16 February 2024

Daniel Westerman
Chief Executive Officer
Australian Energy Market Operator (AEMO)

Submitted via email: ISP@aemo.com.au

Dear Mr Westerman,

AEMO'S DRAFT 2024 INTEGRATED SYSTEM PLAN (ISP)

Origin Energy Limited (Origin) welcomes the opportunity to provide feedback on AEMO's draft 2024 ISP (draft ISP). Origin welcomes the enhancements made in the draft ISP with respect to the identification of key risks to the transition; clearer incorporation of jurisdictional policies; and clarity on the delivery dates for transmission upgrades.

Our submission focuses on areas where further improvements could be made to the modelling and information provided to support the transparency and usefulness of the ISP as a key planning tool:

- ISP and state plans: Where differences between the ISP and state planning documents are observed, clarity on the underlying reasons and drivers for these would be useful. For example, some of the key inputs (such as demand) in the draft ISP differ from those used in NSW planning documents. The rationale behind the different inputs and assumptions will assist stakeholders in reconciling the various plans.
- Risks to the Optimal Development Path and the energy transition: The draft ISP appropriately identifies the key challenges related to the transition, including social licence and supply chain constraints, through sensitivity analysis. We consider this can be further enhanced by incorporating these issues in a standalone scenario that will allow for a better understanding of the cumulative impacts of these challenges, which could then also inform policy making.
- Additional analysis: Additional analysis and more detail on some key areas would be helpful and promote stakeholders' understanding of the plan. This includes the annual consumption figures, particularly the drivers of the demand components, noting that the forecasts have changed significantly compared to the 2022 ISP.

We have provided further details on the above key points in Attachment 1. Should you have any questions or wish to discuss this submission further, please contact Sarah-Jane Derby at Sarah-Jane.Derby@originenergy.com.au or on (02) 8345 5101.

Yours sincerely,

Steve Reid
General Manager, Regulatory Policy

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ISP and state plans

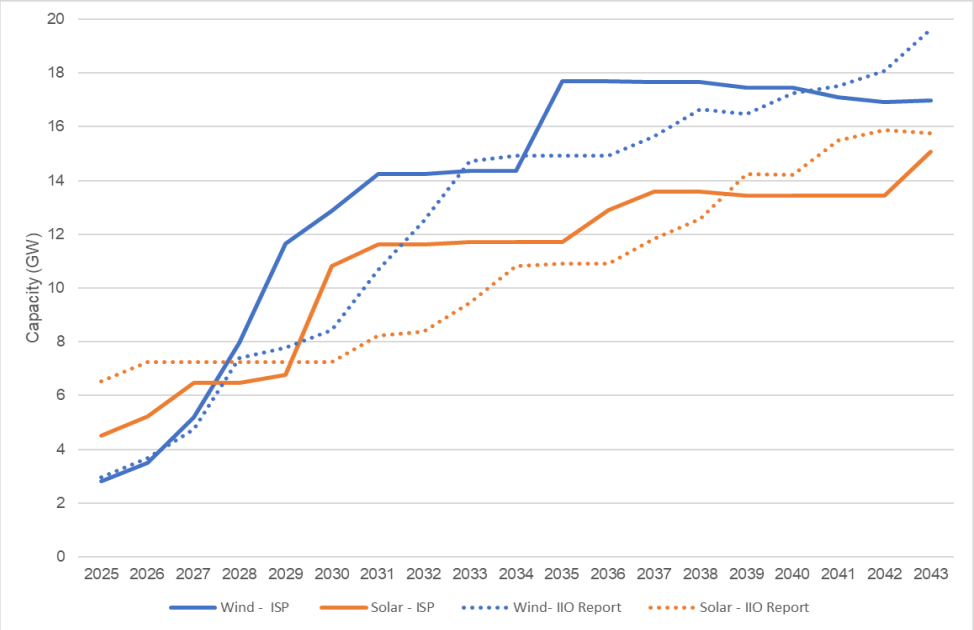
Origin supports incorporating committed energy policies from all jurisdictions in the ISP. This is critical to ensure that a holistic approach to planning the network is achieved.

We have noted that some of the modelling outcomes in the draft ISP are different from jurisdictional planning documents. Given that NSW's primary energy policy, the NSW Roadmap, is well under way, we use NSW as an example to illustrate the differences in modelling inputs and outcomes. We understand that the treatment of NSW in the draft ISP is different from how it is modelled in the Infrastructure Investment Objectives (IIO) Report[1] and other NSW process document, such as modelling studies undertaken for the South West renewable energy zone (REZ).[2] We understand that:

- The demand forecasts used are different, as noted in the final 2023 IIO Report.
- The IIO Report uses a NSW-specific and a NEM-wide supply chain constraint, which limit generation build to 2030 in its central scenario, while the draft ISP uses a NEM-wide build limit in a sensitivity and none under its most likely scenario.
- Modelling for the South West REZ uses developer-provided wind profiles rather than those used by AEMO.

As shown in Figure 1, these factors mean that NSW generation outcomes (e.g., for onshore wind and grid-scale solar) from the two planning frameworks differ which can create confusion for stakeholders.

Figure 1: NSW capacity outcomes – wind and solar



Source: IIO Report – Installed capacity in NSW, central scenario, from the Final 2023 IIO Report, December 2023. ISP: Capacity from the Draft ISP, step change scenario, December 2023.

[1] AEMO Services Limited (ASL) – 2023 IIO Report, https://aemoservices.com.au/our-role/infrastructure-investment-objectives-report

[2] NSW Department of Climate Change, Energy, the Environment and Water (DCCEEW), refined draft South West REZ access scheme and supplementary position paper, https://www.energy.nsw.gov.au/nsw-plans-and-progress/regulation-and-policy/public-consultations/electricity-infrastructure

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It would be useful if the final ISP to set out the rationale behind the different inputs and assumptions, where these are used. This would help stakeholders to reconcile the different planning documents that underpin the energy transition.

Risks to the Optimal Development Path and the energy transition

The primary purpose of the ISP is to model a least cost Optimal Development Path (ODP) for the strategic transmission projects that are necessary for the transition, consistent with energy policies, which are appropriately captured in the current draft ISP.

We also consider the ISP has a role to clearly model and communicate the risks to the ODP, specifically by capturing practical challenges. The draft ISP clearly identified the key risks facing the transition, such as social licence challenges and supply chain constraints, through individual sensitivity analysis. Given these issues can have a cumulative impact on the transition we suggest that an improvement would be to consider all key risks in a holistic manner through an "aggregated risk-adjusted scenario".

A standalone scenario would enable clearer and more comprehensive communication of the risks to the transition. For example, AEMO would be able to model an ODP and underlying generation pathway that incorporates key risks, which could be reported as a scenario narrative. This would make it easier for stakeholders to better understand the implications for the transition should these risks not be addressed, which could also inform government policy where appropriate.

Reduced social licence sensitivity

We understand that the social licence sensitivity was applied through higher transmission and generation costs; and by delaying transmission build. The sensitivity outcomes appear to be counterintuitive however, with, for example, higher wind build in the immediate forecast horizon to offset delayed grid augmentation, despite generation projects also impacted by social licence challenges. In addition, this additional build may not reflect the likelihood that transmission constraints would be worse with delayed grid augmentation, which would further affect the ability of wind to connect to the network.

We consider the sensitivity could be refined by better capturing the risks of reduced social licence to both generation and transmission projects while ensuring the outcomes are practicable. This could include a more granular approach to accounting for social licence (e.g. REZ by REZ); applying a delay metric to generation; or choosing key transmission upgrades or series of generation projects that would not proceed to clearly demonstrate the potential impact of social licence risks on the transition.

In addition, AEMO could consult broadly with all relevant social licence stakeholders, including developers, government departments and community groups. This could include extending the membership of the Advisory Council on Social Licence to developers and other relevant stakeholders.

Additional analysis

Origin considers more detailed analysis and explanations should be provided on the following inputs, modelling methodologies and outcomes, to help stakeholders better understand the ISP.

Demand forecasts

The draft ISP demand forecasts are significantly higher than in the 2022 ISP as shown in Figure 2, despite the scenario settings for the most likely 'step change' scenario being similar. We understand that this may partially be due to new energy policies, but the underlying reasons are not entirely clear.

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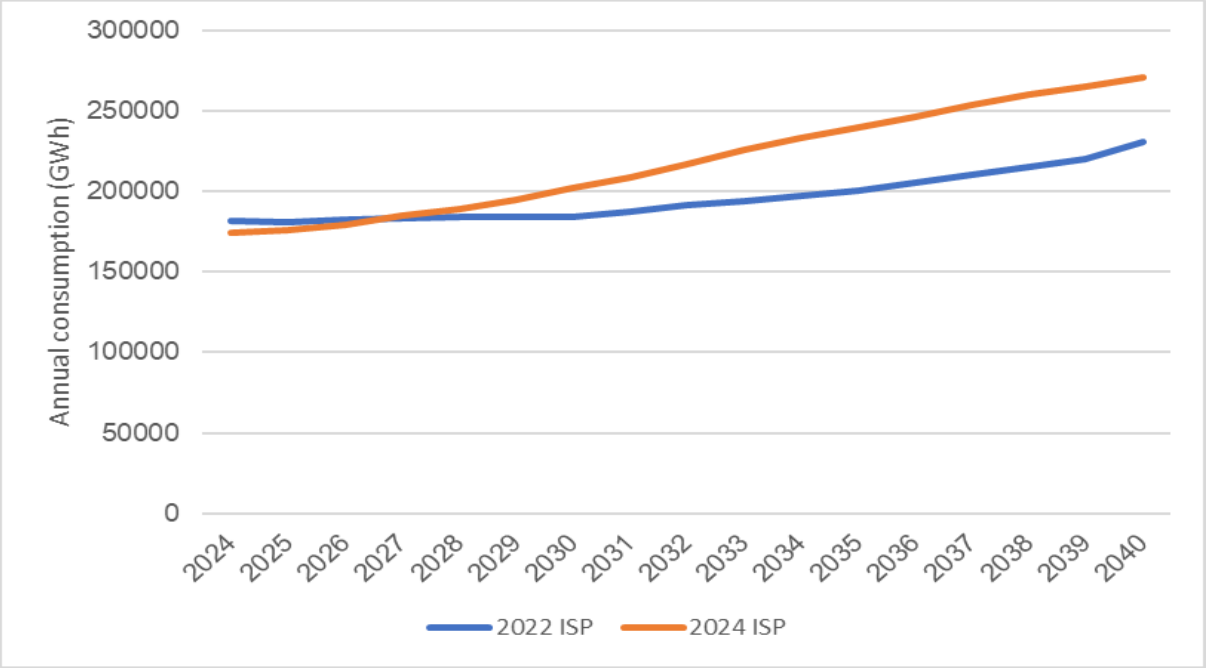
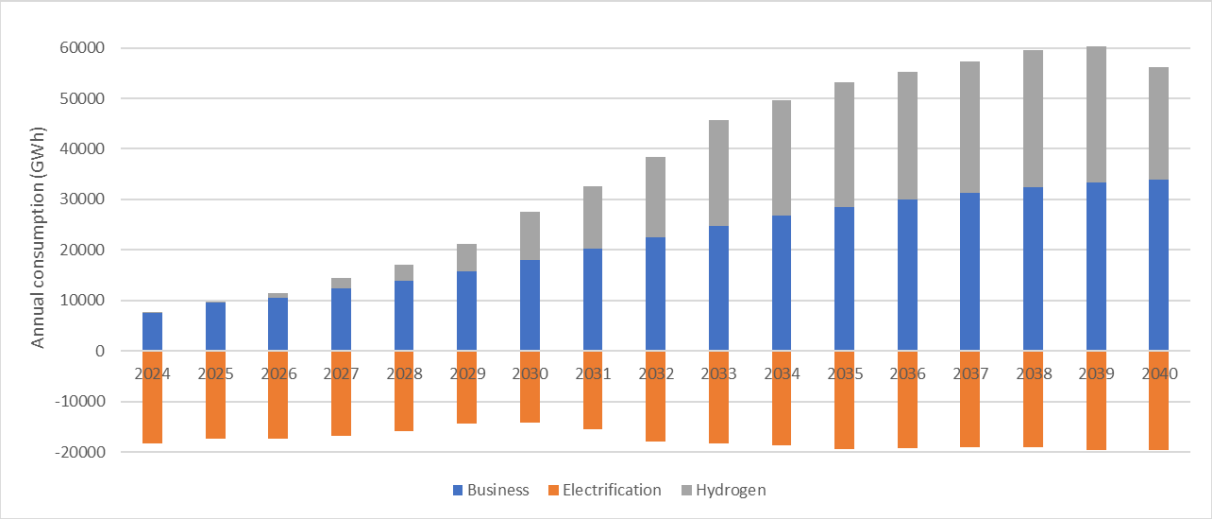
Figure 2: Operational demand, NEM-wide, step change scenario, draft 2024 ISP and 2022 ISP



Source: AEMO's forecasting portal https://forecasting.aemo.com.au/electricity/annualconsumption/operational

We consider the ISP should clearly set out the drivers behind each component that forms part of its consumption forecasts. This includes the components in Figure 3, which shows the three components whereby the largest changes between the 2022 and 2024 ISP can be observed.

Figure 3: Annual consumption (GWh), NEM-wide, step change scenario, difference between the draft 2024 ISP and 2022 ISP, selected components



Source: AEMO's forecasting portal https://forecasting.aemo.com.au/electricity/annualconsumption/operational

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In addition, it is not clear what the methodology is for modelling hydrogen production in the ISP, such as how the model incorporates electrolyser flexibility and whether there are differences across the difference scenarios. The final ISP should set out more information on how hydrogen production values are derived, including across the different scenarios. It should also provide more information on the implied utilisation rate of hydrogen load across the forecast horizon. The additional analysis will be useful for stakeholders to better understand the role hydrogen load plays in the most likely scenario and in driving demand growth.

The final ISP should also have the appropriate sensitivities in place to capture the risk of demand forecasts not eventuating. While the draft does include an electrification alternative sensitivity (aimed at capturing lower-than-predicted industrial electrification), there are no sensitivities for alternative pathways for business demand or hydrogen production. We suggest the final ISP include individual sensitivities for lower business demand and hydrogen production, or alternatively a combined "lower demand" sensitivity as proxy. This would help in understanding the impact if large industrial loads have lower-than-predicted growth or if hydrogen targets are missed.

Generation traces

It is not clear from the ISP methodology how generation profiles are derived for projects located at new sites since these locations would not have historical data that can be drawn upon. We understand the ISP uses the Electricity Statement of Opportunities (ESOO) methodology, which states that the modelling incorporates generation traces entirely derived from meteorological data.[3] However, this does not fully explain how the information is derived, including the assumptions used such as the wind/solar resource mapping data that underpins the projections.

The final ISP should provide more information on how generation traces are derived for new sites across the NEM, including the underlying assumptions such as the generation resource mapping data. This information will be useful for stakeholders in understanding the drivers being generation outcomes, particularly for wind and solar.

Firming outcomes and assumptions

Origin welcomes the discussion in the ISP on firming technologies and the role they will play in supporting the energy transition. The holistic approach to the different types of technologies is appropriate, including the role of consumer energy resources (CER) coordinated through Virtual Power Plants (VPPs), different duration of storage, flexible gas and emerging battery technologies.

Figure 4 shows the draft ISP generation outcomes for the step change scenario for the largest contributors to firming capacity.

[3] ESOO and Reliability Forecast Methodology Document, https://aemo.com.au/-/media/files/electricity/nem/planning_and_forecasting/nem_esoo/2023/esoo-and-reliability-forecast-methodology-document.pdf?la=en

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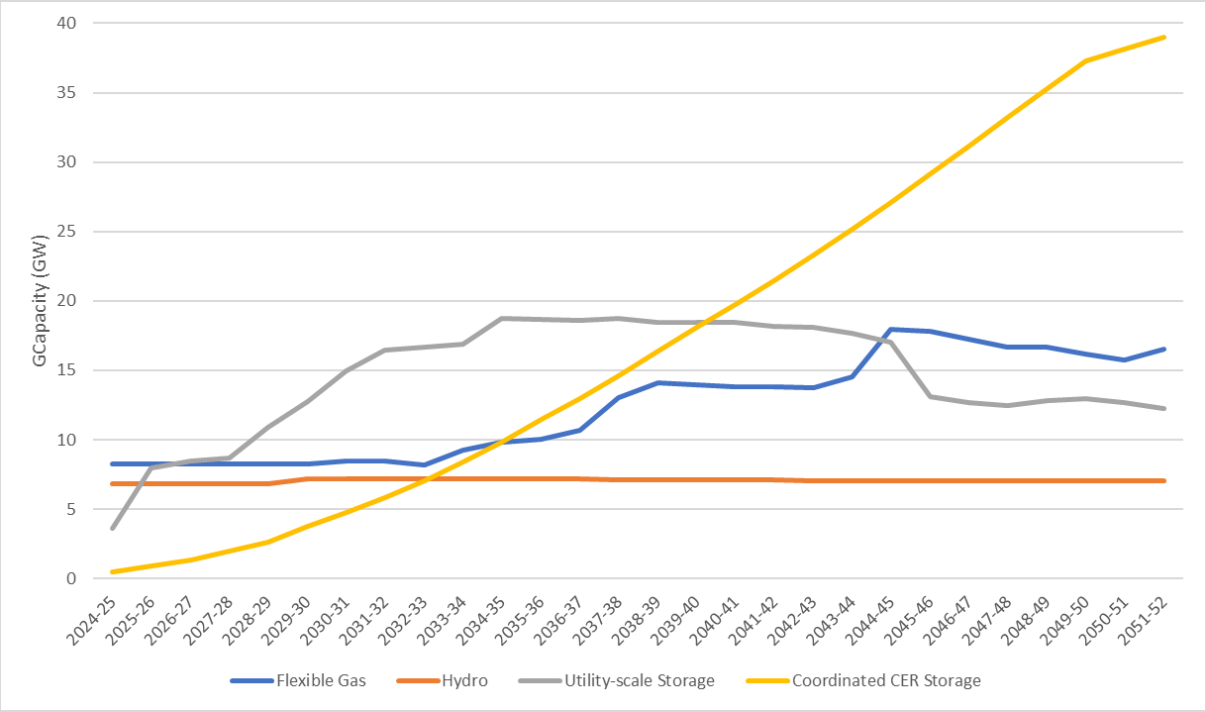
Figure 4: Firming capacity – selected technologies, step change scenario



Source: Draft 2024 ISP – step change scenario – NEM wide capacity

These outcomes show that utility-scale storage capacity peaks and falls around the mid-2040s and additional firming needs in terms of capacity are primarily met by continued growth of coordinated CER storage. We make the following comments:

- We understand the ISP methodology continues to assume perfect foresight from all types of storage. This means that storage generation capacity is not derated to reflect expected charging/discharging behaviour and is instead assumed to always be available when the system needs it. It is unclear if this overestimates the contribution of storage for firming in terms of energy, which could mean that the model is under-building storage capacity. The final ISP should provide additional information on this.
- AEMO notes that orchestration of coordinated CER is a precondition for the integration of these resources into the grid and, therefore, for them to contribute to firming. As there is still a significant amount of work to be done in this area, we suggest a sensitivity around reduced coordinated CER (and higher passive CER) may be useful.
- More generally, stakeholders would benefit from the final ISP including a more detailed explanation on the drivers behind firming outcomes, particularly later in the forecast horizon. This discussion should cover both the capacity outcomes and how the different technologies contribute to firming in terms of energy.

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