Friday, 22 November 2024

Mr. Daniel Westerman
Chief Executive Officer
Australian Energy Market Operator

Dear Mr. Westerman,

The Clean Energy Council (CEC) is the peak body for the clean energy industry in Australia, representing nearly 1,000 of the leading businesses operating in renewable energy, energy storage, and renewable hydrogen. The CEC is committed to accelerating the decarbonisation of Australia's energy system as rapidly as possible while maintaining a secure and reliable supply of electricity for customers.

The CEC welcomes the opportunity to comment on the proposed ISP methodology to inform the preparation and development of the 2026 ISP. The ISP remains an integral element of the NEM energy transition. The CEC broadly supports AEMO's proposed changes to the ISP methodology to incorporate both changes to the National Energy Rules and feedback obtained from Energy Ministers through their review of the ISP, with this submission intended to provide further context and suggested changes in response to the questions posed by AEMO. The CEC hopes this contribution can be used by AEMO to further strengthen the ISP methodology for the 2026 ISP.

OVERALL POSITION

The CEC supports the changes proposed by AEMO in the ISP methodology issues paper to address the actions identified by Energy Ministers in their response to the review of the ISP with a view to better integration of gas; however, encourages AEMO to consider:

- the lack of co-optimisation between the gas supply expansion model and electricity models;
- how alternative investment approaches and/or technologies could be used to more cost efficiently meet any supply gaps in the gas requirements for GPG, for example, electrification, or long-duration energy storage;
- how the model can better account for the trade-offs that can occur between investment in renewables and electricity network as opposed to gas generation and gas network to avoid a situation where any gas network or GPG augmentation costs are 'hidden' from the model; and

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- how the model can better account for the stranded asset and carbon risks associated with development of new GPG assets, such as shorter debt amortisation periods and higher rates of return on investments.

The CEC is also supportive of expanding the ISP's analysis to include a greater consideration of the existing and future distribution network capabilities driving integration of CER and other distributed resources but notes the ability for AEMO to access relevant information regarding distribution network hosting and augmentation capacity will be essential. To that end, the CEC recommends AEMO establish a reference group with DNSPs to meet regularly and discuss information building capacity with each consecutive ISP.

Further context for the above and specific responses to the questions outlined in AEMO's ISP methodology Issues Paper are outlined in the following sections.

INTEGRATING GAS INTO THE ISP

This section largely follows the questions posed in the issues paper and provides additional considerations for AEMO as it develops its ISP methodology.

Question 1: Do you consider that the proposal to develop a gas supply expansion model appropriately addresses the action in the Energy Ministers' response to the Review of the ISP for additional gas analysis to be incorporated in the ISP?

- If yes, why?
- If not, why not, and how could this action otherwise be achieved?

The CEC supports the changes proposed by AEMO in the ISP methodology issues paper to address the actions identified by Energy Ministers in their response to the review of the ISP with a view to better integration of gas.

The CEC notes in particular, "AEMO proposes to develop and apply a gas supply expansion model, which incorporates gas expansion for pipeline, gas storage, and/or production augmentations, informed by industry engagement on likely or plausible augmentations in the gas sector". The CEC agrees that the inclusion of gas system expansion capabilities in the ISP methodology will enable greater consideration of how the cost of gas investments may impact on electricity investments relevant to meeting electricity power system needs.

However, the CEC considers there are further opportunities for improved co-optimisation between the gas supply expansion and electricity models. That is, while the CEC understands that AEMO does not aim to optimise investments in the gas sector, those investments will have a flow on effect to the cost of electricity generated from gas. As such, consideration should be given to these costs when modelling a least-cost pathway for the electricity sector.

Furthermore, AEMO proposes to add an additional expansion module under the existing gas supply model to identify possible solutions to gas supply shortfalls. While the CEC agrees this approach would allow consideration of cost-efficient gas supply and transportation expansion options to enable the ISP modelling to meet forecast gas consumption for electricity generation, the CEC encourages AEMO to also consider how alternative investment approaches and/or technologies could be used to more cost efficiently meet any supply gaps in the gas requirements for GPG, for example, electrification as an effective way to free up gas supplies in the event of supply constraints. While we acknowledge that Ministers did not explicitly ask AEMO to consider

these other solutions, we encourage AEMO to consider the full suite of solutions from as early in the ISP process as possible, to ensure the final document is as robust as possible. This point is further elaborated on in our response to questions 3 and 4 below.

AEMO proposes that when assessing the ODP and the benefits of electricity transmission, it will only include costs and benefits in the CBA which are within the scope of the electricity sector. That is, while gas sector costs would be included in the gas supply expansion modelling in determining plausible gas development projections, they would not be considered through the ISP cost benefit analysis process.

The CEC is unclear as to whether this proposed approach would account for the trade-offs that can occur between investment in renewables and electricity network as opposed to gas generation and gas network.

For example, if a combined transmission and generation solution was costed and considered through the CBA, would AEMO be able to compare this to an equivalent gas solution – that is, a gas transmission pipeline expansion coupled with a new GPG development - through the CBA?

The CEC considers it is important to avoid a situation where any gas network or GPG augmentation costs are 'hidden' from the model, making the actual gas assets appear lower cost than would be the case.

Equally however, the CEC acknowledges that AEMO does not have a gas planning function equivalent to the ISP – that is, AEMO (appropriately, in our view) does not have an equivalent function in determining a gas ODP.

We welcome further clarification from AEMO as to how these trade-offs are accounted for in the ISP and how this intersects with broader planning functions.

Question 2: Do you agree with the proposal for AEMO to develop at least one gas development projection per ISP scenario, and apply the projection as an input to the capacity outlook model?

- If yes, why?
- If not, what method would you recommend for the inclusion of gas development projections in the ISP?

Yes. As stated above, gas markets and systems increasingly affect electricity markets and systems, and thus good electricity planning must account for gas markets. Better integrating gas and electricity infrastructure developments should incorporate consideration and analysis of, for example:

- Costs and risks associated with gas infrastructure investments needed to support gas powered generation;
- Projected gas supply, demand, and prices, including more accurate analysis of the risks posed to the electricity system transition flowing from issues in the gas system and markets;
- The impact of gas markets and gas infrastructure on investments in the National Electricity Market (NEM);
- The global nature of Australia's gas market; and
- Emissions impact of gas infrastructure and markets, including upstream fugitive emissions of methane and other greenhouse gases.

To the last point, the CEC seeks clarification from AEMO as to whether and how the 2026 ISP will account for the upstream emissions associated with fossil methane extraction, compression and transmission through pipelines. We would like to understand how these are accounted for in the total carbon budgets of the ISP model.

In addition to the above considerations, the CEC encourages AEMO to better incorporate the trade-offs between expansion of the gas supply-side and the stated State and Federal Government policy commitments to achieve net-zero greenhouse gas emissions reduction by 2050.

The ISP modelling methodology should better reflect the asset stranding risk of gas supply-side expansion that is ultimately not in the long-term interests of consumers. This risk has been highlighted recently in moves by the Victorian gas distribution networks (AusNet Services, Multinet Gas Networks, and Australian Gas Networks) in applications to the AER to seek higher charges from customers in the form of accelerated depreciation because of fears the rapid switch to electrification of households will leave its assets stranded.[1]

Moving forward, this risk is likely to also be reflected in the access arrangements of gas distribution businesses seeking a higher rate of return for its pipeline investments to counteract the assumed reduction in amortisation of these investments, as rapid electrification will shorten their commercial lifetimes – or the period over which they can recoup their investments.

These stranded asset and carbon risks should also be accounted for in the costs associated with development of new GPG assets, such as shorter debt amortisation periods and higher ROIs for investment – although it is acknowledged that this may also be accounted for in the IASR.

Question 3: What alternative approaches should AEMO consider for enhancing the incorporation of gas in the ISP to address the action in the Energy Minsters' response?

The CEC encourages AEMO to take a broader view of the appropriate stakeholders to approach when assessing the cost of gas infrastructure expansions. It appears that AEMO will be focussing on gas industry representatives to determine the likely costs associated with gas infrastructure expansions. There may be a risk the information provided by these parties will not account for the full suite of costs associated with gas investment.

We encourage AEMO to consult more widely and seek information from a broader set of stakeholders, when it comes to determining costs of further gas development. AEMO should particularly engage with debt providers and insurers, to understand their perceptions regarding the costs and risks associated with major fossil fuel investment, to ensure that any information provided by the gas industry is consistent with independent financial analysis.

Question 4: What improvements could be made to AEMO's proposed approach to increase consideration of gas availability, considering gas transportation and storage capacity?

Question 5: What improvements could be made to AEMO's proposed approach in its capacity outlook models to improve the representation of fuel usage for gas generation, particularly for mid-merit capacity?

As noted in its report on the future of long duration energy storage, the CEC considers that over-reliance on GPG may create reliability and price risks for consumers, particularly in the later stages of coal generation retirement in the 2030 and 2040s.[2]

[1] AusNet Services 2024 | Gas access arrangement review 2024-28 - variation proposal
[2] CEC 2024 | The future of long duration energy storage, pp.8-9.

While some form of fuel-based generation may be unavoidable to meet the last increments of demand, issues with underlying infrastructure constraints creates material risks associated with reliance on GPG. These issues are likely to be particularly severe and problematic in the southern parts of the NEM, where declines in local gas supply and limited interconnection with Queensland are likely to bind.

GPG has been suggested by some stakeholders as the key source of energy backup in a high renewables power system. Aside from the carbon intensity of GPG – including upstream fugitive emissions - there are risks associated with this reliance. Trends in gas supply and underlying transmission pipeline capacity do not necessarily align with such a future.

The CEC is supportive of the indicative direction taken by AEMO in the 2024 ISP and in this methodology paper, to explicitly account for the physical limitations associated with gas transmission and the need for onsite storage to manage these limitations.

We encourage AEMO to broaden these considerations, to more fully account for what other forms of energy storage might be accounted for, as complements and potentially substitutes for gas and GPG.

The CEC has long considered that long-duration energy storage (LDES) is a key exemplar of these other energy storage solutions. LDES is also not subject to the same supply and transmission risks as GPG, so increasing reliance on LDES can significantly reduce overall system exposure to these risks.

The CEC maintains that LDES can be better used to effectively minimise reliance on GPG over the longer-term, helping to reduce total system costs while maintaining reliability for consumers. For these reasons, the CEC would welcome AEMO further engaging with energy market participants to more holistically consider LDES as a viable alternative to GPG in the 2026 ISP methodology.

IMPROVING DEMAND-SIDE MODELLING IN THE ISP

Question 6: What are your views on AEMO's proposed inclusion of distribution network capabilities and their impact on CER within the ISP model?

- What further enhancements could be made?

The CEC is supportive of expanding the ISP's analysis to include a greater consideration of the existing and future distribution network capabilities driving integration of CER and other distributed resources. In 2024, rooftop solar is the fourth-biggest generator in the National Electricity Market (NEM), comprising of 11.3 per cent of the total electricity generation mix.[3] Nearly 30,000 battery units were sold in the first half of 2024 and battery attachments to rooftop solar continue to grow, reaching a high of 19% in June 2024.[4] This indicates the critical current and future role CER will play within Australia's energy matrix.

As outlined in the ECMC's response to the Review of the ISP, effective energy forecasting that considers distribution network service provider (DNSP) investments and programs are essential for energy system planning.[5] Hence, AEMO's consideration of distribution capabilities and augmentations underpinning the uptake of CER will ensure that significant barriers or

[3] CEC 2024 | Rooftop solar and storage report - January to June 2024
[4] CEC 2024 | Rooftop solar and storage report - January to June 2024
[5] Energy and Climate Change Ministerial Council 2024 | Response to the review of the Integrated System Plan

opportunities for consumers and the wider system are well-understood and integrated within decision-making. We are supportive of increased transparency around the information collected to inform the ISP forecasting and encourage AEMO to include this analysis in the demand-side factors statement, introduced by the Australian Energy Market Commission's (AEMC) Improving consideration of demand-side factors in the ISP rule change. This will also ensure consistency in information accessibility across different information requirements for demand-side modelling in the ISP.

The ability for AEMO to access relevant information regarding distribution network hosting and augmentation capacity will be essential. While this information is not readily available consistently across distribution networks as they are all at different stages of building the knowledge capability, as part of introducing flexible export arrangements. It is important to note, distribution businesses are already undertaking analysis and building capacity to collect this information as part of preparing their upcoming for revenue regulatory control period submissions. This highlights the importance of knowledge sharing across DNPSs to reduce duplication of work and reduce costs for consumers.

We recommend AEMO establish a reference group with DNSPs to meet regularly and discuss information building capacity with each consecutive ISP. We encourage this forum to include the Australian Energy Regulator and other stakeholder groups, allowing for additional perspectives on investments and associated costs. The intent of this forum should ensure there is a consistent mechanism for information provision and reduce the likelihood of inefficient costs being passed through to consumers. This will also allow a broader system perspective and increasing consideration of non-network solutions when forecasting the expected development of CER and distributed resources.

The CEC is supportive of the approach identified in Figure 4 of the Issues Paper to determine distribution network capabilities and opportunities for CER and other distributed resources. The inclusion of this information in the capacity outlook model around existing distribution capabilities and augmentation opportunities will allow for better comparison to utility-scale generation, storage and transmission network options, highlighting the opportunity for a more comprehensive least-cost pathway for secure, reliable and affordable electricity.[6]

Question 7: Do you agree with AEMO's proposals to improve its hydrogen electrolyser modelling, or have further enhancements to suggest? Please provide any supporting evidence.

The CEC is supportive of AEMO's proposal to disaggregate hydrogen electrolyser loads for greater clarity within the modelling process and outputs.

Some CEC members considered that hydrogen facilities running at low-capacity factors would markedly increase the production costs of hydrogen, a factor not previously included in AEMO forecasts. However, also considered that developing minimum utilisation factors that reflect the underlying investment requirements would better assist in addressing this issue.

[6] AEMO 2024 | Integrated System Plan Methodology - Issues Paper, p.24

ASSESSING ACTIONABILITY OF TRANSMISSION PROJECTS

The following sets out the CEC's response to AEMO's proposed adjustments to the processes used to consider actionability of transmission projects in the ISP.

Question 8: What are your views on AEMO's proposal to test previously actionable projects for actionability at the project proponent's timing within the actionable window, and at a later re-start timing?

The CEC agrees with AEMO that projects which have previously been identified as actionable (either actionable ISP projects or actionable projects progressing under a jurisdictional framework) should follow AEMO's proposed approach, as their project proponent's nominated delivery date will have been informed by regulatory and engagement activities already underway.

The CEC agrees with AEMO's rationale that applying the project delivery date nominated by a project proponent and informed by regulatory and engagement activities already underway is likely to be a more efficient and appropriate way to test whether a project should be actionable in an imminent ISP, rather than undertaking optimisation studies for multiple years throughout the full actionable window. This would also strengthen alignment between the ISP and the ISP Feedback Loop for the project, where the proponent will seek AEMO's advice on whether the project remains aligned with the latest ISP prior to submitting a revenue application to the AER.

In the event that an actionable project is removed for the ODP, and the project is delayed for a period of time, the CEC considers AEMO's proposed approach to prepare the 're-start' timing of the project as a parameter consulted on through the development of the *Network Expansions Options Report* is a pragmatic approach and agrees this timing would be informed through collaboration and joint planning with transmission project proponents, including TNSPs and jurisdictional planning bodies.

The CEC is also supportive of AEMO's proposed approach to remove the assumed dependency between flow paths and the REZ network augmentations along their route in its take-one-out-at-a-time (TOOT) analysis. The CEC agrees that the development of separate REZ expansion costs that rely on some but not all the flow path network element costs should appropriately be consulted on as part of the REZ expansion options under the *Network Expansion Options Report*.

ENHANCING SELECTED ISP MODELLING APPROACHES

The following sets out the CEC's position on those elements of the 2026 ISP methodology set out in Chapter 7 of AEMO's Issues Paper.

Addressing perfect foresight for storage devices in the time-sequential model

Question 9: Do you agree with AEMO's proposed approach to model storage devices with headroom and foot-room energy reserves and imperfect energy targets in the time-sequential modelling component?

- What improvements should be made to model energy storage limits to better reflect actual behaviour and address issues of 'perfect foresight'?
- Please provide any supporting evidence.

The CEC is broadly supportive of AEMO's continued efforts to accurately account for the treatment of energy storage in the ISP modelling methodology. The introduction of a small margin of energy at the upper and lowers states of charge that is only accessible during conditions that

would otherwise result in unserved energy within the system represents one way to account for the operational realities of energy storage. However, the CEC encourages AEMO to test this with operators of storage assets to determine whether this reflects operations realities.

Notwithstanding, some CEC members did not support incorporating energy planning with error into the ISP methodology and recommended this approach would be better considered in sensitivity analysis. These members contended the application of imperfect assumptions introduces significant uncertainty and variability into the modelling process that could lead to unintended consequences, such as unreliable storage device forecasts.

Enhancing analysis of system security

Question 10: What risks should AEMO consider when assessing how IBR can implement synchronous machines in providing system strength and inertia?

Question 11: Do you agree with AEMO's proposed approach for uplifting cost and modelling representation for system security services in the ISP?

- If not, what alternative methods would you recommend?
- Please provide any supporting evidence.

In their response to the Review of the ISP, Energy Ministers called for *"greater consideration of system security in assessing the optimal mix of generation, storage, transmission and other infrastructure"*.

To address this concern in the 2026 ISP methodology, AEMO proposes to reformulate the current system security constraint to allow synchronous condensers to replace retiring synchronous machines to meet the minimum unit requirement as well, rather than the current approach which assumes that as synchronous machines retire synchronous condensers (or their equivalent) will be delivered through the separate system strength framework to meet the minimum fault level requirements. AEMO also considers the cost of meeting the efficient levels of system strength will reduce over time reflecting the increased availability and capacity of inverter-based resource (IBR) generation capable of providing these services.

The CEC appreciates and accepts the criticality of some level of synchronous machine penetration in the system to provide services such as fault current to maintain effective protection functionality across the NEM.

We also understand that there is significant ongoing work regarding developing the capability of BESS and other forms of energy storage to provide fault current and other essential system services, with AEMO, developers and OEMs working together to determine how IBR technologies can provide this critical service.

Having said this, we consider that AEMO's proposed approach risks locking in excessive volumes of synchronous condenser build. While synchronous condensers will play a key role providing fault current and other system stability services, they are also capital intensive and expensive assets. Issues with supply chains and the generally higher capital costs of these assets means there is a risk of higher costs for consumers if there is an over reliance on synchronous condensers in AEMO's projections of future system security needs.

We therefore urge AEMO to accelerate its work to assess and incorporate the capabilities of grid forming technologies in terms of providing fault current, inertia and generally supporting system stability. It is also essential that AEMO provide clear signals to the market for investment in assets that can provide these services, through development of new service markets and effective use of transitional contracting. We urge AEMO to support reforms such as the inertia services market for this reason.

In terms of what risks should be considered in assessing how IBR technology can complement synchronous machines, the CEC understands that AEMO is currently considering various stability issues related to increased IBR penetration and modes of interaction between these assets and synchronous machines. While we accept this issue must be managed, we also urge AEMO to treat the capabilities of IBR technologies as an opportunity to leverage, rather than a threat to be managed. The use of terms like 'risk' when referring to how IBR can complement synchronous machines suggests AEMO may need to reassess its views here and work with industry to unpack the full range of opportunities associated with IBR technology.

Improving representation of wind resource diversity in large renewable energy zones

Question 12: Do you agree with AEMO's proposal to model more than two wind resource quality tranches for geographically large REZs?

- If not, what alternatives should AEMO consider?

Given that some REZs cover very large geographical areas, AEMO does not consider that using only two tranches of wind resources for the 2026 ISP methodology sufficiently represents the variety of resources across these REZs. Therefore, AEMO proposes to allow for the inclusion of more than two wind resource tranches in some REZs to recognise two resource tranches may not provide enough representation of resource diversity across a large geographical area.

The CEC is supportive of AEMO's proposed approach to allow for more than two wind resource tranches in some REZs. The CEC considers this approach would be particularly beneficial for REZs located in New South Wales and Victoria that cover large geographically diverse areas.

While indicating support for the change, some CEC members highlighted the need for transparency and clarity in the development of renewable resource traces to improve the ISP's value to stakeholders as part of the modelling approach.

As always, the CEC will work with AEMO throughout the development of the proposed ISP methodology to support both the 2026 ISP and achieving the National Energy Objectives and accelerating Australia's transition to net zero. The CEC appreciates the opportunity to provide input on the 2026 ISP methodology issues paper and looks forward to further engagement in next steps.

Further queries can be directed to James Eastcott at the CEC on **jeastcott@cleanenergycouncil.org.au**.

Kind regards

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