January 2022

Review report – Draft 2022 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 publishing 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 through the electricity system's transition to a lower carbon future. AEMO identifies the network investments that are likely to optimise the net market benefits across future 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 or 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 and Cost Benefit Analysis (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; and
- 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 optimal development path 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
- have regard to the need for alignment of market benefits between the ISP and Regulatory Investment Test for Transmission for actionable ISP projects.

Transparency review

In 2019, the ESB implemented rules requiring the AER to review the transparency of inputs and assumptions determined by AEMO in developing the ISP to ensure greater stakeholder confidence in the ISP.

Our Transparency Review is not intended to assess the merits of AEMO decisions. Rather, our role through the Transparency Review 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.

These changes were established in the context of reforms to the National Electricity Rules (NER) and the National Electricity Law that converted AEMO's ISP into an actionable strategic plan. The actionable reforms strengthen the links between the ISP and the cost benefit analysis process that underpins the regulatory investment test for new transmission projects in the NEM.

These reforms commenced on 1 July 2020 and require the AER to publish a transparency review of the Inputs Assumptions and Scenarios Report

(IASR) and the Draft ISP. The AER published its first review of the IASR on 30 August 2021 and is required to publish the review of the draft ISP by 7 January 2022.

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 report outlining how their ISP has complied with our CBA guidelines. However, this Transparency Review of the Draft ISP precedes our evaluation of that compliance report. Further, findings in our Transparency Review have no interaction with our compliance monitoring process, and findings in this report are made independently of that process.

Our assessment approach

Rule requirements

The NER[1] require the AER to provide our views on the adequacy of AEMO's explanations of:

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

Our approach to this review has focused on the adequacy of how inputs and assumptions have contributed to outcomes in the draft ISP, given we have already completed a review of the IASR (published on 30 August 2021) and limited time available to review the draft ISP.

The NER[2] also require AEMO to take the following actions to address any issues identified in the AER's transparency review report:

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

Our assessment

The draft 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, the assumed timing of the retirement of existing generation resources, 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 (CDPs) 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 the majority 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. These matters are set out below.

In addition, AEMO states that it has not included competition benefits in the assessment of the ODP due to the significant uncertainty surrounding key assumptions that would need to be made in calculating those benefits.[3] AEMO also states that is has estimated indicative competition benefits for some CDPs for information only but that these estimated benefits have not been included in estimated total system costs and benefits in the draft ISP.[4] AEMO has also set out its response to stakeholder submissions on this issue and adjustments to the methodology for estimating these benefits. We are currently reviewing the submissions AEMO has received as part of this consultation and will consider whether we need to update our RIT-T application guidelines.

1 NER, cl. 5.22.13(a)
2 NER, cl. 5.22.13(c)
3 AEMO, draft 2002 ISP, 10 December 2021, p.83
4 AEMO, Appendix 6 Cost benefit analysis, 10 December 2021, p.13

Thermal coal plant retirements

Appendix 6 of the draft ISP states that AEMO uses profitability (referred to as 'revenue adequacy') modelling in scenarios that do not have explicit carbon budgets to inform economic closures of generators.[5]

AEMO has provided a high-level explanation of its approach to modelling the closure of coal plant. However, in its explanation of the modelling outcomes, the draft ISP does not detail how the inputs and assumptions have contributed to assessment of the profitability of coal plant and what revenue adequacy thresholds lead to the closure of coal plants in the modelling. The AER has determined that AEMO has not adequately explained:

- how it has derived the large negative profits and whether these are consistent with the revenue adequacy assumption used in the first 10 years of the progressive change scenario; and
- the profit/revenue adequacy threshold at which the model determines the retirement of plant.

Further, as we discussed in our IASR review report, AEMO should provide more explanation as to why thermal coal plants are not assumed to operate more flexibly. This may affect the timing of thermal coal retirements. Appendix 4 of the draft ISP states that AEMO expects coal plant to continue to explore ways to operate more flexibly to mitigate increased competition from low-cost renewable generation and distributed energy generation.[7] AEMO also states that it has observed coal generators operating below previously observed minimum load and by adopting different daily load profiles.[6]

AEMO also states that the draft ISP modelling tested coal decommitment options by allowing decommitment over periods of one week or longer, but this modelling did not consider intra-day decommitment based on discussions with stakeholders.[7] AEMO concludes that seasonal decommitment increased profitability but was not sufficient to extend the life of coal plant in the progressive scenario.[8]

The AER has assessed that AEMO has not adequately explained the derivation of inputs and assumptions in support of these conclusions. AEMO has also not adequately explained the reasons for assuming that thermal coal plants are not expected to operate flexibly on an intra-day basis, particularly given these generators are known to adopt different daily load profiles.

We therefore expect AEMO, in an addendum to the draft ISP, to provide further explanations of:

- How it has derived the assumptions and inputs regarding the profitability of coal plant and how this has contributed to modelled coal plant retirements across each scenario.
- How it has derived the inputs and assumptions used to support the conclusion that 'seasonal mothballing' of coal plant will not extend the life of this plant in the Progressive Change scenario.
- The reasons why intra-day coal plant flexibility has not been modelled.

AEMO must also undertake further consultation on these issues.

VNI West and HumeLink decision rules

The draft ISP applies decision rules in relation to both the HumeLink and VNI West actionable projects which state that:[9]

- these projects should proceed to implementation beyond early works unless there is an increase in the likelihood that either:
  - material volumes of existing dispatchable capacity are retained in New South Wales (or Victoria and NSW for VNI West); or
  - material volumes of new dispatchable capacity are developed in those regions beyond what is assumed in the step change scenario.

5 AEMO, Appendix 6 Cost benefit analysis, 10 December 2021, p.12
6 AEMO, Appendix 4 Operability, 10 December 2021, p.21
7 AEMO, Appendix 4 Operability, 10 December 2021, p22
8 AEMO, Appendix 4 Operability, 10 December 2021, p.22
9 AEMO, draft 2022 ISP, 10 December 2021, p.66, p.69

- these projects should not proceed beyond early works if there is a material increase in total project cost (including early works costs), relative to what has been assumed in the Draft ISP.

This decision rule recognises that there is some uncertainty as to how much existing dispatchable capacity will be retained and/or how much new capacity is likely to be built. However, AEMO has not explained the circumstances under which this assumption would lead to these projects not progressing to the next stage e.g. the increased level of retained capacity or developed capacity above the step change scenario.

We therefore expect AEMO to provide further explanation on both of these matters and consult on them in an addendum to the draft ISP. AEMO must also undertake further consultation on these issues.

MarinusLink timing

The draft ISP states that both MarinusLink cables are actionable projects across all scenarios at some stage between now and the mid-to-late 2030s. In addition, the draft ISP states that:[10]

In all scenarios, the second cable is built two years after the first, except the Slow Change scenario which delays the second cable an additional year. When Marinus Link is brought forward as an actionable project, the second cable is sometimes shifted to three years after the first cable in the Progressive Change scenario, depending on the individual CDPs.

Appendix 6 of the draft ISP, states that although the second cable does not necessarily deliver benefits immediately after its construction, the additional $600m cost of delivering the second cable more than three years after the first means that the timely delivery of the second cable is always beneficial.[11] However, AEMO has not provided details as to how these additional costs have been estimated and how the estimated additional costs of $600m after three years of constructing the first cable leads to the conclusion that timely delivery of the second cable is always beneficial across the scenarios.

We expect AEMO to provide further explanation on these matters in an addendum to the draft ISP. AEMO must also undertake further consultation on these issues.

Low gas price sensitivity

The draft ISP has tested the resilience of the ODP to lower gas prices and states that the ranking of the higher ranked candidate development plans was unchanged.[12] However, in undertaking this sensitivity analysis, in estimating the weighted net benefits across scenarios AEMO has not applied the lower gas price sensitivity in the hydrogen superpower and slow change scenarios.

We expect AEMO to provide further explanation in an addendum to the draft ISP, of why the low gas price sensitivity has not been applied across all scenarios. AEMO must also undertake further consultation on this issue.

10 AEMO, Appendix 6 Cost benefit analysis, 10 December 2021, p.4

11 AEMO, Appendix 6 Cost benefit analysis, 10 December 2021, p.40

12 AEMO, draft 2022 ISP, 10 December 2021, p.86