31 March 2025

Ms Merryn York
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Dear Merryn,

AEMO's Draft 2025 Inputs, Assumptions and Scenarios report – Stage 2

Energy Networks Australia (**ENA**) appreciates the opportunity to respond to the Australian Energy Market Operators (**AEMO**) – Stage 2 Draft 2025 Inputs, Assumptions and Scenarios Report (**IASR**) (**Draft Report**)

ENA represents Australia's electricity transmission and distribution and gas distribution networks. Our members provide over 16 million electricity and gas connections to almost every home and business across Australia.

We commend AEMO for its significant efforts in developing the Integrated System Plan (**ISP**), particularly in recognising the critical role of generation and storage resources connected to the distribution network, and the importance of gas fired generation for firming needs. We welcome that future iterations of the ISP will further enhance the incorporation of these resources, ensuring the ISP truly represents the lowest, whole-of-system cost pathway to enable the energy transition. ENA also welcomes AEMO's increased emphasis on risk analysis in the ISP to maintain system security and reliability in a dynamic energy environment.

ENA supports an ISP that not only reflects government policy but also strengthens risk evaluation to safeguard the long-term interests of consumers and ensure efficient reliable energy delivery.

ENA makes the following points in response to the Draft Report:

1. Risk & resilience

- **Risk analysis:** We advocate for more risk analysis in the forward plan to ensure robustness, system security and reliability under various conditions, such as minimum system load or lengthy dunkelflaute weather events.
- **Project delivery:** A plan that is resilient to project delivery challenges is needed. ENA recommends accounting for both state-led and actionable ISP projects, and commercial realities with an emphasis on timely least regrets investment.
- **Coal retirements:** We view the coordination of coal retirements with the entry of new generation as essential for a stable transition. Stress testing and "what if" analysis on generation project timings will ensure a smoother energy shift.
- **Long term planning:** We advocate for long-term planning reviews that provide investment certainty and benefits consumers and the broader economy, facilitating a pragmatic energy transition.
- **Decision making transparency:** We stress the importance of decision-making processes for projects under the National Energy Rules (**NER**) and state frameworks. Transparency in project costing and cost-benefit analysis will build consumer trust and prevent unnecessary increases to electricity bills.

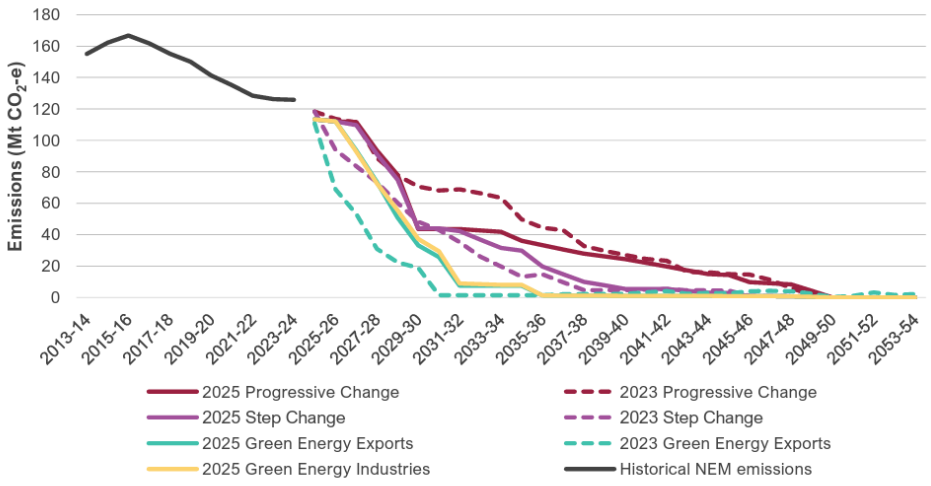
2. Forecasts & modelling scenarios

- **Load forecasts:** We recommend that AEMO base its load forecasts on forward looking projections that are more likely to be committed in the planning timeframe, rather than relying on static or retrospective data. Conducting high and low sensitivity analysis at both transmission and distribution levels is crucial.
- **New industrial loads and infrastructure:** Forecast demand should incorporate new industrial loads, particularly those linked to processing renewable gases such as hydrogen. Consideration of infrastructure needed for growth, including new gas pipes and water availability for renewable gases, is essential, especially during times of drought.
- **Broader demand outlooks and forecast increases in data centres:** We suggest testing a broader range of demand outlooks to better reflect Network Service Providers' observations on connections and electrification of the economy. AEMO should also account for the potential impacts of data centres and AI on electricity demand with high, low, and realistic demand sensitivities. Ideally collective efforts in modelling this new area would ensure that the data centre demands are balanced, as it is ultimately in our networks' interest to not over or under forecast the anticipated load from datacentres.

  ENA notes that all connection data is confidential, unlike AEMO's generation page. Load connections of this commercial and industrial nature can lead to a significant increase in NEM demand. We note that the Energy and Climate Change Ministerial Council (ECMC) is calling for better data on the scale and location of data centres and AI with further ministerial discussions to occur at the next July 2025 ECMC.
- **Scenarios:** While AEMO's use of carbon budgets to model scenarios reflects government policy, we recommend incorporating sensitivities based on historic build limits of energy infrastructure and actual investment to better balance optimism with practical constraints.

  For example, there is increased criticism that renewable energy targets will be delayed, and the potential of extending the life of coal-fired power stations to continue operating beyond the dates used by AEMO (as shown below).

Figure 2 Actual and forecast NEM emissions trajectories from multi-sectoral modelling, all scenarios



This sensitivity could also test new demand profiles for data centres and/or EV's. It could represent a lower limit of the energy transition progress and be used to inform the minimum investment requirements reflecting a broader range of market conditions.

3. Gas

- **Renewable gas:** We welcome the inclusion of renewable gas in the IASR. Modelling[1] on a renewable gas target for ENA in 2024 confirms its critical role in decarbonising Australia by 2050, particularly in industrial sectors where electrification alternatives may be impractical or prohibitively expensive.
- **Hydrogen:** We note that the assumption of hydrogen production from dedicated behind-the-meter sources needs further clarification, especially in terms of how it might impact electricity transmission infrastructure. Costs associated with hydrogen production for export should be borne by the hydrogen industry, not by Australian energy consumers.
- **Underground Hydrogen Storage (UHS):** The modelling for hydrogen illustrates different cost metrics for storage in pipelines compared to underground storage. As shown by Future Fuels CRC[2], underground hydrogen storage is also possible in depleted oil and gas fields, and saline aquifers. Expanding hydrogen storage to include these additional geological formations increases the total prospective storage capacity. The research found that even if only a small fraction of this storage capacity could be realised commercially, it would significantly exceed the storage needs of a fully developed hydrogen industry in Australia. This was true for the five regions analysed. Regardless, the cost of UHS only constitutes a comparatively small fraction of the whole hydrogen value chain.

Table B.1 Key hydrogen storage cost assumptions

	Capital cost ($/kg)	Cushion gas requirement	Fixed operations and maintenance costs
Pipeline storage	887	9%	3% of capex
Lined rock cavern	150	17%	3% of capex
Salt cavern	53	31%	3% of capex

- **Biomethane:** While the cost estimates for biomethane appear reasonable, we recommend refining the cost assumptions across scenarios. Typically, higher biomass collection should increase, rather than decrease, costs. We propose using a single set (for example, the Step Change scenario) of cost curves for each feedstock type across all scenarios.

  The cost and potential of biomethane can be improved with growing investment in anaerobic digestion (AD) facilities and growing experience in industry.

4. Distribution networks and Consumer Energy Resources (CER)

- **CER inputs:** ENA acknowledges the tremendous work AEMO is undertaking to model and forecast across decarbonisation sectors. We appreciate the inclusion of CER in these analyses, including:
  - rooftop solar,
  - non-scheduled solar generation,
  - coordinated & passive storage systems,
  - EV charging/ discharging,
  - underlying demand, and
  - DNSP limits and augmentations.

[1] ACIL Allen (2024), Renewable Gas Target

[2] Future Fuels CRC (2021), RP1.1-04 - Underground storage of Hydrogen: Mapping out the options for Australia

- **Distribution network data provision and modelling:** We appreciate the work to better include more distribution network inputs into methodologies and understand that this will be iterative. While consultation has occurred over an extended period, starting in mid-2024, the specific mandatory data requests have occurred just recently. We acknowledge this activity occurs via the ISP consultation but for completeness are providing the feedback here also. Our members are providing the mandatory data, including the more detailed, augmented data but note that this is challenging to provide in the given timeframe.

  We recommend extending this timeframe in future, to ensure more accurate and comprehensive data can be included.

  As data owners, DNSPs see a benefit in having an opportunity to review AEMO's initial analyses. Further engagement between AEMO and DNSPs to provide context and background information may help ensure that any final assumptions or interpretations of data are broadly agreed.
- **Mid-scale CER modelling:** We suggest incorporating aggregated mid-scale CER modelling to capture non-residential based CER opportunities. For example, community batteries, solar on industrial sites and warehouses. Or more specifically, 100kW to 5MW batteries, as these currently fall outside of the 'input' dataset forecast by CSIRO, and below the 5MW threshold for scheduled storage to appear as an output of the ISP in the ODP's least-cost generation mix.

  These mid-scale CER opportunities can connect to existing available capacity in the network without the need for, or a limited need for, network augmentation. As such, we view this as a notable exclusion from the IASR.
- **Cost factors and understanding EV dynamic pricing:** Further clarity on how cost factors are applied across the different technologies would be helpful to see. It was noted that modelling for installations costs used transmission costs as a proxy for distribution costs using the Oxford Economic Report inputs. We recommend utilising data collected from DNSPs in the parallel ISP working group process to use more accurate inputs related to distribution installation costs. We also recommend that that AEMO provide more visibility on the assumptions going into EV dynamic pricing.
- **Public EV charging inputs:** We consider that the assumptions and inputs for public charging should be reviewed as they may not account for the variety of public charging scenarios that may occur and the need for kerbside AC public charging to complement DC charging. This is particularly important for residents where private off-street parking is not available. For example, in NSW around 30% of residents do not have access to private off-street parking.

ENA and its members look forward to working with AEMO on the development of a robust 2026 ISP. In the meantime, if you would like to discuss this submission, please contact Naomi Wynn, Acting Head of Distribution at nwynn@energynetworks.com.au in the first instance.

Yours sincerely

Dominic Adams

General Manager, Networks