NEMMCO

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Management Company Limited
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Sydney

13 April 2006

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

Dear John

Submission on the Congestion Management Review

Thank you for the opportunity to make a submission on the Congestion Management Review Issues Paper (Issues Paper).

This submission covers the three matters of:

- Specific network issues that the current approach to congestion management has failed to adequately address;
- Problems and issues with the current approach to managing congestion in the NEM and some indication as to the materiality of these problems; and
- Options for improving the management of congestion in the NEM.

Key views that NEMMCO has expressed in the submission are:

- there are no material problems in managing the security of the power system with the fully co-optimised or 'option 4' approach to constraint formulation;
- there is merit in extending the use of Network Service Agreements as a tool to manage congestion;
- there could be practical problems on the timing of transmission investment with the other processes to manage congestion; and
- that the CSP/CSC arrangements increase complexity and the ability to operate multiple concurrent schemes is yet to be tested.

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NEMMCO

Further details regarding the above are in the attached submission.

NEMMCO would be pleased if you could have these matters considered by the Commission. For further details, please do not hesitate to contact Sean Buggy on (02) 9239 9121.

Yours sincerely

Brian Spalding

Brian Spalding
Chief Operating Officer

SUBMISSION

1. Specific network issues that the current approach to congestion management has failed to adequately address

There are a number of approaches to identifying specific issues of congestion within the network. This submission illustrates two potential approaches:

- the first draws on the 2005 Annual National Transmission review[1], which forecasts potential congestion areas and possible sites for augmentation;
- the second lists interaction between high priced events and congestion for a single month to demonstrate potential ways of quantifying the effects of congestion.

Appendix 1 of this submission contains details of further information that NEMMCO can provide to the AEMC for the purposes of this review.

ANTS forecasts of potential congestion

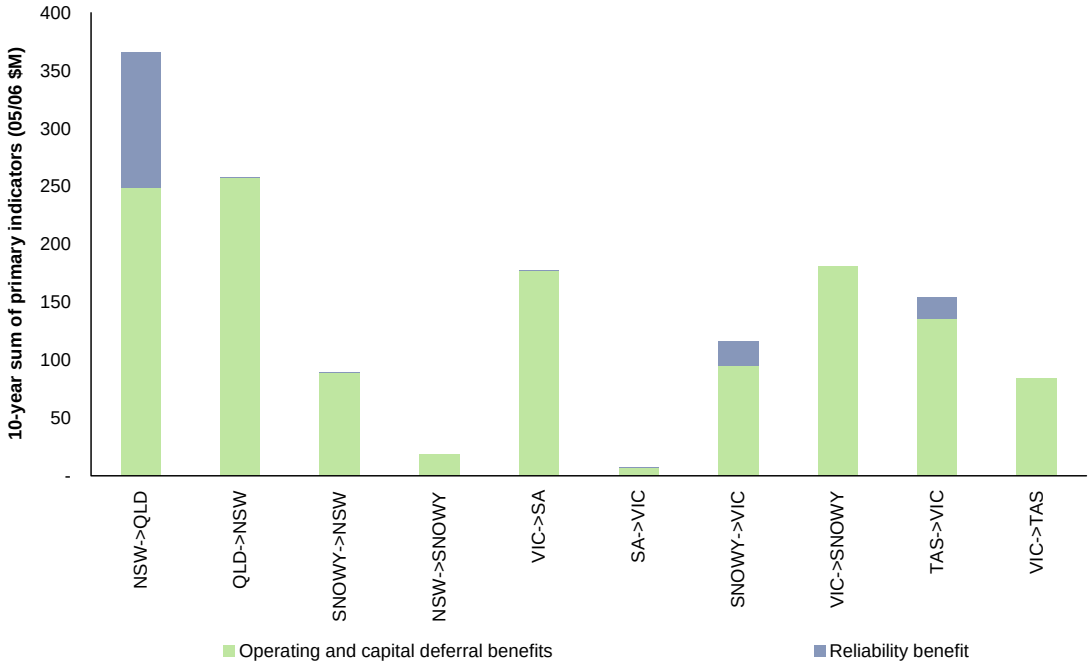
In addition to the Issues Paper (page 15) reproduction of the hours of binding constraints, the SOO also provides a number of approaches to measuring the costs of congestion for investment purposes. While not directly answering questions such as 'What is the nature and materiality of constraints in the NEM', the ANTS uses market simulations of 'system normal' conditions to forecast future network congestion and quantifies the benefits and costs for future augmentation.

The ANTS provides an integrated overview of the current state and potential future development of National Transmission Flow Paths (NTFPs) (or the portion of network used to transport significant amounts of electricity between load and generation centres). The ANTS also considers the current capability of the network and the historical utilisation and incidence of congestion.

'Primary' indicator forecasts are presented in the ANTS to measure the economic cost of congestion on NTFPs in terms of supply reliability, generation investment and generating operating cost . These are shown in Figure 1.

[1] Published in 2005 Annual Transmission Statement (ANTS), which forms part of the 2005 Statement of Opportunities (SOO)

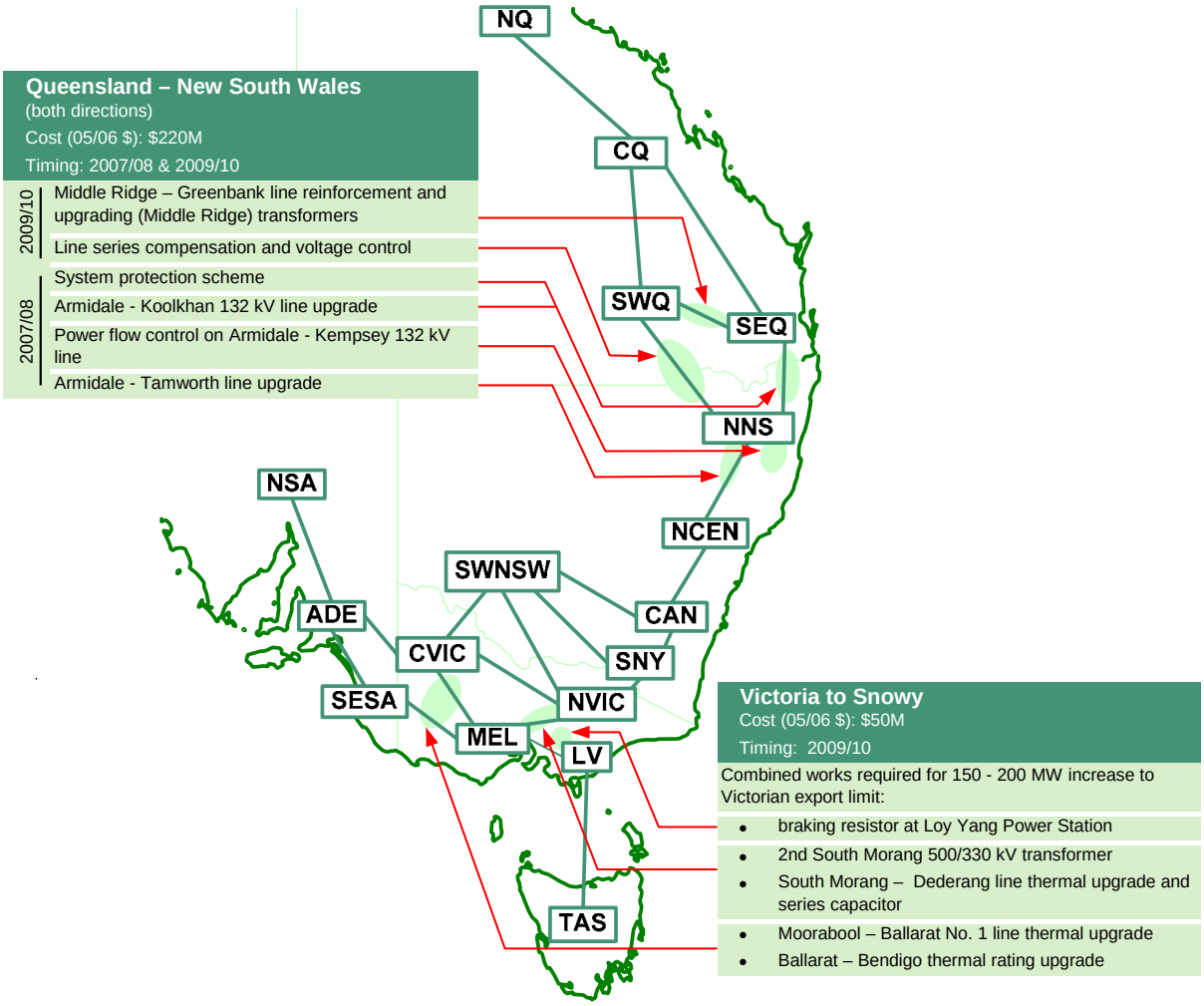
Figure 1 Primary Indicators: Total Market Benefits Allocated to National Transmission Flow Paths Linking Regional Reference Nodes



The ANTS and the Inter-Regional Planning Committee's verification studies[2] identified conceptual augmentations which are upgrades to the transmission network that would reduce the most significant sources of congestion, thereby reducing some of the identified costs to the market. The verification studies presented two conceptual augmentations (see Figure 2) where the simulated market benefits from reducing congestion are greater than the augmentation costs. A number of these network upgrades have now been progressed through the regulatory approvals processes and some are committed.

[2] Inter-Regional Planning Committee, Assessment of the 2005 ANTS conceptual augmentations: Verification Studies, 8 February 2006.

Figure 2 Conceptual augmentation indicative scope, timing and costs



Residual potential benefits exist where:

- network augmentation has not been identified as being economic; or
- conceptual augmentations that have been identified and that proceed do not relieve all congestion and hence do not capture all the potential benefits.

NEMMCO believes that a congestion management regime should aim to capture some of those residual benefits.

A congestion management regime may be an economically efficient way of capturing some of these remaining market benefits if it was capable of increasing the network limits that lead to the congestion for a lower cost than network augmentation. The Network Loading Control Ancillary Service between Snowy to Victoria is an example of such a regime.

Interaction between high priced events and congestion

When analysing historical data on specific network issues, emphasis should be placed on separating congestion that arises from:

- whether the power system is operating under 'system normal' conditions[3];
- whether any outages are planned or forced.

As can be seen in Table 1 below, congestion arising from Outages can have a severe effect on Spot prices, be infrequent and unpredictable.

It may not be practical to develop specific congestion management tools around past cases of material congestion arising from outages, as the combination of events that produced the material congestion may not be reproduced. The time period below was taken for indicative purposes. This table could be prepared for more months if requested by the Commission.

Table 1 Interaction of high priced events for the period of 10 January 2006 to 28 February 2006

Date	Max Price $/MWh	Duration when and Re Prices > $300	Regions in which Prices > $300	Causes	System Normal or Outage
16/01/2006	3279.33	0.5	South Australia	- Invocation of a constraint set in preparation for the testing of the new Very Fast Runback Scheme	Planned Outage
19/01/2006	549.83	1.5 hr	South Australia	- Limit on Murraylink and Heywood interconnectors due to planned network outages	Planned Outage
	4087.28 4519.47 4900.00	1.5 hr	Snowy Victoria South Aus	- High Vic & SA demand due to high temperature - Reoriented Murray-Tumut constraint – to manage negative residues - High price offers from unconstrained Snowy units	System Normal
20/01/2006	2,715.10 2,995.17 3,067.41	3.5 hr	Snowy Victoria South Aus	- High Vic & SA demand due to high temperature - Reoriented Murray-Tumut constraint – to manage negative residues - High price offers from unconstrained Snowy units	System Normal
21/01/2006	2,675.12	1.5 hr	South Australia	- Binding interconnector limit - Increase in SA demand due to high temp	System Normal
22/01/2006	910.96	1 hr	Tasmania	- High temperatures reduced the dynamic ratings of some transmission lines combined with limited ramp rates from some generators - High demand due to high temperatures	System Normal
	304.72	1 hr	South Australia		System Normal
23/01/2006	870.51	1 hr	South Australia	- High demand due to high temperatures - Snowy to Victoria interconnector limit	System Normal

[3] That is equipment that is normally operated in service is actually in service, and equipment that is normally operated out of service is actually out of service

Date	Max Price $/MWh	Duration when and Re Prices > $300	Regions in which Prices > $300	Causes	System Normal or Outage
26/01/2006	2,279.97 7,416.16 7,758.08	2.5 hr	Snowy Victoria South Aus	- High demand due to high temperature - Binding Murray-Tumut constraint	Forced Outage
02/02/2006	9157.27 9738.95 7440.00 371.63	4.0 hr 4.0 hr 2.5 hr 0.5 hr	QLD NSW SNOWY VIC	- High demand in NSW - Voltage stability limiting northern QLD generation - Reoriented Murray-Tumut constraint	System Normal
07/02/2006	1075.52	1.0 hr	Tasmania	- Loss of both Farrell-Sheffield lines limiting West Coast generation and FCAS supply	Forced Outage
19/02/2006	1693.24	0.5 hr	QLD	- High demand in QLD - Transmission outages in QLD	Planned Outage
23/01/2006	2919.93 923.01	2.0 hr 1.0 hr	Victoria SA	- High demand in Victoria region - Simultaneous planned outages on Wagga-Yanco line (NSW) and Robertstown transformer (SA) – close to the two terminals of MurrayLink	Planned Outage
24/02/2006	9134.14 957.02	2.5 hr 0.5 hr	Victoria SA	-High demand in Victoria region -Simultaneous planned outages on Wagga-Yanco line (NSW) and Robertstown transformer (SA)	Planned Outage

2. Problems and issues with the current approach to managing congestion in the NEM and some indication as to the materiality of these problems

2.1 Constraint Formulation and system security

The issues paper requests comment on the effectiveness of 'option 4' constraints. For the avoidance of doubt, NEMMCO refers to these as 'fully co-optimised' constraints.

NEMMCO's view is that there are no material problems with the fully co-optimised approach to constraint formulation to managing system security and reliability. Since the introduction of the fully co-optimised approach there has been a significant reduction in the need for NEMMCO to manually intervene[4] to preserve power system security. In particular reformulation of the Murray/Tumut constraint list[5] to fully co-optimised constraints has reduced or almost eliminated the number of times that NEMMCO must intervene to control the flows between Murray and Upper and Lower Tumut Switching Stations to within the required secure limits.

2.2 Efficient signals for investment

The Issues Paper[6] asks whether it is possible that locational signalling of congestion within regions could yield the investment response of:

- increasing supply (by investment in new generation); or
- reduce demand (through investment in demand side management or alternative embedded energy sources),

NEMMCO's view is that efficient signalling for delivering investments should be considered separately to managing congestion. It is likely that direct benefits for managing congestion via locational price signals would be realised during the dispatch time-frame. In contrast investments signals can be external to the operation of the NEM during the dispatch time-frame. Investment signals include:

- availability to fuel over the assets life (oil, coal, gas or renewable sources);
- access arrangements (to the fuel source, to the demand point through the network);
- technology and operational agreements; and
- regulatory structures.

Although the proximity of the new generation system to the transmission network will be a factor of consideration in the construction of a new generation system, the cost of transmission and hence its signalling for investment is more often a weaker signal than the cost of the fuel source itself. In other words, often it is more expensive to shift the fuel source through railways for coal and pipelines for gas than it is to extend the transmission network to the new power station.

Also as TNSPs are obliged to meet reliability requirements through their licensing arrangements, statutory obligations and items under schedule 5.1 of the Rules, there is a strong driver for them to

[4] Through the use of 'discretionary' constraints that impose temporary fixed limits on interconnectors.
[5] As defined in clause (f) of Part 8 Network Constraint Formulation of the Participant Derogations in the National Electricity Rules (Rules).
[6] AEMC, Congestion Management Review Issues Paper, March 2006, Page 28

remove the congestion between new generation and demand points. Therefore the investment in new network is likely to be subject to the location of new generation rather than the location of new generation being subject to the existing position of the network.

Information regarding the possible positioning of new generation in the NEM can be found in the 2005 ANTS. The SOO and ANTS also provides approximate capital and short run marginal costs (SRMC) for new generators in various locations across the NEM.

Currently the regional pricing of demand and the inelastic nature of that demand would suggest that most residential and commercial retail customers are not heavily influenced by either the price of the wholesale market or the congestion management regime. With the implementation of smart meters to promote customer responsiveness these trends may change, however this would be through a change of technology, not the process of managing congestion. The main group of customers that may be influenced by a congestion management regime would more likely be large energy users that depend heavily on energy and would be impacted by changes to either the reliability or price of that energy.

2.3 Inter regional settlements residue

The Issues Paper[7] outlines that some participants have expressed concerns on the non-firm nature of inter-regional settlement residue (IRSR) units. Consideration of any proposal to 'firm' IRSR units should recognise the value of the market based approach through which the Settlement Residue Auction currently addresses lack of 'firmness'.

An important consideration here is whether a central provider of firm IRSR Units could do this more efficiently and effectively than the market. NEMMCO believes that, on balance, this is not likely to be the case.

The current market mechanisms of the Settlement Residue Auction process are:

- the Settlement Residue Auction process is voluntary;
- the SRA Information Memorandum[8] (Information Memorandum) seeks to inform existing or potential Auction Participants, that purchase of IRSR units does not represent a firm hedge against inter-regional price risk; and
- there are options available that Auction Participants can adopt to deal with lack of 'firmness' of IRSR units which are described below.

Under the heading of Short-term Operational Risks the Information Memorandum points out that:

> it is important to recognise that the IRSR for a Unit will be calculated on the basis of the actual flow of electricity across the relevant interconnector, which is limited by the actual capacity of the interconnector….the capacity of an interconnector is represented by constraint equations in force at that time, and will vary depending on a variety of factors.

An Auction Participant could respond to the lack of 'firmness' by:

1. purchasing a higher number of units than is needed to cover the underlying financial contract. Creation of a such a buffer will assist an Auction Participant's hedge against inter-regional price risk if the flow across the interconnector is limited (it does not help if the interconnector is opened completely);
2. submitting a bid price that reflects the utility of an IRSR Unit's lack of 'firmness';

[7] AEMC, Congestion Management Review Issues Paper, March 2006, Page 7
[8] NEMMCO, Settlement Residue Auction Information Memorandum dated as at 1 July 2005, page 51

3. purchasing a firm product in the secondary market. NEMMCO's understanding is that the secondary market may provide financial products of this nature. While not a direct indicator of the existence of a secondary market in firm inter-regional risk management products, there are a number of financial institutions listed within the category of Trader on the NEMMCO Registration List[9];

4. contracting in particular forms with parties on either side of the interconnector.

2.4 Certainty and transparency

NEMMCO views the 'Improve certainty and practicality' theme[10], as a central contributor to a more efficient operation of the NEM. NEMMCO supports any further suggestion or ideas that will provide greater clarity and transparency of NEM operations without compromising power system security or commercially sensitive information for participants.

There is a significant amount of technical knowledge that participants must acquire to understand the operations of the NEM. It is recognised that participants did have some initial difficulties understanding the outcome of fully co-optimised constraints. In response NEMMCO developed the educational course 'Network and FCAS Constraints' which is a two day workshop, presented by NEMMCO operational staff and delivered to participants and NEM stakeholders.

While the introduction of fully co-optimised constraints as acknowledged above, did introduce some initial difficulties in participant understanding, the reduction in NEMMCO intervention has made the dispatch outcomes more certain, as indicated at section 2.1 of this submission.

[9] NEMMCO, Registration List, March 2006
[10] AEMC, Congestion Management Review Issues Paper, March 2006, Page 8

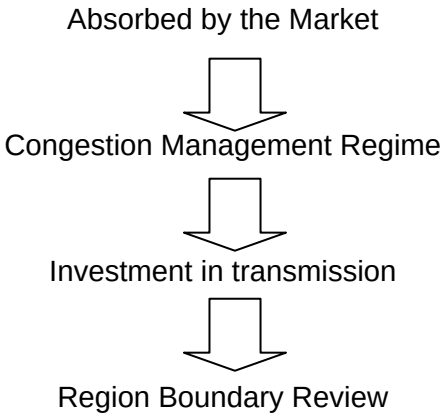
3. Options for improving the management of congestion in the NEM

3.1 A staged approach to congestion management

Introduction

This Issues Paper outlines the staged approach to congestion management (staged approach) on page 37. Allowing the cost of congestion to be absorbed by the normal operation of the market is the first stage. If the congestion can be remedied within the stage, then it will not be necessary to progress to the next stage. If the congestion cannot be remedied then management of congestion is escalated to the next stage, until reaching the final available step of Region Boundary Review. Figure 3 lists the order of each stage.

Figure 3 Summary of the Staged Approach to Managing Congestion



Early within the Issues Paper (page 11) the point is made that:

> It would not be cost effective to eliminate all transmission congestion as this would lead to over investment in transmission capacity. The costs of doing so would be prohibitively high compared to the likely benefits.

The staged approach recognises that different responses are required for differing levels of congestion. There is also merit in the staged approach's focus on cheaper, less disruptive options early in the management of congestion. For instance the Constraint Support Pricing/Contract Support Pricing (CSP/CSC) regime aims to make the best possible use of the existing network to manage material congestion within the dispatch time-frame.

When these have been exhausted, more permanent structural measures to manage congestion over a longer time frame are considered. Instead of immediately building out the congestion or changing the region boundary, there is an orderly path where lower cost options of managing the congestion within the dispatch time frame are exercised first.

Although NEMMCO supports the overall approach, the remainder of this section addresses issues arising from a number of the stages.

Congestion management regime

Due to the unproven nature of CSP/CSC arrangements as acknowledged in the CRA[11] paper, as quoted in the statement below, a conservative approach for any further implementation of CSP/CSC arrangements should be exercised:

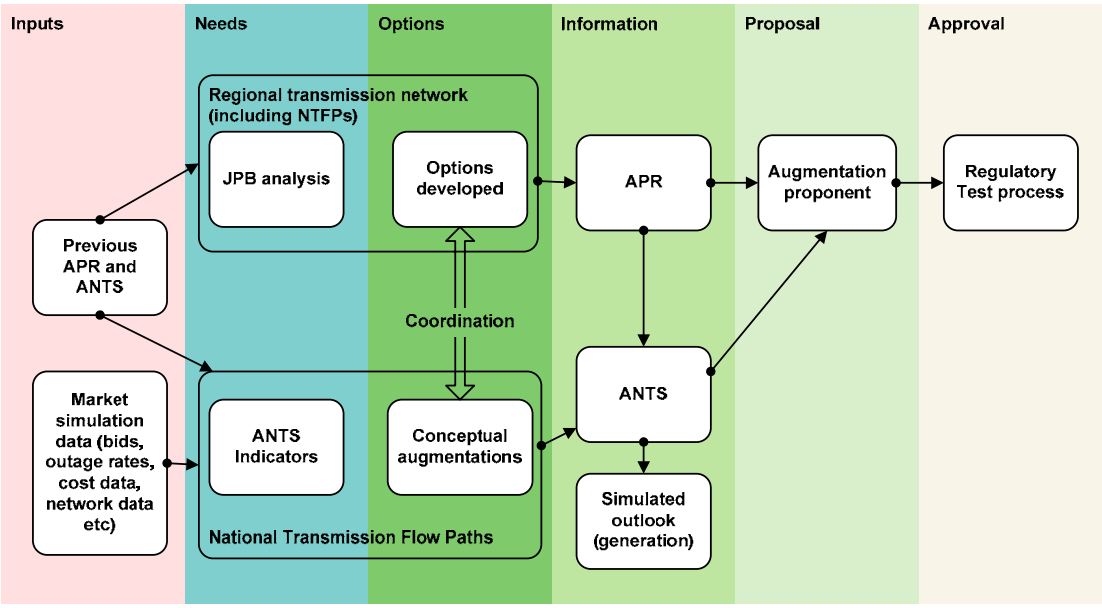
> "We have noted that the regime is unavoidably unique to the NEM"

This arrangement is discussed in more detail at section 3.6 of this submission.

Investment

The Staged Approach has the investment stage sitting between the congestion management regime and the region boundary change. While the triggers for the congestion management regime and region boundary change are to some extent compatible, the process for investing in the network is driven by the Regulatory Test[12] which is the last step at Figure 4.

Figure 4: - The National Transmission Planning Process[13]



Development of a transmission augmentation is a significant exercise that requires numerous processes to be addressed. While congestion may represent a reason for the proposal, it is not formally identified within the Regulatory Test. The staged approach seems to have made a presumption that timing and outcomes of the Regulatory Test will naturally flow between the congestion management regime and region boundary change stages.

Intuitively the broad outcomes of the Regulatory Test should be consistent with the staged approach. However without a definite linkage to bind the Regulatory Test with the staged approach, there is a risk that the Regulatory Test will operate independently of the congestion management regime and region boundary change stages.

[11] CRA, NEM- Transmission Region Boundary Structure, September 2004
[12] ACCC, Review of the Regulatory Test for Network Augmentations, August 2004, Page 77
[13] NEMMCO, Statement of Opportunities, 2005, Chapter 7 page 4.

The Issues Paper made a reference that investment could be facilitated by the Commission invoking the Last Resort Planning Power (LRPP) process. A reading of the factors relevant to the implementation LRRP[14] arrangements lists:

- the LRPP is expected to be exercised rarely;
- the LRPP is to be exercised only where normal market arrangements have failed to provide efficient and timely incentives for the assessment of transmission projects…;
- the LRPP does not extend to directing actual investment to occur.

In light of the above statements the exercise of the LRRP does not seem to represent a practical linkage between the Regulatory Test and the staged approach.

Consistent terminology would also assist integrating the Regulatory Test with the staged approach.

The terms 'material' and 'enduring' are used as the triggers for progressing through the staged approach. A congestion management regime is introduced when congestion is 'material'. The proposed Rule change from the MCE on Reform of Region Boundaries also makes reference to the terms 'material' and 'enduring' through:

- the AEMC basing its determination on whether the region change is likely to result in a material and enduring net economic benefit;
- an applicant that proposes a region change must lodge an application that contains a detailed analysis of whether the region change is likely to result in a material and enduring net economic benefit.

In contrast the Regulatory Test which is reproduced below[15] has no reference to 'material' and 'enduring'. The Regulatory Test uses the term 'maximises the net present value of the market benefit'

> The Commission has determined that the regulatory test is as follows:
>
> A new interconnector or an augmentation option satisfies this test if it maximises the net present value of the market benefit having regard to a number of alternative projects, timings and market development scenarios; and
>
> An augmentation satisfies this test if –
>
> (a) in the event the augmentation is proposed in order to meet an objectively measurable service standard linked to the technical requirements of schedule 5.1 of the Code – the augmentation minimises the net present value of the cost of meeting those standards; or
>
> (b) in all other cases – the augmentation maximises the net present value of the market benefit having regard to a number of alternative projects, timings and market development scenarios.

It is conceivable that congestion maybe deemed 'material' and 'enduring' within the staged approach, but the market benefit of the investment to relieve the congestion may not satisfy the Regulatory Test. This is because it is not clear that staged approach tests for 'material' and 'enduring' are aligned with the Regulatory Test.

[14] Ministerial Council on Energy, National Electricity Rules – Rule Change Application Last Resort Planning Power, October 2005, page 3

[15] [15] ACCC, Review of the Regulatory Test for Network Augmentations, August 2004, Page 77

One discrepancy could be where congestion is deemed by the staged approach as 'materially' disadvantaging a participant. In this case the Regulatory Test may recognise that an investment would remove the disadvantage being suffered by the participant, but it may view there is no change to the market benefit as there would be merely a wealth transfer from other participants to the disadvantaged participants.

Region boundary change

NEMMCO acknowledges that a region boundary change is the final stage available to manage congestion. Placing the region boundary change as the final stage, signals that this stage will not be used frequently to manage congestion.

Not only will participants experience disruption, but NEMMCO will also be required undertake a number of tasks to prepare for a region boundary change. To illustrate these steps an excerpt from NEMMCO's submission on the Snowy Hydro and Macquarie Generation proposed region change is reproduced below:

> "At a minimum a region change may require NEMMCO and TNSP's to re-interpret existing limit equations and NEMMCO to re-formulate constraints and recalculate intra regional loss factors.[16] If either proposal introduces loop flows, fundamental changes to the dispatch algorithm or more complex constraint equations may be involved."

If the staged approach is to be formally adopted to manage congestion, further work is required to address the presumption made in the Issues Paper that where congestion is both material and enduring, investment in transmission may be justified.

3.2 Constraint Formulation

As stated at section 2.1, since the introduction of fully co-optimised constraints, there has been a reduction in the need for NEMMCO to manually intervene to preserve power system security. One benefit is that participants can expect flows to be in accordance with the constraint equation, as opposed to unexpected outcomes from manual intervention. This benefit is consistent with the theme of improving certainty and transparency for participants.

The disadvantage in moving away from a fully co-optimised approach to constraint formulation, is that the power system reliability and security maybe compromised requiring increased intervention by NEMMCO. Such a result would conflict with the Issues Paper[17] theme that:

> The Commission will be conscious that any proposed changes to the congestion management regime should not result in any degradation of system security.

Process of implementing the fully co-optimised approach

The Issues Paper acknowledges that the fully co-optimised approach to constraint formulation was selected after a detailed assessment of the alternatives and consultation with stakeholders. NEMMCO would like to take the opportunity of outlining the details of the process and the status of the implementation of the fully co-optimised approach to date.

The process started on 10 January 2003 where NEMMCO described problems encountered with existing network constraint equations used to manage network limitations within the Snowy Region. NEMMCO proposed a change in formulation of the relevant network constraint equations and sought feedback regarding that proposal.

[16] The reason for changing limit equations is to better express the physical capability of the plant rather than a change to the physical network.

[17] AEMC, Congestion Management Review Issues Paper, March 2006, Page 9.

On 3 March 2003 participant comments were sought on a draft report setting out the proposed test that NEMMCO would use to identify constraints that deserve immediate attention, the proposed nature of any changes and the process by which the proposal would be implemented.

Having taken the second round of feedback into account NEMMCO issued a Final Report on 27 June 2003. The final report established a specific test to determine consistently when a network constraint is to be considered ineffective. If the constraint was judged ineffective NEMMCO would reformulate the constraint as an 'option 4' type with both intra-regional generation and interconnector terms on the left hand side. The final report also set out a consistent trigger for initiation of action to manage counter-price flows and a policy to ensure that, as far as practical, consistent action is undertaken to minimise counter-price flows.

Subsequently participants were notified that the Murray/Tumut fully co-optimised constraints were implemented on 12 November 2003. NEMMCO had consistently raised concerns with the lack of policy clarity on the formulation of constraints and on 20 May 2005 the MCE issued a statement on NEM Electricity Transmission that stated:

> All constraints should be developed in a consistent form. A form of constraint equation that allows NEMMCO to control all the variables (ie a fully co-optimised direct physical representation) should be adopted by NEMMCO.

NEMMCO provided an implementation plan for the required changes to constraint equations that was to commence on 4 July 2005. The plan allowed twelve to eighteen months to convert existing system normal constraint equations to fully co-optimised formulations.

Conclusion

To review the case for the fully co-optimised constraint formulation when NEMMCO is in the ninth month of an expected eighteen month process of implementing the fully co-optimised approach to constraint formulation, would be a retrograde step for the management of system security and reliability in the NEM. In conclusion the fully co-optimised approach to constraint formulation has:

- improved management of system security and reliability; and
- been implemented using a comprehensive consultation process.

Note on moving terms from the right hand side to the left hand side

The Issues Paper put forward the example of moving some of the variables in the constraint equation to the RHS to remove the potential for counter-price flows.

Any movement of terms from the right hand side (RHS) to the left hand side (LHS) might reduce the number of instances that NEMMCO intervenes to minimise negative residues. However such an approach is also likely to increase the number of instances where NEMMCO intervenes to restore power system security.

NEMMCO would like to clarify that the allocation of variables to either the LHS or RHS is in strict accordance with the Network and FCAS Constraint Formulation Policy[18]. The methods to manage negative residues is set down in the Operating Procedure[19].

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[18] NEMMCO, Network and FCAS constraint formulation, July 2005
[19] NEMMCO, Operating Procedure Dispatch, SO_OP3705, 14/03/2006, Section 6

3.3 Counter price flow management

Introduction of the National Electricity Amendment (Negative Inter-Regional Settlements Residue) Rule 2006 No.4, may provide scope for NEMMCO to increase the threshold at which constraints are applied to prevent accumulation of negative residues. Increasing the threshold will reduce the number of times it will be necessary for NEMMCO to 'clamp' the flow on the relevant interconnector, resulting in more efficient dispatch and pricing outcomes. The current threshold is $6,000[20] of the accumulated forecast value of negative residues over the period of counter-price flows.

Efficiency of the Settlement Residue Auction (SRA) process will be enhanced by the new Rule's measure to reduce the length of time that NEMMCO is required to accrue negative residues. Under the previous method of funding, there was a time lag of up to two years between when a large negative residue occurred and when recovery via auction fees was completed.

Recent years of negative residues that have been carried forward by NEMMCO are listed below[21]:

- $624,000 in 2003/2004;

- $908,000 in 2004/2005; and

- $2,602,000 in 2005/2006.

The new Rule will allow NEMMCO to recover negative residues against the proceeds of the next auction, which means that the time lag should be reduced from up to 2 years down to 3 months. It is expected that the reduction in liability and associated interest costs will allow NEMMCO to consider increasing the threshold at which constraints are applied to prevent accumulation of negative residues.

3.4 Firming up IRSRs

One of the examples put forward by the Issues Paper[22] would require NEMMCO to 'firm' IRSR Units when the flow across the interconnector is limited. The design of any process to enable the IRSR Units to be firmed would need to ensure that NEMMCO does not hold any residual risk and that any such role by NEMMCO was reconciled with NEMMCO's core responsibilities of managing the electricity market and maintaining power system security.

In accordance with NEMMCO's understanding of the role of the secondary financial market, perhaps the more appropriate place for assigning the risk of 'firming' IRSR units remains with companies where actively managing financial risk is inherent to their operation

[20] NEMMCO, Operating Procedure Dispatch, SO_OP3705, 14/03/2006, pg29
[21] NEMMCO, Proposed Change to Settlement Residue Auction Clause 3.6.5, February 2005
[22] AEMC, Congestion Management Review Issues Paper Sydney, March 2006, Page 41.

3.5 Network support agreements (NSAs) and network control ancillary services (NCAS) contracts

NSAs

Not only has the incidence of binding constraints fallen significantly since the introduction of the NSAs signed in 2002 in the far north Queensland area[23], but as can be seen in Table 2 taken from the SOO, the number of times NEMMCO was required to direct plant in the Queensland region has also been reduced.

> In January 2002, Powerlink Queensland entered into network support agreements with generators in northern Queensland. This reduced the frequency of directions in that region.[24]

Table 2 QLD Region Number of Finalised Directions where compensation was paid[25]

	2001	2002 before 9/12*	2002/3 after 9/12	2003/4	2004/5
Incidence of Finalised Directions where compensation was paid	135	13	5	8	8

* Note that prior to 9 December 2002 Directions were categorised according to: Power System Security or Reliability. Following changes to Code arrangements effective on 9 December 2002 Directions were categorised according to: energy, ancillary services, or other services.

Under Clause 4.8.9 of the Rules, NEMMCO may direct market participants for the purposes of:

- maintaining power system security, or
- maintaining supply reliability.

NEMMCO directs market participants when:

- there is a security or reliability requirement; and
- the market is unable (for example, due to a lack of sufficient warning) or unwilling to respond.

[23] AEMC, Congestion Management Review Issues Paper Sydney, March 2006, Page 58.
[24] NEMMCO, Statement of Opportunities 2004, 2004, Page 58
[25] NEMMCO, Statement of Opportunities 2004, 2004, Page 17-21 – for data prior to 09/12/2002
NEMMCO, Statement of Opportunities 2005, 2005, Page 13-19 – for data after 09/12/2002

NSAs are used to avoid transmission constraints binding under system normal conditions. Compared to NEMMCO using directions to manage the security and reliability, the adoption of NSAs in northern Queensland presents the following benefits:

1. NSAs pay participants to make their plant available to provide Network Support. The ability to plan the operation of plant in a manner to support the network, is likely to be more cost efficient than compensating directed plant. For instance maintenance of plant may be planned around the conditions stated in the NSA. Compensation paid to directed participants may have to reflect extra costs that have been incurred due to operating the plant unexpectedly and at short notice

2. A more varied range of plant is available to support the network. Due to the short notice of a direction, directed plant is concentrated on those types that can respond quickly such as gas turbines, rather then coal fired plant. NSA's allow a range of plant to support the network which could lead to more cost effective mix of plant being used to avoid the constraint binding;

3. The reduction in the incidence of directions means that dispatch outcomes are more predictable and certain.

NEMMCO supports further investigation of extending the existing NSAs as a congestion management tool. NSAs also fit logically with the Regulatory Test[26] requirement to have regard to 'market development scenarios' when testing the market benefit of an augmentation option.

Under the Regulatory Test Transmission Network Service Providers (TNSP) would be able to regard NSAs as a 'market development scenario'. When determining the market benefit of an augmentation option against the alternative of an NSA, the TNSP could trade off the NSA with the network agumentation via the Regulatory Test.

Currently TNSPs are able to enter into NSAs to satisfy their statutory obligations, obligations under schedule 5.1 of the Rules, and licence conditions. Costs can be recovered from the network users in the area requiring the NSA as a prescribed service.

The recovery mechanism is not as clear if the use of NSAs was to be extended to relieve congestion arising from inter-regional constraints. There are no incentives currently for TNSPs to procure NSAa which will deliver benefits to regions outside their own. In this scenario the NSA would have to be underpinned by appropriate financial arrangements, and recognition would also have to be given in the contracting TNSPs various obligations and licence conditions.

NCAS

With regard to NCAS, NEMMCO supports further investigation in expanding TNSP responsiblities to procure NCAS. Some considerations are outlined below.

Potential services to meet power system security and reliability standards include:

- Generators delivering on performance standards specified within connection agreements with TNSPs;

- TNSP infrastructure;

- TNSP contracts with third parties to provide grid support;

- NCAS contracts.

[26] ACCC, Review of the Regulatory Test for Network Augmentations, August 2004, Page 77

Current responsibility for operating a reliable network is shared by TNSPs and NEMMCO along the following broad lines:

- in satisfying their statutory obligations, obligations under schedule 5.1 of the Rules and licence conditions TNSPs are responsible for ensuring an intra-regionally reliable network at expected peak demand; and

- Rule clause 3.11.3(b) requires NEMMCO to be responsible for ensuring a system-wide secure and reliable network at all times, including managing interconnector transfer capability.

It could be argued that the current arrangement is not precise and there is some overlap between the roles of NEMMCO and TNSPs. At present NEMMCO is reliant upon TNSPs to advise the combined TNSP/Generator reactive capability. NEMMCO can then procure (via tender) the residual between that capability and NEMMCO's assessment of the total reactive requirement at any specific network location.

Increasing the role that TNSPs have in procuring NCAS would be expected to provide TNSPs with increased accountability to:

1. negotiate NCAS contracts at a cost that reflects the value of service compared to the alternate services the TNSPs have available to meet power system security and reliability; and

2. manage the network in a manner that will directly utilise the NCAS services that have been negotiated.

One of NEMMCO's current roles is to procure NCAS to enhance network transfer capability. Measures for TNSPs to procure NCAS to manage interconnector capability would have to be considered for any new arrangement.

Consideration could also be given to making TNSPs responsible for funding NCAS as the relevant services are applied to managing network capability. A methodology would need to be developed to ascribe NCAS costs for each location to an individual TNSP. Those costs could be built into the existing Transmission Use of System (TUoS) charge to be recovered by the TNSP. Allocating recovery of NCAS to manage interconnector capability would also have to be addressed in this methodology.

Prescribed transmission services are defined in Chapter 10 of the Rules as:

> Transmission services provided by transmission network assets or associated connection assets to which a revenue cap applies.

TNSPs are able to earn revenue through:

- the regulated stream of providing Prescribed transmission services;

- or an unregulated stream, for services where the TNSP does not have a monopoly.

If TNSPs procured NCAS, and NCAS was classified as a prescribed service NCAS could also be recognised in the Regulatory Test. This would allow trade off between procurement of NCAS and network augmentation via the Regulatory Test.

TNSPs procuring NCAS instead of NEMMCO would result in procurement being decentralised over a number of TNSPs. Because each TNSP may have differing interpretations of the power system conditions that are to be applied in assessing voltage control capability requirements, NEMMCO may need to maintain a role as 'procurer of last resort' to ensure that the procurement outcome is consistent through out the NEM.

Under the Rules NEMMCO has a requirement to prepare a report on NCAS whose terms of reference are at Rule clause 3.1.4(a1)(4). Such a review could potentially explore some of the considerations mentioned above. Commencement of this report has been deferred so that it does not overlap this Congestion Management Review. NEMMCO will welcome any guidance from the Commission arising from this Review, which could assist in clarifying the scope of the NCAS Report.

3.6 Introduction of new arrangements – CSP/CSCs

NEMMCO has implemented the Snowy CSR/CSC Trial in accordance with the derogation. The lessons that could be taken from the Trial are that:

- both CSP and CSC calculations exceed the complexity of other settlement transactions such as: Energy Sales/Purchases, IRSR, FCAS Sales/Purchases etc;
- CSP/CSC arrangements may need to be customised to the individual case of congestion the arrangement is seeking to address. While high level principles could be applied to each case of congestion, it is unlikely that a generic CSP/CSC transaction could be applied to multiple cases of congestion;
- evaluating costs and benefits arising directly from the Snowy CSP/CSC trial are difficult to measure. Any methodology should include reviewing the bidding behaviour of generators, both directly and indirectly involved with the arrangement. Isolating behaviour that has been influenced by the arrangement and projecting the behaviour that would have occurred if there was no trial could also be explored.

The explanatory text prepared by NECA on the CSP/CSC Trial Derogation[27] proposal refers to the trial as a "partial or simplified form" of the CSP/CSC framework. The Trial is simplified through:

- directly involving only one generator that contributes to the constraint; and
- not having a CSC arrangement for Northerly flows.

Given the complexity of the current trial, a move to implement multiple CSP/CSC arrangements using:

- different combinations of Inter/Intra regional constraints, and
- multiple generators contributing to a constraint

may compound the level of complexity that NEMMCO would have to address in implementation. Potentially the complexity that a participant will need to confront would also increase, when understanding and predicting the likely effects of congestion.

Thought should also be directed to the risks of multiple CSP/CSC arrangements operating simultaneously throughout the NEM. Not only would the incentive signals of individual CSP/CSC arrangements need to be considered, but the potential for conflicting interaction of signals between CSP/CSC arrangements would also need to be identified.

Where there are multiple generators contributing to a constraint, the allocation of Constraint Support Contracts could become a contentious matter. Contention could arise if the CSC was viewed as wealth transfer between competing generators, where one generator gains access to the Network at the expense of another. Reservations were expressed in the CSP/CSC Trial Derogation proposal:

[27] NECA, Despatching the market Constraint Support Pricing and Contracting Trial at the Tumut Nodes, Feb 2005.

There has been no considered conclusion yet reached in relation to CSC allocation or baselines

NEMMCO can see merit in further investigation of the suggestion in the Issues Paper that generators be settled according to locational marginal prices, while customers continue to pay for electricity based on zonal prices. Such an arrangement could potentially introduce the signalling benefits of the CSP but in a more transparent manner than provided through the CSP approach. This is because locational marginal prices would be applied consistently to all generators, at all times, while the CSP only applies to those generators included in the arrangement at times when the constraint included in the arrangement binds.

An additional benefit from such a generation only locational pricing regime, would be to address congestion arising from outages. In section 1. of this submission, it was recognised that material congestion can arise from outages. One limitation of CSP/CSC arrangement is that they can only be introduced when there is some foresight on where the congestion will arise. The lead time required to set up a CSP/CSC arrangement means that it is not practical for the arrangement to alleviate congestion that arise from outages.

The difference between the locational marginal price applied to generators and the zonal price paid by customers may increase risk in bilateral contracting between generators and customers. When addressing a proposal of this nature, consideration would have to be given to a mechanism to address this risk. Appendix 6 of the Issues Paper identifies that the Pennsylvania – New Jersey, Maryland (PJM) Market has adopted full nodal pricing in conjunction with a Firm Transmission Right regime. Implementation of a FTR regime resembling PJM's may introduce challenges similar to those faced by a CSC arrangement.

Additional information that can be provide to the Commission on request

ANTS related Data

The ANTS also contains results on 'secondary indicators' that provide measures of future interconnector use and network congestion, this data can be large in volume and so is not practical to include as part of the submission. However it can be made available to the Commission on request.

The secondary indicators include:

- flow path utilisation curves: This indicator shows the expected distribution of transfers on each interconnector for a particular study year.
- flow gap: This indicator shows the difference between the maximum constrained and unconstrained transfers on each interconnector. It attempts to determine how much extra transfer would occur if the interconnector constraints were relieved;
- constrained hours: This indicator shows the expected number of hours that interconnector transfers are limited by a network constraint. Separate indicators are produced for each direction of transfer.
- average price differences: This indicator shows the average price difference (positive and negative) between adjacent regions when the network is constrained.

The ANTS also identifies those constraints that are forecast to bind at times of unmet demand. Relieving these constraints can potentially improve reliability. The potential reliability benefit of relieving these constraints is alos estimated in the ANTS. This information could be made available to the Commission on request.

NEMMCO also has available historical information describing the level of congestion of the NEM. The information available to NEMMCO to determine the level of congestion includes the:

- amount of use of interconnectors;
- history of constraints group on an intra and inter-regional basis;
- NEMMCO directions to market participants under Clause 4.8.9 for the purpose of power system security and reliability; and
- amount of Inter-regional settlement residues.

This information is available in chapter 13 of the 2005 SOO (including the ANTS) and NEMMCO update constraint histories on a regular basis and provides this information to the market in the form of market notices.

Market Event involving generators being 'constrained on' and 'constrained off'

NEMMCO Communication No. 2094 - Power System Incident Report 31st October 2005, issued on 6 April 2006 contains an illustration of a generator being 'constrained on' and 'constrained off'.