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Dear John

## CONGESTION MANAGEMENT REVIEW

Thank you for the opportunity to comment on the Commission's *Congestion Management Review, Draft Report*, released publicly on 27 September 2007. Macquarie Generation appreciates the work and effort that the Commission has undertaken in investigating the materiality of congestion in the NEM. Macquarie Generation supports the majority of the draft recommendations for incremental change to various aspects of the current regulatory framework. The following submission outlines a number of areas where the Corporation believes these recommendations could be refined or improved.

### **Recommendation 1: Localised spot pricing arrangements**

Macquarie Generation agrees with the analysis and conclusions reported in Chapters 2 and 3 of the Draft Report relating to the materiality of congestion and the analysis of options for localised pricing in the wholesale market.

Macquarie Generation's submissions to the Congestion Management Review Issues Paper and Directions Paper argued that there was not a material level of congestion in the NEM, apart from the problems in and around the Snowy Region. We are pleased that the Commission has undertaken a detailed review of existing research and commissioned its own modelling to comprehensively address this issue.

It is worth noting that the modelling undertaken as a part of the recent Rule change proposal relating to the Snowy Region reported productive efficiency savings of less than \$2 million per annum under a range of boundary change proposals. Macquarie Generation is not aware of any part of the NEM that is likely experience material congestion problems in the next three to five years.

Macquarie Generation had also submitted a consultancy report with Snowy Hydro examining the impact on financial markets of greater localised pricing for generators. Macquarie Generation agrees with the Commission that any local congestion management regime would create basis risk for participants and that the likely costs and controversy of allocating any form of transmission congestion rights would outweigh possible dispatch efficiency savings.

## **Recommendation 2: Constrained-on payments**

Macquarie Generation agrees with the Commission that constrained-on generation is likely to be less of a problem than constrained-off generation in the NEM.

Nevertheless, Macquarie Generation remains opposed to any market arrangement that obliges market participants to supply their product at a price below the level they would voluntarily commit to sell. The current treatment of constrained-on generation creates incentives for generators to declare themselves unavailable, either through bidding behaviour or technical limits, in order to avoid this perverse outcome. This has the potential to impact system reliability.

The key benefit of introducing a system of constrained-on payments is that it would increase the transparency of constrained-on generation and introduce incentives to ameliorate its effects, for example through a revision of the rules and parameters for setting constraint equations.

Macquarie Generation believes there is merit in pursuing cost based compensation for constrained-on plant similar to the arrangements that apply when NEMMCO issues directions to generators requiring them to meet centrally determined dispatch targets. Whenever generation is constrained-on it should be treated as an 'automatic direction' and compensated accordingly.

## **Recommendation 3: Funding negative settlement residues**

Macquarie Generation agrees with the recommendation that negative residues should no longer be netted-off against positive residues within a billing week. The Corporation had supported such an arrangement when the Commission considered this matter in its Rule Determination, *Recovery of Negative Inter-regional Settlement Residue, March 2006*.

Macquarie Generation does not believe that there is any sound basis for the current arrangement of funding any weekly net negative residues from auction proceeds. The choice of a billing week instead of the SRA quarter or some other period is entirely arbitrary. If there is a good case for funding any weekly net negative residues from auction proceeds then there is no reason not to apply the same principle to all negative trading intervals.

The proposal will increase the level of participant interest in settlement residue auctions given the increase in the likely payout of IRSR units across all weeks within an SRA tranche. Reducing the risk that IRSRs units could be devalued by counter price flows should reduce the risk of inter-regional hedging and increase the level of competition in the various forward contract markets throughout the NEM.

Increased interest in IRSR units could contribute to higher future auction proceeds from which to fund any future negative settlement residues. In some cases, this change in funding arrangements could result in more competition in the SRA market, higher auction proceeds and a net increase in payments to TNSPs.

Macquarie Generation does not support the proposal to fund negative residues by billing the importing region's TNSP. The Commission recognises that the emergence of 'disorderly bidding' can result in counter-price flows between regions. In this instance, the existence of intra-regional congestion can create incentives for remotely located generation within the region to bid below cost as a way of ensuring dispatch which is then settled at a relatively high regional reference price. In the process, the remote generation can displace lower cost inter-regional generation, reducing and possibly reversing interconnector flows.

Macquarie Generation does not believe that the TNSP in the importing region should be responsible for funding counter price flows caused by intra-regional congestion in the exporting region. Obliging the TNSP in the exporting region to fund negative residues caused by disorderly bidding would create incentives for the TNSP to address the underlying problem. For example, the TNSP could seek to augment that part of the network experiencing intra-regional congestion through the regulatory test process or pursue network support agreements with those generators influencing network constraints.

#### **Recommendation 4: Managing negative settlement residues**

Macquarie Generation does not believe that the Commission or NEMMCO have demonstrated the case for increasing the threshold for clamping counter-price interconnector flows from \$6,000 to \$100,000 (in negative residues).

In the ten year history of the NEM, intra-regional congestion and disorderly bidding have caused the majority of all counter-price flows between regions. The abolition of the Snowy Region will eliminate the possibility of significant loop flows between regions. Macquarie Generation believes that clamping provides a practical, albeit imperfect, mechanism to mitigate the impact of perverse bidding incentives. The Corporation considers that there may be ways to reduce the frequency of clamping in the NEM, but it should remain in place as a permanent safeguard against inefficient dispatch.

In recent times, there have been some significant counter-price events in the NEM. Macquarie Generation considers that NEMMCO should enact clamping whenever NEMDE pre-dispatch shows a breach of the threshold.

Macquarie Generation welcomes the recommendation requiring NEMMCO to detail how it interprets and applies those parts of the Rules that enable it to clamp interconnector flows. However, the Corporation considers that the Commission needs to go a step further and put in place an obligation on NEMMCO to report periodically on all incidences where counter-price flows exceed the threshold for negative residues and the reasons why the threshold was breached. If it was a system security matter that caused the breach, then NEMMCO should publish a brief market report detailing the specific factors that threatened system security.

#### *Positive flow clamping*

Macquarie Generation believes that there is considerable merit in developing the positive flow clamping proposal as part of a package of congestion management

recommendations to the MCE. It offers the potential for significantly improving the effectiveness of IRSR units, particularly during high price events in the NEM. This should further increase the liquidity of forward contract markets in the NEM.

The draft report outlines a number of alternative ways of implementing the PFC proposal. The Commission favours a limited proposal aimed at restoring interconnector flows to the level that prevailed prior to disorderly bidding, assuming flows were previously from the low price to high price region and there was a reversal of both the direction of flows and relative prices.

Macquarie Generation believes there is merit in analysing the possible market and efficiency impacts of introducing stronger measures to contain disorderly bidding including the introduction of a fixed level of positive interconnector flow in response to all incidences of counter-price flows. A strong form of the PFC proposal would:

- provide a locational signal for new generation investment – generators that locate in a remote of the network that contribute to intra-regional congestion could be displaced by generation from the low-price region;
- provide incentives for generators and TNSPs to work together to reduce the level or impact of intra-regional congestion, for example through transmission investment or some form of contractual agreement.

The National Generators Forum commissioned an assessment of positive flow clamping by Roam Consulting (an attachment to the NGF submission). Roam raise a number of questions about how PFC would operate in practice under a range of scenarios. Roam also examine the likely incidence of counter-price flows on the major interconnectors. Macquarie Generation does not believe that the Roam report identifies any fundamental problems with the PFC proposal, but it does raise some questions that would need to be addressed as part of the further development and analysis of the proposal.

### **Recommendation 5: Settlement residue auction design**

Macquarie Generation supports the proposals to extend the duration of IRSR units by auctioning IRSR tranches up to three years in advance. Such a move would better reflect the duration of contracts in the forward market. It would also provide further scope for participants to develop more tailored products in the secondary IRSR market.

### **Recommendation 6: Network constraint formulation**

The Commission has proposed an amendment to Chapter 3 of the Rules to formalise the requirement for NEMMCO to use the “fully co-optimised network constraint formulation” to the extent practicable, except where NEMMCO reasonably determines that an alternative constraint formulation is necessary to meet system security requirements or to manage negative settlement residues.

Macquarie Generation does not consider that the term “fully co-optimised network constraint formulation” has been adequately defined by the AEMC or NEMMCO. The term describes a general concept – it does not prescribe the process or limits

associated with the development and implementation of constraint equations. Given the importance of constraint equation in determining physical dispatch and pricing outcomes, Macquarie Generation considers that the Rules should be clear and precise as to the meaning and interpretation of the term “fully co-optimised” and the limited circumstances in which NEMMCO can apply alternative formulations.

Macquarie Generation is of the view that there needs to be a broader review of the objectives of the constraint formulation process. NEMMCO has never adequately explained or demonstrated the basis for its preference for an Option 4-style formulation. It is unclear what objective NEMMCO is seeking to achieve – maximising system security, minimising safety margins<sup>1</sup>, managing network flows, or some other outcome.

Macquarie Generation considers that the definition of constraint formulation terminology in the Rules should be worded so that it is linked to achieving a specific objective (or objectives) and NEMMCO should only have discretion to alter a constraint equation if it is necessary to achieve a clearly defined outcome.

NEMMCO has discretion under the current Rules to determine its own policies for developing and formulating constraint equations. NEMMCO is able to decide:

- the threshold level for the coefficients which determine which generator and interconnector are included in constraint equations; and
- which units and interconnectors appear on the left-hand or right-hand side of constraint equations.

While NEMMCO has the power to unilaterally determine constraint formulation parameters, there are few, if any, checks and balances for market participants to assess whether NEMMCO is following its own policy procedures correctly. This is in part a reflection of the number and complexity of constraint equations, but also a lack of formal avenues for participants to question how constraint equations are formulated and updated.

Macquarie Generation has observed constraint equation formulations that seem to produce inconsistent dispatch outcomes between regions and through time. There may be good reasons for the different formulations, although the lack of transparency is a concern.

Macquarie Generation has prepared three examples of constraint equations in the NEM to show how, from the perspective of a market participant, it can be difficult to understand apparent inconsistencies in the approach to constraint formulation. The examples are taken from NSW, Queensland and Victoria using new option 4 constraints that NEMMCO has formulated in the past six months. The constraint formulation for Victoria delivers a markedly different dispatch and pricing outcome than that observed in the other regions.

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<sup>1</sup> Macquarie Generation has previously written to NEMMCO (6/4/07) noting that the introduction of option 4 constraints had not resulted in any material reduction in the level of safety margins in constraint equations ([www.aemc.gov.au/electricity.php?r=20070416.111240](http://www.aemc.gov.au/electricity.php?r=20070416.111240))

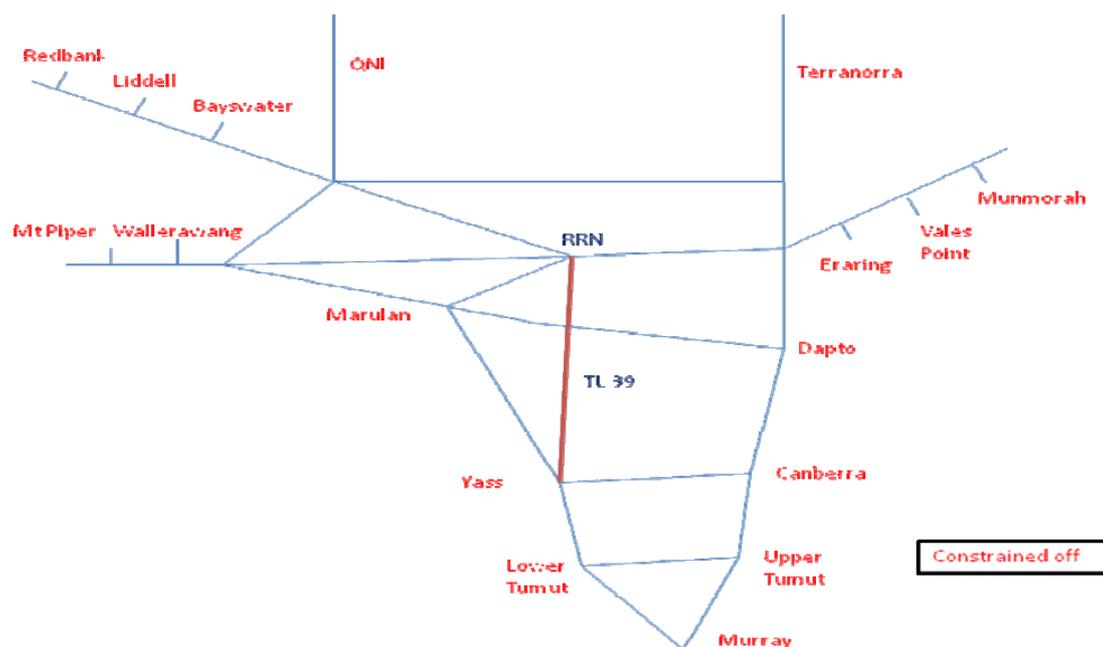
Example 1 shows generating units and interconnector terms in the constraint equation that NEMMCO uses to manage flows on transmission line 39 from Yass to Sydney West under system normal conditions (constraint ID: N>>N-NIL\_V) (see Figure 1). In this instance, flows on Snowy to NSW interconnector have the most direct impact on the thermal limit. It would seem reasonable to expect some constraining-off of interconnector flows and possibly some constraining-off and -on of local generation to manage this limit.

However, under this constraint equation:

- all generators are constrained-off (as shown in red);
- all interconnectors terms are constrained-off;
- units with small coefficients relative to the Snowy to NSW interconnector are constrained-off. For example, Munmorah has a coefficient of 0.082. Following scaling, every 1 MW increase in Munmorah output would add only 0.022 MWs of flow across TL 39. It is difficult to understand why this term is included in the equation.

Because every generator and interconnector is constrained-off, it is not at all clear how the price is set in NSW – it could be an imported price or set by the interaction of generator offers in NSW.

Figure 1: Managing flows on transmission line 39, NSW region



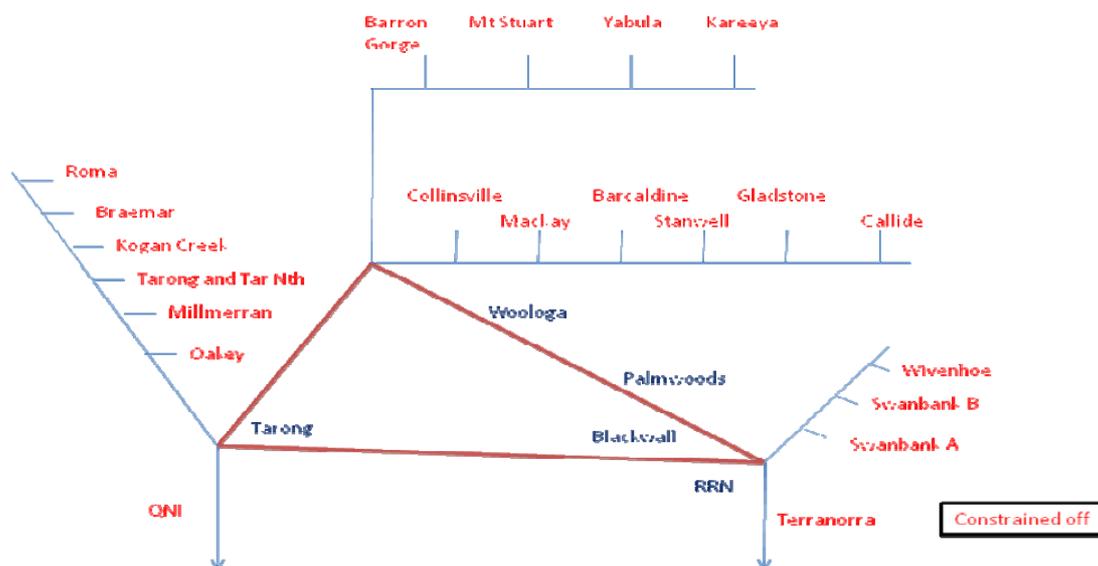
Example 2 shows system normal constraints that NEMMCO uses to manage voltage stability for a trip on the transmission lines across the Tarong cut set (see Figure 2) – Tarong to Calvale ( $Q^{NIL\_TR\_CLTR}$ ), Tarong to Blackwall ( $Q^{NIL\_TR\_TRBK}$ ) and Woologa to Palmwoods ( $Q^{NIL\_TR\_WOPW}$ ). In this instance, it would seem reasonable to expect that NEMMCO would constrain-off generation in Central and South-Western Queensland to manage the stability limit, leaving remaining local generation to participate in the price setting process.

Key points to note:

- all interconnectors are constrained-off;
- all Queensland generators are constrained-off (as shown in red);
- even those generators located close to the regional reference node on the local side of the constraint cut set are constrained-off (Swanbank A and B and Wivenhoe);

Again, constraining-off of all interconnectors and all Queensland plant makes it difficult to calculate how the price is set when any of these constraints bind.

Figure 2: Managing voltage stability across the Tarong cut set, Queensland region



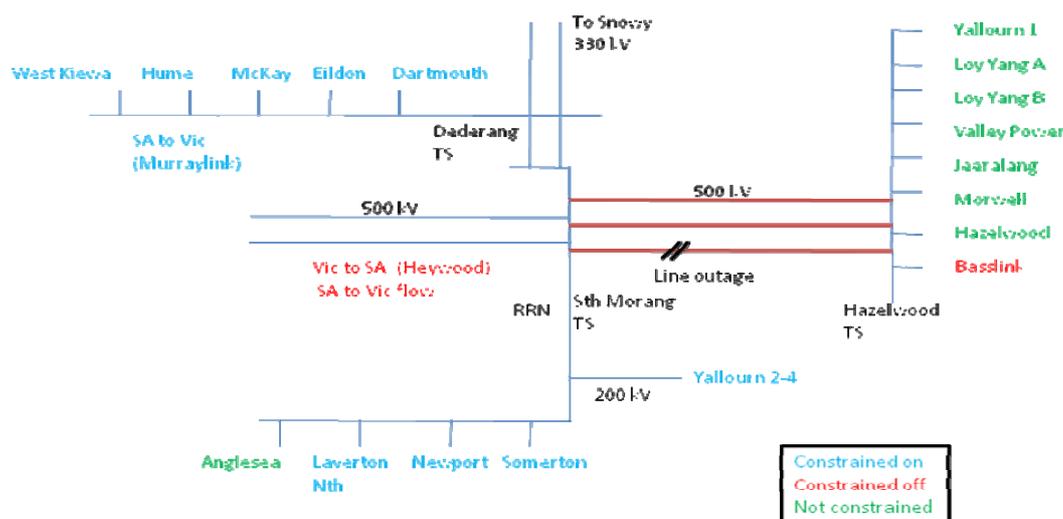
Example 3 shows an outage of one of the Hazelwood to South Morang (500 kV) lines and the constraint equation to avoid transient instability on the 500 kV network for a fault and trip of an additional Hazelwood to South Morang line (V::H\_HWSMVA\_R) (see Figure 3). In this case, generation in the Latrobe Valley would seem to have the greatest direct impact on the limit in the 500 kV system.

Key point to note:

- all interconnectors to and from Victoria are constrained;
- nearly all generation in the 220 kV network is constrained-on (shown in blue);
- the Latrobe Valley generation connected to the 500 kV network is not included in the equation (shown in green).

In this case, the Latrobe Valley generation is able to set the price in Victoria even though this generation can contribute significantly to the constraint. It is not clear why Basslink, which shares a common point of connection with the Latrobe generators, is constrained-off when the constraint binds.

Figure 3: Managing transient stability, Hazelwood to South Morang lines, Victoria



Improving the degree of transparency in the constraint setting process would make it clearer to all participants what are the reasons and circumstances for implementing alternative constraint equation formulations.

### Recommendation 7: Constraint formulation processes

Macquarie Generation welcomes the Commission’s recommendations for the development of guidelines outlining the methodology and process to be followed when developing, formulating and implementing constraint equations.

Macquarie Generation believes these recommendations could be strengthened by setting up an independent review and audit of existing NEMMCO processes. It is only through an independent process, conducted by a reputable organisation with no previous links with NEMMCO’s constraint formulation procedures, that participants would establish a high level of confidence that the constraint guidelines were thorough and reasonable.

The independent review should have a number of tasks.

First, the review should establish what are the objectives that the constraint formulation process is trying to achieve (as discussed in the previous section). The review should ensure that the constraint guidelines are targeted at achieving those objectives and place explicit limits on the circumstances in which NEMMCO is able to alter constraint formulations.

Second, the review should examine the costs and benefits of current NEMMCO practices. For example, the review should consider whether the current treatment of coefficients for inclusion in constraint equations for both generators (0.07 after scaling) and interconnectors (0.1 after scaling) are appropriate. The question needs to be asked whether these coefficients could be raised to reduce the impact of constraining-on and -off on the price setting mechanism without jeopardising the objectives of the constraint formulation process.

The review should also consider the statistical basis for calculating coefficients. The current process examines load flows when constraints bind, producing a precise number that involves some form of averaging across multiple scenarios. Such a process does not take account of the inherent variability in the coefficient under different market conditions – different demand levels, patterns of generation, interconnector flows. Many small coefficients (often calculated to the fourth decimal place) may, in reality, have no impact at all on the binding constraint under most load flow scenarios.

Third, the review should include an audit of existing NEMMCO operations to determine if NEMMCO is following its internal protocols and procedures for the implementation of constraints. This would include a review of the process for determining line flows, development of coefficients and process for preparing constraints. The audit should include a sample of different constraints to assess overall compliance.

Macquarie Generation considers that some of the high level constraint guidelines should be incorporated in the Rules. This would ensure that any proposal to amend the guidelines would be subject to the rigours of the Commission's assessment process. Given the important role constraint coefficients have in determining the impact of equations, the Rules could specify the process for calculating constraint coefficients and the process for deciding whether particular power station units are included in constraint equations.

Macquarie Generation would welcome the opportunity to meet with the Commission to provide further information on some of the matters raised in this submission.

Yours faithfully

A handwritten signature in black ink, appearing to read 'Russell Skelton', with a long horizontal line extending to the right. To the right of the signature is a vertical red line.

RUSSELL SKELTON  
MANAGER, MARKETING & TRADING

4 December 2007