under which the AEMC would have the power to reject an application for review as shown in Exhibit 3-2. It is possible that an application could be influenced by one participant seeking to gain some commercial advantage from other market participants without delivering net benefits to the market as a whole. It is therefore important that a proper process would critically examine the economic benefits and the time period in which they would be expected to be delivered.

Exhibit 3-2 Basis for Rejection of Application for Boundary Change

> The MCE considers that regional boundary reviews should be conducted on application. There will be no distinction between NEMMCO and other parties in bringing forward an application for review. The issue of gaming would be mitigated by the extent to which boundary review processes link to other mechanisms including the Last Resort Planning Power, the Regulatory Test, the ANTS and the arrangements for congestion management.
>
> The AEMC would have the power to reject an application for review where:
>
> - the economic criteria for a regional boundary change are unlikely to be met;
> - a committed investment proposal has been shown to address the constraint;
> - the ANTS has not identified the constraint as material and enduring;
> - the congestion management regime has not identified the constraint as commercially material and enduring, [and/or];
> - an application of the Last Resort Planning Power (LRPP) has identified a project as passing the regulatory test and that project is committed.

Source: Ref(5)

3.2 Macquarie Generation's Request for Boundary Change

Macquarie Generation's request for a regional boundary change comes within the ambit of this change in the market rules and would have to be considered under the newly proposed rules.

EUAA has assessed that the request is unlikely to be rejected unless the first point in the list in Exhibit 3-2 is met because, in relation to the remaining points:

- Due to environmental and physical constraints within the Snowy region, it would be difficult and costly to uprate the Murray to Lower Tumut and Upper Tumut powerlines sufficient to remove the impact of the constraint.[2] Therefore, it is unlikely that an economic proposal could be found and committed in the foreseeable future. TransGrid's 2005 Annual Planning Report, which looks at network developments over the next fifteen years, does not make any mention of planned or proposed projects to significantly uprate these lines.
- It is expected that the constraint will be material and enduring because of the diversity of load patterns and the marginal cost of generating sources between Victoria and NSW. For the foreseeable future, there will be economic opportunities to transfer power between Victoria and NSW at times with peak demand in one region but not with peak demand in the other region(s).

[2] Technical options for uprating these lines include: tower raising, strengthening and reconductoring to increase thermal rating; replacement with new double circuit lines; conversion to dc operation with reconductoring; or conversion of towers for six-phase transmission. Only the new double circuit line option would require significant easement widening. All of these options would be expensive and require long periods of outages with substantial impacts on system reliability and increased energy costs to customers. They might become viable if Victoria and NSW inadvertently developed surplus genenrating capacity to provide enough oppoortunities to take the outages without creating high prices or loss of supply. If the Oaklands project were developed the spare parallell transmisison capacity during project commissioning might also provide an opportunity to upgrade Murray – Tumut without significant costs to customers.

- The Murray – Tumut constraint will remain commercially material because it is associated with power delivery during peak demand in NSW and Victoria when spot prices can approach $10,000/MWh (the Value of Lost Load market cap).

A potential benefit of well defined regions is that they would provide customers for Snowy that could be contracted without the additional inter-regional trading risk that afflicts the current arrangements. This should lead to lower trading costs for retailers and their customers. Additional regions in northern Victoria and southern NSW may provide more economic incentives for local generation, including cogeneration, thus leading to lower losses and lower prices for customers. Some of these benefits would be offset with the additional cost of trading through more regions and therefore the basis for regional boundaries needs to be carefully evaluated as part of the AEMC review of congestion management during 2006.

Whether the costs of the boundary change could be justified economically would depend on a complex analysis of market evolution with and without the boundary change. If it is just a matter of reallocating the IRSR in a way that does not enhance the market power of Snowy Hydro, and distort dispatch and prices, then the costs of making the boundary change might be greater than the benefits due to the dislocation and commercial risk it causes in the market.

EUAA's current expectation (in the absence of detailed economic analysis) is that an analysis is likely to show that, a rationalisation of the Snowy boundary in conjunction with committed plans for identifying and implementing the remaining low cost upgrades on the Snowy interconnections and Snowy generating plant, would maximise benefits to the NEM by:

- Simplifying the description and management of constraints affecting Snowy.
- Maximising the competition between peaking generators in NSW, Victoria and at Snowy at times of peak demand north and south of Snowy.
- Deferring investment in unnecessary new peaking plant until the existing generation plant and transmission system are fully optimised relative to the costs of new peaking plant and demand side resources.

Lower cost options that can be considered for this purpose include:

- Turbine blade and generator upgrades on Snowy Hydro plant.
- Series capacitors added to transmission lines where voltage or dynamic stability constraints are more limiting than thermal constraints.
- Phase shifting transformers to maximise the capability of the Dederang – Wagga – Lower Tumut path and reduce the adverse pricing effects caused by the Murray – Tumut constraint,
- Further tower raising where maximum conductor temperature is limited by thermal expansion and conductor sag rather than the rated temperature of the conductors themselves.

This approach would be in the interests of energy users providing the best available technologies that were evaluated objectively, because it would lower delivered energy prices, plus network charges, to the extent that increased competition would align energy prices with marginal costs to end users.

4 CONCLUSIONS

The best outcome for energy users is likely where the management of transmission constraints encourages efficient dispatch and pricing for the available generation resources and mitigates market power under high priced conditions. The current arrangements for managing the Murray-Tumut constraint have been shown to produce satisfactory dispatch and pricing outcomes in the NEM on two occasions on 7 December 2005 and 19 January 2006. However, the measures to introduce Constraint Support Payments and Contracts (CSP/CSC) should be only regarded as temporary because they are *ad hoc* in nature, subject to change and costly to maintain from a regulatory point of view (because of the disputation that can be caused).

The preferred *in principal* approach is to define stable NEM boundaries that reflect relatively unconstrained groups of load centres and generators that can share a reference node and with well defined constraints with other regions. Boundaries would be set so that inter-regional constraints are simple to quantify in terms of measurable power flows across the boundaries. However, since careful planning and consultation is needed to achieve regional boundary changes in the NEM, there are substantial lead time constraints involved. Any potential market power issues would also need to be resolved.

Therefore the immediate action should be to:

- Set in train an economic assessment of regional boundaries that should apply to the Snowy region and its environs to address the Vic – Snowy –NSW constraints with say a ten year horizon. This is the Macquarie Generation proposal.
- Give consideration to abolishing the Snowy regional boundary as soon as possible by allocating Murray to Victoria and Tumut to NSW subject to an assessment of the impact on other intra-regional constraints that may become material in the period until new regions are enacted. This is the Snowy Hydro proposal but it is only suitable as a short-term solution because of the risk of other intra-regional constraints taking effect. The benefits of abolition of the Snowy region as an interim stage might well be minimal, in which case this stage would be skipped.
- Continue with the CSP/CSC trial with careful monitoring to ensure that dispatch and pricing outcomes are efficient and of benefit to end users. This trial could cease when the boundaries have been realigned.
- Consider adopting the redistribution of IRSRs as proposed by the Loy Yang Group but only as a temporary measure until either the Snowy region is scrapped or new regions enacted. This proposal is expected to provide efficient outcomes providing Snowy Hydro purchases most of the IRSR for the Snowy-Vic and Snowy-NSW interconnections.

The potential gaming of inter-regional settlement residues (IRSR) by Snowy for different ownership shares of the IRSR corresponding to each interconnector from Snowy and for

differing contract positions at the Victorian and NSW nodes may warrant some quantitative analysis. Such work should be associated with the congestion management review being undertaken by AEMC during 2006.

APPENDIX A REFERENCES

A.1 Participant Documents

1. "Despatching the Market: Proposed Trial at Tumut Nodes", Letter from Mr Russell Skelton, Macquarie Generation to Mr Sebastian Roberts, ACCC, 4 March 2005.
2. "Rule Change Proposal to Establish NEM Regions in northern Victoria and Southwest NSW", Letter from Mr Russell Skelton of Macquarie generation to Dr John Tamblyn of AEMC. Undated (probably late 2005). This letter and attachments sets out the detail of Macquarie generation's proposal.
3. "Derogation – Management of Negative Settlement Residues in the Snowy Region" Letter and attachment from "The Loy Yang Group[3]" to Mr Anthony Englund, Director, Market Rules, AEMC dated 27 October 2005
4. "Rule Change Proposal for the Snowy Region: Revision of Transmission Connection Nodes", Letter and attachment from Roger Whitby, Executive Officer Trading, Snowy Hydro to Dr John Tamblyn Chairman of AEMC dated 11th November 2005.

A.2 Regulatory Documents

5. "NEM – Transmission Region Boundary Structure", Charles River Associates Report September 2004 for MCE. This documents sets out the process and benefits of the Constraint Support Payment and Contracting mechanism to manage intra-regional constraints.
6. "Despatching the Market: CSC/CSP Trial at the Tumut Nodes", Letter from John Eastham of NECA to Mr Sebastian Roberts of ACCC, 7th February 2005. This letter and attachment describe the basis for the CSC/CSP Trial and the support and objections offered by participants.
7. "National Electricity Rules – Rule Change Request Reform of Regional Boundaries", Letter with attachment from Hon Ian Macfarlane to Dr John Tamblyn Chairman of AEMC. Undated (post August 2005).
8. "Terms of Reference for Australian Energy Markets Commission – Congestion Management Review", Letter from Hon Ian Macfarlane to Dr John Tamblyn, 5th October 2005 with attached Terms of Reference.
9. "MCE Directed AEMC Electricity Transmission Work", Letter from Dr John Tamblyn to Hon Ian Macfarlane, 25th October 2005. This letter sets out the two phase staging of work related to the Regulatory Test and the Congestion Management Review.

[3] The Loy Yang Group consists of Loy Yang Marketing Management Company Pty Ltd, Southern Hydro (now owned by AGL), International Power, TRU Energy, NRG Flinders, Hydro Tasmania and NEMMCO.

A.3 Consultation Documents

10. Minutes of ACCC PRE-DETERMINATION CONFERENCE, Tuesday 10 May 2005, The Grace Hotel, 77 York Street, Sydney

11. "Managing Negative Settlement Residues on the Vic-Snowy Interconnector", Darryl Biggar, ACCC under cover of letter to Mark Miller of NEMMCO, 20th May 2005. This document sets out a detailed analysis of how negative residues arise and how they are managed with Constraint Support Payments.