Australian Energy Market Commission

WHAT ARE THE BENEFITS OF GETTING PRICES RIGHT? TRANSMISSION PRICING

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About the AEMC

The Council of Australian Governments, through its Ministerial Council on Energy, established the Australian Energy Market Commission (AEMC) in July 2005 to be the Rule maker for national energy markets. The AEMC is currently responsible for Rules and policy advice covering the National Electricity Market. It is a statutory authority. Our key responsibilities are to consider Rule change proposals, conduct energy market reviews and provide policy advice to the Ministerial Council as requested, or on AEMC initiative.

Introduction

The National Electricity Market (NEM) incorporates the interconnected electricity system across south-eastern Australia. Prices in this market are determined in real-time on a half-hourly basis at each regional reference node (RRN), with each region and RRN broadly corresponding to each State and its capital city, respectively. The exception is the Snowy region, encompassing the Snowy mountains area in southern NSW, which has its own regional price.

The NEM is an 'energy-only' market, in that no separate payments are made in respect of the provision of generation capacity – all plant are compelled to recover their revenues through the relevant spot price and the surrounding derivative contracts they choose to enter. It is also a gross pool market. This means that almost all energy consumed at any given time is settled through the centrally managed spot market. Forward trading occurs with reference to these spot prices. e.g. through 'contract-for-differences'.

Under the NEM governance structure, as laid out in the National Electricity Law (NEL), the Australian Energy Market Commission (AEMC) is the Rule-making body for the market. However, this role is not 'at large' – we are required to operate within defined limits. These are:

- To undertake reviews as directed by the Ministerial Council on Energy (MCE) or of the AEMC's own accord;

- To assess Rule change proposals from any person, the MCE or the Reliability Panel against the NEM objective and Rule-making test;

- And crucially, to NOT initiate Rule changes ourselves, except in certain limited circumstances.

The statutory structure for AEMC decision-making was a deliberate choice intended to provide greater regulatory transparency and predictability to the market. It means we have to take the NEM largely 'as we find it' unless specifically asked to consider more fundamental market design change options.

The NEL requires the AEMC, in exercising any of its functions, to have regard to the NEM Objective in section 7 of the NEL:

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

The AEMC has interpreted the NEM objective as having three broad components:

- Economic efficiency in the context of the electricity market – with efficiency comprising productive, allocative and dynamic dimensions;

- Reliability, security and safety of electricity services – but noting their interactions with economic efficiency, particularly in relation to reliability; and

- Good regulatory practice and consistency with the policy direction of the market – this refers to the importance of predictability and directional consistency of change or intervention in the market design or operation.

Importantly, distributional outcomes are not a discrete component of the NEM objective. However, the Commission considers distributional issues to be important in so far as they may affect the stability of the NEM arrangements.

Another key feature of the NEM objective worth emphasising is that it clearly has a much broader focus than productive or static dispatch efficiency alone. The Commission needs to also consider matters such as trading and investment implications as well as the implementation and transitional costs of any decision.

1 Network congestion

A reliable supply of electricity to end-users requires supply and demand to be matched at all times. The market and system operator, NEMMCO, performs this function through the application of its dispatch algorithm. This algorithm contains a representation of key loads and supply sources (namely, generation) as well as detailed information about the capabilities of the transmission network.

The objective function of NEMMCO's dispatch algorithm seeks to minimise the cost of serving load, based on participant bids and offers, subject to the limits of the transmission network. These limits are, in turn, based on technical criteria intended to ensure that the equipment can operate safely and securely. Failures of transmission equipment can have extensive impacts and impose very high economic costs. For example, both London and the north-east of North America experienced major power blackouts in August 2003. The North American blackout lasted several hours and affected some 50 million people.

Network congestion occurs when the optimal pattern of generation (based on bids and offers) to meet demand for electricity cannot be met due to transmission limits. The extent of network congestion thus depends on the interaction of consumer demand, the type and location of generation infrastructure and the nature and configuration of transmission assets operating in the market. Economic incentives for transmission companies have a big role to play in promoting network development and operation in such a way as to reduce the incidence and/or the cost of network congestion. The AEMC made a number of significant changes last year to the regulatory regime as it relates to transmission companies in pursuit of this purpose. However, even within a framework of efficient incentives for the providers of transmission services, there will be a degree of prevailing network congestion because it is unlikely to be efficient to seek to eliminate all congestion.

A challenge for any market design, or any process of development and evolution of the chosen market design, is therefore how best to manage the congestion that does arise. The NEM is no different.

2 The impacts of congestion

In a highly competitive electricity market, where bids closely reflect costs, one would expect that a bid-based merit-order dispatch would lead to the least-cost pattern of generation being run to meet demand. By implication, when network limits bind, higher-cost plant needs to be dispatched to meet load. To the extent this happens, the market experiences a productive efficiency loss compared to a situation where transmission limits do not bind.

In general, economists prefer to allow prices to allocate scarce resources (such as transmission capacity) rather than rely on administrative mechanisms. As between the RRNs in the NEM, congestion is 'priced' in that it is reflected in differences in regional reference prices (RRPs) set at each RRN. The RRP reflects the marginal cost of an additional unit of supply at the RRN. All generators and loads in the NEM are settled on the basis of their local prevailing RRP, leaving aside the current Snowy trial arrangements.

Over time, as a result of the competitive process, one would expect responses to these price signals reflecting rational profit-seeking behaviour. These responses might take the form of investment in new generation capacity in regions experiencing strong load growth, or investment in large load projects in regions that are generation-rich. Thus, price signals revealing information about the relative scarcity of supply in different locations can drive processes that support allocative and dynamic efficiency over time – and hence contribute to the 'management' of congestion.

However, while the boundaries of the original regions of the NEM were established to reflect major points of potential network congestion (i.e. where the level of interconnection was weakest or non-existent in some cases), current and future network bottlenecks may not occur at the same places. Under the current regional design of the NEM, congestion between the RRN and other locations (or 'connection points') within a region is not priced.

To the extent congestion is not priced, it can lead to a situation where the price at which participants are settled (the RRP) diverges from the hypothetical (or 'shadow') price that better reflects the local demand and supply conditions at the participant's location. Within the dispatch algorithm, it is effectively the comparison between a generator's offer price and its nodal shadow price that determines whether a generator is dispatched – if a generator's offer price is below its nodal shadow price, it will generally be dispatch whereas if a generator's offer price is above its nodal shadow price, it will generally not be dispatched.

Hence, congestion can lead to a situation where there is a potential disjoint between the price a generator receives for its output (the RRP) and the local shadow price that determines whether it is dispatched. This is what we mean by 'mis-pricing'. Mis-pricing creates dispatch (volume) risk for generators because it can leave a generator being exposed to:

- being despatched and being settled at prices that do not meet its incremental costs (ie it is 'constrained-on'); or

- missing out on being dispatched even though its offer price is below the RRP (ie it is 'constrained-off').

As a result of these exposures, mis-pricing can distort participant decision-making in both the short and long run. In the short run, mis-pricing can provide an incentive for generators to engage in non-cost-reflective 'disorderly' bidding, such as bidding -$1,000/MWh or $10,000/MWh to avoid being constrained-off or -on, respectively. This behaviour, which is distinguishable from the exercise of transient market power, can increase the underlying resource costs of supply. In the long run, mis-pricing may distort investment technology, location and timing decisions on both the supply and load sides of the market.

The degree of granularity with which congestion is priced is a key element of any market design. As noted above, the NEM design prices some but not all network congestion. Internationally, there are some markets (e.g. PJM) that price all congestion through nodal settlement of the spot market, and other markets (e.g. Great Britain) that do not price any network congestion through the spot market. In the British wholesale market arrangements, congestion is managed by the system operator through contracts with network users, including in the real-time 'balancing' market.

Market designs that explicitly price congestion, to a lesser or greater extent, expose participants to financial risks that needs to be managed. In particular, greater pricing granularity may lead to more extensive divergences between the price at which participants are settled and the price at which their derivative contracts are referenced. In the absence of any means of hedging this 'basis risk', generators may be reluctant to enter derivative contracts with counter-parties in different locations. Yet these derivative contracts are often the basis for important participant investment and operating decisions. For example, few (if any) retailers would be willing to sign contracts with end-use customers at fixed prices if they could not themselves hedge their wholesale costs of supply. Likewise, few (if any) generation investors would be willing to sink hundreds of millions of dollars of capital costs without some security as to their future cash-flows from operation. Consequently, the tools available for managing basis risk are another crucial part of the market design. It is no accident that market designs that involve highly granular pricing of congestion also tend to have sophisticated financial instruments (such as Financial Transmission Rights, or 'FTRs') to help manage this risk.[1]

In the NEM, being a zonal market where all participants are settled at the prevailing RRP, basis risk does not arise in relation to derivative trading within a region. However, basis risk does arise where participants enter derivative contracts with counter-parties located in other regions. The key instrument for hedging the basis risk of inter-regional price separation is the Settlement Residue Auction (SRA) unit. When there is price separation between NEM regions, dispatch will generally (but not always) result in electricity flows from lower-priced regions to higher-priced regions. When this occurs, a positive 'settlement residue' will be generated. Shares (units) in any residues that might accrue are sold for each directional interconnector between two regions on a quarterly basis. However, SRA units do not provide their holders with a 'firm' hedge, in that the units may not yield a return that compensates

[1] New Zealand is an exception.

holders for the full price difference between RRNs in respect of their notional quantity of MWs. This non-firmness may arise for several reasons, such as transmission outages (which reduce potential flows between regions) or because constraints elsewhere in the network lead to either 'counter-price' flows on interconnectors or the existence of RRP differentials even when interconnector flows are not at their notional limit (this is a volume risk not a price risk). A view on the 'correct' amount of congestion to price might be thus conditioned by views on the effectiveness of the risk management instruments available to market participants, and on views as to how complex the trading and risk management environment should be. This view might evolve over time as a market matures.

The extent to which congestion is priced in a particular market design might also be conditioned by perceptions of the scope for transient market power to emerge, and to be exercised. As more congestion is priced, generators will be settled at prices that more closely reflect the demand and supply conditions at their location. This might influence the competitive dynamics of how participants behave and hence how prices are established. On the one hand, more granular pricing may reduce the impact that the exercise of transient market power has on prices faced by market participants in other locations. On the other hand, generators facing a local nodal price may find it profitable to withhold production in order to prevent constraints from binding that might otherwise reduce their price. To the extent withholding occurs, and there would appear to be evidence that it does, it may diminish or reverse the productive and dynamic efficiency benefits of greater pricing granularity. This is an important practical consideration that the Commission has borne in mind throughout its congestion workplan.

Taking all of this into account, the use of prices to reflect and manage the risks of congestion can be viewed along a spectrum of trade-offs. At the one end, generation (and potentially also load) can face prices that reflect all congestion. This is often referred to as full nodal pricing. In such a market, mis-pricing is eliminated, which in turn eliminates dispatch risk and the perverse incentives for disorderly bidding. However, it creates more basis risk for market participant to manage. In such a market, to facilitate entry into derivative contracts, participants need to have access to instruments that enable them to hedge the basis risk arising whenever a constraint binds. These instruments need to be allocated to participants in some manner such as through auctioning or grandfathering, all of which raise complex competition issues. At the other end of the spectrum is a market with a uniform price in which no congestion is priced. In such a market, participants do not face basis risk but do face the dispatch (volume) risk of being constrained-on or -off when congestion occurs. The way in which participants manage dispatch risk can have detrimental effects on the efficiency of dispatch, but this needs to be offset against the reduced basis risk they face and the likely more liquid contracting conditions in which they can trade. The NEM is somewhere between these two extremes, with some pricing of congestion between regions and SRAs to help participants manage inter-regional basis risk.

This discussion illustrates why more granular congestion pricing might deliver economic benefits, but might also impose economic costs within the overall framework of economic efficiency. Further, we must be acutely aware that any process of evolution in the market design carries its own risks, both in terms of perceptions of regulatory risk and in terms of transition and implementation costs.

These are all important considerations in marrying the valuable insights that can be provided through economic theory and international experience, with the practicalities of how the NEM has been developed.

3 Current AEMC work program on congestion

Turning to the challenge of translating theory into practice, there are three areas of work relating to congestion currently being pursued by the AEMC:

- Snowy regional boundary Rule changes;
- MCE regional boundary criteria Rule change;
- Congestion management review (CMR).

The three Snowy region Rule change proposals all relate to the appropriate configuration of regional boundaries and other instruments to manage congestion arising in the transmission network in the Snowy mountains area. This congestion is widely regarded by market participants as the key (unpriced) material and enduring 'pinchpoint' of congestion in the NEM and hence warrants priority attention in conjunction with a more general review.

The MCE regional boundary Rule change refers to the formulation of the appropriate criteria and processes for changes to regional boundaries going forward. The existing criteria, which have been in place since the start of the NEM, are focussed on technical variables such as the hours of constraint or variations in loss factors and it is widely accepted that these ought to be replaced by criteria more focussed on economic efficiency.

The CMR is an overarching review of options for improved management of congestion requested by the MCE that is approaching the Draft Report stage.

With respect to the scope of the CMR, the Commission must adhere to the MCE's terms of reference. This makes clear that the AEMC is to develop an *interim* congestion management regime to better enable market participants to address the physical and financial trading risks that are associated with *material and persistent* congestion *prior* to consideration of the need for regional boundary change. In other words, boundary change – and the accompanying creation of a new RRN and RRP – is to remain the ultimate long-term response to material and enduring congestion. This, coupled with other MCE statements, suggest that a recommendation to adopt full nodal pricing would go beyond the scope of the review contemplated by the MCE.

In undertaking the CMR, as in all its work to date, the Commission has been mindful of the requirements of the NEM objective, including the need for our recommendations to reflect good regulatory practice. This implies the need for proportionality between the materiality of the issue at hand and the proposed response. By making sure our decisions are proportionate to the materiality of the 'problem', the Commission can reduce perceptions of regulatory risk

Therefore, the Commission has focussed considerable attention on the available evidence regarding the materiality of the prevailing level of congestion in the NEM. Materiality in this context refers to both the physical prevalence, location and duration of congestion, as well as (and perhaps more importantly), the economic efficiency implications of that congestion. The materiality of congestion has, in turn, guided the Commission's consideration of potential policy responses, including options for the more granular pricing of congestion. In exploring these options, the Commission has sought to go beyond theoretical analysis and debates and has paid particular attention to the practicalities of the different ways in which more granular pricing could be implemented.

Taking all of these factors into account, the AEMC recognises that an assessment of the case for a move to more granular pricing (or conversely, how much mis-pricing it is appropriate to tolerate) must involve a careful balancing of the benefits and costs involved. This is an empirical question to be answered by reference to the practical circumstances before us. Moreover, the Commission considers that an appropriate policy response to this empirical question assessed against the test of the NEM objective requires a medium to long-term review of ***all*** the relevant data, rather than emphasising specific short-term events or incidents in the market that may reflect particular market or system conditions and may be better addressed by subsequent competitive market responses.

4 Materiality of congestion

1.1 How prevalent is mis-pricing?

In the course of undertaking the CMR, the Commission has had the benefit of analysis of trends in the prevalence of mis-pricing by Dr Darryl Biggar as well as by NEMMCO.

Dr Biggar's analysis showed a rising trend in the number and hours of mis-priced connection points over the period 2003/04 to 2005/06. Whilst some of this was due to the accession of Tasmania to the NEM, he found that about 95 generator connection points had been mis-priced for more than 100 hours per year on average for those three years. Dr Biggar's analysis also indicated that the number of mis-priced connection points and the average number of hours of mis-pricing per connection point had increased rapidly over the period. Finally, Dr Biggar observed that the incidence of mis-pricing would not be eliminated by an increase in the number of regions in the NEM to seventeen.

NEMMCO's preliminary work on mis-pricing, prepared in March 2007, also identified an increasing trend in the NEM-wide incidence of mis-pricing from 2003/04 onwards. However, the analysis indicated that the number of connection points being mis-priced was fairly steady as between 2001/02 to 2005/06. Across all regions, the NEM-wide number of mis-priced connection points remained within a band of 120-140. The average annual duration of mis-pricing at each of those connection points fluctuated over the period falling from 160 in 2001/02 to 40 in 2002/03. This was followed by a gradual increase to just over 60 in 2004/05 and 110 in 2005/06.

In more recent work undertaken for the Commission (which will be published), NEMMCO distinguished between mis-pricing resulting from the binding of system normal constraints and mis-pricing resulting from the binding of outage constraints. This more recent analysis shows that mis-pricing due to system normal constraints has been fairly constant at 50 hours per year over the final three years of the study, with NSW, Queensland and South Australia experiencing an increase over that period and Victoria experiencing a sharp drop. The analysis also indicates considerable variation in system normal constraints across time and space during the period.

By contrast, NEMMCO's analysis also shows that there has been a significant increase in the amount of mis-pricing due to transmission outages, from 20 hours in 2003/04 to over 120 hours in 2005/06. The huge increase in the outage proportion of mis-pricing during 2005/06 is mainly due to a number of lightening events affecting flows between central and southern Queensland. It is relevant to note that mis-pricing and inefficiency caused by outage conditions may well require a different policy response to that which is appropriate for mis-pricing arising during system normal conditions. For example, the impact of outages may be more appropriately addressed through the TNSP incentive arrangements that are presently being progressed by the AER under the new Rules, rather than through more granular pricing.

Regarding the magnitude of mis-pricing impacts (in $/MWh) for different connection points, the analysis shows that the impacts vary substantially from year to year and across regions and connection points. The evidence suggests that many constraints have a relatively short life-cycle, in that they may lead to some mis-pricing for one or two years before being addressed by investment in transmission or generation infrastructure soon afterwards.

This analysis of the nature incidence location and duration of 'network' congestion in the NEM will have a direct bearing on the Commission's assessment of the need for and role and feasibility of a localised intervention mechanism to price material and enduring network congestion pending on investment response or a boundary change.

However, before coming to a view on whether there is a need for an appropriate policy response to the observed incidence of mis-pricing in the NEM, it is necessary to consider the economic efficiency costs it imposes.

1.2 What are the economic costs of mis-pricing?

While the indicators discussed above can provide important insights into the prevalence of network congestion and how it has evolved over time, they do not demonstrate the magnitude of the associated economic costs. The AER has published some interesting work in this regard, looking at the cost of all congestion in the NEM based on actual historical bids and offers made by participants. On this basis, the annual cost of congestion has been estimated to be in the range of $30-70 million per annum.

However, one of the difficulties in interpreting this figure is that it implicitly assumes that bidding behaviour by generators does not change between the two states of the world being compared, i.e. with and without network congestion. The discussion above indicates that there are likely to be incentives at the margin for generators to 'manage' congestion themselves through how they bid, e.g. to avoid being constrained-on or constrained-off. The AER analysis also assumed that bids and offers reflect underlying resource costs, which may not always be the case.

We have sought to shed more light on this question through our congestion management review. Specifically, we have commissioned economic modelling from our consultants, Frontier Economics, which estimates the productive efficiency costs of mis-pricing under an assumption of price-taking generator bidding behaviour. The states of the world being compared under this analysis are nodal versus regional pricing of generation. This analysis, which we will publish with our Draft Report in August, suggests a productive efficiency loss from mis-pricing in the order of $8 million per annum.

Through submissions to our consultation on the congestion management review, we have been provided with other modelling work seeking to characterise the dynamic efficiency impacts of 'mis-pricing'. This work seeks to analyse the impact of more granular spot market pricing (and transmission charging) on total capital and operating costs associated with transmission and generation investment in Queensland over a fifteen-year time horizon. We have given careful consideration to this work, and will present our views on its implications with our draft report. The study in question can be found on the AEMC website[2].

At the same time, we have noted the submissions of market stakeholders on the practical impacts of congestion on their operational and investment decisions. Obviously, not all participants share the same views on either the materiality of congestion or the appropriate policy responses. However, the majority of submissions have rated the impact of congestion as a second order priority compared to other concerns. For example, Stanwell said:

> "Based on a materiality assessment (current and future), dispatch risk due to network congestion is a second order issue for generators in Queensland. Instead, the regulatory risk associated with the outcome of the CMR (ie whether a specific scheme will be introduced in Queensland) is of greater concern… This particularly relates to managing basis risk under a congestion management regime and the impacts for contract market liquidity.[3] "

Other submissions have placed more weight on the materiality and impact of congestion in the NEM. For example, the Southern Generators' Group said:

> "Our conclusion from the existing analyses would be that there is strong evidence to suggest that congestion is having an impact on NEM efficiency and that this impact is likely to trend higher. Further work is required to measure this impact and to compare it to the potential cost of introducing new CM mechanisms.[4] "

The Commission is continuing to gather and analyse information on the incidence and economic impact of congestion in the NEM. This analysis is an important point of reference for the Commission in choosing between the available options for improving the market arrangements for managing congestion, having regard to the proportionality principle noted above.

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[2] See: http://www.aemc.gov.au/pdfs/reviews/Congestion%20Management%20Review/Issues%20Paper/Submissions/030International%20Power%20LYMMCO%20InterGen%20(Australia)%20TRUenergy%20AGL%20Hydro%20Hydro%20Tasmania%20Flinders%20Power%20Supplementary%20Submission%20On%20Future%20Efficiency%20Gains%20%2022%20December%202006.pdf

[3] Stanwell Corporation Limited, submission dated 11 July 2007, page 4.

[4] Southern Generators' Group submission on the CMR Directions Paper, April 2007, page10.

5 Options for Change?

In seeking to apply the NEM objective and the principles of good regulatory practice, we have utilised the available evidence on the prevalence and materially of network congestion as a critical input to our analysis. Different patterns of mis-pricing suggest different policy responses. For example, as noted above, mis-pricing associated with outages on the transmission system (e.g. in order to undertake scheduled maintenance) might be more appropriately addressed through incentive schemes for transmission companies to improve their management of outages rather than through changes to the way the wholesale spot market is priced and settled.

Further options being considered by the Commission in the context of network performance include greater facilitation of network control ancillary services procurement and provision to avoid congestion, as well as the removal of any remaining barriers to the use of network support agreements to avoid or delay the need for more expensive augmentation options.

The Commission also recognises that the publication of more timely and relevant information on constraints and mis-pricing may facilitate more timely and efficient decision-making by market participants.

In this regard, the Commission notes the Council of Australian Government proposal to establish a national transmission planning body which will provide a rolling ten year plan for the development of national flow paths and an improved information basis for network and generation investment by market participants.

With regard to options for introducing more granular pricing of material and enduring congestion, we have the benefit of a trial of one such scheme in the Snowy region, and the benefit of significant contributions from Charles Rivers Associates[5] and more recently in a consultant report to the Commission and from Dr Darryl Biggar.[6]

While I do not propose to comment on the specifics of these proposals in detail, given the stage of the Commission's work on its congestion management review and the pending Draft Report, I would like to make a number of observations that are relevant in considering the potential for such arrangements to contribute to the NEM objective:

- First, all the pricing options involve more locationally-specific settlement prices for generators (and potentially load). This gives rise to a basis risk management issue for those generators, to the extent they contract with participants who are located elsewhere and settled at different prices. The difference between settlement prices in different locations that occurs when constraints bind gives rise to a positive or negative value, which can be used to those offset or hedge locational price differences. The theoretical work of Read and Biggar set out potential ways in which these hedging instruments can be developed;

[5] Through their report to the MCE prior to the congestion management review being commenced.
[6] Through his Constraint Based Residues proposal.

- Second, any regime of more granular pricing of congestion, including one that is location-specific and time-limited will have to resolve a number of practical implementation challenges. The key challenges relate to matters such as:

  – The threshold or trigger for initiation;

  – Determination of which constraints ought to be priced and whether the regime should encompass only system normal constraints or outage constraints as well;

  – The duration of an intervention, or alternatively, the threshold for its removal; and

  – Most vexing of all – the mechanism for allocating the positive or negative sums produced by congestion in the form of rights and/or obligations to participants. On this matter, the options range from some means of grandfathering rights on the basis of historical dispatch patterns or rated capacity at one extreme to full auctioning of rights at the other extreme. The different options have differing strengths and weaknesses, including their implications for efficiency and competition, the associated incentives and capacity of participants to game the process and differing implications for wealth distribution and equity. Not all of these factors are directly relevant to the requirements of the NEM objective but they are all likely to raise thorny issues when applied to specific situations;

- Third, the insights that can be provided by the current trial in the Snowy region are quite limited. The trial represents a 'special case' in which many of the less tractable design issues are not present, e.g. there is only one generator involved and no practical scope for new generator entry, significant transmission investment or demand side response in the region.

6 Concluding comments

As I hope will have been revealed through the discussion above, congestion management is a difficult challenge in any market design, and applying the valuable theoretical insights to a 'live' market setting in a manner consistent with the requirements of the NEM objective and good regulatory practice requires careful consideration of materiality, costs and benefits at a detailed level. This has been the challenge for the AEMC in taking forward its work on congestion management through to the Draft Report, scheduled for August, and to completion in the form of a Final Report to the MCE by the end of 2007.

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