Improving Transmission Regulation and Network Congestion Management in the National Electricity Market

An address by John Tamblyn
Chairman
Australian Energy Market Commission

CEDA
Energy Reform Series
Sydney, 10 May 2006

Introduction

While substantial progress has been made in developing the Australian energy market since the reforms of the 1990s initiated by the Council of Australian Governments (COAG) and those undertaken following the December 2003 report to COAG by the Ministerial Council on Energy (MCE), further challenges remain for the reform agenda in delivering the objective of an efficient, reliable and secure energy market which serves the long-term interests of the Australian community.

This paper examines some of the remaining challenges for the Australian energy market in meeting the objective of efficient and reliable energy supplies and the contribution that the Australian Energy Market Commission (AEMC) can make in performing its role in the energy market.

As part of the new governance arrangements for the National Electricity Market (NEM) the AEMC is now well positioned to assist in meeting that objective through its function of energy market Rule-making, conducting market reviews initiated by the MCE, and energy market development more broadly.

Our role

In performing its role, the AEMC has adopted a conscious policy of consulting first with all stakeholders on the matters under review before conducting its analysis and reaching draft and final decisions. Our energy market work is also guided by two broad themes which are to:

- Provide greater clarity, certainty and consistency in the application of regulation through the Rule-making role; and
- Develop regulatory arrangements which provide a better alignment between the investment and operational incentives of transmission operators and the requirements and interests of market participants and energy consumers.

The AEMC now has before it a wide range of Rule change proposals and reviews which have the potential to impact directly on the efficient design and performance of the energy market in the medium and longer term.

It should be emphasised at the outset that the Australian energy market is currently performing very effectively as a result of the reforms and developments of the last 10 years.

The result has been the delivery of high levels of reliability and security of energy supply at internationally competitive prices – with substantial benefits to Australian households, industry and the economy as a whole

Significant challenges remain to be addressed in the next phase of energy market reform in order to ensure that the balance of energy supply and demand at competitive prices is maintained in the period ahead.

Forecasts of demand for and production of electricity and gas over the next 15-20 years indicate a requirement for substantial investment in electricity generation and gas production and in transmission and distribution infrastructure which must be sufficient to maintain the reliability and security of energy supplies in response to changes in the level and pattern of energy demand.

Maintaining reliable electricity supply

Taking this longer-term view, a priority issue for the NEM over the next 5-10 years is to ensure that the price signals and investment incentives provided by the market design and regulatory arrangements continue to bring forward appropriately timed, located and co-ordinated investments in both generation and transmission capacity that are sufficient to "keep the lights on" in the medium to long term.

This central performance objective for the NEM is a complex one to meet because of the hybrid design of the electricity market. The price signals and incentives that drive generation investment are provided by the competitive electricity wholesale market, while the incentives and obligations governing transmission investment are provided by the economic regulation framework, the periodic revenue cap decisions of the Australian Energy Regulator (AER) and the reliability requirements of the Rules and of relevant State and Territory legislation.

It will be essential therefore to ensure that the arrangements governing the operation of the wholesale market on the one hand and economic regulation of transmission on the other, are sufficiently well aligned and co-ordinated to ensure that the decentralised decisions of generators and the regulated decisions of transmission service providers result in both generation and transmission capacity being made available at the times and locations required to meet the future power demands of the market on an ongoing basis. The success of the regulatory framework and the market incentives in addressing these issues will have a direct bearing on the efficiency and reliability of the NEM in future.

Placing the focus on the need to maintain efficient, reliable and secure power supplies in the long term underlines the importance of the inter-relatedness of generation and transmission in the overall performance of the market. It also highlights the necessity of taking into account the interactions between generation and transmission in framing future policy, legislation and Rule changes and in the future administration of the wholesale market and power system and the economic regulation of the transmission system.

The principal elements of the AEMC's current work program enable us (and indeed require us) to take an integrated, market-wide view of the impact and effectiveness of the regulatory framework as a whole in facilitating the achievement of the NEM objective. This paper gives a very high level overview of the work program with particular reference to the AEMC's current work in reviewing the Rules for the economic regulation of transmission services and arrangements for the management of network congestion in the NEM.

The AEMC's current work program priorities.

The AEMC's current work program includes a number of priority projects which impact on three important and inter-related drivers of the performance of the NEM; network investment and operation, efficient operation and performance of the wholesale market and the reliability and security of supply. These projects include:

- A review of the Rules for the regulation of electricity transmission directed to facilitating efficient and timely investment in and use of transmission across the NEM while aligning

the long-term incentives of transmission service providers with other market participants including end-users;

- A review of options for the management of material network congestion in the NEM to improve the efficiency of despatch, pricing and risk management in the wholesale market;
- Rule proposals regarding the principles and processes for changing the boundaries of pricing regions in the NEM and specifically to change the boundary of the Snowy pricing region of the NEM which is subject to material network congestion; and
- A comprehensive review by the Reliability Panel of the settings which govern the overall reliability of the NEM bulk supply system.

This work will have direct implications for the efficiency of the transmission and generation sectors and the interactions between them and for the performance of the NEM in terms of efficient, reliable and secure power supplies into the future.

These projects are described in turn below to illustrate their linkages and their potential implications for the longer-term design and performance of the NEM.

Review of electricity transmission Rules

The National Electricity Law (NEL) requires the AEMC to review and rewrite to the extent necessary, the transmission regulation Rules of Chapter 6 of the National Electricity Rules (NER). The review is being conducted in two stages:

- First, the Rules governing regulation of transmission revenues; and
- Second, the Rules for transmission pricing.

The revised Rules are to commence on or before 1 January 2007 and the MCE has made a regulation to that effect.

The Rules for the economic regulation of transmission services have been a long standing challenge for the NEM. They have been the subject of extensive reviews by NECA and the ACCC, with the ACCC's Statement of Regulatory Principles (SRP) reflecting the current status of electricity transmission revenue regulation.

Regulation of access to essential infrastructure services has also been reviewed by the Productivity Commission, the Exports and Infrastructure Taskforce and the Expert Panel appointed by the MCE to report on energy access pricing.

Principal goal for the review of transmission revenue and pricing

The AEMC's principal goal for the review of Rules for transmission revenue and pricing is to establish in the Rules a clear and certain regulatory framework that facilitates efficient investment in and operation of transmission services that meet the technical, economic and commercial requirements of users of those services and of the NEM as a whole. To a large extent the AEMC has codified the provisions of the AER's Statement of Regulatory Principles (SRP) in the Rules in response to submissions to that effect from a majority of stakeholders and in order to increase the clarity, transparency and certainty of regulation and the accountability of the AER's processes and decisions.

Adopting a rules-based approach to transmission regulation in place of the previous guideline-based approach reflected in the AER's SRP is consistent with the separation of Rule-making and Rule administration that is a central feature of the new energy market governance arrangements which gave rise to the establishment of the AEMC and the AER.

Clarification of regulatory process and methodologies in the Rules was also supported by the Expert Panel that reported recently to the MCE on energy access pricing.

Key themes

The AEMC has identified the following key themes to guide the conduct of the review and they were reflected in the Rule Proposal it published in February for consultation with stakeholders.

First, the AEMC sought to provide greater certainty and transparency in regulatory processes and methods by:

- Specifying in the Rules the form of regulation to be applied in different market circumstances, the methodology for determining regulated revenues and the form of incentives to be adopted by the AER; and
- Codifying a propose-respond process and fixed timetables for regulatory decision-making by the AER;

Second, the Rule Proposal sought to establish a more certain environment for long-term investment in transmission services by:

- Specifying in the Rules the opening regulatory asset base (RAB) for each transmission operator and the process for rolling forward the RAB values (excluding the possibility of periodic optimisation of the RAB);
- Requiring the AER to accept the transmission operator's forecasts of capital and operating expenditure if the AER determines they are "reasonable estimates" on the basis of specified criteria; and
- Specifying in the Rules the method for determining the Weighted Average Cost of Capital (WACC) and fixing key WACC parameters for five years before they can be reviewed and changed by the AER.

Thirdly, and of most direct relevance to the theme of promoting better co-ordination of the investment and operating decisions of transmission operators and generators, the AEMC's Rule Proposal sought to achieve a closer alignment between the long term incentives of transmission operators and those of network users and end use customers by:

- Providing for presumptive approval by the AER of capital expenditure forecasts for projects that are either for reliability augmentations, to meet regulatory obligations or have passed the Regulatory Test; subject to review of the efficiency of the cost estimates by the AER on the basis of specified criteria;
- Requiring commercial negotiations between network operators, generators and large network customers where contestable or negotiated provision and pricing of services is feasible;
- Facilitating (through the role of the Regulatory Test in the revenue determination process) the adoption of non-network solutions to network congestion (eg, generation or demand side options) where they are economically feasible; and
- Providing incentives for network operators to deliver higher network availability and reliability at times of most value to market participants.

Submissions

A majority of stakeholder submissions were supportive of the general approach of the AEMC's Rule Proposal and many of the more detailed proposals it contained. However, concerns were raised in the submissions about a number of more detailed aspects of the Proposal.

The following were among the more substantive issues identified in submissions:

- Concerns were raised by a number of stakeholders about the degree of codification in the Rules of the regulatory processes and methodologies with a number advocating provision of greater flexibility and discretion for the AER in some respects. As noted above, the provision of clarity and certainty in the Rules about the regulatory framework and its application by the AER was a clear theme in many submissions and has been one of the goals for the conduct of the review. Nevertheless the AEMC will review the nature and extent of guidance that is to be provided to the AER in the Rules and will make adjustments where it considers that appropriate.

- Some stakeholders expressed concern about the feasibility and desirability of separately defining "prescribed transmission services" supplied by the shared network and "negotiated transmission services" supplied to dedicated customers under more contestable or negotiated conditions. Under the Rule Proposal only the former would be subject to revenue cap regulation, while the latter would be subject to commercial negotiation, or will be unregulated where the service is capable of competitive supply. The AEMC has formed a working group of market participants to advise it on the classification and definition of these different service types. The AEMC retains the view that it is desirable in principle to limit the application of intrusive forms of regulation to services supplied under conditions of monopoly or substantial market power and intends to develop definitions and processes to achieve that outcome in practice.
- Criticisms have been made of the AEMC's proposals for reopening of the revenue cap within a regulatory period in specified circumstances and to permit an ex post review by the AER of the prudencey of capital expenditure before it is rolled into the RAB. Some stakeholders sought reintroduction of the contingent project regime for large known but uncertain capital projects. This was part of the AER's SRP methodology but the AEMC had consciously omitted that feature from its Rule Proposal. The Commission will review these aspects of the Rule Proposal in the light of these stakeholder comments in order to assess whether any further modifications are warranted.
- Some submissions were also critical of the design, power and balance of the incentive arrangements specified in the Rule Proposal to encourage improved cost efficiency in capital and operating expenditure and improvements in the availability and reliability of network services. These are critically important elements of the economic regulation framework and the AEMC is reviewing those aspects of its Rule Proposal in the light of these submissions.
- There was general support for the AEMC's proposal to specify in the Rules the WACC methodology and certain WACC parameters, on the basis that they are to be reviewed by the AER after five years. A number of submissions welcomed the provision of increased certainty in the short term while retaining the flexibility for periodic adjustments in response to changes in financial market conditions.

While the AEMC remains open to varying the approach set out in its initial Rule Proposal in the light of the comments in stakeholder submissions, in framing the Draft Determination, it will continue to seek an appropriate balance between the need to:

- manage the market power of transmission operators;
- provide incentives for efficient investment and operations; and
- establish appropriate transparency and accountability obligations for the regulator.

As already noted, a particular theme for the conduct of this Review has been to develop regulatory arrangements which align the incentives and behaviours of transmission operators with the requirement of participants in the wholesale market and the interests of electricity customers. The alignment of incentives and co-ordination of activities of the transmission and generation sectors is particularly relevant in the management of network congestion in the NEM which is examined next.

Network congestion and regional boundary changes

The AEMC's work program also includes an MCE directed review of options for improving the management of network congestion in the NEM and Rule proposals seeking changes to the boundaries of NEM pricing regions in cases of material and enduring network congestion.

Network congestion occurs when the available network capacity is insufficient to permit the despatch of the least cost combination of available generation to meet demand across the NEM. Congestion can result in electricity spot price differences between NEM pricing regions, reflecting the despatch of higher cost generation in importing regions. Such regional price differences are intended to reveal the marginal cost of network congestion and to signal to

market participants when and where it would be efficient to invest to avoid the cost of congestion.

In the short run, options for managing the costs and risks of network congestion include financial hedges by participating in the settlement residue auctions (SRAs), by entering into bilateral contracts with other market participants or by contracting with customers to temporarily reduce their consumption.

In the longer run, the options include investment in appropriately located network or generation capacity, sustained demand side participation initiatives and non-electricity alternatives.

The regional pricing structure is a central design feature of the NEM. The boundaries of pricing regions were initially established at points across the NEM where transmission connections were weakest and network congestion was material and sustained. Change to regional boundaries provides one means of adapting to changes in the location of network congestion which is material and persistent. Boundary changes allow the cost of congestion to be priced transparently in the wholesale market and managed through financial hedges where investment to reduce or eliminate the congestion has been shown to be uneconomic.

Terms of reference

The MCE's terms of reference for the review of network congestion management options require the AEMC to address three key issues:

- Improved arrangements for managing financial and physical trading risks associated with material network congestion;
- Development of a regime to manage material network constraints until it is addressed through investment or regional boundary change; and
- The relationship between a constraint management regime, regional boundary review criteria and triggers, the Regulatory Test and the operational and investment incentive arrangements for network service operators.

Key themes guiding the Review

The AEMC has identified the following key themes to guide the conduct of the Review. It considers that an effective congestion management regime should:

- Improve the efficiency of the NEM – in the short run in terms of efficient despatch and pricing of congestion and in the long run in terms of efficient investment responses;
- Facilitate efficient management of the physical and financial risks resulting from network congestion; and
- Protect the security of the power system and the reliability of supply.

Network congestion and its consequences is another influence on the performance of the market which occurs at the intersection between the transmission network and the wholesale market. In developing measures to manage congestion, the AEMC will be taking account of the linkages and interactions between the two sectors, including the implications of its current review of the Rules for the regulation of transmission services.

The MCE has also submitted a Rule change proposal containing processes and criteria for assessing and deciding changes to the boundaries of NEM pricing regions. Under the proposal, the AEMC would assess any request for a boundary change against new forward looking, economically based criteria to determine whether the proposed boundary change is likely to result in a material and enduring economic benefit to the market.

The intention of this proposal is that regional boundary changes would be the last resort in a staged approach to network congestion management and would only be considered in cases of material and sustained congestion which had not been addressed effectively by other measures, including investment in network, generation and demand side measures.

It is worth emphasising here that network augmentation, (if it is found to be economic under the Regulatory Test) is an alternative to a boundary change as it would reduce or remove the congestion as a concern. However, if investment (network or non-network) is not an economic option and the congestion is material and sustained, a boundary change would be an appropriate response to enable the costs and risks involved to be priced transparently in the spot market. It is also worth noting that any transmission augmentation response would reflect the network business's response to the incentives and constraints imposed by the economic regulation framework, while a boundary change response would seek to manage the congestion through the wholesale market and hedge contract mechanisms. This is a further example of the important intersections between the transmission network and the wholesale market in the NEM.

Other Rule proposals

The AEMC is also processing two Rule proposals seeking alternative changes to the boundary of the Snowy pricing region to address the material and persistent network congestion that has been evident in the region for some time. Any changes made to the Snowy Region boundary as a result of these Rule change proposals could have implications for both spot prices and relative despatch volumes for generators trading in and through that part for the NEM. For various reasons, including the environmental sensitivity of the Kosciusko National Park, network augmentation to date has not proved to be a feasible response to the congestion.

The proposals are currently at the early stages of analysis and will be assessed against the NEM objective in terms of their potential contribution to improved efficiency in the NEM (efficient despatch and pricing) improved risk management, power system security and reliability of supply.

The AEMC's work on congestion management and regional boundary change is ongoing and is a further example of the need to recognise and address in the regulatory framework issues which involve complex interactions between the transmission network and the operation of the wholesale market. As with the regulation of transmission revenues and prices, effective solutions to network congestion will also require measures to better align the incentives provided to market participants through the operation of the wholesale market and those provided to network operators and users through the economic regulation framework.

While the reviews of the transmission regulation Rules and network congestion management arrangements should contribute to improved alignment and co-ordination between the transmission and generation sectors, it is also essential that the resulting outcomes are consistent with the delivery of a secure power system and reliable electricity supply at the standard expected by the community.

Review of the NEM reliability settings

As already noted, continuing reliability of electricity supply depends on adequate levels of generation and transmission capacity being available at the time and location required to meet consumer demands. Security of supply depends on that generation and network capacity being operated safely and securely within the technical limits of the plant and equipment that makes up the power system.[1]

Delivery of the levels of investment and performance required to maintain power system security and supply reliability involves the interaction of the decisions and actions of generators and transmission operators with the signals, incentives and obligations provided by the competitive wholesale market, economic regulation of the transmission network and the settings of certain technical standards and related obligations.

[1] Sufficient margin from the ultimate limits of the network needs to be maintained to allow for unexpected events such as plant failures to occur while maintaining the integrity of the power system as a whole.

The current NEM reliability settings are an important element of this broader framework of electricity market arrangements and comprise:

- An explicit reliability standard for NEM generation and bulk transmission (the bulk supply system) currently set at 0.002 percent of unserved energy over the long term;
- Price mechanisms designed to ensure that the wholesale market provides price signals sufficient to encourage the supply and demand side investment and usage responses required to meet the reliability standard comprising:
  - a price cap known as Value of Lost Load or VoLL and a market floor price; and
  - a cap on financial exposure known as the cumulative price threshold or CPT; and
- Intervention mechanisms which are set up as a last resort safety net to address potential short-term shortfalls of generation capacity relative to the NEM reliability standard:
  - A "reserve trader" mechanism through which NEMMCO can purchase in advance additional reserve generation or demand-side reductions; and
  - A power for NEMMCO to direct generators to provide additional supply to meet capacity shortfalls.

These short term intervention mechanisms are not designed to address investment shortfalls, but can require existing generation plants to be made available and operated. Measures are taken to minimise or eliminate price distortions when interventions occur. The reliability settings are inter-related. The reliability standard sets the level of reliability performance the market is expected to achieve over time (reflecting an assessment of the community's valuation of reliable power supply relative to the costs and risks inherent in its delivery). VoLL and CPT constitute a limitation on spot market price outcomes that are designed to provide the incentives for the market to invest to deliver the necessary generation capacity while managing the financial risks. The intervention mechanisms are available to address reserve shortfalls should the price mechanisms fail to deliver.

The AEMC has requested the Reliability Panel to undertake a comprehensive, integrated review of the effectiveness of these NEM reliability settings, including whether there is a need to improve or change them. The AEMC has called for this comprehensive review to ensure that the reliability settings to apply in future are appropriately aligned and integrated so as to promote efficient reliability outcomes that reflect the expectations of Australia's electricity consumers. The outcomes should ideally apply for a period of time into the future to provide a stable environment for investment to take place.

The reliability settings for the NEM will interact directly with the other NEM arrangements referred to in this paper – the Rules for the regulation of transmission services and improved arrangements for the management of network congestion.

Some concluding observations

> "Electricity supply is fundamental to our industry and lifestyle. Its cost is a key determinant of the economy's cost structure and an important source of our competitive advantage. As our economy and population grow we will need more investment in our electricity supply."[2]

Clearly, the Australian community and economy need to be assured of efficient, reliable, affordable electricity supplies today, tomorrow and into the future and that the investment and operating decisions required to deliver it will be made in an efficient, timely and co-ordinated way.

Rule makers and regulators do not make the investments in infrastructure or produce and transport the electricity needed to power Australian businesses and households over the long-term. That is done by energy businesses who respond to the demands of their customers and

[2] Reforming and Restoring Australia's Infrastructure; Report prepared for the Business Council of Australia by Port Jackson Partners Limited, P.8

the risks, incentives and signals provided by the energy market and the regulatory framework that governs it.

However, Rule makers and regulators have a very substantial influence on the behaviour and actions of energy businesses and customers and so, on the efficient and reliable long term performance of the market. These influences are through the development of the Rules that govern the market (in the case of the AEMC) and the administration of those Rules (in the case of the AER and NEMMCO).

The AEMC understands this and is currently progressing a number of priority projects, which have the potential to improve the future efficiency and reliability performance of the energy market through their impact in better aligning the incentives and actions of network businesses and market participants and in increasing the clarity, certainty and consistency of the Rules and their administration by regulators.