

Review report – Draft 2024

Integrated System Plan

Integrated System Plan

The Australian Energy Market Operator (AEMO) is responsible for publishing the Integrated System Plan (ISP) every two years and an ISP methodology at least every four years. The ISP is a forward-looking roadmap for eastern Australia's power system that seeks to optimise consumer benefits from future investment as the market transitions to a lower carbon environment.

The ISP identifies the transmission network (or equivalent non-network) solutions that are most likely to optimise net market benefits. AEMO identifies the network investments that are likely to optimise the net market benefits across future National Electricity Market (NEM) development scenarios over the planning horizon as the optimal development path (ODP) for the NEM. The ODP includes 'actionable' ISP projects and future ISP projects, which can be progressed through the regulatory investment test for transmission (RIT-T) process. It also identifies future ISP development opportunities such as distribution assets, storage, and demand side developments.

Our role in the ISP

The AER provides oversight of the ISP by ensuring that AEMO's processes are robust, credible and transparent. The requirements and considerations that the AER places on AEMO's forecasting processes are specified in our Forecasting Best Practice Guidelines (forecasting guidelines) and Cost Benefit Analysis Guidelines (CBA guidelines).

The AER's forecasting guidelines require AEMO's forecasting practices and processes to have regard to the following principles:

- forecasts should be as accurate as possible, based on comprehensive information and prepared in an unbiased manner
- the basic inputs, assumptions and methodology that underpin forecasts should be disclosed

- stakeholders should have as much opportunity to engage as is practicable, through effective consultation and access to documents and information.

Our CBA guidelines aim to ensure that AEMO identifies an ODP that promotes the efficient development of the power system based on a quantitative assessment of the costs and benefits of various options across a range of scenarios. In undertaking this assessment, the CBA guidelines:

- require AEMO to balance the risks of premature or overdue investment to consumers
- provide AEMO flexibility in its scenario development, modelling and the selection of the ODP
- require that the ODP provide a positive net market benefit in the most likely scenario
- require AEMO to have regard to the need for alignment of market benefits between the ISP and the RIT-T for actionable ISP projects.

Transparency Review

The National Electricity Rules require the AER to review the transparency of inputs and assumptions determined by AEMO in developing the ISP. The purpose of this Transparency Review process is to provide greater stakeholder confidence in the ISP.

Our Transparency Review process is not intended to assess the merits of AEMO's decisions. Rather, our role through the Transparency Review process is to focus on the adequacy of AEMO's explanations of key inputs and assumptions and how these have contributed to the outcomes of the draft ISP.

As part of the Transparency Review process, the AER is required to publish:

- a report of its transparency review of AEMO's Inputs, Assumptions and Scenarios Report (IASR)¹

¹ NER, cl. 5.22.9.

- a report of its transparency review of AEMO's draft ISP.²

The AER published its review of AEMO's 2023 IASR on 28 August 2023 and is required to publish its review of AEMO's draft 2024 ISP (this report) by 15 January 2024.

Monitoring and compliance

The AER has a separate role in monitoring the ISP's compliance with our CBA guidelines. AEMO is required to submit a compliance report outlining how its ISP has complied with our CBA guidelines. However, our transparency review of the draft ISP precedes our evaluation of that compliance report. Further, findings in this report have no interaction with our compliance monitoring process and are made independently of that process.

Our assessment approach

Rule requirements

The NER³ require the AER to provide our views on the adequacy of AEMO's explanations of:

- how it has derived key inputs and assumptions
- how inputs and assumptions have contributed to the outcomes in the draft ISP.

We reviewed the adequacy of AEMO's explanations of how it derived key inputs and assumptions when we completed a review of the 2023 IASR, and this reflects the AER's views for the purposes of this ISP review.⁴ We note that AEMO published an addendum to the 2023 IASR to address the issues we identified.⁵ For the purposes of reviewing the draft 2024 ISP, we have focused on the adequacy of AEMO's explanations of how inputs and assumptions have contributed to the outcomes in the draft ISP.

The NER⁶ also require AEMO to take the following actions to address any issues identified in the AER's Transparency Review:

- provide further explanatory material in an addendum to the draft ISP
- consult on these issues.

Our assessment

The draft 2024 ISP envisions a future NEM that is projected to include technologically and geographically diverse resources such as renewable energy, long, medium and short duration energy storage, gas generation and increased transmission, including interconnection. Therefore, national and jurisdictional policy settings, the costs of new entrant generation types (both capital costs and operating costs) and the cost of the transmission that connects them to load are all key inputs into the ISP.

Overall, we consider that AEMO has been transparent in setting out its approach for assessing the set of candidate development paths in determining the draft ODP, as well as exploring the optimal timing of actionable projects and testing the resilience of these candidate paths. This includes outlining the key drivers and benefits of actionable projects. Our review concludes that AEMO has adequately explained most of its inputs and assumptions, and how they contribute to the draft ISP outcomes. However, we consider there are some aspects of the draft ISP where AEMO should better explain how key inputs and assumptions contribute to the draft ISP outcomes. AEMO is required to consult on each of the issues raised in our assessment. These matters are set out below.

Scenarios for Sensitivity Analysis and presentation of results

The draft 2024 ISP explored three scenarios: step change, progressive change and green energy exports scenarios. It assessed the resilience of the ODP by applying a number of alternative assumptions to the step change scenario through sensitivity analysis.

Further, much of the output in the draft ISP and its appendices is only presented for the step

² NER, cl. 5.22.13.

³ NER, cl. 5.22.13(a).

⁴ <https://www.aer.gov.au/publications/reports/performance/transparency-review-aemo-2023-inputs-assumptions-and-scenarios-report>

⁵ <https://aemo.com.au/-/media/files/major-publications/isp/2023/addendum-to-2023-inputs-assumptions-and-scenarios-report.pdf?la=en>

⁶ NER, cl. 5.22.13(c).

change scenario, despite the progressive change scenario having similar weighting.

We expect AEMO to provide details in an addendum to the draft ISP for any sensitivity analysis undertaken for scenarios other than the step change scenario, or explain the reasons for why it has not undertaken this additional analysis.

Consumer Energy Resources (CER)

Appendix 2 of the draft 2024 ISP identifies that in the longer term existing, committed, and anticipated battery solutions will reach their own point of retirement and renewal of these assets may not be needed if the scale of CER and CER orchestration is achieved. The draft ISP also identifies varying levels of CER orchestration across the three scenarios assessed. However, we expect AEMO to provide details on the underlying assumptions of CER orchestration as forecast across the different scenarios.

We also note that AEMO has not explained how or whether the cost of these assumptions were modelled. AEMO notes that, without significant policy changes and increased social licence, a high level of orchestration is not possible.⁷

We therefore expect AEMO to provide further explanation on these matters in an addendum to the draft ISP.

Jurisdictional policies for renewable energy zones

Appendix 3 of the draft 2024 ISP presents information about the development of renewable energy zones (REZ) in the NEM. While we note that this development is largely underpinned by state-based frameworks, as noted in the IASR,⁸ the outlook in each jurisdiction is not consistently related back to the planning documents, legislation and ministerial orders in each jurisdiction. As an example, the draft ISP notes the Victorian offshore wind targets, however, the Queensland SuperGrid Infrastructure Blueprint and Queensland REZ Roadmap are not mentioned and treated as options.

It is also not clear in the draft ISP how the development paths relate to these state-based policy commitments. For example:

- The offshore wind target of the Victorian government results in 9 GW of generation capacity, but the offshore zones in all other states have no modelled generation capacity despite significant resources and progress on delivery.
- For NSW, the reported Illawarra REZ generation capacity does not match the REZ network capacity declared by the NSW Energy Minister despite a mechanism to directly support its development through the auction of long-term energy service agreements to generators and storage operators under the *Electricity Infrastructure Investment Act 2020 (NSW)*.
- In Queensland, the draft ISP identifies a concentration of capacity in a few REZs, where the REZ Roadmap identifies multiple smaller rather than larger capacity zones.

We expect AEMO to show how the draft ISP modelling results align with the policy commitments in each jurisdiction, including the overall size of zones, the flexibility of the timing of infrastructure delivery and the rate of capacity increase.

Firming and storage in renewable energy zones

In Appendix 3 of the draft 2024 ISP, REZs are reported in terms of installed wind and solar generation capacity. Except for pumped storage, the published data does not cover the localisation of grid-scale storage in renewable energy zones. There is significant evidence that many new projects include battery storage⁹, and established state¹⁰ and Commonwealth policies¹¹ promote investment in firming infrastructure. This includes tenders completed in 2023 for long-term energy services contracts for firming infrastructure and long duration storage.¹²

⁷ AEMO, Draft 2024 ISP, *Appendix 8 Social Licence*, 15 December 2023.

⁸ AEMO, *2023 Inputs, Assumptions and Scenarios Report*, July 2023, pp. 24–38.

⁹ AEMO, *NEM Generation Information October 2023*, November 2023.

¹⁰ *Electricity Infrastructure Investment Act 2020 (NSW)*.

¹¹ <https://www.dcccew.gov.au/energy/renewable/capacity-investment-scheme>

¹² <https://aemoservices.com.au/tenders>

We expect AEMO to explain in an addendum to the draft ISP how or whether storage and firming capacity was included in the modelling, and its impact on the capacity and energy generation in each REZ.

System security remediation costs

AEMO forecasts that approximately \$8 billion is required by 2039–40 for system strength remediation (under the step change scenario). AEMO states that this system strength remediation is required for the forecast connection of inverter-based generation in REZs. AEMO states that this cost estimate may be an upper bound, as it is based on synchronous condenser technology, and over time alternative technologies such as grid-forming inverters may become commercially viable at scale.¹³

In its ISP Methodology, AEMO sets out how the ISP will assess requirements for power system security services.¹⁴ For system strength, AEMO calculates the synchronous three phase fault level from the market modelling outputs and forecasts the investments required to both operate the network and to connect inverter-based resources.

While AEMO transparently sets out how system security remediation services are forecast from a set of market modelling outputs, it is not clear how or whether the draft 2024 ISP market modelling and ODP has been iteratively informed by, and updated to reflect, system security remediation costs.

We expect AEMO to further explain how or whether the selection of the ODP is informed by the forecast of system security remediation costs.

¹³ AEMO, Draft 2024 ISP, *Appendix 7 System Strength*, 15 December 2023, p. 17.

¹⁴ AEMO, ISP Methodology, June 2023, section 4.2.