AEMO
Network Planning Group
2016 NTNDP
Consultation Paper
Submission

INTRODUCTION

The National Transmission Network Development Plan (NTNDP) is a valuable tool to outline where the industry is headed and for those interested in investing in the national electricity market (NEM) to have a reference document on which to base their interest. The two recent significant political disruptions to the operation of the NEM have had a profound effect on many aspects of the organization, particularly with respect to new investment.

While the two disruptions were directed towards climate change matters they have triggered a profound change in the manner of operation, the generation technologies and the price of resulting power to the community.

In particular the NEM has changed from a deterministic management where competing generators bid for slots to supply power to meet demand. The new regime is a weather driven stochastic management where, after identifying the demand and the likely contribution from wind and solar generation, competitive generators are selected to provide the remainder. In some instances where there is an excess of weather driven generation, due to transmission limitations, generators have been taken out of service to balance demand and supply.

It would seem appropriate to acknowledge these changes and their outcomes as material matters in this annual document aimed at providing a sound basis for investment in the industry. Comments below have been identified under the suggested topics proposed in the consultation document.

CONSULTATION QUESTIONS

1 MATERIAL ISSUES

There are a number of pertinent issues likely to arise over the life predicted in this document.

System management
The 2016 NTNDP is the appropriate investment oriented vehicle to acknowledge the profound change from a deterministic power system to a weather driven stochastic system, including the necessity of shutting down non-dispatchable generation to maintain system stability in specific regions.

This change, triggered by political action, is moving investment in generation from one of medium capital expenditure (capex), medium operating expenditure (opex) for fossil fuel resourced units to a different investment regime for weather driven non-dispatchable generation. Here the investment pattern is for assemblies of smaller units

with relatively high capex and correspondingly low opex resulting in a more complex investment situation.

Political disruption
The NEM has survived two major political disruptions. All three major political parties have proposed to increase the proportion of renewable energy in the power system with the proportion and method awaiting the next federal election. This fact, combined with the likely outcome being more weather driven non-dispatchable wind and solar generation, will increase the need for a greater reserve margin that is economically inefficient.

Rate of change
The power system is being subjected to more rapid change but decisions and subsequent actions to cope with these are becoming slower. This means that the 2016 NTNDP, in projecting forward, is becoming more important as a tool to advise logical investment.

2 SCENARIO DEVELOPMENT

Scenarios, by their nature, suggest relatively smooth transition in the future and are not good at identifying likely disruptions or dislocations. They are effective for forward planning without significant disruption. However, with the last two political disruptions and the one foreshadowed by all political parties at the forthcoming election forward scenarios do not necessarily provide adequate information for prospective investors.

It is considered that some effort should be made to determine whether there are significant system disruptions or dislocations if the political imperatives of proceed. To this end there should be some form of backcasting or truncation of proposed scenarios to try and identify potential anomalies.

One approach is to start from the AEMO 100% Renewable Report that, while having limitations, remains a very useful study and work back to the present in varying time frames. Another possibility is to truncate the proposed scenarios to half their proposed timescale and study the results. I am sure the modeling group has far better ideas to attack this problem of location disruptions or dislocations arising from political imperatives.

3 MODELLING COP21 IMPACT

COP 21 is a trigger for major technological change brought about by political action. The primary aim of this initiative is to reduce the proportion of power from fossil generation and increase that from renewable generation. The available, reasonably competitive, renewable resources of wind and solar are non-dispatchable. This provides some problems for the power system.

As the AEMO 100% Renewable Report indicates increasing the proportion of non-dispatchable generation results in a large increase in necessary reserve margin because of the availability/capacity limitations of these technologies. This is economically inefficient requiring significant generation to lie idle in reserve.

In addition, excess non-dispatchable generation is being taken out of service for system stability reasons in some regions. Neither of these states is acceptable from an economic or investment view. These situations can be reduced by allowing for interruptible supply contracts, as set out in network challenges below.

4 NETWORK DEVELOPMENT CHALLENGES/OPPORTUNITIES

It is agreed that the initiatives developed have resulted in a set of challenges and opportunities over the predicted life in the document. Some of these have been identified below.

CHALLENGES

Weather driven system
The primary challenge is to develop the management of the stochastic weather driven system as the proportion of non-dispatchable generation increases.

Excess reserve margin
In particular, management needs to anticipate the major increase in necessary reserve margin with increase in non-dispatchable generation and develop means of utilizing this resource rather than let it lie idle as a poor investment. Serious consideration should be given to introducing rules for handling interruptible supply.

Interruptible supply is just the opposite of the existing interruptible demand where large customers are willing to reduce their demand under specific conditions in return for a cheaper tariff. In cases where wind or solar generation would normally be required out of service the affected parties can arrange to supply suitable loads, capable of intermittency, at a reduced tariff. Such loads could be electrolytic processes or other initiatives capable of operation in a discontinuous manner.

This is pertinent as a higher proportion of non-dispatchable power is consigned off for system stability reasons. Eventually AEMO may be required to record the unused output of renewable generation not utilized when fossil generation is utilized in preference for system stability reasons.

North/South network
The existing high voltage network is configured in a north/south orientation based on existing cities and fossil fuel availability. To gain the most from any weather driven generation it needs to be extended in an east/west direction to move away from the present solar surge around longitude 145E and to provide the maximum weather variation from east to west. Eventually the NEM may extend beyond Olympic Dam taking advantage of weather variability. In the meantime a connection extending towards Olympic Dam would assist with the present South Australia problems in providing more inertia from NSW to South Australia.

OPORTUNITIES

Isolated power systems

There are many power systems in the world similar to the NEM with no or insignificant connection to other power systems. These isolated power system have common problems with increasing the proportion of of non-dispatchable generation and are undergoing similar disruptions as the NEM. There is strong case to seek government innovation funds to assist other less well-developed isolated power systems on a consultancy basis.

Communication
These system management changes are not well understood by the general public, particularly those who have invested in local non-dispatchable generation who expect their investment to return as well as contribute to climate change mitigation. AEMO runs a limited number of education courses on the internet and should increase this to generate a more informed community capable of understanding why AEMO has limitations in operating the power system.

5 IMPROVE METHODOLOGIES

The comments referring to locating possible system disruptions or dislocations with accelerated political imperatives above should be considered.

6 INPUT ASSUMPTIONS

While not a technical matter the question of available funds and investment to provide the necessary infrastructure over the period in question needs consideration, particularly with respect to activities in the rest of the world and the need for incentives of some sort.

These comments are a contribution to the statement by the Managing Director M Zema on “Meeting the challenge of the new energy world” on 16/3/2016.

For consideration
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