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Update to the Integrated System Plan Methodology

Nexa Advisory welcomes the opportunity to share our views and insights on the proposed changes and updates to the AEMO Integrated System Plan (ISP) Methodology.

The ISP is a critical process and roadmap that shapes planning and system design and is a vital tool for investors, policy makers and broader industry towards Australia's transition to a clean energy economy.

However, the broad range of updates proposed to the modelling methodology will, in concert, have the impact of reducing the role for renewable generation and batteries, while also limiting the ability of those resources to get to market. This will necessarily result in the modelling predicting a capacity shortfall, noting that the ISP methodology also underpins a range of other AEMO modelling approaches, including the Electricity Statement of Opportunities (ESOO) and Gas Statement of Opportunities, suggesting that the suite of proposed updates have a predetermined desired outcome.

The clean energy transition is critical to meeting Australia's climate targets, energy security and supply stability, and controlling and abating cost of living pressures on Australians.

New transmission is essential to achieve the clean energy transition, allowing renewably generated electricity to reach the market Australia customers. However, since the first ISP in 2018, the AEMO ISP has consistently identified a number of key new interconnectors, but delivering them is taking too long for a number of complex, but resolvable reasons¹. These delays in building new transmission lines have negative consequences for electricity customers, with delays of just a year resulting in significant electricity bill increases².

Ensuring that the 2024 ISP has the "buy in" of all stakeholders will be necessary to expedite the significant build of both new renewable generation and transmission. Any opaqueness in approach risks further delaying the clean energy transition through a loss of social licence.

It is therefore imperative that AEMO genuinely engage with the large number of groups of key stakeholders to demonstrate transparency in how the decisions and conclusions that drive the outputs in the ISP are determined. This will ensure that the momentum and significant shift in support and alignment across the industry on the role and value of the ISP is maintained for the 2024 ISP.

¹ <https://nexaadvisory.com.au/site/wp-content/uploads/2022/04/Removing-transmission-roadblocks-discussion-paper-080422.pdf>

² https://nexaadvisory.com.au/site/wp-content/uploads/2022/06/Report-Modelling-Electricity-bill-impact-due-to-transmission-delay_2022-06-07.pdf

Key Points & Recommendations

1. Emission reduction goals

Support for AEMO's inclusion of an additional class of benefits defining the 'value of carbon emissions' in the cost-benefit analysis performed as part of the ISP development

Strong support for the ISP to focus on modelling an energy system transition that is truly in the long-term interest of consumers by keeping temperature increases to 1.5°C

2. Stakeholder engagement

We recommend that AEMO take more time to develop consumer and community risk preferences, consulting on the approach taken and the details of any metrics used, to ensure that consumer and community views are adequately captured in the development of the Optimal Development Path (ODP).

We recommend AEMO provide an opportunity for wider consultation and expand the remit of aspects covered in ISP methodology consultation document to include the treatment of energy efficiency and decisions and limitations on demand response and other consumer led aspects of the transition.

We recommend AEMO provides clear and transparent details on how the 2024 ISP scenarios will be decided and how AEMO will ensure that these decisions will be made transparently in the absence of input from key stakeholders. Further, we strongly recommend the establishment of a Delphi process or similar to ensure transparency and buy in from across the range of stakeholder groups.

3. Determining the Optimal Development Path

We recommend that AEMO ensure that the determination of Candidate Development Paths (CDP) and ODP are not constrained by a reliance on a widespread hydrogen economy, while the Green Energy Exports scenario is the only Paris-compliant scenario (1.5 degree) to deliver on Commonwealth climate mitigation goals.

4. Treatment of low carbon technologies

We recommend that AEMO rethink this decision to derate short duration storage devices, consulting more broadly on the likely impacts of this approach on ISP outputs and the wider industry and how these changes will impact AEMO's other system work.

- If accommodating "imperfect forecasting" is required, then the derating approach must be applied in a technology agnostic and technology neutral method.
- If AEMO does proceed with derating short-term storage, we recommend not determining the derating approach based on relatively narrow information on historical operations.
- If AEMO insists on derating batteries, we strongly urge more nuanced and proportionate deratings.

Emission Reduction Goals

Support for AEMO's inclusion of an additional class of benefits defining the 'value of carbon emissions' in the cost-benefit analysis performed as part of the ISP development

We strongly support AEMO's suggestion of incorporating the National Electricity Objective (NEO) emission reduction objective by adding an additional class of benefits defining the 'value of carbon emissions' in its cost benefit analysis, which would represent the value of investments that reduce carbon emissions beyond the existing ISP scenario parameters.

In the consultation paper, comments related to the NEO explicitly state: "If an emissions reduction objective is inserted into the NEO, this would be expected to allow treatment of emissions reduction as a new category of market benefit that AEMO can acknowledge and apply in its development of the ISP."

In terms of achieving the "spirit" as well as the letter of the NEO revision, taking this step will be an important piece of ongoing and necessary work to integrate emissions reductions targets and energy policy. It will bring more realism to the whole-of-system plan for the long-term development of the power system, given the likelihood that efforts to limit climate change will become more ambitious and urgent over time. The costs of a warming climate will also unfortunately become clearer over time.

Given that the revision to the NEO has received the endorsement of the National Energy Transformation Partnership, with the request to fast-track an emissions objective into the NEO³, AEMO should immediately begin work to identify appropriate metrics to use to incorporate and value emission reduction in the 2024 ISP cost-benefit analysis in readiness for the making of the revision.

Strong support for the ISP to focus on modelling an energy system transition that is truly in the long-term interest of consumers by keeping temperature increases to 1.5°C

In line with the NEO revision's imperative to better integrate emissions reductions into AEMO's work, and as a minimum, AEMO should include at least one additional 1.5 degree aligned scenario focused on rapid domestic decarbonisation, for instance electrification of residential demand.

While we recognise that scenario analysis is based on *plausible* futures, which does necessitate the exploration of outlier futures to frame extremes, a preferred framework would be for AEMO to apply an emissions budget aligned with 1.5 degrees and use the different scenarios to explore different ways of meeting this budget over the medium and long term. By doing this, AEMO can uphold its core purpose of "establishing a whole-of-system plan for the efficient development of the power system that achieves power system needs for a planning horizon of at least 20 years for the long-term interests of consumers" while "consider[ing] emissions reduction in how they undertake their respective powers and functions." It would be a way for AEMO to model the development of an energy system that would identify the necessary investment to deliver outcomes that are truly in the long-term interest of consumers.

³ <https://www.energy.gov.au/government-priorities/energy-and-climate-change-ministerial-council/priorities/national-energy-transformation-partnership/consultation-proposed-legislative-changes-incorporate-emissions-reduction-objective-national-energy-objectives>

The stated purpose of the Integrated System Plan is to establish a whole-of-system plan for the efficient development of the power system that achieves power system needs for a planning horizon of at least 20 years for the long-term interests of consumers. We believe that the long-term interests of consumers and communities include living on a habitable planet and avoiding dangerous and irreversible changes to the climate system, which requires temperature increases to be constrained below 1.5°C. This also aligns with the commitment the Australian government has made to the objectives of the Paris Climate Accord including “pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels.”

Stakeholder Engagement

Concerns about the lack of transparency on the risk metrics and consumer risk preferences

In the relevant consultation document, AEMO explains that it “may use informed judgement to finalise the Optimal Development Path (ODP) with reference to consumer risk preferences by incorporating evidence-based risk metrics where available.” We agree that consumer preferences are important. We also believe that *community* preferences are important.

We appreciate AEMO’s ongoing work to support deeper community input through the formation of the Advisory Council on Social License (ACSL). We believe that there should be a pathway for consumer preferences to be incorporated in the decision on the ODP. Additionally, there should also be consultation focused on broader community preferences around the ODP.

Using "professional judgement" to weight the scenarios is a necessarily subjective approach that may introduce opacity into the 2024 ISP, and we ask that AEMO also consider community preferences in any risk preference calculation.

AEMO need to consider the fundamental principle of risk asymmetry. The risks associated with delivering transmission too late far exceed the risks associated with going too early. Bringing forward transmission build provides an inherent buffer in the power system that helps manage the price and reliability risks associated with unplanned events since even delays of just one year in commissioning new transmission results in increased electricity bill costs to consumers⁴.

Where AEMO incorporates consumer and community preferences, they must consult more widely than the ISP consumer panel to ensure that the broadest range of consumer and community views obtained, since some consumer groups will focus more on the costs of the investment required, ignoring the benefits of that same investment.

In addition, we would like more information and transparency on the composition and selection of the ACSL as well as the Consumer Panel to ensure that both panels are meaningful representations of Australian consumer and community voices. While it is at the discretion of AEMO, there is general concern with the strong biases of members of these panels which mean they don’t represent the broader consumer base.

⁴ https://nexaadvisory.com.au/site/wp-content/uploads/2022/06/Report-Modelling-Electricity-bill-impact-due-to-transmission-delay_2022-06-07.pdf

If not handled appropriately, a number of challenges may emerge from AEMO’s current proposal, such as consumer and community unwillingness to adopt and support the ODP due to a lack of social licence, and we would like to have more information and clarity on specific consumer-related metrics and the chance to consult and provide input on the detail of any metrics.

It is not clear what these “evidence-based risk metrics” might entail:

- ‘Willingness to pay’ and the Value of Customer Reliability (VCR) don't adequately capture all consumer and community preferences.
- Cost-of-living is a top-of-mind issue for consumers. Expanded renewable energy represents the most substantive opportunity to reduce energy costs. Transmission is often essential to unlock access to this lower-cost energy.
- Community risk preferences with regard to global warming may be significant. We observe that in both the federal and state elections climate change and energy prices were among voters' top concerns.

Without understanding the specific details and approach proposed it is impossible to fully evaluate any potential unintended outcomes (e.g., prioritising a narrow subset of consumers, such as those currently serving on the consumer panel, over a broader representation of consumers across the NEM and Australian communities; prioritising short-term project costs over longer-term considerations, including longer-term equitable access to renewable energy).

We recommend that AEMO take more time to develop consumer and community risk preferences, consulting on the approach taken and the details of any metrics used, to ensure that consumer and community views are adequately captured in the development of the ODP.

Recommendation that the ISP methodology consultation document expand the remit of aspects covered in the consultation

The consultation document published by AEMO offers a relatively narrow and technical scope for comment and a very limited time to comment – the minimum required. We note that expanded and broader consultation is likely to be useful to AEMO on other aspects of the ISP modelling, such as the appropriate/best way to incorporate consumer and distributed energy resources, modelling assumptions around coal exits, the treatment of energy efficiency and the underlying decisions around the demand forecasts and response.

Currently the scope of what is under consultation in the methodology update appears to be unnecessarily constrained, limiting engagement with key stakeholders who could provide expert inputs.

We recommend AEMO provide an opportunity for wider consultation and expand the remit of aspects covered in ISP methodology consultation document to include the treatment of energy efficiency and decisions and limitations on demand response and other consumer led aspects of the transition.

Recommendation to provide additional details on how the scenario-weighting process will provide a meaningful chance for input from key stakeholders as well as transparency

AEMO established the Delphi panel in the last ISP 2022 to vote on the preferred scenario. While the Delphi process was not perfect, it was an essential step in providing participants and industry stakeholders with the opportunity to engage on the adoption of scenarios used in the ISP modelling.

The Delphi panel allowed for transparent and open decision-making on the four scenarios that are key for generating meaningful ISP outputs that can be broadly accepted by industry and consumers.

Additionally, while it is not entirely clear what consumer risk metrics AEMO will use to inform its “professional judgement” on consumer preferences, we note that a consumer representative suggested, at the public webinar (20 April), that consumer preferences and views on risk be used to help determine the selection of the modelling scenarios used in the 2024 ISP.

Not committing to the Delphi process for the ISP 2024 and without providing details of an alternative methodology raises serious concerns on the level of transparency and a significant retrograde step for genuine engagement that risks undermining the outputs of the 2024 ISP and in determining the ISP 2024 preferred development path. The 2022 ISP Delphi panel was a major breakthrough on the engagement and support from across the various industry and stakeholder groups. Not only did this process provide transparency but also allowed participants to have a say which led to a significant shift in support and alignment across the industry on the role and value of the ISP.

We recommend AEMO provides clear and transparent details on how the 2024 ISP scenarios will be decided and how AEMO will ensure that these decisions will be made transparently in the absence of input from key stakeholders. Further, we strongly recommend the establishment of a Delphi process or similar to ensure transparency and buy in from across the range of stakeholder groups.

Recommendation for additional opportunity to consult on IASR

We strongly recommend AEMO injecting another public engagement forum in the ISP timetable before the end of May to provide an update on the IASR and the Methodology, as a further opportunity for stakeholders to provide input before the IASR is finalised and published in July.

While we appreciate AEMO’s responsive and thoughtful engagement with the initial round of feedback, there is significant time between July 2023 and December 2023 with no information from AEMO on its evolving thinking, especially given the rapid and dynamic transformation within the energy sector and relevant processes (Safeguard Mechanism, NEO revision, NEPS process, CIS) as well as the large amount of stakeholder feedback on the IASR and likely feedback on the updated methodology.

We therefore ask for another opportunity to get an update on AEMO’s thinking and contribute to the IASR process before the finalisation in July.

We note that this point is outside of the scope of the ISP methodology consultation, but we want to take this opportunity to provide advice on the need for additional engagement to ensure transparency on how decisions are made that have a significant impact on the results.

Determining the Optimal Development Path

Concerns that based on current information, AEMO will be hobbled in identifying the Optimal Development Path (ODP)

The principal objective of the suite of models and analysis set out in the ISP Methodology is to determine an ODP that optimises benefits to consumers. However, we are concerned that the exercise of selecting an ODP among CDP will be rendered intrinsically less useful because of fundamental flaws in the range of underlying scenarios from which CDPs emerge.

Given that CDPs represent the least-cost development pathway from each modelled scenario, the efficacy of the ODP selection process relies on the value of the scenarios. The major concern with the current range of scenarios is that the only 1.5 degree-aligned NEM decarbonisation scenario makes flawed assumptions about what hydrogen can and should be used for, given the international consensus⁵ that renewable hydrogen is needed for decarbonising industries like steel and fertiliser-making, not for blending into the gas grid for residential heating.

Another concern with the current range of scenarios is that the only 1.5 degree-aligned scenario also banks on an extremely rapid scale-up of Australia’s clean energy exports. While this is desirable if done well, this scenario should be complemented with plausible 1.5 scenario focused purely on domestic decarbonisation needs, in order to establish a trustworthy baseline for the minimum, not just the maximum level of additional renewable generation needed in a 1.5-degree world.

In order to “cover the breadth of potential and plausible futures impacting the energy sector” the 2024 ISP must therefore include a 1.5-degree scenario focused on accelerated decarbonisation of our domestic economy, driven by rapid renewables and storage build, high electrification, greatly expanded access to distributed energy resources (DER) and dramatically improved energy performance economy-wide.

- Having both scenarios modelled will be important in allowing for comparison of the infrastructure and investments needed to achieve the minimum needed for 1.5-degree alignment (i.e., domestic decarbonisation) as well as the maximum for 1.5-degree alignment (i.e., rapid build-out of Australia’s green exports economy, Australia taking responsibility for decarbonising our ore exports to the region by processing them locally with renewable electricity and hydrogen).
- Having this comparison would allow for a more informed assessment of the ‘no regrets’ infrastructure required in either 1.5-degree scenario.

We agree that the strong renewable-powered exports economy modelled in Green Exports is one credible path that is valuable to model, especially with the inclusion of broader green exports. However, given uncertainty around hydrogen production and use, and especially given analysts’ assessment of the implications of increased international competition from the US post-IRA and other countries, we need at least one other scenario that meets the science-backed, Paris-aligned warming path of 1.5 degrees but which makes different assumptions about the scale, pace, and use of hydrogen.

⁵ https://www.iee.fraunhofer.de/content/dam/iee/energiesystemtechnik/en/documents/Studies-Reports/FINAL_FraunhoferIEE_ShortStudy_H2_Blending_EU_ECF_Jan22.pdf

In addition, the significant role that domestic use of hydrogen and biogas plays throughout several of the scenarios is questionable given the momentum toward end-use electrification. Some assumptions related to the domestic use of hydrogen and biogas (e.g., subsidies) aren't justifiable as they do not emerge from existing policies and aren't tested from a viability standpoint.

Additionally, the current rate for delivering new renewable generation and storage is below what is required to meet the 2022 ISP step-change scenario and significantly below what would be required to deliver an export-focused scenario, suggesting that such "superpower" scenarios are not plausible or achievable⁶.

Finally, as well as including at least one additional 1.5-degree scenario with a focus on domestic decarbonisation we also recommend that the current 1.5 Green Energy Exports scenario treat Renewable Energy Industrial Precincts in the model in a parallel to the way REZs are modelled, as a way of framing the specific geographical developments needed to underpin regional economic diversification and the rapid decarbonisation of our domestic and export economies.

We recommend that AEMO ensure that the determination of CDP and ODP are not constrained by a reliance on a widespread hydrogen economy, while the Green Energy Exports scenario is the only Paris-compliant scenario (1.5 degree) to deliver on Commonwealth climate mitigation goals.

Treatment of low carbon technologies

Concerns about the logic underlying the derating of storage devices

AEMO's consultation paper describes the proposal to limit the storage capacity (in MWh) of storage devices in both the time-sequential model and the capacity outlook model (i.e., Section 3.3.3 of the Draft ISP Methodology) to reflect imperfect foresight and utilisation of storage devices and that storage devices "are not and will not be operated exclusively to meet power system needs at the precise time they are most required."

AEMO proposes to limit the storage capacity of storage devices, which is effectively equivalent to preventing the device from discharging its full energy capacity by up to 50% (for devices with less than 2 hours of storage). It also would apply these limits to aggregated embedded energy storages, including virtual power plants (VPPs) and electric vehicles to grid.

We have three major concerns about this derating proposal, which we state below with associated asks:

Concern 1: "Imperfect forecasting" applies to several technology types, not just storage. Given that the specific problem addressed is "imperfect forecasting", we note that coal and gas operations are also impacted by imperfect forecasting. Imperfect forecasting (and associated operational considerations) at a gas plant contributed to load shedding in NSW in recent years. While last year's energy market suspension clearly demonstrated that other established technologies can be energy-limited and impacted by imperfect forecasting.

⁶ <https://cleantechnica.com/2023/04/28/australias-new-net-zero-report-is-a-study-in-bad-assumptions-wishful-thinking/>

If basing this on actual operational experience, we would ask that the “imperfect foresight” logic and derating be expanded to other participants, such as gas, coal, and hydro-generation as well. Further, justification from AEMO on why coal, gas and hydro-generation should not be similarly derated on the basis of “imperfect foresight” is urgently required.

Ask 1: If accommodating “imperfect forecasting” is required, then the derating approach must be applied in a technology agnostic and technology neutral method.

Concern 2: The derating numbers proposed are inappropriate for large penetrations of storage. History (and existing operational profiles) are not a good guide for the future since short term storage is still developing in its role as a grid resource. Once operating at scale, storage will simply not operate as it currently does.

For example, many existing batteries are currently optimising for FCAS, which will not be the case in a world with many gigawatts of battery storage and options for other ancillary services.

Given that the stated vision of the ISP is to “fully utilise the opportunities provided from existing technologies and anticipated innovations in Distributed Energy Resources (DER), large-scale generation, networks and coupled sectors such as gas and transport” derating batteries based on the relatively narrow information about operations to date seem strongly penalise a specific technology, while not applying the same logic to other technologies or adhering to the ISP’s stated vision.

The proposed derating method also seems to rely on the idea that storage technologies will not improve or innovate, even as they roll out more broadly, and as their use and orchestration becomes more profitable. This is in strong contrast to the modelling assumptions that improvements in the future will permit the use of blended hydrogen in domestic use and networks (currently not a technology in use).

Ask 2: If AEMO does proceed with derating short-term storage, we recommend not determining the derating approach based on relatively narrow information on historical operations.

Concern 3: The limitations provided are drastic and risk artificially skewing the modelling. The 50% derating for shallow storage in particular makes battery storage, VPPs, and other emerging technologies look disproportionately expensive and skews the modelling against them, effectively setting them up as preordained “losers” in the 2024 ISP, with the proposed derating methodology flowing into other key system reports, such as the ESOO.

Ask 3: If AEMO insists on derating batteries, we strongly urge more nuanced and proportionate deratings.

We recommend that AEMO rethink this decision to derate short duration storage devices, consulting more broadly on the likely impacts of this approach on ISP outputs and the wider industry and how these changes will impact AEMO’s other system work.

About Nexa Advisory

Nexa is a full-service advisory firm. We work with public and private clients including renewable energy developers, investors and climate impact philanthropists to help accelerate efforts towards a clean energy transition. We've been shaping the energy industry for over 20 years. With a proven track record across policy creation, advocacy, political risk assessment and project delivery, we're holistic in our approach and deliver solutions with commercial intent.

The Nexa Advisory team is a collaboration of passionate energy specialists, all committed to the successful transformation of Australia's energy markets. The team is focused on helping clients grasp the unpredicted opportunities the energy transformation will bring. The decentralisation of energy promises, for the first time, to enable a truly democratised ecosystem with people and communities at the centre. We believe in an energy industry where people are at the centre of every recommendation we make. This belief guides our approach to the challenges we solve, and the outcomes we create.

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