

Electricity Supply Industry Planning Council

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PC2005/0037

14 November 2008

Dr J Tamblyn
Chairman
Australian Energy Market Commission
Level 5,
201 Elizabeth Street
SYDNEY NSW 2000

Dear Dr Tamblyn,

RE: REVIEW OF ENERGY MARKET FRAMEWORKS IN LIGHT OF CLIMATE CHANGE POLICIES

Thank you for the opportunity to contribute to the AEMC's consideration of the impact of climate change policies on the operation of the energy market.

It is the Planning Council's view that the basic structure of the Australian energy market has shown itself to produce efficient and reliable results and that a major shift in market policy is not warranted at this stage.

However, it is clear that the tightening of generation reserves and transmission capacity, in conjunction with the introduction of climate change mechanisms, will provide a significant challenge to existing market structures. Such a stress-test is likely to expose some weaknesses in the complex market arrangements and the Planning Council is encouraged that the AEMC is working to anticipate and correct those weaknesses before they distort the efficient operation of the market.

The Planning Council has addressed its thoughts under the eight key issues below. In addition to those specific comments the Planning Council notes that the Scoping Paper, as it stands, makes no explicit reference to the issue of cross-border transmission charges. The Planning Council sees this as a critical issue in any consideration of the

development of the national transmission network to accommodate renewable generation. It is inevitable that renewable generation will need to locate where the resource is most economic, which means that the transmission investment may need to be concentrated in a particular geographic areas. There are significant equity issues associated with building transmission assets to meet national targets, but having those assets funded by the customers in a single jurisdiction. Without addressing the issue of equity, the Planning Council is concerned that investment decisions may be skewed by jurisdictional interests and the reasonable protection of local consumers.

1. Convergence of Gas and Electricity Markets

1. *How capable are the existing gas markets of handling the consequences of a large increase in the number of gas-fired power stations and their changing fuel requirements?*
2. *What areas of difference between gas and electricity markets might be cause for concern and how material might the impacts of such differences be?*

The Scoping Paper takes the view that "*the effects of the expanded RET are more focussed on electricity markets.*" The Planning Council considers that the expanded RET scheme will significantly increase renewable generation. Many of the commercially available renewable generators produce a variable output that is likely to have a marked impact on the pattern of usage of gas in the market which will affect consumption patterns and hence the usage of production facilities and pipelines.

Subject to its final settings, the CPRS is likely to result in an increase in the relative contribution gas generation. The concurrent advent of more renewable generation could be expected to cause the demand on gas generators to be volatile and, to an extent, unpredictable.

The greater relative importance of gas and the need for gas generators to be more responsive has implications for investment in gas infrastructure, the operation of gas markets and the need for greater coordination between gas and electricity markets. Specific matters which we consider should be addressed in the study are:

- Do gas market arrangements provide sufficient price signals in regard to the market value of short term gas storage?
- Are the processes and procedures for assuring system security and reliability in the electricity market matched and appropriately integrated with procedures to ensure secure and reliable supply of gas? For example, the redundancy reliability associated with transmission assets in the electricity market is not matched by similar requirements on gas pipelines. As gas becomes more integral to electricity markets, a consideration of total reliability needs to be undertaken.

Investment in new gas plant also raises a number of issues with connection to the network and secure operation of the power system common to all new generation investment. These matters are discussed in more detail below.

2. Generation Capacity in the Short Term

3. *What are the practical constraints limiting investment responses by the market?*
4. *How material are these constraints, and are they transitional or enduring?*
5. *How material is the likelihood of a need for large scale intervention by system operators? How likely is it that this will be ineffective or inefficient?*

The Planning Council agrees with the matters the AEMC proposes to assess. An issue of particular concern is that of efficiently matching transmission investment to generation investment. The final design of the RET scheme has not yet been announced but there is the potential for a design that delivers a fast build-up in renewable generators in the next few years. A fast build up of renewable generation, coupled with the time taken to decide and deliver augmentations and extensions to the network, could lead to sub-optimal development of the overall power system. The potential problems are exacerbated by the likely need for changes to the regulatory arrangements for transmission investment, the time taken to make a decision to augment the system justified on the basis of market benefits and the time required to gain permits and build major transmission assets. Efficient investments in major transmission assets to support an efficient response to CPRS and RET will also require taking a truly national view of system development. The Planning Council notes that the first full national plan will not be produced until late 2010.

Despite the difficulty of the issue and the time constraints, the implementation of an efficient overall pattern of generation and network investment will be essential to minimising the cost of achieving the carbon abatement and renewable energy targets. The potential to make efficient overall decisions could be limited by the current application and interpretation of the Regulatory Test which excludes the value of additional Renewable Energy Certificates (RECs) a transmission augmentation might deliver. The AEMC might examine the potential benefits associated with changes to the Regulatory Test to allow the value of RECs to be taken into account in investment decision making.

In any event, the Planning Council would be concerned if the investment imperative to satisfy renewable targets resulted in a changes to the market objective which we consider raises other risks.

3. Investing to Meet Reliability Standards with Increased use of Renewables

6. *How material is the risk of a reduction in reliability if there is a major increase in the level and proportion of intermittent generation?*
7. *What responses are likely to be most efficient in maintaining reliability?*

The recommendations from the Reliability Panel's Comprehensive Reliability Review include ongoing review of VoLL and the CPT to reflect investment costs as they change over time. Clearly the environmental regulatory regime, the CPRS and the expanded RET scheme would be factors affecting new entrant prices in the NEM which should be addressed in such a review process. Approaches to efficiently manage congestion on the network and network investment are discussed under other sections of the Scoping Paper. These two matters should deal with most of the concerns related to investment from the point of view of maintaining reliability.

The Planning Council considers that the more pressing risk is to security rather than reliability. Changes should be considered to the market arrangements to maintain operational security and ensure investment in the necessary services to deliver that outcome.

4. Operating the System with Increased Intermittent Generation

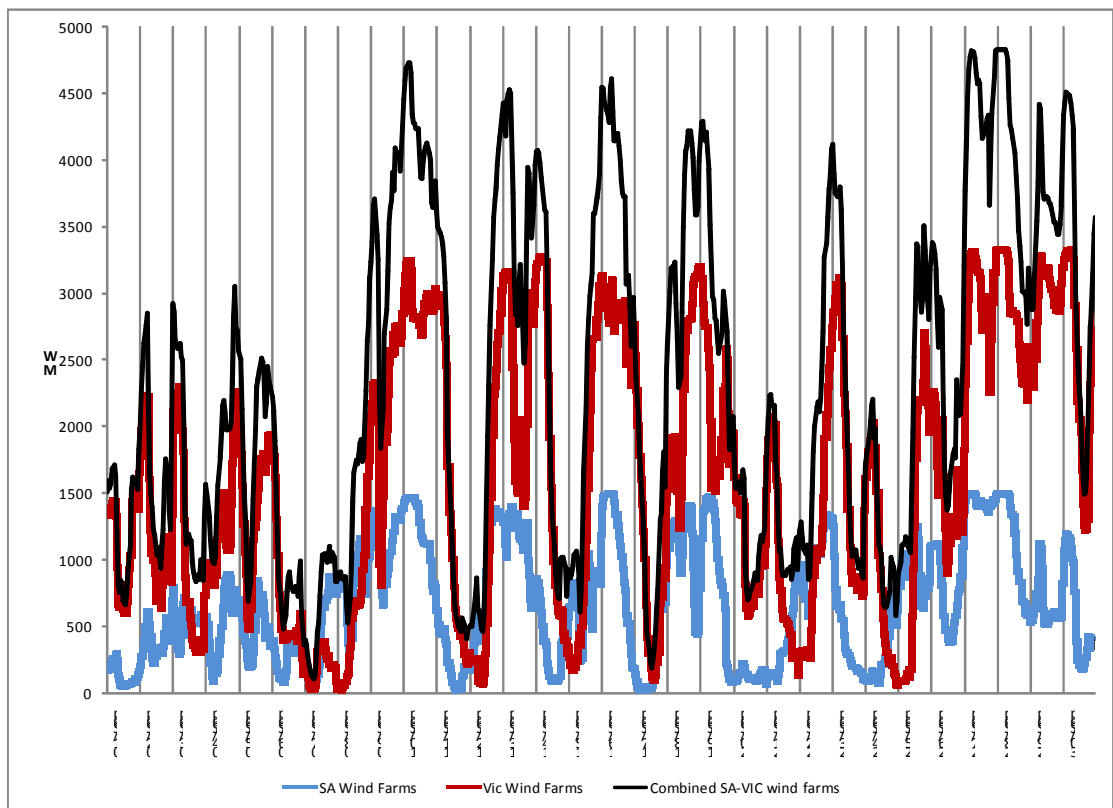
8. *How material are the challenges to system operations following a major increase in intermittent generation?*
9. *Are the existing tools available to system operators sufficient, and if not, why?*
10. *How material is the risk of large scale intervention by system operators and why might such actions be ineffective or inefficient?*
11. *How material are the risks associated with the behaviour of existing generators, and why?*

The Planning Council considers that the expanded RET scheme is likely to lead to very high penetration rates of wind generation in several regions of the NEM. South Australia in particular is likely to have a large percentage of its total installed capacity represented by wind, to the point where South Australia could have the highest level of wind penetration in the world.

The Planning Council therefore considers that the AEMC review should very carefully analyse the effects of large amounts of wind on the market arrangements and consider the ramifications of creating such an international precedent. The Planning Council has not seen any studies conducted to date that have sought to fully model and address all the issues likely to be raised in such a situation.

The Planning Council has been progressing studies on wind generation in the NEM for a number of years. We have recently commissioned more advanced modelling including new point modelling of wind resources from the CSIRO.

As an example of the work being undertaken, the following graph shows a typical trace of the aggregate wind output for Victoria and South Australia for one possible future scenario. The scenario envisages a total nameplate capacity of 1,500 MW of wind in South Australia plus 3,500 MW of wind in Victoria. The case uses existing and committed wind farm sites plus a selection of advanced wind farm projects to develop the case. We note that we are aware of wind farm projects being actively pursued that could supply significantly more than this scenario but the scenario was chosen on the basis of what many commentators would consider more likely.



The graph shows that although there is noticeable diversity between Victoria and South Australia, wind generation from both states frequently show significant correlation. The trace is based on the hourly output and the largest change from one hour to the next in this case is around 1,600 MW. When coupled to the natural variability in demand, the demand on other generators to respond to falls in wind output rises to around 2,100 MW per hour. Current experience suggests that as much as half of this response would be required in five minutes. Movements of this magnitude would be a challenge in the market especially at times where the capacity of other plant operating at the time is reduced by high wind generation levels. This analysis supports previous

work and is broadly consistent with the performance we see currently, albeit at a much reduced scale.

The risks that such a change would present would depend upon:

- the extent to which the change was predictable; and
- the market mechanisms employed to map the range of likely outcomes and ensure both adequate generation reserves and flexible generation resources were available to maintain security.

NEMMCO is well advanced in the implementation of the wind forecasting system (AWEFS) funded by the Commonwealth Government. The Planning Council considers that accurate forecasts of the median wind generation need to be promulgated to the market to achieve efficient commitment and dispatch of plant especially where that plant is slow start or energy constrained. For the maintenance of system security, the wind forecasting system needs to also be able to predict the range of likely wind generation outcomes and the risk of sudden changes in wind output. The forecasts developed need to be incorporated into market information and management systems to ensure the plant expected online over the pre-dispatch period has the capability to:

- maintain a minimum reserve margin to meet the expected load over a range of possible wind generation outcomes;
- provide sufficient inertia to meet very short term fluctuations in output and demand;
- meet requirements for regulating and contingency reserves; and
- provide sufficient ramp rate capability to deal with expected volatility beyond the five minute dispatch period.

In some of these areas, the Rules already provide sufficient scope for NEMMCO to use or modify existing procedures to efficiently integrate larger volumes of wind into the system. This Review ought to address, in particular, the need for any changes to the Rules to better deal with inertia and load following. Inertia is an important characteristic of some generation which has real value to the market. At this stage there are no provisions to pay for inertia or otherwise ensure its provision. Inertia terms are, however, sometimes included in market constraints are inherent in determining ancillary service requirements.

Load following in the Australian NEM is provided by the five minute dispatch and pricing approach. This approach is rare in market designs internationally and can lead to distortions. Arguably it under-rewards flexible plant providing the service and over-rewards others generating at the time. The disjoint between pricing on the 5 minute dispatch interval and settlement on the 30

minute period has been identified in the past as being a potential source of distortion. The higher variability from one five minute to the next which is expected with a higher concentration of wind generation seems likely to exacerbate the issue. The AEMC review should consider alternative arrangements including the potential costs and benefits of moving to a 30 minute pricing for most plant and 5 minute dispatch and settlement prices for plant providing the load following service.

There needs to be ongoing attention to the development of the wind forecasting system to improve the accuracy of forecasts and to extend the scope of forecasting provided. The responsibility for funding such work needs to be determined.

In addition to managing active power and active power reserves, the market and regulatory arrangements to manage reactive power needs to be considered. The current Rules are deficient in this area and there is an increasing need to develop an appropriate framework for the acquisition of reactive power and reactive power reserves. The Planning Council, the Planning Council's consultants and consultants to NEMMCO have all identified reactive power and voltage control can be a critical issue in a power system with a large concentration of wind farms.

South Australia has adopted higher technical standards for wind connections in this respect but refined and nationally consistent standards could lead to more efficient outcomes. We consider that improvements to the generator technical standards relating to reactive power should be considered. However a necessary pre-cursor to better technical standards is a comprehensive framework for the supply of, and payment for, reactive power. This framework would need to clarify requirements for both dynamic and static reactive power supply and decide accountabilities for the development and dispatch of reactive power resources.

5. Connecting New Generators to Energy Networks

- 12. How material are the risks of decision-making being "skewed" because of differences in connection regimes between gas and electricity, and why?*
- 13. How large is the coordination problem for new connections? How material are the inefficiencies from continuing with an approach based on bilateral negotiation?*
- 14. Are the rules for allocating costs and risks for new connections a barrier to entry, and why?*

The Planning Council agrees with the need to address issues associated with the connection of new generators to energy networks. Experience shows that both the electricity and gas markets have delivered investment and the connection arrangements have been sufficient to support that investment.

Again the CPRS and RET schemes stress test these arrangements and the future success of the current rules are uncertain.

The current connection arrangements will be tested by large numbers of intending generators seeking to locate in similar areas. These areas will be those with competitive renewable energy resources or gas supply. Often these areas will be in weak areas of the grid or remote from the grid. The issues associated with augmenting the existing grid and managing congestion is addressed in a later section. The other issues we consider need to be addressed include:

- arrangements for extending the electricity grid to new areas with a number of intending generators; and
- the approach to negotiating the actual connection and associated technical standards in areas where numbers of participants are expected to seek connection over a period of time.

The provisions in the Rules for investment decision making on network investment apply well to augmentations but are not so easily applied to the extension of the network. Where a planned extension of the network is for the benefit of a single party, the decision making and cost allocation is straightforward. However in many cases, the extension would be to a new province in which a number of parties might seek to develop projects over time. Effective arrangements to deliver efficient outcomes in these cases do not seem to exist. This is of particular interest to South Australia with both wind and geothermal resources. Effective arrangements need to maintain the dynamic efficiency benefits of allocating efficient prices and also need to address the risk to network service providers of stranded assets.

European experience with renewable generation in particular highlights the difficulties of assessing the connection of one project at a time. On this basis of one modest project, it is possible to argue that certain connection standards such as provision of SCADA, fault ride through capability and reactive power is unnecessary. Continuing on that basis has lead to a situation where there is now a very large block of generation without these capabilities and this contributes to security risks and system management costs. The Planning Council considers that this could be dealt with under the current arrangements, at least in part, by the setting of technical standards being informed by forward planning and by imposing "make good" provisions on participants connecting below a particular standard.

6. Augmenting Networks and Managing Congestion

15. *How material are the potential increases in the costs of managing congestion, and why?*
16. *How material are the risks associated with continuing with an "open access" regime in the NEM?*
17. *How material are the risks of "contractual congestion" in gas networks and how might they be managed?*
18. *How material is the risk of inefficient investment in the shared network, and why?*
19. *How material is the risk of changing loss factors year-on-year?*

South Australia is already experiencing problems with network congestion resulting from investment in wind generation. The congestion, or expected future congestion, has had a market impact on the areas in which proponents are now operating. In a market with a significant penetration of wind generation, some level of ongoing congestion will be efficient and some projects may not be viable as a result. However the Planning Council considers that the overall development of the system needs to be addressed in an efficient manner to minimise the cost of carbon abatement and meeting renewable energy targets.

Accepting that some congestion with wind will be efficient, we need to ensure that:

- there are incentives on NSPs to find creative solutions to maximise the utilisation of the existing network;
- connection of new generators should not add inefficiently to congestion;
- provisions in the regulatory regime to assess and decide when and where investment is warranted should provide for efficient investment in the future market;
- the National Planner and planning by Network Service Providers should seek to identify expected congestion and whether removing or relieving that congestion is likely to be efficient as earlier as possible.

The AER is now implementing arrangements to provide some market incentives to TNSPs and we would support those processes. In regard to the connection of new generation, we would note that there has been debate on the broader issues of congestion management. The market still lacks incentives for efficient locational investment and the tools available to assist in the management of congestion risk. While we encourage reassessment of some

decisions in the light of what the market can now expect, we also consider that some simpler actions could be taken to improve the situation.

In our experience, the minimum standard in technical standard S5.2.5.12 "Impact on network capability" is too low and there appears to be no clear objective function against which to negotiate a standard. The minimum standard would allow any level of impact on intra-regional transfer capacity or interconnector exports. Connections of generators with poor connection facilities and to critical, lower-voltage lines can inefficiently reduce the capability of the broader network.

7. Retailing

20. *How material is the risk of an efficient retailer not being able to recover its costs, and why?*
21. *What factors will influence the availability and pricing of contracts in the short and medium term?*
22. *How material are the risks of unnecessarily disruptive market exit, and why?*

The stochastic nature of most renewable options is likely to lead to more price volatility in the market. Retailers are aware of the contract risks associated with the intermittent nature of many renewables and are beginning to adjust the purchase price accordingly. The forward contract market is likely to reward flexible plant and lead to further investment in the area. In other words, the market mechanisms in this area appear relatively sound.

8. Financing New Energy Investments

23. *What factors will affect the level of private investment required in response to climate change policies?*
24. *What adjustments to market frameworks, if any, would be desirable to ensure this investment is forthcoming at least cost?*

The Planning Council agrees that these issues need to be considered in a fast changing environment. Many of the issues raised lie outside the areas of influence of the electricity market design. One that does not, is the regulatory regime for networks. The Planning Council is concerned as to whether the network regulatory regime contains adequate flexibility to respond to a fast changing world. On the basis of detailed analysis undertaken by the Planning Council and Monash University, we expect significant customer response to higher retail prices in a carbon constrained world. We can also confidently state that growth in sales and peak demand is very closely aligned to economic growth. Under the current regulatory arrangements, determinations are being developed today that stretch across the implementation of CPRS and an extended RET, and through a period of uncertain economic growth

out to 2015. The responsiveness of demand and sales to economic growth and price suggests a high risk that forecasts on which capital spending plans are being approved could be well above the actual demand that eventuates.

The AEMC might like to consider options for a more flexible response to the uncertain environment whether it be through a formulaic approach to capital that factors in economic terms or the adoption of a lower base-line capital with greater reliance on the contingent project mechanism.

The Planning Council would be happy to discuss further details of the above issues with you or your staff at your convenience.

Yours sincerely,

David Swift
CHIEF EXECUTIVE