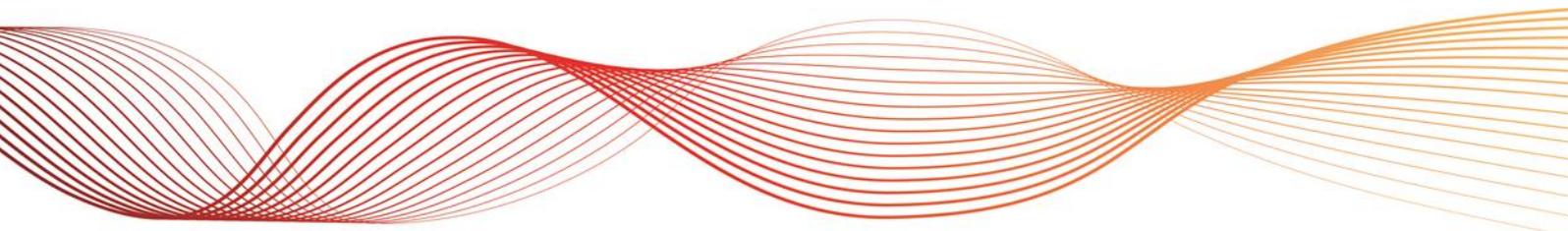




# 2015 PLANNING STUDIES

CONSULTATION PAPER

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# IMPORTANT NOTICE

## Purpose

AEMO has prepared this document to seek feedback on the preparation of the 2015 National Transmission Network Development Plan (NTNDP). This document has been prepared by AEMO as required by rule 5.20.1 of the National Electricity Rules.

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# CONTENTS

<b>EXECUTIVE SUMMARY</b>	<b>4</b>
1. Improve wind farm modelling	5
2. Improve the methodology for modelling renewable generation	5
3. Revise the methodology for modelling plant retirements	5
4. Improve modelling accuracy for long term expansion plans	6
5. Scope for the 2015 NTNDP	6
<b>INPUT ASSUMPTIONS</b>	<b>7</b>
Summary of AEMO's 2015 consultation topics	8
Supporting information	8



## EXECUTIVE SUMMARY

The Australian Energy Market Operator (AEMO) welcomes feedback from stakeholders on AEMO's initiatives to improve the 2015 National Transmission Network Development Plan (NTNDP).

AEMO is keen to continually improve its suite of planning publications to better meet stakeholder needs. AEMO respects the expertise of its stakeholders and values all feedback, which is critical in guiding meaningful progress. AEMO is committed to ensuring the NTNDP remains a transparent and valuable information resource that represents a holistic view of the south-eastern Australian electricity transmission network.

This paper details AEMO's proposed planning study assumptions for the 2015 NTNDP, and outlines the issues AEMO intends to address in 2015.

AEMO welcomes stakeholder feedback on the following key aspects of the 2015 NTNDP:

- **Revise the methodology for modelling plant retirements by updating cost data and reviewing alternative modelling approaches.**

AEMO's ability to model generator retirements in the long term expansion plans is currently limited due to incomplete cost data associated with plant retirements. Stakeholders are invited to comment on AEMO's proposal to revise the cost data and treatment of generator retirements. In particular, AEMO is looking for comments on the appropriateness of using the current retirement/rehabilitation cost assumptions.

- **Improve the methodology for modelling renewable generation by considering alternative approaches to least-cost expansion.**

The long term expansion plans are currently modelled using short run marginal costs for all generators. AEMO considers that this assumption may bias against renewable generation expansion, favouring instead Large-scale Renewable Energy Target (LRET) non-compliance. AEMO invites stakeholders to comment on alternative approaches to modelling renewable generation.

- **Review the scope for 2015 NTNDP by considering relevant sensitivities to the planning scenarios.**

The 2015 NTNDP will use scenario definitions developed by the 2014 scenarios working group. AEMO may need to consider additional sensitivity studies including studies to model any carbon abatement policy changes. Stakeholders are invited to comment on AEMO's proposed scope for NTNDP scenario considerations.

Consultation in the NTNDP planning phase is a Rules requirement, but this does not detract from AEMO's sincerity in welcoming input. Stakeholders who have any additional suggestions on ways AEMO can improve its 2015 NTNDP, other than the topics outlined in this document, should also include these ideas in submissions.

Feedback is requested by Friday 27 March 2015.

## 1. Improve the methodology for modelling renewable generation

### PLEASE CONSIDER:

- **Using the required least-cost model, how can we best model renewable generation expansion, considering the LRET?**

AEMO proposes to review the methodology for modelling renewable generation in the long term generation expansion plans.

AEMO's current model simulates generation price bids according to the plant's short-run marginal cost (SRMC), which is the total additional cost over a short time period for a small change in output.

In the model, SRMC is a combination of variable operating costs, fuel costs and any emissions costs. SRMC does not take into account the capital liability position of any existing generator, nor any opportunity to make additional returns. It represents a perfectly competitive outcome maximising dynamic, productive and allocative efficiencies in the National Electricity Market (NEM).

Decisions to build new generation in the model are based on minimising both the investment costs and production costs for the NEM, subject to meeting the reliability requirements. New generation price bids are also based on the generator's SRMC, but any decision to build the unit considers both the capital expenditure and production cost.

The least cost modelling approach (based on SRMC bidding) maximises the NEM's efficiency, but it underestimates the generator revenue earned from the energy market. This potentially delays pre-emptive new generation being added to the market and it makes modelling renewable energy particularly challenging as these constitute a large proportion of likely new entrants in the short- and medium term. .

The large-scale generation certificate (LGC) market provides the financial incentive for renewable generation to be developed to meet the Large-Scale Renewable Energy Target (LRET). Renewable generators receive revenue from the NEM, but this is usually insufficient to cover the generators' fixed costs, including capital costs. This revenue shortfall is met by selling LGCs, with the price of the certificate typically representing the difference between the generator's long-run marginal cost (LRMC) and the average annual electricity price received.

However, the price of an LGC is capped by the LRET penalty price. If the revenue earned from the electricity market is too low, the renewable generator will not be able to recover all its investment costs, even with the LGC price set at its cap.

While this is a market reality, the least-cost modelling approach underestimates the NEM price received (due to SRMC bidding) and therefore overestimates the LGC price needed for the renewable generator to be economically viable. Consequently, the least-cost model has the potential to over-estimate LRET non-compliance which occurs when the required LGC price is in excess of the LRET penalty price.

This limitation may be overcome by either:

- Estimating the level of LRET non-compliance outside the long term model, based on some assessment of the actual profitability of renewable generators; or
- Making some notional adjustment to either the cost of renewable generation, or the LRET penalty price within the model, to represent the expected premium above SRMC pricing that would be earned by renewable generators in the NEM.

AEMO invites stakeholders to suggest alternative approaches to modelling renewable generation taking the LRET scheme into account.

## 2. Revise the methodology for modelling plant retirements

**PLEASE CONSIDER:**

- **Should AEMO consider using a profitability model for long term generation expansion?**
- **What time frame would you suggest for applying the profitability model?**

AEMO proposes to review the cost assumptions for plant retirements.

As part of the 2014 fuel and technology cost review, AEMO obtained costs for generator plant retirement. These include the costs of end-of-life plant remediation and site rehabilitation. These costs are plant and technology specific. As described in point 1, SRMC bidding may underestimate electricity market prices and therefore not provide signals for building new generation for purposes other than meeting the minimum reserve levels. This could lead to retirements being delayed or not occurring.

AEMO is considering using a profitability model to help inform investment and retirement decisions in the first part of the analysis period (for example, the first 5 to 10 years). This model would be used purely to fine tune the least cost model. This could be done as a sensitivity to the least cost model outcomes.

AEMO invites stakeholders to comment on the appropriateness of using a profitability model to inform generation investment and retirements for the NTNDP, and the ideal time frame for its application.

## 3. Scope for the 2015 NTNDP

**PLEASE CONSIDER:**

- **Are there any other material issues or topics that you believe should be considered for the NTNDP?**

The renewable energy integration, energy storage and rapid advancements in technologies are changing the electric power industry. AEMO will continue to investigate the future challenges and opportunities for efficient investment, efficient operation and use of electricity services for the long term interests of consumers of electricity.

During 2015, AEMO will consult with stakeholders to identify the most relevant issues, and to develop key themes for the 2015 NTNDP.

In the 2015 NTNDP, AEMO will use the scenario definitions developed in 2014 by the scenarios working group. AEMO may consider additional sensitivities and further explore findings of the 2014 NTNDP, given developments in the regulatory framework.

Once AEMO has received suggestions for changes to input assumptions and modelling methodology, and other stakeholder responses to this consultation, AEMO will review and finalise the 2015 NTNDP modelling scope. AEMO will consider the transmission network service providers' most recent annual planning reports when preparing the 2015 NTNDP.

The 2015 NTNDP will assess the following:

- The need for transmission network augmentations (including timing and options) to meet forecast electricity consumption, as triggered by the connection of specific large demand connections, or based on delivering positive net market benefits.
- The need for augmentations to the shared transmission network, to support new transmission connections.
- Major asset replacement projects, commenting on the ongoing need for network capability for the asset being replaced as well as the capacity of the new asset. The outlooks will not comment on replacement drivers or the current asset conditions.



- The adequacy of current Network Support and Control Ancillary Services (NSCAS), identifying any gaps in ability to maintain power system security and reliability of supply for the transmission network, in accordance with power system security and reliability standards.

# INPUT ASSUMPTIONS

**PLEASE CONSIDER:**

- **Are there additional sensitivities that can be considered in our assumptions for the 2015 NTNDP studies?**

The input data files for existing and future generation, interconnector capability, demand forecasts and fuel and technology costs are available on the AEMO website under the Planning Assumptions<sup>1</sup>. These files will be updated as required, to reflect the latest economic data to be used for the 2015 NTNDP.

## Scenarios

The 2015 NTNDP studies will be based on scenario definitions as developed in 2014 by the scenario definitions working group. AEMO may consider additional sensitivities studies to reflect the impact of regulatory or technology changes.

## Forecasts

The 2015 NTNDP will use the 2015 National Electricity Forecast Report (NEFR) forecast for electricity consumption and maximum demand. Additional sensitivities may be considered.

## Generation

The 2015 NTNDP will consider the existing generation capacity in the NEM as per the generator information pages, including partial availability and publicly announced retirements. New generation capacity will be based on the committed generation projects listed on AEMO's generation information page.<sup>2</sup>

## Renewable energy target and carbon price

The legislated Federal renewable energy target will be applied in the capacity expansion model. The model will select the most efficient expansion from existing capacity, new generation and LRET penalty as legislated. Excess large-scale generation certificates (LGCs) will be banked over a period of six years.

The 2015 NTNDP studies will incorporate carbon price projections developed for the 2014 scenario definitions, with the initial value of zero until 2020.

Additional scenarios may be considered closer to the time that the 2015 NTNDP is prepared..

## Fuel and technology costs

The 2015 NTNDP will use the fuel and technology costs data for both existing and new generation as provided by ACIL Allen in 2014. Any updates to the costs assumptions that are considered necessary by AEMO, will be published on the AEMO website under the Planning Assumptions<sup>3</sup> and incorporated in the modelling.

## Transmission network

The model will incorporate existing and planned regional transmission network capability as advised by the transmission network service providers for New South Wales, Queensland, South Australia and Tasmania, and AEMO's Victorian planning team.

<sup>1</sup> <http://www.aemo.com.au/Electricity/Planning/Related-Information/Planning-Assumptions>

<sup>2</sup> <http://www.aemo.com.au/Electricity/Planning/Related-Information/Generation-Information>

<sup>3</sup> <http://www.aemo.com.au/Electricity/Planning/Related-Information/Planning-Assumptions>



## Summary of AEMO's 2015 consultation topics

AEMO seeks your input on the following questions:

1. Using the required least-cost model, **how can we best model renewable generation expansion**, considering the LRET?
2. Should AEMO consider using a **profitability model for long term generation expansion**?
3. What **time frame** would you suggest for applying the profitability model?
4. Are there any **other material issues or topics** that you believe should be considered for the NTNDP?
5. Are there **additional sensitivities that can be considered in our assumptions** for the 2015 NTNDP studies?

AEMO welcomes comments from stakeholders at any time. To assist with our modelling and analysis timeframes, we would appreciate receiving your feedback by **27 March 2015**.

Please email your submissions, and any questions relating to this paper to: [planning@aemo.com.au](mailto:planning@aemo.com.au)

Or post to:

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