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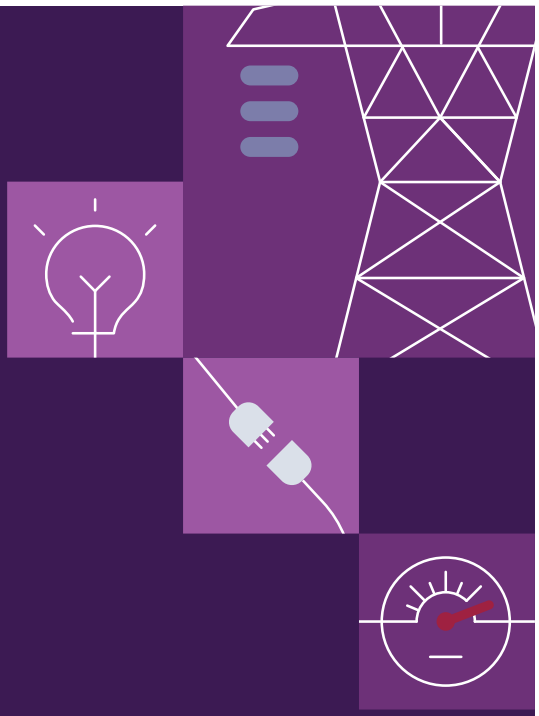

ISP Methodology

Consultation summary report

Published: 25 June 2025

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New South Wales | Queensland | South Australia | Victoria | Australian Capital Territory | Tasmania | Western Australia

Australian Energy Market Operator Ltd ABN 94 072 010 327

Executive summary

AEMO will soon begin the market modelling and power system analysis required to prepare and release the Draft 2026 *Integrated System Plan* (**ISP**). Published every two years, AEMO's ISP is a roadmap for the transition of the National Electricity Market (**NEM**) power system, presenting the plan for essential infrastructure that meets both consumer needs and government energy and emissions targets between now and 2050.

AEMO is now releasing the final ISP Methodology

The ISP is underpinned by an integrated approach to energy market modelling and power system analysis, detailed in the *ISP Methodology*, which is used to identify an optimal development path for the NEM. This final *ISP Methodology* follows consideration of stakeholder submissions received in response to changes proposed by AEMO in October 2024 and March 2025. This review has been completed consistent with the National Electricity Rules (**NER**) and in accordance with the Australian Energy Regulator's (**AER**'s) Forecasting Best Practice Guidelines[1].

AEMO thanks stakeholders for their submissions

AEMO has considered all submissions in response to the Draft *ISP Methodology* and Consultation Paper. The material recommendations and AEMO's responses are outlined below.

Stakeholder feedback	AEMO's response
Multiple suggestions were made for AEMO to continue to evolve and enhance the treatment of consumer energy resources (**CER**) and other distributed resources in the ISP assessment. These suggestions included **more detailed representation of the distribution networks** and **considering the co-optimisation of investment** across utility-scale generation and storage, electricity transmission and distribution networks, and consumer-side and distributed resources.	**Change made compared to draft position** – AEMO has provided the ability in the ISP Methodology for more layers of distribution network hierarchy information to be included where possible, but this has not extended to the point of a full co-optimisation across the energy sector due to modelling limitations. AEMO expects to be able to publish new insights in the 2026 ISP regarding distribution network opportunities to facilitate the aggregate operation of CER and other distributed resources.
Stakeholders supported the expansion of gas-powered generator (**GPG**) cost analysis proposed in the *Draft ISP Methodology*, while also calling for **improved transparency and clarity on gas development projections'** development options and costs. One suggestion was made to **extend the proposed adjustments for mid-merit gas generators** to also apply to existing flexible gas generators for the reliability assessments completed for the ISP. Feedback was also made to request further 'fuel neutrality' in the ISP.	**Change made compared to draft position** – AEMO has made adjustments to address stakeholders' feedback by extending the proposed adjustments for mid-merit gas generators to also apply for existing flexible gas generators, as well as a range of changes to support improved transparency and clarity on gas development projections' development options and costs to be applied in the ISP. In addition, AEMO has specified that daily gas supply limits in the ISP will be based on a zonal representation of the East Coast Gas Market to more accurately represent gas supply, storage and transportation limitations within the ISP models. AEMO will also leverage new data on gas infrastructure options and their costs, under consultation currently in the Draft 2025 *Gas Infrastructure Options Report*, which is a new report influencing the ISP's inputs and assumptions.
In response to AEMO's proposal to **test previously-actionable projects at the project proponent's nominated delivery date**, rather than seeking to optimise the timing throughout the 'actionable window', some stakeholders recommended further scrutiny of transmission project proponents' nominated delivery dates while others noted that assessments may differ from previous results which assessed multiple years within the actionable window.	**Agree with no change compared to draft position** – AEMO agrees that uncertainty around transmission project delivery timing is an important consideration in preparing the ISP, and scrutinises the nominated delivery dates including through existing provisions for AEMO to joint plan with transmission network service providers (**TNSP**s) and jurisdictional bodies. AEMO will adjust project lead times where evidence supports this change as part of preparing the inputs and assumptions for each ISP. AEMO considers that it remains appropriate to test previously actionable ISP projects for actionability in each new ISP at the nominated project proponent date rather than re-optimising the timing, and will jointly plan with project proponents to understand

[1] AER. August 2020. *Forecasting Best Practice Guidelines*. At https://www.aer.gov.au/system/files/AER%20-%20Forecasting%20best%20practice%20guidelines%20-%2025%20August%202020.pdf.

Stakeholder feedback	AEMO's response
	whether project development has indicated a need to change the project proponent's date.
Several comments were received which proposed **changes be made to the framework under which the ISP is delivered**, to adjust how the optimal development path is identified for the ISP.	**Out of scope** – Changes to the framework under which the ISP is delivered are out of scope for this consultation on the ISP Methodology. AEMO has not made any changes to the *ISP Methodology* where those changes would not be consistent with the overarching ISP framework established under the NER.
The majority of stakeholders supported AEMO's proposed approach **for addressing perfect foresight for storage devices in the time-sequential modelling** into the ISP. Some stakeholders suggested further refinements, including further engagement with battery owners and operators rather than relying on a sample of historical events, while other stakeholders suggested additional reliance on historical data. Concerns were raised about **the inclusion of headroom reserve in addition to footroom reserve** when modelling batteries, with stakeholders suggesting that this could inappropriately restrict the performance (and therefore the projections for) batteries in the ISP outlook.	**Clarification made compared to draft position** – based on stakeholder feedback, AEMO has clarified in the *ISP Methodology* that the adjustments to address perfect foresight for storage devices will be made in the time-sequential modelling, with subsequent insights considered in the capacity modelling outlook where appropriate, given existing iterative methods for validation between the two model types. On balance, AEMO has decided to retain the original proposal for application of both headroom and footroom for short-term storages, rather than applying footroom only. It is important to reflect some of the operational uncertainties presented by periods of very low energy prices or high frequency control ancillary services prices, and headroom reserve serves to reflect this uncertainty in part. It is worth noting that the headroom reserves are included as 'soft' constraints in the model, so that the withheld capacity does remain accessible at a cost in the model.
AEMO's **revised hydrogen modelling approach** was supported by several stakeholders, particularly the inclusion of minimum utilisation factors and the use of weekly production targets. Some requests were made for further hydrogen analysis and detail to be included in the ISP assessment and modelling process, including consideration of hydrogen electrolyser locations, storage duration and hydrogen pipeline cost assumptions.	**Change made compared to draft position** – AEMO has added further clarity in the *ISP Methodology* to incorporate requests for further analysis of location for hydrogen electrolysers. Regarding additional requests for further hydrogen analysis and detail, AEMO has been unable to accommodate these requests for this review due to modelling complexity and the need to prioritise other assessments. AEMO will continue to enhance and evolve its modelling of hydrogen over successive ISPs. Several requests for detail and clarity will be responded to and addressed in the final 2025 *Inputs Assumptions and Scenarios Report* (**IASR**) rather than in this report, as they relate to inputs and assumptions rather than a change to the *ISP Methodology*.
Submissions were generally supportive of AEMO's **proposed enhancements for system security considerations**, and several recommendations were provided to enhance treatment of cost trajectory for security remediation components, modelling generator retirements and accounting for system strength needs across sub-transmission and distribution electricity networks.	**No change compared to draft position** – while AEMO acknowledges stakeholder feedback on the importance and magnitude of system security challenges, AEMO believes the proposed methodology strikes the right balance of these factors, based on current industry knowledge and technical evidence. AEMO confirms that although not all system security components can be modelled dynamically while managing model complexity and solve times, estimates of all material system security costs will be included in the 2026 ISP.

AEMO has made eight major changes to the ISP Methodology

The final *ISP Methodology* to be applied for the 2026 ISP includes the following eight major changes, compared to the version applied for the 2024 ISP:

- **Adjusting the sub-regional topology and sub-regional electricity demand allocation approach** to follow the proposal in the Draft 2024 *Electricity Demand Forecasting Methodology*.
- **Introducing representation of distribution network capacity**, and opportunities to facilitate aggregate operation of CER and other distributed resources.
- **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.
- **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.
- **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.

- **Implementing 'imperfect foresight' in the time-sequential 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'.
- **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.
- **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.

AEMO appreciates the feedback provided by stakeholders through the *ISP Methodology* review process. AEMO looks forward to continuing to consult with industry, consumer advocates and other stakeholders throughout the delivery of the 2026 ISP.

Contents

Tables

Figures

1. Consultation process

This consultation summary report has been prepared for the final stage of the consultation conducted by AEMO to review its *ISP Methodology,* in accordance with the Australian Energy Regulator's (**AER's**) *Forecasting Best Practice Guidelines* (**FBPG**)[2]. This paper outlines how AEMO has taken stakeholder feedback into account in its preparation of the *ISP Methodology* that will be applied for the delivery of the 2026 *Integrated System Plan* (**ISP**). This section provides the stakeholder consultation process for this review, and the overall 2026 ISP development process.

1.1. Stakeholder consultation process

The FBPG require the *ISP Methodology* to be reviewed through a two-stage consultation process at least every four years in accordance with the consultation procedures in Appendix A of the FBPG. The *ISP Methodology* was most recently consulted on through a single-stage process in March 2023, and was originally established in July 2021.

This report considers feedback received from stakeholders in response to the Draft *ISP Methodology* and Consultation Paper and discusses corresponding updates made to the *ISP Methodology* – a marked-up version of which is released alongside this consultation summary report. This document uses terms defined in the National Electricity Rules (**NER**), which are intended to have the same meanings.

AEMO's process and timeline for this consultation is outlined in Table 1. The publication of this Consultation Summary Report and the final *ISP Methodology* concludes the consultation process for the review of the *ISP Methodology*.

Table 1 Consultation process and timeline

Consultation steps	Dates
Issues paper published	23 October 2024
Post-publication webinar	1 November 2024
Consumer advocate verbal submission	20 November 2024
Submissions closed on issues paper consultation	22 November 2024
Draft *ISP Methodology* and Consultation Paper published	13 March 2025
Post-publication webinar	3 April 2025
Submissions due on Draft *ISP Methodology* consultation	14 April 2025
Final *ISP Methodology* and Consultation Summary Report published	25 June 2025

AEMO's consultation webpage for the *ISP Methodology*[3] contains all previously published papers and reports, written submissions, and other consultation documents or reference material.

In response to the Draft *ISP Methodology* and Consultation Paper released on 13 March 2025, AEMO received 21 non-confidential submissions, and one confidential submission. Stakeholders who provided non-confidential submissions are listed in Table 2.

[2] AER. Forecasting Best Practice Guidelines. August 2020, at https://www.aer.gov.au/system/files/AER%20-%20Forecasting%20best%20practice%20guidelines%20-%2025%20August%202020.pdf.

[3] At https://aemo.com.au/consultations/current-and-closed-consultations/2026-isp-methodology.

Table 2 Stakeholders who provided submissions

Submissions		
Alinta Energy	Centre for Independent Studies (**CIS**)	**ISP Consumer Panel**
ANU 100% Renewable Energy Group	**Climateworks**	**Jemena**
Ausgrid	**ElectraNet**	**Justice and Equity Centre**
AusNet	**Ergon Energy and Energex**	**Marinus Link**
Australian Energy Council	**Etrog Consulting**	**Nexa Advisory**
Australian Energy Producers	**Fletcher, Andrew**	**Origin**
Centre for New Energy Technologies (**C4NET**)	**Hydro Tasmania**	**Transgrid**

AEMO thanks all stakeholders for their feedback throughout the *ISP Methodology* review process, including in response to the Draft *ISP Methodology* and Consultation Paper. A summary of material issues raised in submissions, and AEMO's responses, is detailed in Section 3 and Section 4.

1.2. 2026 ISP development process

The *ISP Methodology* developed for the 2026 ISP may also be used in the 2028 ISP and any associated ISP updates. Figure 1 shows the process to develop the ISP, and current progress on all elements for the 2026 ISP[4].

Before developing and consulting on the Draft 2026 ISP, AEMO is required to:

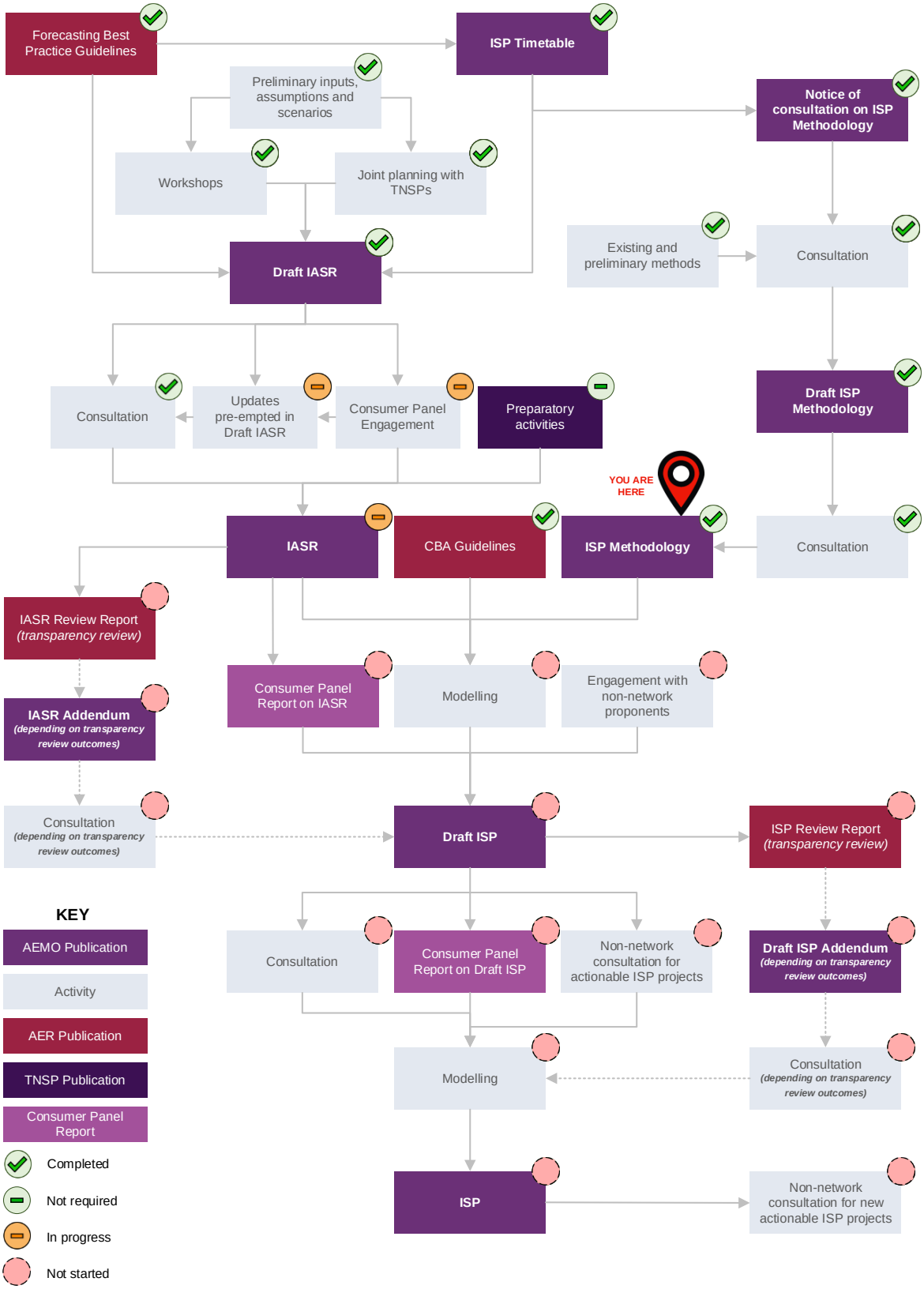
- **Consult on inputs, assumptions and scenarios** – AEMO published consultation submissions from 37 stakeholders on Stage 1 of the Draft 2025 *Inputs, Assumptions and Scenarios Report* (**IASR**), and published 27 consultation submissions on Stage 2. AEMO also released the Draft 2025 *Electricity Network Options Report* and the Draft 2025 *Gas Infrastructure Options Report*, both on 22 May 2025, for consultation. AEMO will publish the final versions of these reports with accompanying consultation summary reports in July 2025.
- **Consult on the *ISP Methodology*** – AEMO published 39 consultation submissions on the *ISP Methodology* issues paper that was released on 23 October 2024, and published 21 consultation submissions on the Draft *ISP Methodology* that was released on 13 March 2025. The final version and this accompanying Consultation Summary Report were published on 25 June 2025.

In addition, AEMO will develop **Demand Side Factors Information Guidelines** by 19 December 2025, consistent with the Australian Energy Market Commission's (**AEMC**'s) final rule on improving consideration of demand-side factors in the ISP[5], including releasing a paper in July 2025 to initiate consultation. These guidelines will drive a more consistent approach to the collection of relevant information for ISPs. Given the need for inputs and assumptions for the 2026 ISP to be finalised in the first half of 2025 to support the release of the Draft 2026 ISP in December 2025, AEMO and distribution networks have collaborated extensively to release proposed distribution network opportunities data for consultation in the Draft 2025 *Electricity Network Options Report*, and finalisation in July 2025. The final Demand Side Factors Information Guidelines are expected to apply for future ISPs.

[4] The 2026 ISP Timetable provides more information on the key milestones of the 2026 ISP development process, at https://aemo.com.au/energy-systems/major-publications/integrated-system-plan-isp/2026-integrated-system-plan-isp.

[5] AEMC. *Improving consideration of demand-side factors in the ISP. Final determination*, December 2024. At https://www.aemc.gov.au/rule-changes/improving-consideration-demand-side-factors-isp.

Figure 1 Navigating the ISP process



2. Background

The *ISP Methodology* was first released in 2021, and was updated in 2023. This recent consultation provided an opportunity to ensure that the ISP modelling and cost benefit assessment processes are fit for purpose in the context of the ongoing energy transition. The scope included implementation of changes needed to deliver on the outcomes of the Australian Energy Ministers' *Response to the Review of the Integrated System Plan*[6] (**Response to the ISP Review**), including new rules made by the AEMC to give effect to these.

In this section:

- Section 2.1 provides context for the consultation.
- Section 2.2 sets out a brief overview of the current ISP modelling approach.
- Section 2.2 discusses the Federal Government's ISP Review.
- Section 2.4 notes matters which were not considered within the scope of this consultation, and why.

2.1. Context for this consultation

Published every two years, AEMO's ISP is a roadmap for the transition of the power system that underpins the National Electricity Market (**NEM**), with a clear plan for essential infrastructure that meets both consumer needs and government energy and emissions targets between now and 2050. The ISP draws on a comprehensive set of inputs, including federal and state government policies for emissions reduction, energy and the environment, and the ISP modelling seeks the optimal mix of generation, storage and network infrastructure investment.

Australia's energy transition has accelerated significantly since the release of the first ISP in 2018, and the first *ISP Methodology* in 2021. Growth in new rooftop solar systems has averaged 12% year on year over the past five years, and these resources contributed more electricity to the grid in the fourth quarter of 2024 (17%) than did grid-scale solar, wind, hydro or gas. In 2024, large- and small-scale renewables accounted for almost 39% of the total electricity delivered through the NEM, compared to around 31% in 2021.

In 2024, Energy Ministers endorsed the findings of the Federal Government's review of the ISP (**ISP Review**), which considered how the ISP could "best support the energy transformation" in the NEM. Actions arising from the review are intended to expand the scope of the ISP to include enhanced incorporation of gas market conditions and further consideration of demand-side opportunities.

This consultation provided an opportunity to ensure that the modelling and cost benefit analysis approaches used to prepare the ISP remain fit for purpose, and to incorporate the outcomes of the Federal Government's ISP Review.

2.2. ISP modelling overview

AEMO's *ISP Methodology* sets out the methodologies for the:

- **Modelling applied in the ISP.** This includes the capacity outlook model, time-sequential model, gas supply model and power system assessments.
- Cost-benefit analysis used in the ISP. This includes:

[6] At https://www.energy.gov.au/sites/default/files/2024-04/ecmc-response-to-isp-review.pdf.

- AEMO's approach to applying the steps outlined in the AER's Cost Benefit Analysis (**CBA**) Guidelines.
- Differentiating scenarios and sensitivities and their treatment in informing the optimal development path (**ODP**).
- Outlining the use of scenario weights to determine the ODP.

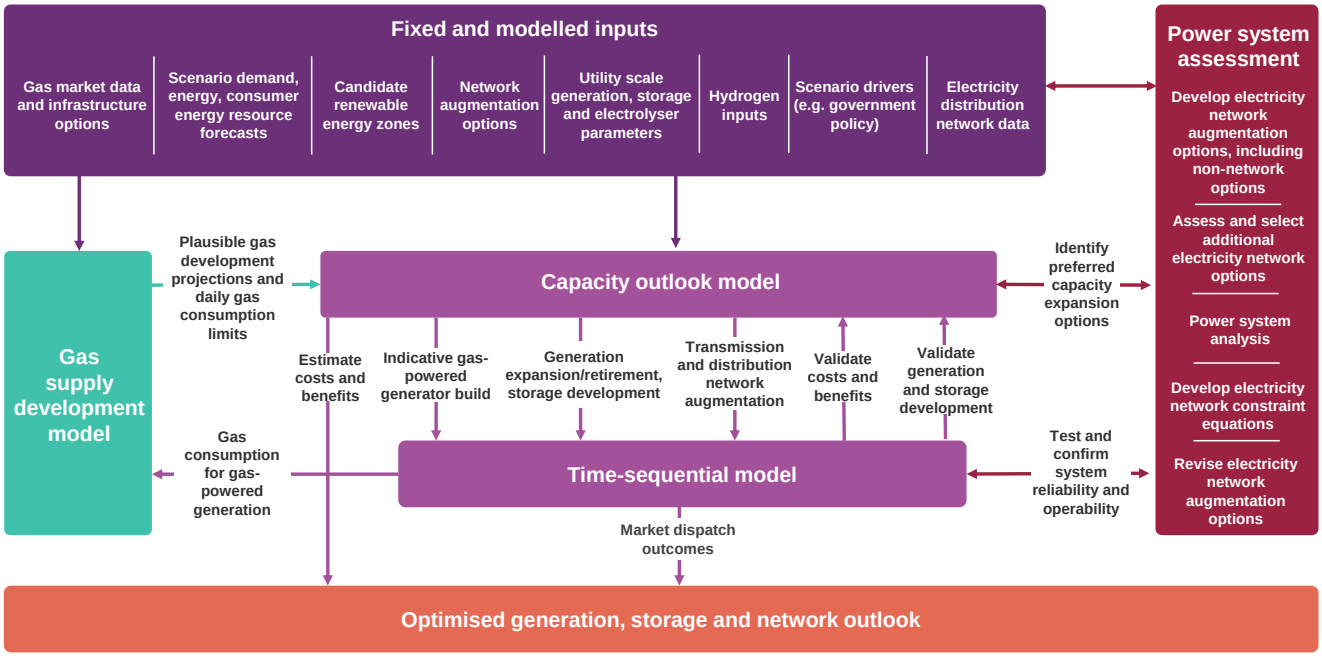
The combination of these processes leads to the determination of the ODP for an ISP.

The preparation of fixed and modelled inputs is not part of the *ISP Methodology*. Instead, these are developed in AEMO's IASR, which relies on inputs and methods that are extensively consulted upon either through the development of the IASR or the application of AEMO's *Forecasting Approach,* particularly AEMO's *Electricity Demand Forecasting Methodology*.

Figure 2 provides an overview of the ISP modelling methodology. The overall ISP process is an iterative approach, where the outputs of each of the different models or analytical processes are used to determine or refine inputs into the other models and processes. Using the colours shown in Figure 2:

- The **fixed and modelled inputs** and **consulted-on inputs** are the inputs, assumptions and scenarios published in the IASR. These include inputs that are influenced by earlier power system assessments used to describe the existing capability of the NEM and to develop a set of network and non-network development options.
- The **capacity outlook** model (Section 2 of the *ISP Methodology*) uses all the available inputs to develop projected generation, transmission, distribution to increase opportunities for distributed resources, generation retirement, and dispatch outcomes in each of the ISP scenarios. The aim when doing so is to minimise capital expenditure and operational costs over the long-term outlook, while also meeting the requirements and drivers of the energy transition for each scenario, including policy-defined criteria.
- The **time-sequential** model (Section 3 of the *ISP Methodology*) then optimises electricity dispatch for every hourly or half-hourly interval. In so doing, it validates the outcomes of the capacity outlook model and feeds information back into it. The model is intended to reflect participant behaviour hour-by-hour, including generation outages, to reveal performance metrics for both generation and transmission.
- The **gas supply development** model (Section 4 of the *ISP Methodology*) identifies gas infrastructure limitations and gas development projections to be used in the capacity outlook and time-sequential models.
- The **power system assessment** (Section 5 of the *ISP Methodology*) tests the capacity outlook and time-sequential outcomes against the technical requirements for the power system (network constraints, security, strength, inertia) as well as assessing future marginal loss factors (**MLF**s) to inform new grid connections. These assessments feed back into the capacity outlook and time-sequential models to continually refine outcomes.
- The **cost-benefit analyses** (Section 6 of the *ISP Methodology*) test each individual scenario and development plan considered by the ISP to determine the ODP and test its robustness.

Figure 2 Overview of ISP modelling methodology



2.3. Federal Government's ISP Review

Over 2023 and early 2024, the Federal Government undertook a review of the ISP[7], and on 5 April 2024, the Energy and Climate Change Ministerial Council published the Energy Ministers' Response to the ISP Review[8]. The response outlined a series of actions to enable the ISP to set a direction for the energy system as a whole, while maintaining the critical function of the ISP in transmission planning.

The ISP Review focused on supporting emissions reduction, integrating gas and electricity planning, enhancing demand considerations, transformation of Australia's energy mix, jurisdictional policy interactions, and the timely delivery of ISP projects.

In December 2024, the AEMC published final determinations on changes to the NER and National Gas Rules (**NGR**) to implement aspects of the review of the ISP:

- For **improving consideration of demand-side factors in the ISP**[9], the rules now require AEMO to publish a demand-side factors statement in the ISP (and information guidelines to explain which categories of information will be collected to enable AEMO to prepare the statement and how the information will be collected). In addition, the rules place an obligation on distribution network service providers (**DNSP**s) to provide relevant information to AEMO for the statement in accordance with the guidelines, and AEMO is required to publish the information provided by DNSPs. Due to the timing of the AEMC's rule change, this information guideline will not be applied in full until the 2028 ISP, although all relevant DNSPs have voluntarily provided AEMO with data for the 2026 ISP.

[7] Australian Government, Department of Climate Change, Energy, the Environment and Water. *Review of the Integrated System Plan – Final Report*, January 2024. At https://www.aph.gov.au/Parliamentary_Business/Committees/Senate/Energy_Planning_and_Regulation_in_Australia/EnergyPlanning/Additional_Documents.

[8] At https://www.energy.gov.au/sites/default/files/2024-04/ecmc-response-to-isp-review.pdf.

[9] AEMC. *Rule determination. National Electricity Amendment (Improving consideration of demand-side factors in the ISP) Rule 2024*, December 2024. At https://www.aemc.gov.au/rule-changes/improving-consideration-demand-side-factors-isp.

- For **better integration of gas and community sentiment into the ISP**[10], the rules now enable AEMO to access, use and disclose specified gas information collected under the NGR, subject to confidentiality provisions, to expand and deepen gas analysis included in the ISP. The information will be used by AEMO to develop gas development projections that will be included in the ISP. No rule changes were made for enhancing inclusion of community sentiment information in the ISP, as the AEMC considered that existing rules and joint planning processes between AEMO and transmission network service providers (**TNSP**s) were already sufficient for this purpose.

The AEMC made transitional rules which allowed consultation by AEMO on changes to the *ISP Methodology* on the basis of the draft rules (published by the AEMC for consultation) to satisfy consultation requirements in the NER for amending the *ISP Methodology*[11]. AEMO consulted in the *ISP Methodology* Issues Paper on the basis of the draft rules, and prepared the *Draft ISP Methodology* Consultation Paper on the basis of the final rules.

In the Consultation Paper, AEMO also welcomed any feedback from stakeholders in regard to the final rule in December 2024, and stakeholder views on any necessary or desirable changes to the *ISP Methodology*. AEMO provides responses to those submissions, where such views were raised, in Section 4 of this Consultation Summary Report.

Not all endorsed actions or new rules resulting from the Review of the ISP have required a change to the *ISP Methodology*. Table 3 shows the publications that AEMO will amend to address each ISP Review action or rule change, to help inform engagement by stakeholders on appropriate publications.

Table 3 Implementation for actions in the Energy Ministers' Response to the ISP Review

Action in the response to the Review of the ISP	Process for implementation				
	2025 IASR	ISP Methodology	2025 Electricity Network Options Report[A] and 2025 Gas Infrastructure Options Report[B]	Enhanced Locational Information report[C]	Draft ISP and final ISP
Integrating gas into the ISP	✔	✔	✔		✔
Enhanced demand forecasting and optimising for the demand-side	✔	✔	✔		✔
Better data on industrial and consumer electrification					✔
Coal-fired generation shutdown scenarios					✔
Improving locational information				✔	✔
Enhanced analysis of system security	✔	✔			✔
Jurisdictional policy transparency	✔ [E]				✔
Clarifying policy inclusions	✔ [E]				✔

[10] AEMC. *Final report. National Electricity Amendment (Better integration of gas and community sentiment into the ISP) Rule 2024 and National Gas Amendment (Better integration of gas and community sentiment into the ISP) Rule 2024*, December 2024. At https://www.aemc.gov.au/rule-changes/better-integration-gas-and-community-sentiment-isp-0.

[11] NER clause 11.182.3.

Action in the response to the Review of the ISP	Process for implementation				
	2025 IASR	ISP Methodology	2025 Electricity Network Options Report[A] and 2025 Gas Infrastructure Options Report[B]	Enhanced Locational Information report[C]	Draft ISP and final ISP
Improving the accessibility of the ISP[D]	✔				✔
Incorporating community sentiment	✔		✔		✔
Additional planning inputs	✔				✔

A. The *Electricity Network Options Report* is consulted on as part of the IASR. This was previously known as the *Transmission Expansion Options Report*, but has been renamed to reflect the inclusion of both transmission and distribution in future ISPs.
B. The first *Gas Infrastructure Options Report* was released in May 2025 as a draft for consultation, to support better integration of gas into the ISP.
C. The *Enhanced Locational Information* report provides a consolidated set of locational information about where to locate projects in the NEM.
D. AEMO will consider opportunities throughout the ISP development process to enhance consumer understanding of key elements.
E. These actions are to be implemented, in parallel with the IASR process, through the publication of a guideline on AEMO's policy inclusion consultation process with jurisdictions.

2.4. Related consultation processes

This consultation was limited to matters AEMO needs to consider to determine any revisions to the *ISP Methodology*. There is a range of matters relating more generally to the ISP which should be considered through other processes, such as consultation on inputs and assumptions, or consultation on a Draft ISP, rather than through consultation on the *ISP Methodology*. Figure 1 (in Section 1.2) shows consultation opportunities through the ISP development process.

An example of a change that is out of scope of this consultation would be whether AEMO should run a particular new sensitivity analysis. The *ISP Methodology* already broadly outlines how AEMO may conduct sensitivity analyses, and how such analysis is considered in selecting the ODP. However, the specifics of individual sensitivities to be conducted, including parameters to vary and their justification, are considered through other processes including through the consultations on the Draft IASR and Draft ISP.

3. List of material issues

The key material issues arising from stakeholder submissions in response to the *Draft ISP Methodology* and Consultation Paper are listed in Table 4. AEMO's responses to these issues are detailed in Section 4.

Table 4 List of material issues

No.	Issue	Description	Raised by
1.	Consumer energy resources (**CER**), distributed resources, and distribution network capabilities	• Enhance modelling transparency and granularity by incorporating sub-transmission and distribution network data to improve CER representation at the asset level. • Refine CER modelling by applying realistic limits to virtual power plant (**VPP**) and demand side participation (**DSP**) including industrial and data centre loads, and align assumptions with actual consumer behaviour and operational constraints. • Improve CER uptake modelling by incorporating the effects of emergency curtailment, network constraints, and infrastructure costs.	**Ausgrid, AusNet, C4NET, CIS, Ergon Energy and Energex, Etrog Consulting, Hydro Tasmania, ISP Consumer Panel, Jemena, Justice and Equity Centre, Nexa Advisory, Origin, Transgrid**
2.	Gas-powered generation (**GPG**) and infrastructure	• Stakeholders supported expanding GPG cost analysis and recommended applying scenario-specific gas price uplifts - particularly where infrastructure needs are higher based on industry consultation. • Improve transparency and clarity in gas development projection methodologies and infrastructure costs and development options to be used in modelling. • Extend proposed adjustments for mid-merit gas generators to include flexible gas generators to enhance the reliability and accuracy of capacity outlook modelling. • Conduct a comprehensive assessment of upstream and downstream emissions – including renewable gas – and clarifying gas use impacts on scenario carbon budgets.	**Australian Energy Producers, CIS, Climateworks, ElectraNet, Hydro Tasmania, ISP Consumer Panel, Jemena, Marinus Link, Nexa Advisory, Origin, Transgrid**
3.	Selecting the ODP	• Improve transmission network project timing assessments by using broader data sources and catering for potential delays based on historical data. • Expand scenario analysis to include constrained supply chains for renewable energy development and transmission network projects, delayed or reversed policy targets, and greater emphasis on anticipated loads aligned with government policy to strengthen the ODP's robustness.	**Alinta Energy, Australian Energy Producers, Climateworks, ElectraNet, ISP Consumer Panel, Justice and Equity Centre, Marinus Link**
4.	Correcting for perfect foresight of the ISP model	• Explore alternative modelling approaches by engaging with battery operators, and improve representation of battery dispatch to better reflect real-world decision-making and system costs. • Some stakeholders advised removing headroom reserves and refining footroom assumptions to better reflect individual market participant behaviour, rather than system-level reliability metrics. • Upgrade modelling platform to enable deeper integration of modelling improvements across AEMO's planning and market modelling tools.	**Andrew Fletcher, ANU 100% Renewable Energy Group, Australian Energy Council, CIS, Ergon Energy and Energex, Hydro Tasmania, ISP Consumer Panel, Justice and Equity Centre, Marinus Link, Origin**
5.	Treatment of hydrogen	• Stakeholders supported clearer and more realistic hydrogen utilisation assumptions, recommending alignment with CSIRO modelling, inclusion of storage costs, and constraints based on variable renewable energy (**VRE**) availability and production pathways. • Incorporate hydrogen storage costs, revise pipeline cost assumptions, and reassess blending limits. • Refine electrolyser siting by removing the *Green Energy Exports* scenario variant and assessing locations REZ-by-REZ.	**Andrew Fletcher, Australian Energy Producers, ElectraNet, Hydro Tasmania, ISP Consumer Panel, Justice and Equity Centre, Marinus Link**
6.	System security	• Adopt realistic cost assumptions for emerging technologies, avoid relying solely on public closure timelines, and model generator retirements based on market and system conditions. • Expand climate stress testing to include compounding extreme events and enhance system strength modelling below 330 kV to better capture distribution-level security needs.	**Alinta Energy, Ergon Energy and Energex**

4. Discussion of material issues

4.1. Consumer energy resources, distributed resources and distribution network capabilities

4.1.1. Issue summary and AEMO's assessment

The majority of stakeholder submissions on this topic (**Ausgrid**, **C4NET**, **Hydro Tasmania**, **Jemena**, **Origin** and the **ISP Consumer Panel**) were broadly supportive of the proposed approach for incorporating distribution network capabilities and opportunities for CER and other distributed resources in the ISP modelling, noting this is the first time that distribution network information has been incorporated in the ISP. Stakeholders provided feedback for further enhancement of the approach, for consideration and improvement over successive ISPs.

Some stakeholders (**CIS**, **Etrog Consulting**, the **ISP Consumer Panel**, the **Justice and Equity Centre** and **Nexa Advisory**) re-iterated their concerns about distribution network data sources, and the treatment of CER asset costs in the ISP cost benefit analysis.

The table below summarises stakeholder feedback and AEMO's responses.

Stakeholder feedback	AEMO's response
Distribution network data and opportunities	
Ausgrid recommended that AEMO include a sub-transmission network layer in its assessments and incrementally aggregate low-voltage CER data to sub-regional nodes to correctly represent the distribution network's flexibility and actual hosting capacity. They highlighted omitting the sub-transmission layer could lead to an incomplete picture and misguide ISP planning, especially as large commercial loads like data centres emerge. **Ausgrid** also recommended that constraint equations for CER network capability and other distributed resources network capability remain separate, rather than being combined, to allow appropriate consideration of the differences between CER and other distributed resources.	AEMO agrees with **Ausgrid** that, where possible, it will be appropriate to include sub-transmission representation in the distribution network data used to represent opportunities for CER and other distributed resources in the ISP modelling process. Given that the 2026 ISP will represent the first application of distribution network data in the ISP modelling process, AEMO will apply a flexible approach which acknowledges the evolving nature of available network data and modelling capabilities. As such, AEMO has introduced this sub-transmission network information to the diagram and approach for incorporating distribution network opportunities as sub-regional equations in the ISP model. This is an optional element to be included where applicable and where data is available. AEMO acknowledges that not all DNSPs may be able to provide this information as this network hierarchy may not be relevant for all networks. AEMO also notes that it may not be possible to include this information in the first iteration of distribution network modelling for the ISP. AEMO agrees with **Ausgrid** that it is more appropriate to separate the CER and other distributed resources equations, and will remove the implication that these could be combined.
C4NET provided a summary of the insights from the Enhanced System Planning collaborative research program, a two-year exercise "aimed at informing planning for sub-transmission level electricity systems beyond 2030". **C4NET** noted that the research program outlined a replicable methodological framework capable of economically assessing opportunities to significantly increase CER and other distributed resources hosting in electricity distribution systems, and included insights relating to gas and electricity network investment decision-making outcomes, and noted the importance of realising the full potential of future system flexibility as part of long-term integrated system planning. **C4NET** agreed with AEMO that the representation of underlying details about DNSP networks will need to be enhanced over successive ISPs, and acknowledged that the recommendations from the research program may not be possible to fully consider and incorporate for the 2026 ISP, but recommended parallel evolution of data and modelling approaches while delivering the	AEMO agrees with **C4NET** that the approach to modelling distribution network opportunities for CER and other distributed resource opportunities presents significant research and industry opportunities. AEMO acknowledges that the initial approach adopted for the 2026 ISP will evolve as the data quality and modelling approaches improve over successive ISPs. AEMO welcomes industry, DNSP and research organisations' views as part of ongoing consultation for successive ISPs, and will keep stakeholders updated through appropriate consultation mechanisms.

Stakeholder feedback	AEMO's response
initial inclusion of distribution network planning considerations into the ISP.	
Origin recommended AEMO work towards modelling CER and network capabilities at the individual distribution asset level to improve accuracy. It cautioned that the current sub-regional approach may overestimate CER output and firm capacity, and suggested clearly documenting its limitations in the interim.	The approach proposed in the Draft *ISP Methodology* and the Draft 2025 *Electricity Network Options Report* does include initial use of individual DNSP asset data at the distribution transformer level to calculate the net CER availability before being aggregated to the sub-regional node in the ISP model. While AEMO agrees with **Origin** that more granular modelling would allow more precise distribution network opportunity outcomes, unfortunately this level of granularity is not possible for the 2026 ISP model without significant simulation time and model complexity trade-offs. As such, AEMO and DNSPs have developed an approach which seeks to inform the sub-regional level constraints with granular data and network modelling where it is available. For the 2026 ISP, AEMO has decided this added complexity appropriately trades off the increased accuracy and precision with regard to the impact to other modelling focus areas. Section 2.12 of the Draft 2025 *Electricity Network Options Report* outlines the methodology and process for collecting distribution network data and approach for incorporating into ISP inputs. AEMO will ensure that the final 2025 *Electricity Network Options Report* documents the limitations of the proposed approach, as **Origin** suggests.
AusNet recommended that AEMO derive aggregated sub-regional network capabilities and constraints through ongoing consultation with DNSPs. They stressed that export capacity assessments vary significantly based on considered constraints and upgrades (both at sub-transmission level and at lower-voltage level within the distribution system) and also based on which augmentations are considered. In particular, **AusNet** emphasised a desire to engage with AEMO about its ongoing sub-transmission connections enablement projects "and how they may inform AEMO's modelling."	AEMO agrees that consultation will be crucial, and will continue working with DNSPs to finalise the distribution network capabilities and constraints modelled at the sub-regional network level once the data aggregation process is complete. AEMO has released the proposed approach for consultation through the Draft 2025 *Electricity Network Options Report.* On the matter of sub-transmission connection enablement projects, AEMO considers that higher-voltage projects such as these are more appropriately considered through joint planning for the transmission and sub-transmission systems, and in some cases might already be broadly covered as part of the generation and storage forecasting approach in the ISP. AEMO will continue joint planning with **AusNet**, **AEMO Victorian Planning** and **VicGrid** in the lead up to the release of the final 2025 *Electricity Network Options Report*, to consider the impact of any sub-transmission connections enablement projects.
Origin supported "AEMO's proposal to adjust rooftop PV firm capacity contributions based on observed constraint impacts" and recommended applying this approach consistently across all CER technologies. It suggested extending the constraint-based adjustment methodology to include non-scheduled solar, coordinated battery systems, and electric vehicles (**EV**s).	AEMO agrees with **Origin's** feedback, and has expanded the *ISP Methodology* text to note that the firm capacity contributions consideration will be extended to other types of CER and other distributed technologies, when needed.
Jemena supported AEMO's shift toward a more integrated approach to electricity distribution network planning and recommended including both network and non-network solutions in collaboration with DNSPs.	AEMO welcomes submissions in response to the Draft 2025 *Electricity Network Options Report* regarding non-network options and how they could be considered as part of this work. At this stage, AEMO has taken a similar approach to the treatment of non-network options in the transmission and distribution networks – that is, calling for non-network options at each stage of consultation.
The **ISP Consumer Panel** recommended that AEMO reduce its reliance on DNSPs for CER and other distributed resources data and engage a broader range of stakeholders, including aggregators, battery providers, and EV providers. It urged AEMO to prioritise better use of existing infrastructure in its modelling to give greater consideration to non-network solutions like dynamic management and demand response, which could reduce the need for new transmission investments.	AEMO appreciates the **ISP Consumer Panel's** input and notes that data from DNSPs is a necessary first step to represent distribution network capabilities in the ISP model. The purpose of the approach is to identify if certain parts of the distribution network would need additional capacity to optimise the use of CER and reduce CER curtailment. AEMO will model distribution augmentation in tranches to include a variety of network and non-network solutions like dynamic operating envelopes and dynamic voltage management systems for CER as described in Section 5 of the Draft 2025 *Electricity Network Options Report.* AEMO notes the **ISP Consumer Panel's** feedback about engaging third-party providers that may facilitate operation of CER and other distributed resources. AEMO welcomes insights from these parties and any insights and approaches that could be incorporated either through direct inclusion in the CER forecasts consulted on through the IASR process, or as non-network options considered by DNSPs as they develop and deliver network capacity opportunities, consistent with the application of the regulatory investment test for transmission (**RIT-T**) and revenue determination processes for network investments.

Stakeholder feedback	AEMO's response
	AEMO supports prioritising better use of existing infrastructure. AEMO and the DNSPs have proposed an initial tranche of available existing capacity for each network, with a second tranche of capacity delivered through existing infrastructure supplemented with better voltage control mechanisms envisaged to be implemented at relatively low additional cost.
Consideration of CER technologies	
Ausgrid recommended AEMO revise its approach to data centres by incorporating a portion of early-stage projects into forecasts, using a method similar to that applied to large industrial loads. It argued that excluding all early-stage data centre projects overlooks a rapidly growing and impactful load category, which could significantly affect load growth and network planning.	AEMO's approach to forecasting data centre loads in the NEM is under review through the Electricity Demand Forecasting Methodology consultation, accessible via AEMO's website[12]. AEMO notes that the draft methodology recognised the need to include anticipated data centres, with an approach similar to other large industrial loads. AEMO considers it appropriate to consider load forecasting matters through that process, rather than through the *ISP Methodology*, as load forecasts affect multiple AEMO planning and forecasting publications. AEMO will incorporate the updated Electricity Demand Forecasting Methodology outcomes into the 2026 ISP.
Ergon Energy and Energex recommended reassessing the assumption that passive EVs are not subject to curtailment, especially as vehicle-to-grid **(V2G)** adoption increases. They also called for improved modelling of CER curtailment and household behaviours to enhance the ISP's accuracy.	While AEMO agrees that ideally all CER elements would be included in modelling of CER and other distributed resources, some approximations have been necessary to support model tractability. AEMO considers that any curtailment of CER will likely occur at times of peak rooftop PV export. In the case of passive EVs and storage, AEMO considers that export from these devices is unlikely to contribute to curtailment, i.e. uncoordinated storage will not be discharging at times of peak rooftop PV export and instead will be charging. AEMO considers that V2G and coordinated storage, i.e. devices participating in a VPP, could be more responsive than their passive storage counterparts and potentially likely to be at risk of being curtailed if exporting at these times. In fact, AEMO has included all V2G EVs in its coordinated CER forecast in the Draft 2025 IASR. V2G EVs are not part of the passive EV forecast. In response to **Ergon Energy and Energex's** feedback, AEMO has clarified this information in the relevant statement in the ISP Methodology. As V2G technologies evolve, assumptions around curtailment and coordination will be refined. Stakeholder input is vital to improving forecast accuracy, and AEMO will continue to adapt its methodology in response to industry developments as new and better data becomes available to inform modelling approaches.
Impacts of forecast CER growth	
Origin recommended incorporating the potential impact of emergency rooftop solar curtailment on consumer behaviour and CER adoption into its CER forecasts. It suggested that this would improve the accuracy of system planning by accounting for how last-resort curtailment measures might deter future CER uptake.	AEMO does not consider that potential emergency operational measures will be a material behavioural driver affecting investment decisions given the rare circumstances that may lead to curtailment. AEMO notes that as part of consultation on the Draft 2025 IASR, AEMO reduced its CER forecasts, including a 15% reduction in rooftop PV and 20% reduction in household battery uptake by 2050 in the *Step Change* scenario. This change was informed by stakeholder feedback and reflects a moderated outlook of expected CER market participation by CER owners. Consumer behaviour is implicitly incorporated in CER forecasts as they are part of historical uptake trends, while explicit modelling of behavioural drivers (such as the one here described, if it emerges) will be incorporated as data becomes available.
Origin recommended aligning CER uptake modelling with that of other distributed resources by incorporating network constraint impacts. It argued that treating CER uptake as an external input overlooks operational and adoption limitations, potentially leading to overestimated adoption levels.	AEMO recognises that CER operations will be impacted by the distribution network limitations developed for the 2026 ISP, which may reduce CER operations if curtailed due to insufficient distribution network capability. AEMO will consider the degree of distribution investment and potential persisting curtailment, that arises from this expanded methodology, and will consider it in future CER uptake forecasting. Further detail on the distribution network data collection and implementation process is discussed in Section 2.12 of the Draft 2025 *Electricity Network Options Report.*

[12] At https://aemo.com.au/consultations/current-and-closed-consultations/2024-electricity-demand-forecasting-methodology-consultation.

Stakeholder feedback	AEMO's response
CIS recommended that AEMO account for distribution network limitations on passive CER storage, include associated infrastructure costs in modelling, and test scenarios with low CER uptake. It suggested that this would require revising the current assumption that passive CER charging and discharging are unaffected by distribution constraints, to better reflect real-world limitations and costs.	Passive storage is included in the complete set of constraints representing distribution network limitations on the operation of CER, as discussed in Section 2.4.7 of the *ISP Methodology*. For the 2026 ISP, AEMO considers that exports from passive EVs and storage is unlikely to contribute to curtailment – that is, at times of peak rooftop PV export. AEMO agrees that the insights from a 'low CER uptake' sensitivity analysis could be informative, and will take this into account in the prioritisation of modelling work and sensitivity selection for the ISP, noting lengthening simulation runtimes for the expanded ISP model.
CIS recommended that AEMO revise its treatment of CER by recognising financial incentives as the primary driver of CER adoption, rather than treating uptake as an exogenous input influenced by non-financial motivations.	AEMO has provided information in the Draft 2025 IASR and its reference materials to explain the basis of the CER forecast preparation. The CER forecast does include consideration of household and consumers' financial motivations to invest in CER, while non-financial drivers are implicitly captured in historical uptake trends.
CER cost and co-optimisation	
Nexa Advisory recommended that the *ISP Methodology* more fully integrate co-optimisation of CER with distribution network planning and improve transparency in sub-regional augmentation. It proposed cross-checking distribution network development plans against the ISP and consulting on network options in the Draft 2025 *Electricity Network Options Report* to assess whether capital investment or non-network solutions offer the lowest cost for consumers.	AEMO recognises stakeholders' interest in co-optimising CER and other investments. AEMO does not consider that it is currently feasible to introduce full co-optimisation between the CER forecasts and the ISP modelling outcomes. This may be possible in future ISPs, depending on future market trends, modelling capabilities, and data availability. AEMO is implementing a range of additional elements to the 2026 ISP considering distribution network opportunities for CER and other distributed resources. As this is a significant modelling change for the 2026 ISP and the data and modelling approach are new, AEMO will need to assess the quality of the outputs along the way and consider this in how information and insights are released in the 2026 ISP. AEMO considers that these approaches are an appropriate first step to integrate distribution network capabilities into the ISP model. These approaches are consistent with the AEMC's rule determination on improving demand-side factors in the ISP, which found that the final rule "represents the first step in an incremental approach" and that "other challenges would need to be addressed if the ISP is to provide a more holistic view of investment needs across the power system (at both the transmission and distribution level)". AEMO notes that the uptake of CER are financial decisions made by households and businesses for reasons not only related to the electricity market. AEMO will continue to explore further enhancement options for future ISPs.
CIS urged AEMO to co-optimise CER and distribution networks alongside large-scale generation, storage, and transmission to better reflect real-world investment behaviour.	
The **Justice and Equity Centre** recommended reframing the ISP's analytical approach to evaluate the optimal balance between network augmentation and CER, rather than focusing narrowly on CER curtailment costs. It argued that CER uptake should be treated as economically driven and included within the ISP's optimisation framework to support more efficient, consumer-focused planning.	
Etrog Consulting recommended that the ISP include consumer investment costs for CER to enable more realistic co-optimisation between consumers and the grid. It urged AEMO to treat consumer-driven investments like commercial ones by incorporating CER costs into the ISP's optimisation framework, allowing modelling to inform – rather than dictate – consumer decisions.	
Other issues	
Climateworks recommended AEMO enhance transparency for energy users and demand-side investors by providing detailed, time and location-specific cost and opportunity data. They proposed creating a "Demand Side Statement of Opportunity" to address demand uncertainty and support strategic investment decisions.	AEMO does not consider that the data availability and modelling capability is currently sufficient for AEMO to implement this recommendation. Rather, AEMO is taking an initial step in this 2026 ISP to incorporate distribution network opportunities for CER and other distributed resources, and welcomes feedback along the way on how this can be enhanced to meet stakeholder needs. In addition, AEMO will release a demand side factors statement as part of the 2026 ISP, in response to the ISP Review. This statement may go partway towards addressing this **Climateworks** recommendation.

4.1.2. AEMO's conclusion

AEMO has updated the Section 2.4.7 in ISP Methodology in response to stakeholder feedback and internal analysis to:

- provide further clarification on how coordinated and passive CER charge and discharge cycles are modelled in the ISP methodology,

- update the distribution network limitations constraint impacting CER operation and other distributed resources to align with the approach released in the Draft *2025 Electricity Network Options Report,* and
- include a reference to the *Electricity Network Options Report*, which details the inputs and considerations in collection of DNSP data and preparation of distribution network capabilities and augmentation options and costs to be used into the ISP modelling.

AEMO will continue to engage with stakeholders on the implementation of distribution network capabilities and opportunities through the 2025 *Electricity Network Options Report* consultation.

AEMO acknowledges the insights provided by stakeholders, and that this area in particular is a topic of ongoing innovation and evolution. AEMO expects the approach to incorporating distribution network opportunities for CER and other distributed resources will be enhanced over successive ISPs.

4.2. Gas-powered generation and infrastructure

4.2.1. Issue summary and AEMO's assessment

Most stakeholders have supported the proposed approach for the integration of the gas supply development model into the ISP Methodology. The following views were expressed:

- The **ISP Consumer Panel** suggested that AEMO should ensure 'fuel neutrality' in the ISP, and should conduct future gas modelling to reflect the costs of supporting the transition process with intermittent gas-powered generation (**GPG**).
- **Jemena** supported AEMO's improved approach to gas infrastructure modelling, recognising the growing interdependence between gas and electricity systems.
- **Hydro Tasmania** emphasised the importance of accurately reflecting gas's evolving role in a renewables-dominated system.
- **Marinus Link** supported the methodology change to limit annual growth in GPG capacity by considering daily limits to gas supply for GPG.

The table below discusses specific feedback provided by stakeholders to further enhance the integration of gas into the ISP modelling, and AEMO's assessment of these recommendations.

Stakeholder feedback	AEMO's response
Gas development projections	
ElectraNet suggested that gas infrastructure investments included in the ISP for modelling purposes should meet the same high threshold criteria as other committed projects. It recommended that only highly reliable investments should be considered if unable to assess this iteratively or in cost-benefit analysis to avoid compromising the ODP's robustness. If AEMO is unable to assess the gas development options iteratively or in the CBA, only highly reliable investments should be considered – to avoid compromising the ODP's robustness.	The gas infrastructure options that would be considered as part of the gas development projection assessment will include projects that have been assessed in the GSOO or identified in the *Gas Infrastructure Options Report* which is itself subject to stakeholder consultation. The GSOO follows a rigorous project classification approach similar to the commitment criteria used for electricity projects in the NEM. More information can be found in the 2025 GSOO Methodology Supply Adequacy[13]. Similar to the NEM Capacity Outlook modelling, gas projects considered committed and anticipated will be treated as if they are going to progress by the gas supply development model. All other known and generic gas infrastructure options, as identified by the *Gas Infrastructure Options Report*, are then given as options to the gas supply development model to develop gas development projections.

[13] At https://aemo.com.au/-/media/files/gas/national_planning_and_forecasting/gsoo/2025/gsoo-methodology-supply-adequacy.pdf?la=en.

Stakeholder feedback	AEMO's response
	The intent of integrating gas into the ISP is not to fully co-optimise the gas and electricity sectors, but to use realistic gas development projections to inform gas fuel availability for GPG.
The ISP Consumer Panel recommended that AEMO explore how the gas supply development model could assess hydrogen and biomethane developments to meet forecast demand for renewable gases.	The gas supply development model will consider known projects for biomethane as per the 2025 GSOO. AEMO may consider hydrogen projects subject to modelling timelines.
Jemena suggested that gas development projections should remain scenario-neutral, geographically generalised, and explicitly non-prescriptive to ensure investment outcomes are driven by market requirement and remain technology and proponent-neutral.	AEMO notes that the aim of the gas development projections is to support the planning of electricity investments in the NEM. The projections will not direct or action gas investments. The 2025 *Gas Infrastructure Options Report*[14] describes predetermined and model-determined gas infrastructure options.
Nexa Advisory requested AEMO to articulate potential opportunities for reducing the need for gas network development (dependence on peak day gas demand, which drives 'shortfalls' identified in the GSOO from the end of the decade).	The gas supply development model will include a range of infrastructure options either identified by gas market participants as part of the 2025 GSOO analysis or based on a set of generic options consulted on in the *Gas Infrastructure Options Report*. These options will not be limited to gas network infrastructure, but will also include storage, production and regasification facilities. The 2025 *Gas Infrastructure Options Report* provides details on the gas infrastructure options to be considered in the development of the gas development projections. Additionally, the GSOO's gas demand forecast used in the gas supply development model reflects expectations of declining peak day gas demand from non-GPG gas users. It incorporates factors such as improved energy efficiency, electrification, and evolving gas policy drivers.
Marinus Link supported AEMO's proposal to consider different gas sector development paths for each ISP scenario.	AEMO acknowledges **Marinus Link's** support for the proposed approach to consider different gas sector development paths for each ISP scenario.
CIS requested the gas development projection methodology to be further clarified to improve transparency and accountability. It raised a concern that frequent use of discretionary language like "may" introduces excessive flexibility for AEMO to make subjective judgement about which gas development projection is appropriate for the counterfactual scenario compared to alternative pathways.	AEMO acknowledges the feedback and understands the concern from **CIS** about the potential disadvantages if AEMO were to have excessive flexibility in the gas development projection modelling approach. As this is the first iteration of developing and integrating gas development projections into the ISP, some aspects of this process are necessarily still evolving, and a certain degree of flexibility is required to allow for improvements based on stakeholder feedback and modelling outcomes. AEMO considers the proposed flexibility is appropriate at this stage. More information about gas development projections and how AEMO proposes to develop them has been provided in the Draft 2025 *Gas Infrastructure Options Report*.
Nexa Advisory recommended that AEMO maintain its current focus on electricity sector modelling. It advised against expanding the ISP's scope to include investment planning or an ODP for gas infrastructure.	The gas development projection methodology aligns with the AEMC rule changes, that support the better integration of gas into the ISP[15]. The rule changes make clear that AEMO is not required to develop an ODP for gas infrastructure or direct gas investments, nor is AEMO intending to prepare one. AEMO notes that gas development projections are intended solely to support electricity investment planning in the NEM. They are not designed to direct or action gas investments.
Inclusion of gas costs	
The ISP Consumer Panel encouraged AEMO to expand the analysis of gas GPG costs to support future ISP developments	AEMO intends to update the fuel price forecast for the final 2026 ISP. The updated fuel price forecast will reflect gas development projections from the Draft 2026 ISP.
Hydro Tasmania recommended applying a 'gas price uplift' in scenarios with materially higher GPG and related gas infrastructure development and ensure the application and magnitude of this uplift is informed by industry consultation.	
Marinus Link supported AEMO's proposal to consider gas price premiums for development paths that require greater supporting infrastructure.	

[14] At https://aemo.com.au/consultations/current-and-closed-consultations/2025-gas-infrastructure-options-report-consultation.

[15] At https://www.aemc.gov.au/rule-changes/better-integration-gas-and-community-sentiment-isp-0.

Stakeholder feedback	AEMO's response
Enhanced gas infrastructure modelling and augmentation information	
Jemena supported continuing using formal sources like the GSOO and Gas Bulletin Board. It encouraged AEMO to continue engaging with industry on gas infrastructure inputs used in its modelling. It noted this enables consistency and transparency in assessing project and development timelines by considering insights and delivery experience from a broad range of stakeholders.	AEMO notes the support for this approach and recognises that the AEMC rule changes affecting the electricity and gas markets are enabling greater consideration of gas information by gas stakeholders under the GSOO to inform electricity investment planning in the ISP. AEMO will continue the engagement with industry stakeholders as part of the 2026 ISP development process.
Nexa Advisory suggested AEMO must transparently provide the costs and options of infrastructure development used in developing the gas supply development model and ***Gas Infrastructure Options Report***.	The Draft 2025 *Gas Infrastructure Options Report* includes gas infrastructure options and gas infrastructure cost components to be used when developing the gas development projections. It is worth noting that certain project-specific details that form the different options may be confidential. As a result, the associated cost may also be subject to confidentiality. AEMO must not release gas infrastructure option details and costs in a manner that reveals confidential information. AEMO will consider this feedback as part of the 2025 *Gas Infrastructure Options Report* consultation process.
Hydro Tasmania supported AEMO's updated GPG modelling approach, including the use of liquid fuels as an alternative fuel for GPGs, capital cost adjustments for dual-fuel capability, and a cap on new GPG builds. It recommended maintaining the exclusion of retrofitting existing gas units for secondary fuels and reconsidering the assumption that all new gas units will be dual-fuel capable, due to potential cost and environmental limitations.	AEMO confirms that retrofitting of existing gas units is not proposed. All new gas units will be assumed to be dual-fuel capable as this is the recent trend in new GPG development interests[16].
Reliability assessment	
Origin requested AEMO's proposal to adjust operation of mid-merit gas generators in the capacity outlook model should be extended to flexible gas generator operation, where appropriate, to further enhance the reliability and usefulness of the ISP.	AEMO agrees with **Origin's** feedback regarding existing generators, and will adjust the operation of all existing gas generators to reflect actual outcomes in the DLT, when appropriate. AEMO does not consider it appropriate to adjust the behaviour of new build generators, given long modelling horizons and the changing role that previous ISP has identified for gas generators.
Interactions between gas and other sectors	
Transgrid pointed out social licence challenges relating to air pollution, high cost and low availability of land, and existing limitations of gas to supply several power stations during peak demand.	While AEMO does not propose to model explicit build constraints on combustive generation across sub-regions, the more detailed consideration of gas zone daily gas consumption limits will effectively limit uptake of these technologies, reflecting existing limitations to supply gas and the impact of potential future investments. Build constraints related to emissions are considered implicitly, as the capacity outlook model incorporates emission constraints.
Climateworks noted that the ***ISP Methodology*** gas modelling approach lacks explicit modelling for the systematic replacement of gas infrastructure in response to electrification.	AEMO considers different levels of electrification via the ISP scenarios, which in turn will impact the assessment of gas development projections. The ISP scenarios provide a spread of different gas demand forecasts for residential, commercial and industrial customers, leading to differing scales of gas infrastructure needs. More information can be found in the 2025 IASR[17] and 2025 GSOO[18].
Nexa Advisory suggested AEMO should determine how to compare the cost of gas infrastructure development – and associated increases in gas usage – with the cost of distribution network development and CER growth. It acknowledged the difficulty of optimising costs between these two critical areas as they are both modelled as fixed inputs into the electricity capacity outlook model. It also suggested AEMO clarify how the 'trade-off' effect of higher CER due to constrained gas will be assessed to determine the lowest cost pathway forward and include it as part of an	AEMO is for the first time introducing more explicit considerations of the cost of gas infrastructure development, as well as distribution network development in this ISP. The analysis of alternative gas development projections would allow for insights into the impact of different gas investments on the operation of CER, the development of distributed resources, and the need for distribution network augmentations.

[16] The latest version of Aurecon's *2024 Energy Technology Cost and Parameters Review* report will be published along with the final 2025 IASR at https://aemo.com.au/consultations/current-and-closed-consultations/2025-iasr.

[17] At https://aemo.com.au/consultations/current-and-closed-consultations/2025-iasr.

[18] At https://aemo.com.au/energy-systems/gas/gas-forecasting-and-planning/gas-statement-of-opportunities-gsoo.

Stakeholder feedback	AEMO's response
alternative CER uptake sensitivity (if out of scope of the methodology).	
Nexa Advisory suggested AEMO's CER projections remain conservative noting as peak electricity and gas demands eventuate, consumers are more likely to respond through demand shifting or uptake of batteries increasing CER update and likely reducing the demand on gas infrastructure.	As outlined in the IASR, CER projections are developed distinctly for each of the scenarios, taking into consideration a range of drivers and that in combination with the gas development sensitivities may provide further detail on the interplay between CER and gas infrastructure.
Nexa Advisory recommended that AEMO avoid relying solely on gas sector engagement when assessing gas infrastructure developments. It emphasised the need for AEMO to lead broad, inclusive engagement following the release of the Draft *Gas Infrastructure Options Report*.	AEMO is committed to transparent consultation on the inputs and assumptions underpinning gas development projections. Stakeholder feedback is sought through the 2025 IASR, the 2025 *Gas Infrastructure Options Report* , and the Draft 2026 ISP. Where appropriate, AEMO also engages directly with gas industry stakeholders to gather targeted input.
Emissions	
Australian Energy Producers noted the ISP should view the transition from coal to GPG as a crucial strategy for cutting emissions and improving system reliability, given that GPG produces around 50% less carbon dioxide equivalent (**CO_2-e**) per megawatt hour (**MWh**) than coal.	The capacity outlook models include a carbon budget constraint. The constraint allows the model to reflect investments trade-off between the candidate technologies. GPG emissions are included as part of the candidate options and are subject to the carbon budget requirement. The capacity outlook model will determine the generation and transmission mix that minimises the total system cost while meeting demand forecast, technical and resource limitations, and policies.
The **ISP Consumer Panel** encouraged AEMO to conduct a more complete assessment of upstream and downstream emissions from gas generation including both renewable and natural gas. It requested the ISP clarify the impact of gas use on emissions and the carbon budgets under each scenario.	The gas supply development model will not consider or assess emissions relating to gas production. The 2026 ISP will continue to consider emissions relating to electricity generation.
Gas supply development model	
Australian Energy Producers suggested that although the gas supply development model improves gas availability in the ISP, it can be improved in future updates. It noted that it is only assessing physical feasibility and it is not integrating with electricity models, investment signals, and market dynamics.	The purpose of the gas integration in the ISP is to expand consideration of gas market developments and their impact on the availability of fuel for GPG to support the planning of electricity investments in the NEM. AEMO acknowledges the feedback and will continue working on improving the modelling of the gas system in future ISPs according to the new rules requirements.
Other matters	
Australian Energy Producers suggested the ISP must consider full-system cost metrics rather than levelised cost of energy (**LCOE**) alone, as presented in the GenCost report to evaluate the system benefits of GPG in facilitating VRE penetration, maintaining grid stability, and delivering reliable, rapid, and least-cost electricity system outcomes.	AEMO's modelling approach for the ISP focuses on minimising overall total system costs, in alignment with the AER's CBA Guidelines. The ISP process includes an integrated suite of models and assessments to validate the forecast generation, storage and transmission developments. This validation ensures the power system is operational, reliable and meets technical requirements. While the GenCost report includes both LCOE and capital costs, the ISP models do not use LCOE. The ISP applies capital and operation costs for all technologies. More information about the range of inputs, assumptions and scenarios for the 2026 ISP are in the 2025 IASR.
Australian Energy Producers requested the status and costs of alternative fuels be more accurately reflected in the ISP, as overestimating maturity and scalability and underestimating cost risks of these evolving technologies could distort the ISP analysis outcomes.	AEMO acknowledges the recommendation and will consider the feedback as part of the consultation of the Draft 2025 *Gas Infrastructure Options Report*, which includes renewable gas developments and the cost estimation process for all gas infrastructure options.
The ISP Consumer Panel encouraged AEMO to 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).	For the 2026 ISP, AEMO does not intend to provide analysis on commercial viability of gas infrastructure. However, AEMO may analyse gas infrastructure utilisation based on modelling outcomes.

4.2.2. AEMO's conclusion

Based on stakeholder feedback and internal analysis, AEMO has made the following changes in the *ISP Methodology*:

- Include a reference to the *Gas Infrastructure Options Report*, which details the inputs and considerations in preparing the gas development projections to be used into the ISP modelling.

- Use daily gas supply limits based on a zonal representation of the East Coast Gas Market (**ECGM**), replacing the sub-regional daily supply limits specified in the Draft *ISP Methodology*. The adjustment will more accurately represent gas supply, storage and transportation limitations of the gas system within the ISP models. Information about supply and pipeline zones for the ECGM is outlined in the 2025 *Gas Infrastructure Options Report*.
- Update the fuel price forecast for the final 2026 ISP to reflect the gas development projections from the Draft 2026 ISP.
- Use the time-sequential model as part of the validation process to assess the feasibility of the gas-powered generation builds. Insights from the time-sequential model may lead to adjustments in inputs in the capacity outlook model.
- Include additional information on the gas development projects in the ISP publications, incorporating stakeholder feedback from the 2025 *Draft Gas Infrastructure Options Report* and 2025 Draft IASR, as well as insights from modelling results.

4.3. Selecting the optimal development path

4.3.1. Issue summary and AEMO's assessment

Stakeholder submissions related to testing for actionability **(Alinta Energy,** the **ISP Consumer Panel** and the **Justice and Equity Centre)** suggested AEMO should not rely only on project proponent timing but should also consider a broader range of resources and historical trends for project lead times. Other feedback received provided recommendations related to other aspects of the capacity outlook model.

The table below summarises stakeholder feedback and AEMO's responses.

Stakeholder feedback	AEMO's response
Assessing actionability of transmission projects	
Alinta Energy recommended AEMO incorporate historical data sources on project lead times in the capacity outlook model. It recommended including data on key macro factors historically disrupting renewable energy development and other sources showing non-linear trends and delays in project lifecycles, particularly for wind and solar.	AEMO agrees that uncertainty around project delivery timing is an important consideration. For the 2026 ISP, AEMO will apply baseline lead times to new technologies derived from Aurecon's report on latest assessment[19] of current trends. AEMO considered further delays to projects due to this uncertainty in the 2024 ISP through the *Constrained Supply Chains* sensitivity with additional delays to transmission and generation projects applied that were informed considering observed delays in historical projects. AEMO will consider this while developing the list of sensitivities for the Draft 2026 ISP.
Marinus Link recommended AEMO allow for staged actionable ISP projects, and noted that it considers it important that AEMO's ISP methodology has sufficient flexibility to provide guidance on the optimal timing of Stage 2 [of Project Marinus]". **Marinus Link** noted this would support stakeholder planning and ensure the ISP remains responsive to evolving project developments as Project Marinus Stage 1 is nearing committed status while the actionability and optimal timing of Stage 2 is re-tested in the 2026 ISP.	The current *ISP Methodology* allows for staged projects. AEMO will undertake joint planning with Marinus Link and TasNetworks to consider whether it is appropriate to make use of staging for Project Marinus in the 2026 ISP. Ultimately, the 2026 ISP modelling and cost benefit analysis will inform selection of the optimal development path, including whether staging is appropriate and the actionability of stages that are not yet considered anticipated or committed. AEMO notes that its revised approach to testing previously actionable projects will mean that actionability is tested at the proponent's timing and immediately after the end of the actionable window, instead of optimising project timing by testing every year within the actionable window. When applying this to Project Marinus for the 2026 ISP, retention of its actionable status would confirm the optimal timing of the project (or each stage) is within the ISP actionable window, however, the optimal timing of the project (or each stage) will not be specified. Alternatively, consistent with the treatment of all future ISP projects, if Project

[19] The latest version of Aurecon's *2024 Energy Technology Cost and Parameters Review* report will be published along with the final 2025 IASR at https://aemo.com.au/consultations/current-and-closed-consultations/2025-iasr.

Stakeholder feedback	AEMO's response
	Marinus was no longer identified as actionable, the 2026 ISP would specify the updated optimal timing of the project. RIT-T proponents propose a project timing in the RIT-T, which may not necessarily reflect the optimal project timing identified in the ISP, where specified, and that optimal timing may change in successive ISPs or ISP updates.
The ISP Consumer Panel recommended AEMO use a broader range of sources, beyond TNSPs, for project timing considerations. It said it is concerned about the ISP's reliance on TNSPs to determine optimal project timing, arguing TNSPs are not independent enough to be fully realistic about project timing.	The optimal project timings identified in the ISP are a product of many factors – the project lead time is one, as it is used to represent the earliest possible in-service date in the ISP model, but there are many others including costs and benefits of the project relative to other potential projects, as well as the various drivers of power system needs articulated in the IASR. The **ISP Consumer Panel's** feedback primarily relates to the setting of the individual project lead times for each transmission project. AEMO works closely with TNSPs and jurisdictional bodies to ensure that project lead times are fit for purpose, and as accurate as possible. AEMO considers that TNSPs and jurisdictional bodies are best placed to determine and propose the project lead times, which AEMO reviews before accepting as inputs, including amending where deemed necessary. This ability was noted in the 2023 *Transmission Expansion Options Report* and AEMO will continue to jointly plan with TNSPs ahead of the release of the final 2025 *Electricity Network Options Report* by 31 July 2025 to include appropriate lead times for transmission projects.
The **Justice and Equity Centre** recommended maintaining the ISP's focus on identifying the optimal network development path in line with the national electricity objective **(NEO**), rather than adjusting timing based on a proponent's preferred schedule. It argued that if a proponent cannot deliver within the actionable window, AEMO should consider introducing contestability in project delivery and ownership instead of compromising the integrity of the planning framework.	AEMO does not have the ability in its role as National Transmission Planner to introduce contestability in project delivery for transmission projects in the NEM. AEMO acknowledges the strong impact that nominated transmission project lead times and earliest in service dates have on the ISP ODP outcomes, and will continue to joint plan closely with TNSPs and jurisdictional bodies to seek to ensure that project lead times assumed in the ISP model are fit for purpose and as accurate as possible.
Climateworks recommended AEMO formally request the AER to revise the CBA Guidelines so AEMO's role shifts from outlining the "most likely" development path to "proactively designing one that will inform and optimise the energy system transformation". Specifically, **Climateworks** proposed relaxing the obligation that AEMO consider using the most probable value(s) for each variable and/or parameter that forms part of the most likely scenario. AEMO's ability to consider emerging policies in the ISP was raised in this context**.**	AEMO is required to comply with the ISP framework as set out in the NER in preparing the ISP. The framework provides parameters for how AEMO can consider policy in determining the power system needs to be met by the ISP and how the ISP contributes to achieving the NEO, which are summarised in Section 3.1 of the Draft 2025 IASR. AEMO must consider emission reduction targets in the AEMC's targets statement. AEMO may consider policies that governments have committed to by sufficiently progressing the policy such that it meets at least one of the eligibility criteria in NER 5.22.3(b)(2). By meeting clear eligibility criteria (for example, by legislating a policy target or by allocating material funding in the jurisdiction's budget papers), jurisdictions are demonstrating a sufficiently high standard of commitment to the policy to indicate that AEMO, in the context of the ISP, should incorporate the policy into its forecasting, modelling and scenarios, with the power system needs to meet the policy at lowest cost identified through the ISP modelling and evaluation process. Emerging policies are unlikely to meet this standard of commitment, or be included in the AEMC's targets statement. However, the NER do allow the ISP to include sensitivities showing the impacts of energy policies, including emerging policies, where AEMO has been requested to do so by a participating jurisdiction. AEMO is considering submissions on its treatment of policy received during its consultation on the Draft 2025 IASR in preparing the final 2025 IASR.
Contingency Planning	
Climateworks recommended that AEMO broaden its analysis across all modelled scenarios and strengthen contingency planning. It suggested that enhanced contingency planning would help AEMO anticipate deviations from expected trends – such as underperformance of distributed energy resources – and adjust infrastructure investment accordingly.	When selecting the ODP, AEMO considers both risk-neutral and risk-averse approaches by ranking CDPs according to highest weighted net market benefits and least-worst weighted regret **(LWWR)** methods. The LWWR approach considers the risk of over and under investment under each scenario; therefore, the LWWR approach explicitly enables a form of contingency planning across the scenarios. The core scenario analysis is also augmented via the use of sensitivity analysis addressing particular changes of inputs, which helps provide additional contexts and perspectives when determining the ODP, via the use of both weighted net market benefits and LWWR.

Stakeholder feedback	AEMO's response
	Additionally, when AEMO deems it necessary, option value analysis may be applied to consider the benefits of ensuring on-time delivery of network augmentation against different scenario contingencies, such as earlier-than-expected retirement of coal.
Other matters	
Ergon Energy and Energex recommended AEMO improve transparency around how potential future VRE-driven price volatility and its influence on investment decisions will be captured in the ISP modelling. They suggested enhancing the modelling to better reflect feedback loops between electricity prices and large-scale investment timing, location, and viability.	AEMO recognises that undertaking detailed time-sequential modelling to determine reliability and operability is an important area of investigation when undertaking long-term market modelling for the NEM. AEMO's time-sequential modelling process is used to validate the least-cost solution determined by the capacity outlook model and investigate various reliability and resilience metrics. Price outcomes are not considered as part of this validation process. On occasion and only where relevant, AEMO's time-sequential modelling may be configured with a bidding-behaviour model that reflects bidding behaviours observed by generators in order to conduct these assessments. This type of modelling focuses on market participants' behaviour, including AEMO's application of views on portfolio dynamics and strategic decisions by participants and is not a focus of the ISP, but may be deployed for broader forecasting and planning purposes (such as predicting expected volumes of gas powered generation, or forecasting potential electricity price movements to inform consumer's elastic response to potential price trends over time). Within an ISP context, the use of this type of modelling can assist in operability assessments that validate the appropriateness of the capacity outlook model's generation developments (such as if assessing GPG variance when validating the operability of gas fuel supply, and assessing the NEM's resilience to renewable energy droughts), or revenue adequacy assessments where this is relevant to potential retirement analysis (this is not expected to be considered in the 2026 ISP).
ANU recommended AEMO should improve the chronological modelling used in the ISP, particularly within the Single-Stage Long Term model **(SSLT)**. The submission argued the current use of sampled chronology (e.g. "2 days per month") significantly biases the model in favour of gas generation and against long-duration storage like pumped hydro. It suggested using longer, contiguous chronological samples (e.g. "4 weeks per year") or full chronological modelling would yield more accurate and potentially lower-cost outcomes by better capturing periods of low renewable generation. It noted the modelled storage duration is limited to 48 hours, which contradicts the 160-hour capacity of Snowy 2.0. This short duration likely results from inadequate chronological analysis of solar, wind, and demand data over time. The submission said this sampling methods favours "short-term solutions (such as OCGT) and overlooks the lower-cost solution of long-duration (>100 hours) pumped hydro".	AEMO employs a suite of models that have different purposes; each having its own limitations. As correctly pointed out, the SSLT has limitations relating to on how the granularity of the model is represented; hence AEMO subsequently implements another model called the Detailed Long-Term model (**DLT**) that has significantly better temporal representation to address these issues. These models, together with the rest of the other models, make up the ISP modelling and are operated inter-dependently and iteratively. AEMO notes that only closed-cycle gas turbine (**CCGT**) and biomass build decisions from the SSLT are passed to the DLT. Other technologies — including open-cycle gas turbine (**OCGT**), batteries, and pumped hydro — are determined within the DLT, which uses a more detailed chronological representation. Regarding feedback on storage durations, aside from Snowy 2.0, proposed pumped hydro schemes generally align with the durations modelled in the ISP. Due to computational constraints, AEMO must limit the number of objects represented in the model.
CIS recommended that AEMO revise its use of the Take-One-Out-at-a-Time (**TOOT**) methodology by assessing the value of interconnected project sets, rather than individual projects, to avoid overstating their benefits. It argued that a key example would be Snowy Hydro 2.0 and the transmission needed to connect it to major load centres, namely HumeLink, Victoria – New South Wales Interconnector West (**VNI West**), Sydney Ring and Western Renewables Link. It also suggested that AEMO publishing TOOT results is inconsistent with the confidentiality obligation on AEMO Services (in its capacity as the New South Wales Consumer Trustee) under the *Electricity Infrastructure Investment Act 2020* (**EII Act**) in relation to the disclosure of the maximum capital cost amount for development and construction of a REZ network infrastructure project determined by the New South Wales Consumer Trustee in authorising a network operator to carry out a REZ network infrastructure project, as it could reveal sensitive cost information.	AEMO has previously considered and responded to this feedback during the preparation of the 2024 ISP. AEMO acknowledges that the current approach does not correctly value the specific impact that one project can add to another. Therefore, the sum of individual TOOT net market benefits will differ from the total net market benefits of the ODP. However, AEMO considers that the current approach more clearly articulates the individual value of each project and also aligns better with the CBA assessment of value, which primarily assesses the costs and benefits of the actionability of individual projects in isolation. However, AEMO notes that certain projects cannot be tested in isolation, as they are prerequisites for other projects. In regard to Snowy Hydro 2.0, as communicated during the 2024 ISP consultation, this project is incorporated as a committed project and is treated as such during modelling. AEMO is aware that under the EII Act, the Consumer Trustee must set a maximum capital cost for the development and construction of network infrastructure projects in New South Wales REZs which it authorises. This maximum cost represents an upper limit on the expenses that can be recovered from electricity customers for the project. The Consumer Trustee and the AER must

Stakeholder feedback	AEMO's response
	keep this amount confidential, except in specific circumstances where disclosure to the Minister is permitted. The EII Act confidentiality obligation referred to by the CIS applies to AEMO Services in its capacity as the New South Wales Consumer Trustee when the Consumer Trustee authorises a REZ network infrastructure project to be carried out. AEMO Services is a separate legal entity from AEMO, therefore AEMO is not subject to this obligation. However, AEMO complies with its confidentiality obligations in supporting AEMO Services to assess REZ network infrastructure projects such as for Central-West Orana REZ and Hunter Central Coast REZ. In preparing and publishing the ISP, AEMO uses and discloses confidential information in accordance with its legal obligations, including the protected information regime in the National Electricity Law. In publishing TOOT values, AEMO does not share project-specific information relating to the net benefit of REZ network infrastructure projects that could be used to estimate the maximum capital cost for such projects. The Consumer Trustee's calculation of the maximum capital cost in the performance of its functions under the EII Act is not analogous to TOOT analysis in the ISP. ISP TOOT analysis cannot be used to determine the maximum capital cost under the EII Act. TOOT analysis tests changes in net market benefits (both costs and benefits) when individual actionable projects are removed from the ISP modelling. Those net market benefits are dependent on the inputs, assumptions, scenarios and modelling methodology applied to a specific ISP, ISP update or feedback loop, and are subject to change, unlike the project's maximum capital cost under the EII Act.

4.3.2. AEMO's conclusion

AEMO will continue to assess the optimal timing of projects within the ISP via CBA assessment, and following stakeholder feedback, will incorporate the proposed Draft *ISP Methodology* changes around the testing of projects within the actionable window.

Further considerations around which sensitivities to include in the 2026 ISP will be presented in the IASR or the Draft 2026 ISP.

4.4. Perfect foresight in the ISP's time-sequential model

4.4.1. Issue summary and AEMO's assessment

The majority of stakeholder submissions on this topic (**Hydro Tasmania**, the **Justice and Equity Centre** and **Marinus Link**) supported the proposed approach for addressing perfect foresight for storage devices in the time-sequential modelling into the ISP and expressed the following views:

- **Hydro Tasmania** supported AEMO's refined approach to modelling storage assets, particularly the move away from perfect foresight, the use of headroom and footroom requirements.
- The **Justice and Equity Centre** supported the objective of incorporating imperfect foresight assumptions.
- **Marinus Link** supported efforts to address limitations of perfect foresight, including the introduction of headroom and footroom requirements and deliberate energy planning error.

The aim of the imperfect foresight modelling approach is to validate the reliability and operability of Candidate Development Paths (**CDP**s). Reliability is assessed in the ISP using the time-sequential model, which operates iteratively with the capacity outlook model to ensure forecast generation, storage and transmission developments meet the reliability standard. The application of this approach is not extended to the capacity outlook models, but the capacity outlook modelling may be refined based on reliability assessments in the time-sequential model informed by this approach.

The table below summarises stakeholder feedback and AEMO's responses.

Stakeholder feedback	AEMO's response
Imperfect foresight	
The ISP Consumer Panel and **CIS** recommended AEMO to explore other modelling approaches to dealing with imperfect foresight to improve modelling accuracy. **CIS** raised concerns that the proposed solution does not address the model's underlying issue of overly-optimistic battery discharge profiles, leading to an underestimation of the total cost of storage needed to meet reliability standards. It suggested that it would be more accurate to model battery dispatch profiles based on historical data. It also suggested to apply simple assumptions, such as halving modelled peak dispatch as shown in AEMO's real battery dispatch, if the model is too computationally difficult.	While the proposed approach does not fully align with actual generation, there is an improvement in the modelling of battery charge/discharge profile in the time-sequential model to assess reliability risks. AEMO expects to continue to refine this methodology in future ISPs to better reflect battery behaviour, but considers that existing battery penetration and operating behaviours may not be representative of the operations that would be expected in future as storage penetration increases. Regarding the recommendation to reduce modelled peak dispatch, AEMO proposed the application of derating factors during the 2023 *ISP Methodology* consultation. However, this approach was not supported by stakeholder feedback[20].
The **ISP Consumer Panel** recommended AEMO engage with battery owners and operators as a matter of priority rather than relying on inference from a sample of historical events.	Since the 2023 *ISP Methodology* consultation, AEMO has been exploring different approaches to better represent the battery profile in the time-sequential model. The proposed methodology is an improvement to the perfect foresight outcomes seen in the model and allows AEMO to consider current and long-term market dynamics. AEMO will continue to investigate approaches that reflect future behaviour as the system evolves. AEMO will continue to engage with industry stakeholders to improve current methodologies for future ISP publications.
Hydro Tasmania and **Marinus Link** requested AEMO to provide additional information on the impact of the application of these methodology changes on the modelling results. **Hydro Tasmania** also requested more clarity on how 'forecasting with error' is used in practice.	Preliminary information has been provided in the Draft *ISP Methodology* Attachment – Addressing perfect foresight for storage devices in the time-sequential modelling[21], and AEMO will provide more detailed analysis in the Draft 2026 ISP publication. AEMO will apply "deliberate energy planning error" as a final validation step in the ODP to assess system resilience during difficult weather reference years. The headroom and footroom approach will be incorporated in all time-sequential modelling.
The Justice and Equity Centre recommended incorporating imperfect foresight assumptions into the ISP to better reflect real-world decision-making by market participants. It argued that current proxy methods are insufficient, as they fail to capture learning and compounding effects. While recognising AEMO's limitations for the 2026 ISP, they stressed that full integration must be achieved by 2028.	AEMO's analysis indicates that battery behaviour with the imperfect foresight approach aligns more closely to actual historical behaviour than battery behaviour with perfect foresight in the time-sequential model. AEMO acknowledges that grid and market dynamics continue to change, and forecasting and bidding strategies will continue to improve. AEMO will continue exploring new approaches to represent market behaviour in the operation of batteries. From a capacity outlook modelling point of view, perfect foresight is beneficial as it helps ensure that the resulting capacity expansion plan represents the least-cost solution over the planning horizon. In contrast, imperfect foresight plays a more significant role in validating the capacity expansion plan outcomes within the time-sequential model, which has a more granular resolution and captures more accurately battery behaviour.
Origin recommended that the introduction of imperfect charge targets be explored through sensitivity analysis rather than as a default modelling approach. It argued that incorporating uncertainties like generator and interconnector outages, renewable availability, and demand conditions into the core model reduces transparency and should instead be isolated to assess their impact without compromising the clarity of central ISP forecasts.	AEMO will apply "deliberate energy planning error" as a final validation step in the ODP to assess system resilience during difficult weather reference years. The headroom and footroom approach will be incorporated in all time-sequential modelling.
Andrew Fletcher encouraged AEMO to assess the impact of imperfect foresight in medium- and long-term weather forecasting on pumped hydro energy storage (PHES) and hydro dispatch. The submission argued that suboptimal storage	AEMO acknowledges the feedback related to long duration storage. AEMO's reliability assessment involves the inclusion of a severe drought reference weather year, which will test the ability of deep storages to fully refill.

[20] At https://aemo.com.au/en/consultations/current-and-closed-consultations/consultation-on-updates-to-the-isp-methodology.

[21] At https://aemo.com.au/consultations/current-and-closed-consultations/2026-isp-methodology.

Stakeholder feedback	AEMO's response
management due to forecasting errors could lead to reliability issues.	The proposed methodology for addressing perfect foresight is focused on short-term storages, which are more susceptible to being "over-optimised" by the model, and therefore to over-represent the contribution of these devices on the reliability outcomes. In contrast, long-term storages are more capable of managing uncertainties related to weather variability and are more effective in supporting reliability during periods of low renewable energy generation. While the implementation of this approach will also affect these longer-duration resources, the impact of the associated constraints is expected to be less significant due to the greater availability of stored energy.
Headroom/footroom reserves	
The ISP Consumer Panel and the **Justice and Equity Centre** recommended AEMO drop the headroom reserve and use only footroom reserve for the purpose of adding imperfect foresight to model storage providers' behaviour The **Justice and Equity Centre** also **suggested** that the quantum of footroom reserve assumed could be increased to ameliorate the removal of the use of headroom.	The headroom reserve reflects operational uncertainties of periods of very low energy prices or high frequency control ancillary services (**FCAS**) price. For example, battery operators might choose not to charge during periods of low prices to reserve some capacity to respond to lower frequency events. Consideration of these type of events is valuable while assessing reliability and operability of the system. It is worth noting that the headroom, same as footroom, is implemented as soft constraints such that the withheld capacity remains accessible at a cost. Regarding the recommendation about increasing the footroom to compensate the headroom removal, AEMO considers that maintaining the headroom reserve has the same effect, as the overall accessible battery capacity remains the same compared to having both headroom and footroom.
The Justice and Equity Centre recommended that AEMO avoid linking footroom assumptions to system-level metrics like anticipated unserved energy. They argued that market participants act based on individual profit incentives, not systemic reliability goals, and should be modelled accordingly in both operational and investment contexts.	AEMO does not propose to link the headroom or footroom with system level metrics such as unserved energy. The amount of headroom and footroom reserve is equivalent to the battery's unconstrained energy dispatched at a maximum power over a five-minute interval. In this way, high-power, short-duration devices are more impacted compared to longer duration storages – a consideration the headroom and footroom reserves approach is intended to address. The objective of implementing headroom and footroom constraints is to more accurately reflect short duration storage behaviour, thereby supporting the validation of operability and reliability outcomes associated with the CDPs investments under a least-cost optimisation approach.
Other matters	
The **Justice and Equity Centre** recommended that AEMO consider upgrading or replacing the PLEXOS modelling platform to enable more fundamental integration of modelling improvements. They note that the ISP is not the only output produced by AEMO using PLEXOS – it is used as the foundation to produce the reliability standard and market settings.	The ISP modelling process involves many different tools and systems, and is not limited to PLEXOS. Some of the modelling approaches investigated to address perfect foresight in the time-sequential model were not practical to incorporate in the modelling process given ISP modelling timelines. AEMO will continue to work on improving modelling methodologies and the associated systems and tools.

4.4.2. AEMO's conclusion

Considering the stakeholder feedback and internal analysis, AEMO has clarified the approach for time-sequential modelling in the ISP Methodology to reaffirm that AEMO will:

- Model for imperfect foresight via both headroom and footroom reserves, and deliberate energy planning error approaches.
- Apply headroom and footroom reserves in all time-sequential modelling. Deliberate energy planning error will only be applied as a final validation step in the ISP's ODP.
- Provide additional information in the ISP publication on the modelling results of the headroom and footroom reserves and deliberate energy planning error approaches.

4.5. Treatment of hydrogen

4.5.1. Issue summary and AEMO's assessment

Stakeholder submissions on this topic **(Marinus Link, Hydro Tasmania)** supported AEMO's revised hydrogen modelling approach, particularly the inclusion of minimum utilisation factors and the use of weekly production targets, and recommended maintaining these improvements to enhance the realism and effectiveness of hydrogen planning in the 2026 ISP. Some stakeholders **(**the **Justice and Equity Centre,** the **ISP Consumer Panel, Andrew Fletcher** and **ElectraNet)** raised concerns and provided recommendations for consideration of hydrogen electrolyser locations, storage duration and hydrogen pipeline cost assumptions.

The table below summarises stakeholder feedback and AEMO's responses.

Stakeholder feedback	AEMO's response
Utilisation factors	
The **Justice and Equity Centre** recommended introducing maximum utilisation rates for electrolysers based on realistic VRE availability and updating hydrogen assumptions to reflect plausible production pathways. It advised including dedicated storage costs when assuming high utilisation through firmed VRE, as current modelling does not account for this.	AEMO proposes to adopt a minimum utilisation factor for electrolysers to reflect industry feedback on the feasible economic operation of electrolysers, as discussed in the Draft 2025 IASR. AEMO does not propose to impose a maximum utilisation factor for electrolysers. With regards to cost of hydrogen storage, this was not calculated for previous ISPs. For future ISPs, AEMO may include the total costs for hydrogen storage as part of the total system cost reporting, depending on prioritisation of overall ISP modelling resourcing. AEMO does not propose to optimise the amount and duration of hydrogen storage due to competing modelling priorities.
Andrew Fletcher recommended using the ratio of hydrogen production period to storage duration from stakeholder analysis and applying it to ACIL Allen's figures to ensure internal consistency. He also called for greater transparency in AEMO's modelling assumptions – particularly around weekly balancing – and suggested relocating the hydrogen production period assumption from the *ISP Methodology* to the IASR for more frequent updates and streamlined consultation.	AEMO's modelling requires necessary simplifications, particularly given the significant modelling developments that will be incorporated in the 2026 ISP. One of these simplifications is due to the inability to model and optimise hydrogen storage directly in a tractable manner when the volume of hydrogen in some scenarios over the short to medium term are relatively small. When it comes to determining an implicit level of storage that underpins different production targets, AEMO (following stakeholder feedback on the 2024 ISP) does not consider it appropriate to have monthly storage hydrogen targets. A daily storage target, as seen in the 2024 ISP sensitivity, has very significant implications on firm capacity requirements. AEMO considered that a weekly production target (with an implicit requirement of hydrogen storage of up to seven days) balances these concerns and aligns with Andrew Fletcher's analysis of the need of five to 12 days of hydrogen storage. AEMO notes that in the submission, Andrew Fletcher argues that applying the factors from his work to ACIL Allen's duration does support a weekly assumption. Regarding relocating the hydrogen production period assumption to the IASR, while AEMO agrees that theoretically this assumption could change over time, it is currently impractical to implement a hydrogen production target with a time period more frequent than weekly in the current ISP model. AEMO will continue to consult on this for future ISP Methodology updates and reviews, and as the modelling environment permits. The hydrogen methodology within the ISP Methodology will continue to evolve as the market develops and changes.
Cost of hydrogen	
The **ISP Consumer Panel** recommended including hydrogen storage costs in electricity modelling and reassessing the assumed 10% hydrogen blending limit in gas pipelines. It advised accounting for variable hydrogen storage durations and providing evidence if deviating from the 10% blending assumption.	A uniform storage duration assumption is a necessary simplification given the model's complexity. While the exclusion of hydrogen storage costs is not ideal, its impact is limited due to the current model's inability to endogenously represent storage, meaning it would need to be post-processed. The hydrogen blending limit in distribution networks is discussed in the IASR.
ElectraNet recommended revising hydrogen pipeline cost assumptions to reflect the unique technical and regulatory challenges of hydrogen infrastructure. It suggested incorporating updated industry data and insights into hydrogen project siting and cost modelling to better inform the ODP.	The hydrogen pipeline cost components that will be used to derive the hydrogen transport contribution to electrolyser costs are published in the Draft 2025 *Gas Infrastructure Options Report*. This includes consideration of the higher costs compared to natural gas pipelines. The pipeline contribution of the electrolyser cost will be published as part of the 2025 IASR. AEMO does remain open to stakeholder feedback on new industry and project data.

Stakeholder feedback	AEMO's response
Location of electrolysers	
The **Justice and Equity Centre** recommended removing the *Green Energy Exports* variant in favour of *Green Energy Industries* and assessing electrolyser siting on a REZ-by-REZ basis. They advised assuming electricity will be transported to electrolysers, only including hydrogen projects with viable supply chains, and reforming the ambitious scenario to reflect realistic hydrogen uptake expectations.	A shortlist of electrolyser REZ locations will be published in the final 2025 IASR, to be tested as potential candidates in the SSLT and further narrowed down (if necessary) as inputs into the DLT. Electrolyser locations will be selected based on a range of criteria, including capacity factors, locational cost factors, distance from demand centres, build limits and informed by previous results. AEMO notes the recommendation regarding the preferred scenario variant, and will incorporate this feedback into the final 2025 IASR.

4.5.2. AEMO's conclusion

AEMO notes feedback around the incorporation of hydrogen storage, and will continue to explore its inclusion into the modelling in future ISPs, but notes that this remains a necessary simplification.

Regarding feedback around the location of electrolysers, AEMO will publish the shortlist of electrolyser locations in the 2025 IASR, and has further clarified in the final *ISP Methodology* the need for potential further filtering of REZ electrolysers in the SSLT.

Other feedback related specifically to modelling inputs will be addressed in the 2025 IASR.

4.6. System security

4.6.1. Issue summary and AEMO's assessment

Stakeholder submissions on this topic **(Alinta Energy, Ausgrid** and **Ergon Energy and Energex)** were generally supportive of AEMO's proposed enhancements for system security considerations. Stakeholders provided recommendations related to cost trajectory for security remediation components, modelling generator retirements and accounting for system strength needs across sub-transmission and distribution network.

The table below summarises stakeholder feedback and AEMO's responses.

Stakeholder feedback	AEMO's response
Unit commitment and use of alternative security service providers	
Alinta Energy recommended that AEMO avoid assuming that alternative technologies (such as grid-forming inverters) will materialise to provide lower-cost system security services. Instead, they recommended that AEMO use the cost assumptions provided by TNSPs through their procurement processes. In general, **Alinta Energy** considered the projected cost trajectory for system security to be overly optimistic.	AEMO acknowledges the uncertainties associated with new and developing technologies, particularly in the context of delivering critical security services. Significant work is underway locally and internationally to benchmark and trial the capabilities of these providers before they can be actually incorporated into power system operation. While this work is promising, AEMO has already taken a relatively conservative view on the technology mix used to meet security requirements in the ISP cost assumptions. Minimum system requirements are assumed to be met predominantly by existing thermal units and new synchronous condensers in the near term, before clutch-fitted gas unit costs and eventually grid-forming technology costs begin to contribute. AEMO does not assume grid-forming technology will be relied on to meet minimum system strength needs providing protection quality fault current until beyond the end of the decade. This is consistent with TNSP RIT-T modelling assumptions, and with the recent Aurecon technology maturity review[22]. AEMO does see a more immediate and demonstrated role for grid-forming technology in meeting the remediation requirement of localised IBR investments. The average remediation cost trajectory for new IBR projects in the ISP does allow this technology to begin contributing to the solution mix earlier in the horizon.

[22] At https://www.transgrid.com.au/media/diyb5fng/2403-aurecon_maturity-of-grid-forming-inverter-solutions-for-system-strength.pdf

Stakeholder feedback	AEMO's response
	This is consistent with the preferred option mixes being identified through the regional TNSP RIT-T activities. More information on the weighted trajectory of remediation costs applied to existing thermal unit retirement, and connection of new IBR, can both be found in the 2025 IASR. AEMO's understanding of the present capability and readiness of grid-forming technology is further explored in the *Transition Plan for System Security*[23].
Ergon Energy and Energex recommended AEMO adopt a more flexible, economically driven approach to modelling generator retirements that accounts for market conditions and system needs. They recommended AEMO should not rely exclusively on publicised closure timelines.	AEMO does not rely solely on announced closure dates, as retirements are optimised in the DLT model. As an example, it is common in ISP modelling for coal closures to be brought forward to meet policy targets or scenario-based carbon budgets. In addition, the assessment of retirements may be augmented via the short-term (**ST**) assessment of bidding behaviours, as laid out in the ISP Methodology.
Additional security considerations	
Ausgrid recommended AEMO enhance its modelling to reflect system strength needs across sub-transmission and distribution networks below 330 kV. It contended that the current focus on transmission-level system strength remediation overlooks the costs of remediating critical distribution-level challenges, especially in high-demand urban areas. It suggested this approach risks underestimating total investment needs.	AEMO agrees that system security costs and considerations extend beyond the transmission network. The minimum fault level requirements, used to estimate replacement system strength needed as existing thermal units retire, do have regard for the fault levels needed so that distribution networks operate correctly. AEMO confirms that any generator connections modelled in the distribution networks will also be assumed to include system strength remediation, with a cost methodology consistent with those connecting to the transmission network.

4.6.2. AEMO's conclusion

AEMO acknowledges stakeholder feedback on the importance and magnitude of system security challenges, the need to capture these impacts on ISP total system cost, and the uncertain trajectory of new technologies to provide these services in future. AEMO believes the proposed methodology strikes the right balance of these factors, based on current industry knowledge and technical evidence, and does not propose to make additional methodology changes in response.

AEMO confirms that although not all system security components can be modelled dynamically while managing model complexity and solve times, estimates of all material system security costs will be included in the 2026 ISP.

[23] At https://aemo.com.au/energy-systems/electricity/national-electricity-market-nem/nem-forecasting-and-planning/transition-planning

5. Other matters

This section lists feedback received from stakeholders on matters outside of the key themes discussed in Section 4, and AEMO's assessment of these matters.

Table 5 Specific feedback on ISP Methodology

Stakeholder feedback	AEMO's response
Time-sequential modelling	
The **Australian Energy Council** recommended that AEMO improve transparency and accessibility of its reliability modelling in the ISP. It suggested that external parties should be able to replicate results, which requires AEMO to provide the underlying data. It also argued that the VRE lull analysis in the 2024 ISP does not represent reality because it does not include Queensland.	AEMO acknowledges the feedback. A full ESOO-style reliability assessment was not performed for the extended VRE drought event sensitivity in the 2024 ISP. The analysis covered only one specific weather pattern over a short period of time. The weather conditions explored were based on historical events in June 2019 where Queensland experienced higher VRE availability compared to other regions. The aim of the analysis was to have a NEM-wide perspective of low renewable energy availability which coincides in most of the regions.
Ergon Energy and Energex recommended AEMO expand the detail and transparency of climate stress test scenarios, ensuring they include compounding extreme events to better assess system resilience. They emphasised the importance of modelling compounding events such as simultaneous heatwaves, low VRE output and coal plant outages.	AEMO acknowledges the feedback. The time-sequential model assesses system resilience as part of the validation of the capacity expansion model outcomes. During the validation process, AEMO incorporates a reference weather year representing severe drought conditions, along with selected extreme weather scenarios that could impact the system capability. This analysis is included as part of the ISP publication. AEMO may consider modelling compounding events through sensitivities as part of the validation process, time permitting.
Carbon budgets	
The **Justice and Equity Centre** supported using carbon budgets to align with emissions targets but cautioned against treating them as strict caps that could limit ambition. It recommended combining carbon budgets with other analytical methods, such as expected value-based analysis, to ensure they guide rather than constrain decarbonisation efforts.	The use of carbon budgets as hard limits ensures that the electricity sector's contribution fits within economy-wide emissions resulting from the multi-sectoral modelling. Further decarbonisation beyond the maximum allowed emission from the electricity sector (the carbon budget) is not restricted in the modelling.
The Justice and Equity Centre recommended that AEMO evolve the ISP to fully co-optimise both network and non-network solutions, treating non-network options as endogenous within the modelling framework. While acknowledging this may not be feasible for the 2026 ISP, it urged implementation by 2028 to ensure a more balanced and efficient planning approach.	AEMO considers the ISP Framework provides for detailed consideration of non-network options through the RIT-T frameworks, and that no changes are required to the *ISP Methodology* to further facilitate the uptake of non-network options in this methodology.
Sensitivity analysis	
Ergon Energy and Energex proposed investigation of the implications of delays to actionable projects and consequential impacts on the ODP via the *Constrained Supply Chains* sensitivity analysis.	AEMO agrees with the importance of this sensitivity. A *Constrained Supply Chains* sensitivity was included in the 2024 ISP to test robustness of the ODP. AEMO will take this feedback into consideration in the final 2025 IASR and the draft and final 2026 ISP. As part of the preparation of the 2025 IASR, AEMO is updating its Electricity Demand Forecasting Methodology and is considering the extent to which loads that are uncertain are incorporated.
Australian Energy Producers recommended AEMO consider a constrained renewables scenario to further explore the technology and supply chain risks associated with renewables.	
ElectraNet recommended AEMO include sensitivities that test the impact of delayed or reverse policy targets. It also recommended AEMO give greater weight to anticipated loads aligned with government policy to improve the robustness of the ODP.	
Policy and regulatory signals for REZ planning and development	
Transgrid recommended that AEMO consider state policy decisions and regulatory milestones when assessing the likelihood of REZ development. It suggested using indicators such as legislative progress and the awarding of access rights in New South Wales REZs as evidence that projects are likely to proceed.	AEMO considers state energy policies in the ISP, including those related to REZ development, consistent with NER 5.22.3(b). When considering anticipated and committed projects in the ISP, AEMO applies the relevant project commitment criteria set out in the RIT-T instrument, as required by the CBA Guidelines. AEMO will continue to consider milestones such as the awarding of access rights within a REZ in the context of those project commitment criteria.

Stakeholder feedback	AEMO's response
Climateworks recommended that AEMO collaborate with government agencies to conduct place-based modelling, including regional-scale forecasts, to guide infrastructure planning tailored to specific precincts. It proposed developing a 'regional ISP' to better align supply, storage, and transmission planning with local needs.	Through this *ISP Methodology*, and the in-progress reviews of the Electricity Demand Forecasting Methodology and 2025 IASR, AEMO expects greater consideration of sub-regional energy drivers that may improve place-based insights regarding demand and supply infrastructure. While the granularity uplift will not necessarily reflect **Climateworks**' suggested 'regional ISP', AEMO considers that greater robustness in the regional development factors will be an outcome of these uplifted methods and assumptions.
Sub-region representation	
Transgrid recommended that AEMO apply the Chapter 5 ISP methodology (power system assessment) to the entire New South Wales transmission network and engage in regular consultation with Transgrid. Transgrid suggested that simplified constraint models may not adequately reflect the complexity of the Central New South Wales to Sydney, Newcastle, Wollongong (**SNW**) flow path, and that collaboration could improve network representation.	AEMO agrees that the Central New South Wales to SNW flow path is complex, and that simplifications are required to represent the electricity network in the ISP model. AEMO has been closely joint planning with Transgrid and EnergyCo on the Sydney Ring proposed projects since the 2020 ISP. In response to joint planning with Transgrid, AEMO further divided this flow path into two for the 2024 ISP and applied generator coefficients to better represent these transmission lines. The Sydney Ring South project was identified as actionable in the 2024 ISP. AEMO welcomes the opportunity to joint plan with Transgrid, as the insights from detailed market modelling are progressed for the Project Assessment Draft Report of the RIT-T as well as more detailed power system studies.
Other market modelling matters	
Transgrid recommended placing limits on the number of VPP events and the proportion of storage volume accessed to reflect realistic consumer expectations. It argued that CER assets, unlike utility-scale BESS, are primarily for consumer benefit and should not be assumed to offer the same availability or flexibility for market participation.	AEMO agrees with Transgrid that it will be important to consider how much flexibility is appropriate to model for CER storage devices. AEMO has provided further clarity on differences between charge and discharge cycles applicable to coordinated and passive storage devices in the capacity outlook model in Section 2.3.7 of the *ISP Methodology*, to ensure that this flexibility is available. In terms of placing any limits, AEMO expects this to occur through the IASR. The proportion of storage volume available to provide VPP was reduced by 35% (*Step Change* scenario by 2030) to reflect hesitancy in customer acceptance for market participation. Adding a separate constraint for number of VPP events would increase complexity and impact runtimes from a market modelling perspective and would outweigh the impact it may show in the ISP outcome.
Transgrid recommended refining the modelling methodology for DSP to better reflect the limited and infrequent participation of industrial users. It suggested adding cumulative weekly, monthly, and annual energy limits, as well as capping the number of DSP response events, to align with realistic operational constraints.	AEMO produces DSP forecasts in accordance with its existing DSP Methodology[24]. This methodology identifies both market-driven demand responses, and reliability-driven demand responses. The market-driven responses represent residential, commercial and industrial responses that are typically triggered at high levels of market price. As both the market-driven and reliability-driven levels of DSP are considered at these very high price levels (or the market price cap for reliability responses), the cumulative frequency of their use is not expected to be frequent. AEMO recognises that weekly, monthly or annual energy limits could be applied to limit their participation, however, does not consider that adding such a constraint would impact the ISP developments given the costly nature of their use, relative to other solutions. AEMO would expect that if usage was unrealistically high, that time-sequential modelling would indicate a requirement for greater reserves to maintain reliability, and could adjust its reliability settings in the capacity outlook model accordingly if required.

In addition to stakeholder feedback, AEMO has identified that it may be possible to allow the model more flexibility in meeting the emissions reduction targets by removing the restrictions in the methodology on how to allocate emission headroom across the modelling horizon. AEMO will allow for further redistribution of the headroom across steps to allow for better use of the emission allowance identified by multi-sectoral modelling.

[24] Available at: https://aemo.com.au/energy-systems/electricity/national-electricity-market-nem/nem-forecasting-and-planning/forecasting-approach.

A number of submissions provided recommendations for the value or source of inputs and assumptions and considerations for scenarios which were consulted through the IASR consultation process, and AEMO will address this feedback through the 2025 IASR consultation:

- The **Justice and Equity Centre** recommended that all ISP scenarios be revised to align with Australia's Paris Agreement commitments, including long-term temperature goals. It argued that including scenarios like *Progressive Change*, which aligns with a 2.6°C trajectory, undermines the ISP's credibility and risks promoting outcomes not in consumers' or the climate's best interests.
- **ANU** recommended that AEMO use data from the numerous premium-quality Cost Class AA pumped hydro sites to establish a more accurate cost estimate. It highlighted a significant overestimation in the GenCost 2024-25 draft, which is based on lower-quality sites and overlooks high-quality options near major transmission corridors, resulting in costs far exceeding those of Snowy 2.0 and Aurecon's estimates for Class AA sites.
- **Marinus Link** recommended clearer guidance on hydrogen minimum utilisation factors, aligned with CSIRO's modelling. It advised delaying any reduction in utilisation assumptions until hydrogen load is materially present (post-2030), and applying reductions only to new, not existing, hydrogen loads.
- **Australian Energy Producers** recommended AEMO recognise the role of carbon capture, utilisation and storage (**CCUS**) in producing low-carbon hydrogen and decarbonising hard-to-abate sectors. It urged incorporating CCUS into the ISP and IASR, supported by International Energy Agency (**IEA**) findings and the 2024 National Hydrogen Strategy, as a cost-effective hydrogen production pathway using natural gas.
- **CIS** recommended that AEMO incorporate the potential for delays in coal generator retirements into the ISP to reflect recent announcements in New South Wales and Queensland. It argued that excluding these scenarios would limit the ISP's ability to represent a sufficiently broad and realistic range of future energy pathways.
- **Climateworks** recommended that AEMO enhance the *ISP Methodology* by enabling more timely updates and interim sensitivities to reflect rapid policy and market changes. It suggested earlier and more detailed data sharing with governments and stressed that key assumptions often become outdated before the ISP is finalised.
- **Climateworks** recommended that AEMO formally request the Energy and Climate Change Ministerial Council (**ECMC**) to direct the AEMC to expand the Emissions Target Statement to include the energy impacts of industrial decarbonisation and green export targets. It argued that AEMO should be allowed to consider policies with substantial commitment, even if not yet legislated, due to their significant implications for future energy demand.
- The **Justice and Equity Centre** recommended that AEMO expand Section 2.1 of the *ISP Methodology* to clearly differentiate between mandatory and discretionary government policy considerations. It also suggested including key references, such as the AEMC Emissions Target Statement and Section 3.1 of the AEMO Draft IASR 2025, to strengthen the policy framework.

Finally, the submission from **CIS** raised issues not related to either the *ISP Methodology* or the IASR. They are recorded in Table 6.

Table 6 Feedback on issues not related to either the *ISP Methodology* or the *Inputs, Assumptions and Scenarios Report*

Stakeholder feedback	AEMO's response
CIS raised concerns that the method used to allocate scenario weights in previous ISPs has been inconsistent, leading to unrealistic outcomes in previous ISPs.	AEMO acknowledges the feedback regarding the use of the Delphi process in scenario weighting. While the *ISP Methodology* consultation does not include a review of the Delphi methodology, AEMO notes the concerns raised and will consider them in developing scenario weights for the 2026 ISP.

Glossary

This glossary has been prepared as a quick guide to help readers understand some of the terms used in the ISP. Words and phrases defined in the National Electricity Rules (NER) have the meaning given to them in the NER. This glossary is not a substitute for consulting the NER, the AER's Cost Benefit Analysis Guidelines, or AEMO's *ISP Methodology*.

Term	Acronym	Explanation
Actionable ISP project	-	Actionable ISP projects optimise benefits for consumers if progressed before the next ISP. A transmission project (or non-network option) identified as part of the ODP and having a delivery date within an actionable window. For newly actionable ISP projects, the actionable window is two years, meaning it is within the window if the project is needed within two years of its earliest in-service date. The window is longer for projects that have previously been actionable. Project proponents are required to begin newly actionable ISP projects with the release of a final ISP, including commencing a RIT-T.
Actionable project progressing under a jurisdictional framework	-	A transmission project (or non-network option), other than an actionable ISP project, which optimises benefits for consumers if progressed before the next ISP, is identified as part of the optimal development path (ODP), and which will progress under a jurisdictional policy that AEMO considers under NER 5.22.3(b) and includes in the ISP.
Candidate development path	CDP	A collection of development paths which share a set of potential actionable projects. Within the collection, potential future ISP projects are allowed to vary across scenarios between the development paths. Candidate development paths have been shortlisted for selection as the ODP and are evaluated in detail to determine the ODP, in accordance with the ISP Methodology.
Capacity	-	The maximum rating of a generating or storage unit (or set of generating units), or transmission line, typically expressed in megawatts (MW). For example, a solar farm may have a nominal capacity of 400 MW.
Committed project	-	A generation, storage or transmission project that has fully met all five commitment criteria (planning, construction, land, contracts, finance), in accordance with the AER's Cost Benefit Analysis Guidelines. Committed projects are included in all ISP scenarios.
Consumer energy resources	CER	Generation or storage assets owned by consumers and installed behind-the-meter. These can include rooftop solar, batteries and electric vehicles (EVs). CER may include demand flexibility.
Consumption	-	The electrical energy used over a period of time (for example a day or year). This quantity is typically expressed in megawatt hours (MWh) or its multiples. Various definitions for consumption apply, depending on where it is measured. For example, underlying consumption means consumption being supplied by both CER and the electricity grid.
Cost-benefit analysis	CBA	A comparison of the quantified costs and benefits of a particular project (or suite of projects) in monetary terms. For the ISP, a cost-benefit analysis is conducted in accordance with the AER's Cost Benefit Analysis Guidelines.
Counterfactual development path	-	The counterfactual development path represents a future without major transmission augmentation. AEMO compares candidate development paths against the counterfactual to calculate the economic benefits of transmission.
Demand	-	The amount of electrical power consumed at a point in time. This quantity is typically expressed in megawatts (MW) or its multiples. Various definitions for demand, depending on where it is measured. For example, underlying demand means demand supplied by both CER and the electricity grid.
Demand-side participation	DSP	The capability of consumers to reduce their demand during periods of high wholesale electricity prices or when reliability issues emerge. This can occur through voluntarily reducing demand, or generating electricity.
Development path	DP	A set of projects (actionable projects, future projects and ISP development opportunities) in an ISP that together address power system needs.
Dispatchable capacity	-	The total amount of generation that can be turned on or off, without being dependent on the weather. Dispatchable capacity is required to provide firming during periods of low variable renewable energy output in the NEM.
Distributed resources	-	Includes both CER and other distributed resources. Both of these include solar photovoltaic (PV) generation and battery energy storage (BESS) assets, with CER generally understood to be 'behind the meter' and other distributed resources to be 'in front of the meter'. For other distributed resources, these are generally between 100 kW and 30 MW in capacity for solar PV, and between 5 MW and 30 MW for BESS.

Term	Acronym	Explanation
Firming	-	Grid-connected assets that can provide dispatchable capacity when variable renewable energy generation is limited by weather, for example storage (pumped-hydro and batteries) and GPG.
Future ISP project	-	A transmission project (or non-network option) that addresses an identified need in the ISP, that is part of the ODP, and is forecast to be actionable in the future.
Identified need	-	The objective a TNSP seeks to achieve by investing in the network in accordance with the NER or an ISP. In the context of the ISP, the identified need is the reason an investment in the network is required, and may be met by either a network or a non-network option.
ISP development opportunity	-	A development identified in the ISP that does not relate to a transmission project (or non-network option) and may include generation, storage, demand-side participation, or other developments such as distribution network projects.
Net market benefits	-	The present value of total market benefits associated with a project (or a group of projects), less its total cost, calculated in accordance with the AER's Cost Benefit Analysis Guidelines.
Non-network option	-	A means by which an identified need can be fully or partly addressed, that is not a network option. A network option means a solution such as transmission lines or substations which are undertaken by a Network Service Provider using regulated expenditure.
Optimal development path	ODP	The development path identified in the ISP as optimal and robust to future states of the world. The ODP contains actionable projects, future ISP projects and ISP development opportunities, and optimises costs and benefits of various options across a range of future ISP scenarios.
Regulatory Investment Test for Transmission	RIT-T	The RIT-T is a cost benefit analysis test that TNSPs must apply to prescribed regulated investments in their network. The purpose of the RIT-T is to identify the credible network or non-network options to address the identified network need that maximise net market benefits to the NEM. RIT-Ts are required for some but not all transmission investments.
Renewable energy	-	For the purposes of the ISP, the following technologies are referred to under the grouping of renewable energy: "solar, wind, biomass, hydro, and hydrogen turbines". Variable renewable energy is a subset of this group, explained below.
Renewable energy zone	REZ	An area identified in the ISP as a high-quality resource area where a cluster(s) of large-scale renewable energy projects can be developed using economies of scale.
Renewable drought	-	A prolonged period of very low levels of variable renewable output, typically associated with dark and still conditions that limit production from both solar and wind generators.
Scenario	-	A possible future of how the NEM may develop to meet a set of conditions that influence consumer demand, economic activity, decarbonisation, and other parameters. For the 2024 ISP, AEMO has considered three scenarios: *Progressive Change*, *Step Change* and *Green Energy Exports*.
Secure (power system)	-	The system is secure if it is operating within defined technical limits and is able to be returned to within those limits after a major power system element is disconnected (such as a generator or a major transmission network element).
Sensitivity analysis	-	Analysis undertaken to determine how modelling outcomes change if an input assumption (or a collection of related input assumptions) is changed.
Spilled energy	-	Energy from variable renewable energy (VRE) resources that could be generated but is unable to be delivered. Transmission curtailment results in spilled energy when generation is constrained due to operational limits, and economic spill occurs when generation reduces output due to market price.
Transmission network service provider	TNSP	A business responsible for owning, controlling or operating a transmission network.
Utility-scale or utility		For the purposes of the ISP, 'utility-scale' and 'utility' refer to technologies connected to the high-voltage power system rather than behind the meter at a business or residence.
Value of greenhouse gas emissions reduction	VER	The VER estimates the value (dollar per tonne) of avoided greenhouse gas emissions. The VER is calculated consistent with the method agreed to by Australia's Energy Ministers from time to time.
Virtual power plant	VPP	An aggregation of resources coordinated to deliver services for power system operations and electricity markets. For the ISP, VPPs enable coordinated control of CER, including batteries and electric vehicles.
Variable renewable energy	VRE	Renewable resources whose generation output can vary greatly in short time periods due to changing weather conditions, such as solar and wind.