2026 Integrated System Plan (ISP) Consumer Panel Response

Draft ISP Methodology Consultation Paper – Published 13 March 2025

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April 2025

Acknowledgement of country

The 2026 Integrated System Plan Consumer Panel acknowledges the Traditional Custodians of the land, seas and waters across Australia. We honour the wisdom of Aboriginal and Torres Strait Islander Elders past and present and embrace future generations.

We acknowledge that, wherever we work, we do so on Aboriginal and Torres Strait Islander lands. We pay respect to the world's oldest continuing culture and First Nations peoples' deep and continuing connection to Country; and hope that our work can benefit both people and Country.

Summary

The 2026 ISP Consumer Panel appreciates the opportunity to respond to this ISP Methodology consultation paper. This paper provides responses to the Draft ISP Methodology under three headings: "Summary", "Specific Comments" that expand on our summary responses and the third heading provides some "General Observations". Note that page references in this submission refer to the Draft Methodology Consultation Paper, unless otherwise specified, noting that the submission is based on both the "Draft ISP Methodology – clean" and associated "Consultation Paper", both released on 13th March 2025.

Some of the issues raised in the consultation paper have been discussed in our recent submissions to the 2025 Draft IASR papers, stage 1 and stage 2. This submission is consequently brief and considers the main questions from the consultation paper.

We commence with very brief responses to the 8 'key updates' to the ISP methodology that AEMO is proposing (pages 4 and 5), these being[1]

1. *Adjusting the sub-regional topology and sub-regional electricity demand allocation approach to follow the proposal in the Draft 2024 Electricity Demand Forecasting Methodology.*

Supported. AEMO has undertaken significant work to have much better data on sub-regional topography and sub-regional considerations. This data needs to be utilised, specifically in the ISP modelling that builds on the 2025 IASR.

2. *Introducing representation of distribution network capacity, and opportunities for increased levels of consumer energy resources (CER) operation and higher uptake of other distributed resources.*

This is a priority for updating in the Methodology. The Panel recognises that valuable work on this topic has been undertaken by AEMO while remaining concerned that the full extent of distributed energy considerations has been narrowed to distribution network expansion to accommodate CER/DER. Other factors also need to be incorporated including VVP's, community energy responses, innovative aggregators and coordination efforts etc

3. *Expanding the gas supply model to determine gas development projections, including project developments from the Gas Statement of Opportunities (GSOO) and potential further investment options such as gas network, storage and supply augmentation opportunities.*

The Panel supports the overall framework for enhancing the integration of gas (including renewable gas) as an input into the ISP modelling, including building on the existing gas modelling for the GSOO and adopting and iterative approach to the relationships between

[1] From pages 4 and 5 of the Draft Isp Methodology consultation paper.

the gas supply development model and the existing capacity outlook and time-sequential models.

We are generally encouraged by AEMO making significant progress on this challenging task as part of the 2026 ISP, as well as AEMO's recognition that further enhancements of this process will be required, and possible, for subsequent ISPs. We also anticipate further consideration of gas issues in the soon to be released "Gas Infrastructure Option Report," to which the Panel also intends to respond.

4. *Testing transmission projects previously identified as actionable at the project proponent's timing within the actionable window, and beyond the actionable window, to determine the optimal timing of projects in development paths. This will help align the ISP and ISP Feedback Loop process with the latest proponent advice.*

While the rationale for this change is understood, the Panel is not convinced that determining "optimal timing of projects in development paths" is realistic given uncertainty in global economic conditions, supply chains and policy uncertainty.

5. *Modelling future hydrogen electrolysers within a renewable energy zone (REZ) rather than at a port, to reflect the current market understanding that it is generally a lower cost to pipe hydrogen than transmit electricity.*

The Panel has discussed the over optimistic assumptions about future hydrogen use in previous submissions and is pleased to see the role of hydrogen being applied to more realistic levels in the 2025 IASR.

We agree with AEMO's decision to have minimum utilisation factors for H2 and note these should start at 100% as identified on our submission to the draft IASR Stage 1.

6. *Implementing 'imperfect foresight' in the model for storage devices to better reflect what may happen in reality, using headroom and footroom reserves for devices as well as deliberate 'energy planning with error'.*

The Panel recommends that AEMO:

- abandons the idea of headroom and explores more nuanced approaches to dealing with imperfect foresight for batteries for the 2026 ISP.
- commits to developing/applying modelling approaches that robustly address the nuance of imperfect foresight for batteries for the 2028 ISP.
- engages with battery owners and experts on this issue as a matter of priority rather than relying on inference from a sample of historical events.

7. *Adjusting representation of transmission network capabilities for REZs to better reflect the treatment of large dispatchable loads, wind diversity across geographically large REZs, and the impact of nearby transmission flow paths.*

This approach is supported and the excellent work undertaken by AEMO is recognised, to better reflect geographic diversity in the IASR 'inputs.'

8. *Applying a minimum synchronous unit constraint to reflect replacement asset lead times, while also applying system security remediation costs that evolve with technology advancements and account for changes to power system security as renewables connect and fossil fuelled generators retire.*

This proposal is supported in principle.

Specific Comments

In this next section we provide some further comments about the 'updates' of most relevance to the Panel's reflections of consumer interest. Numbering refers to the list of 8 topics in the Summary section above.

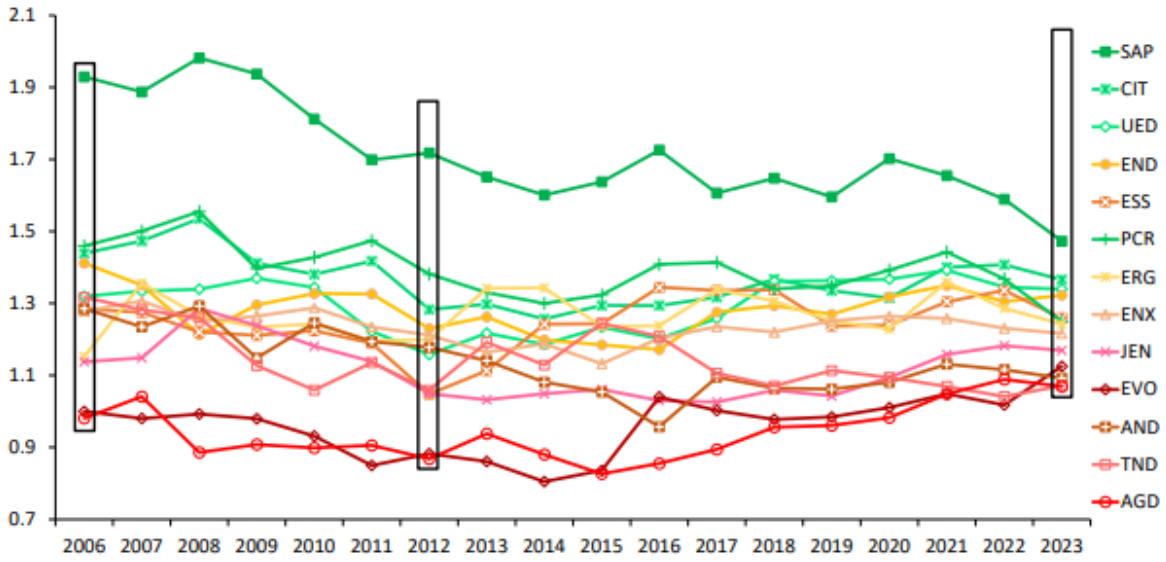
2, Distributed energy, DNSP's and CER/DER

The Panel recognises that valuable work on this topic has been undertaken by AEMO while remaining concerned that, despite clear and reasoned feedback from us and other stakeholders:

- AEMO's focus remains on what new investments can be made in networks (to accommodate more CER/DER) rather than how is CER/DER likely to reduce the need for (transmission, in particular) network investment. This lack of balance falls short of recognising the system cost savings CER/DER may achieve, undermining the benefit of AEMO's enhanced attention to CER/DER, and resulting in consumers paying more than necessary for the energy transition. There is not adequate consideration of the value of non-network solutions, such as dynamic management and demand response.
- AEMO is not looking beyond DNSPs as sources of information on CER and DER. DNSPs neither have the ability to capture the majority of elements in the CER/DER benefit stack nor good visibility of some CER/DER markets and future innovations. DNSP's cannot approach CER/DER consideration from an 'agnostic' position about how it will be best orchestrated. The Panel is disappointed with this outcome given that we think we have been very clear about the distinction between distributed energy and the subset that involves distribution network businesses.
- We also note the merit of exploring factors that can better improve the use of existing network too.

The AER's 2024 annual networks benchmarking reports show that multilateral total factor productivity (MTFP)[2] has not improved in aggregate across distribution networks for a decade and a half, only the two worst performing networks from a decade ago showing material improvement in MTFP. An ISP that focuses on building additional network without considering better use of existing network is not in consumer best interests and is unlikely to be a DNSP focus.

Figure 3 MTFP indexes by individual DNSP, 2006–23



The Panel notes "consultation on the DNSP inputs" (p22) falls a long way short of directly engaging with an appropriate diversity of stakeholders and undertaking robust research to determine as evidence-based approach. The diversity of distributed energy stakeholders includes aggregators, battery providers, EV providers, VVP's, community energy organisations, networks and innovative businesses.

The Panel notes the challenges of introducing further measures to fully integrate CER/DER into the ISP but recognises that it is essential and urgent to do so.

3, Expanding the gas supply model

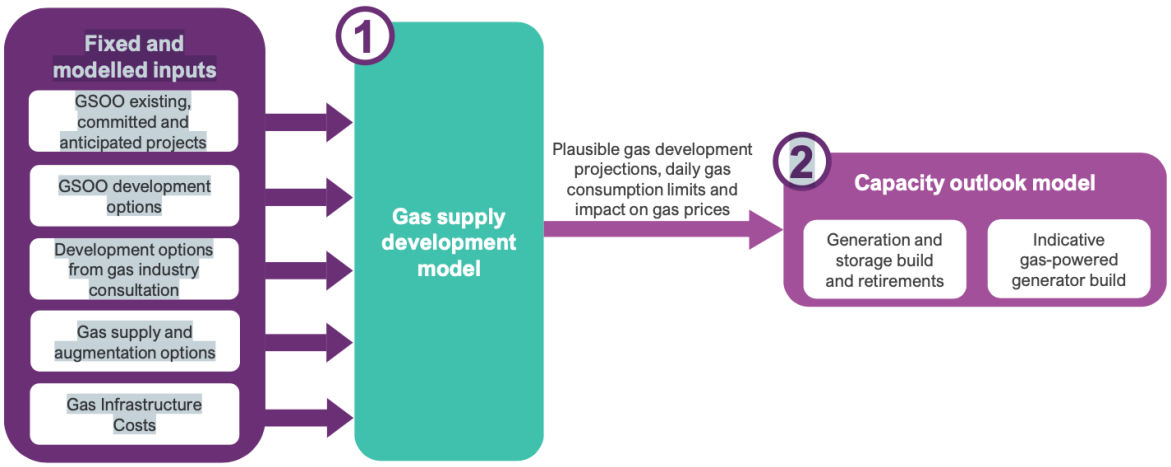
The Panel acknowledges the challenges of responding to the ISP Review's proposal to expand and better integrate gas supply and gas infrastructure requirements within the ISP.

We understand AEMO has addressed these challenges by building on the existing GSOO AEMO's Gas Supply Model as used in the production of the GSOO, and the more recently

[2] https://www.aer.gov.au/system/files/2024-11/AER%20-%202024%20Annual%20Benchmarking%20Report%20-%20Electricity%20distribution%20network%20service%20providers%20-%20November%202024_4.pdf (page vi)

developed Gas Supply Development model (GSD model). Figure 19 in the Draft Methodology (p 72), illustrated below, provides a useful illustration of the iterative process that links options for gas infrastructure development and the Capacity Outlook model.

Figure 19 Interaction between the electricity and gas supply development models



The Panel considers this an appropriate approach to integrating the gas modelling into the ISP process. We support AEMO's proposal to maximise the use of the data and forecasts already collected from businesses for the GSOO, despite the risk of using less recent data.

However, in this respect we also note and support, AEMO's proposal to include more recent projects identified during engagement with the industry.

Given the various views on the potential for renewable gases, we are encouraged by AEMO's proposal to: "explore' how the gas supply development model could *"assess hydrogen and biomethane developments to meet forecast demand for renewable gases".* (Draft ISP Methodology, p 73)

Our comments below also recognise the 'constraints' on the integration of the gas supply development model into the overall ISP modelling. These constraints were set out in the ISP Review and in the subsequent AEMC's rule changes (December 2024). As AEMO notes (Consultation Paper, p 36), the AEMC's rule changes:

" require AEMO to make improvements to the ISP analysis to ***optimise investment in the electricity network, not the gas system****…The new Rules do not include an ODP for gas or propose that AEMO develop policy positions on gas developments."* [emphasis added]

For this reason, and the overall complexity of the task, it is important to note some of the matters that the gas supply model and the gas supply development model do not address, including:

- There is only one gas supply development path for each scenario, although others may be subject to a sensitivity test

- The gas supply development path for each scenario must be plausible but not necessarily optimal
- There is no co-optimisation of gas and electricity development
- The model does not consider the gas distribution network; its focus is on generation, storage and transmission.

The Panel's reading of the Consultation Paper suggests that there is stakeholder interest in pursuing further integration of electricity and gas markets in the ISP, particularly expanding the number of gas supply development paths in each scenario, and co-optimisation of the electricity and gas developments.

AEMO partially responds to these concerns with the Consultation Paper identifying areas for further development in the gas supply modelling in the 2026 ISP or in the 2028 ISP. Many of these developments are in response to stakeholder submissions to the Methodology Issues Paper, including the Panel's submission to the paper. Areas for further development discussed by AEMO include:

- AEMO further considering the inclusion of renewable gas (green hydrogen and biogas) as part of investigating gas development projections (Consultation Paper, p 30),
- Further analysis of gas prices as a result of different gas development projections during the ISP development process (Consultation Paper, p 33)
- Develop an alternative gas development projection in the counterfactual scenario in the capacity outlook model given the potentially different GPG requirements without investment in transmission augmentation in the counterfactual scenario (Consultation Paper, p 34)
- Recognise concerns about the commercial viability of future gas infrastructure build, although AEMO concludes that *"market and policy settings may need to evolve to enable the gas investment required"* in the gas supply models and/or the capacity outlook model (Consultation Paper, p 35)
- Explore the consideration of gas emissions in the gas supply development model in future ISPs (Consultation Paper, p 32)
- Further changes to the implementation of the emissions constraint to account for the impact of emissions from gas (Consultation Paper, p 33.

The Panel supports these proposals. In our view, it is particularly important for AEMO to ensure 'fuel neutrality' in the ISP. That is, future gas modelling should more completely reflect the costs of supporting the transition process with intermittent GPG generation and clarify the impact of gas use on emissions and the carbon budgets under each scenario. Specifically, we encourage AEMO to:

- Expand the analysis of gas GPG costs to support future ISP developments
- Conduct a more complete assessment of upstream and downstream emissions from gas generation (both renewable and natural gas)

- Expand the analysis of the commercial viability of gas infrastructure and how this might change as traditional non-GPG gas markets decline (subject to future policy developments).

To summarise, the Panel supports the overall framework for enhancing the integration of gas (including renewable gas) as an input into the ISP modelling, including building on the existing gas modelling for the GSOO and adopting and iterative approach to the relationships between the gas supply development model and the existing capacity outlook and time-sequential models.

We are generally encouraged by AEMO making significant progress on this challenging task as part of the 2026 ISP, as well as AEMO's recognition that further enhancements of this process will be required, and possible, for subsequent ISPs.

4, Project timing and the "Actionable Window."

The Panel is concerned about AEMO's proposal to rely on the transmission companies to provide their optimal timing. We do not think that the transmission companies are 'independent' enough to be fully realistic about project timing. Transgrid, in particular, has the biggest development role of all TNSP's and are required to act in consumers' interests, including the interests of the overall NEM. This is because of the expectations that they act in accordance with the NEO. Yet they are also a monopoly business while also in a central position for the major actionable projects that impact on the efficient functioning of the NEM as a whole (PEC, Hume, VNI, QNI – all projects that are actively considered by the ISP). We observe that if history is any guide at all, there is a high risk for consumers that they will exercise that market power, likely impacting project timing. Neither AEMO nor consumers have the power to 'push' them, or any other energy business, to prioritise meeting optimal ISP project timing. A broader range of sources is needed, beyond TNSPs for project timing considerations.

5, Modelling Hydrogen electrolysers

The Panel questions the idea that hydrogen storage can be assumed to have a certain number of days (p46). Hydrogen, if used, may be stored and fully cycled diurnally (requiring only a few hours of storage), seasonally (requiring multiple weeks of storage), or anything in between depending on the application.

The Panel questions the exclusion of hydrogen storage costs for electricity (p47) noting that if hydrogen is used, some dedicated storage with be essential.

The Panel challenges AEMO's assertion that a 10% limit, by volume, of hydrogen blending in natural gas pipes is 'conservative' (p47) and notes our submissions to the IASR on this topic. Further evidence is needed if variation to the 10% limit is used.

6, Implementing imperfect foresight

This is one of the more significant challenges that is being addressed for the 2026 ISP, while not being a new topic, it has clearly taken an increased amount of consideration by AEMO. It appears to the Panel the AEMO is taking a limited view of the perfect foresight. In the consultation paper (page 40) AEMO says that it will take an approach that is *"realistic, reasonable and sound*". The Panel supports this objective, but it is concerned AEMO is taking a narrow, simple and backwards-looking approach to a broad, complex and future-critical problem.

Imperfect foresight manifests in different ways and timescales, from different perspectives and with complex and profound implications that will change – and often increases - over time.

The Panel opines that AEMO appears to be limiting its assessment of foresight to reserving headroom capacity for events to prevent unserved energy (p39). Given that adding load does not offer assistance during an LOR event, it would appear AEMO is basing this framing on AEMO's limited experience with directing batteries to deal with MSL (minimum system load) events. The Panel notes that this is a very narrow application of imperfect foresight as it relates to batteries. Considering imperfect foresight as it relates to batteries over an investment and operational timeframes, neither battery investors nor AEMO can know with confidence all or most of the following factors

- what the spot price will be in a given interval 10 minutes, 10 hours, or 10 days (from an operation perspective for short to medium term storage)
- what will the spread and frequency of sport prices be in 10 months, 10 quarters or 10 years. (from an investment perspective)
- what the production will be for a given future dispatch interval for contracted or collocated renewable energy generators (for a given battery)
- what the demand will be for a given future dispatch interval for contracted load (for a given battery)
- what a given battery's SOC will be at a given time relating to a number of the above events
- what wholesale market price settings will be in place beyond the latest determined RSSR at a given point in time
- the cost and availability of existing battery technology in 5, 10 years
- if there will be breakthroughs in battery technology in 10, 20 years
- what in-market or out-of-market tools AEMO will or need, or have, to ensure sufficient state of charge in batteries at a regional/NEM level in anticipation of dunkelflaute type events, or
- when these tools will be needed and established and what the revenue implications are
- if coal plants will exit the market earlier than planned, bringing forward the need for more storage and increasing available revenue

- if demand will fall so far short of expectations that it reduces profitability of existing batteries and the signals for future battery investment
- in the longer term, if and when transmission or other constraints will limit flows effecting the battery's operation and returns.
- the extent future batteries will reduce wholesale the price volatility batteries relied upon for financial returns.

The Panel acknowledges that not all of these need to be specifically addressed and this is a challenging problem for AEMO and consumers more broadly, but notes it is important to get right since batteries will be a key aspect of the future energy system and are more vulnerable to the complex interaction of multiple uncertainties than other future market participants.

The Panel asks if AEMO has engaged with battery owners and operators on this matter? The consultation paper does not appear to indicate any have supported AEMO's proposed approach to imperfect foresight. Panel members have spoken to two battery owners about this matter; both have provided verbal feedback they share the Panel's concern about the arbitrariness and limitations of AEMO's proposed approach.

The Panel recommends that AEMO:

- abandons the idea of 'headroom' and explores more nuanced approaches to dealing with imperfect foresight for batteries for the 2026 ISP.
- commits to developing/applying modelling approaches that robustly address the nuance of imperfect foresight for batteries for the 2028 ISP.
- engages with battery owners and experts on this issue as a matter of priority rather than relying on inference and evidence from a sample of historical events.

Some General Observations

The following comments reflect broader aspects of the methodology that are or interest to the Panel:

- What is uncertainty? This question increasingly haunts and impacts the ISP, the associated IASR and subsequent modelling and is of direct interest to consumers who cannot easily bear much of the burden of uncertainty related costs. Uncertainty requires close consideration of methodology implications. Uncertainty is about many factors, including weather (e.g. dunkelflaute events), consumer behaviour (e.g. as battery and EV owners), technological breakthroughs, policy changes, international economy and much more. We understand that the Plexos model "assumes" perfect foresight. This is not appropriate for real world impacts so the approach for interpreting Plexos generated outputs into 'real world' settings is increasingly important – and difficult too!

- Parameters and their relationship with sensitivities. The (3) Scenarios include common parameters. Meanwhile there are many demands for a very broad range of 'sensitivities' to be used to test a wide diversity of factors associated with candidate development paths. The final methodology should include some discussion about the relationship between parameters and sensitivities and the process for identifying which sensitivities will be prioritised for including in modelling.
- Weighting Scenarios. We know that a "Delphi Panel' approach has been used for past ISPs to determine scenario weightings. The 2024 Panel expressed concern about how these weightings impacted CDP / ODP selection, specifically the high impact of Green Energy Exports scenario, despite its low probability. It is also recognised that the Delphi process has been well run and a helpful process. We look forward to further discussion with AEMO about scenario weightings for the 2026 ISP.
- The following topics have been identified in our IASR submissions and also have overlap with Methodology considerations.
    - AEMO to consider the use of an explicit feedback loop between supply and demand forecasts and price forecasts, to ensure AEMO's models capture the dynamic nature of these relationships. Noting that this is a topic that we have also raised in our draft IASR submission and noting there that it is also relevant to the ISP Methodology.
    - We proposed an update and increase in the forecasts for PVNSG, especially for the Progressive change scenario to reflect motivations for mid-scale extend beyond economic considerations and that AEMO will not necessarily have visibility into the planning pipeline for these projects. AEMO says that the Methodology has been extended to include DNSP investments. We state elsewhere in this submission that this is too narrow, in our opinion.
    - We have encouraged AEMO to utilise behavioural science in forecasts. AEMO has responded by saying that this is a 'tantalising possibility' but not currently practical. We think that this is an area for further exploration for future ISP methodologies.