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Australian Energy Market Operator – Draft ISP Methodology – April 2021

EnergyAustralia is one of Australia's largest energy companies with around 2.4 million electricity and gas accounts across eastern Australia. We also own, operate and contract an energy generation portfolio across Australia, including coal, gas, battery storage, demand response, wind and solar assets, with control of over 4,500MW of generation capacity.

The ISP Methodology is a critical document. AEMO's analytical approach, including by determining the scope of inputs and assumptions through the IASR, will have a significant influence in shaping subsequent RIT-T assessments. This is obviously in addition to setting out AEMO's approach for the ISP, which sets strong expectations for policy-makers, investors and customers on the mix and timing of investments that will deliver the energy transition at least cost. In order to appropriately manage the significant task of producing its ISP, and minimise stakeholders re-prosecuting matters during further consultation, we expect AEMO will be reluctant to reopen matters that have been decided as part of its Methodology when consulting on its draft ISP results. Also, while AEMO has discretion to review its Methodology more frequently, the AER's Forecasting Best Practice Guidelines require it to be reviewed at intervals up to four years, raising the prospect that certain approaches may be retained in preparing the 2024 ISP as well as for 2022.

We therefore appreciate the opportunity to provide feedback on AEMO's Draft Methodology and our substantive comments are outlined in the following sections. In relation to procedural matters, we are particularly grateful for AEMO's efforts in transparently responding to stakeholder suggestions in its associated consultation paper (even noting this is a requirement under the National Electricity Rules), as well as the callout boxes in the draft methodology document where significant changes have been made. We expect these callouts will be removed in the final version in making it a stand-alone document. AEMO may wish to publish a separate 'tracked changes' version of its Final ISP Methodology to assist stakeholders in comparing to the April draft document.

The ISP's findings should recognize the significance of engineering and other limitations

We note and support the ongoing work of AEMO in integrating 'real life' engineering constraints into its system optimisation modelling. This is a complex and important task.

The analysis and findings from AEMO's broad Engineering Framework program, including actions from the Renewable Integration Study (RIS), will extend beyond the 2022 ISP. We therefore have some concerns that critical decisions on Actionable projects will be based on optimal development pathways that have not been properly tested from a power system performance and an operational perspective. For example, AEMO's RIS Stage One report identified various limits to integrating amounts of variable renewable output above 50 to 60 percent, and actions to facilitate up to 75 percent are in various states of progression[1], however this still falls well short of projections in some ISP scenarios. In the absence of more sophisticated approaches that deal with renewable integration issues, AEMO's ISP Methodology would essentially determine optimal development paths based largely on a thermal capacity constraints only, coupled with mostly deterministic views of firm interconnection capacity at times of peak demand.

Operational constraints associated with system strength issues more broadly should be transparently recognised. Where it is assumed that transmission transfer capacity will be fully utilised, AEMO should factor in additional build costs that would make this so, otherwise the benefits of full utilisation should not be assumed. At a high level, this could be accommodated via sensitivities for transmission cost inputs. We consider, however, that AEMO has the capabilities to conduct some more detailed load-flow type power system analysis using the PSS/E platform across the broad scenarios, and can incorporate this as methodological improvements.

We encourage AEMO to design, adopt and report more specifically on some of this modelling to validate system performance across the wide range of scenarios contemplated by the ISP over the outlook period. For example, a load-flow snapshot could be taken every 5 or 10 years for peak, typical and minimum demand conditions to test system normal and critical contingencies conditions from a thermal, voltage control and wider stability perspective. We think completing and reporting on this work more thoroughly will not only build confidence in the technical feasibility of the scenarios and the least cost expansion plans, but will also:

- highlight some critical differences across the scenarios, given the varying degrees and locations of intermittent and dispatchable new entrants (at both the wholesale level and behind the meter); and

- aid in ensuring the necessary constraint equations (including for power system security services) are designed and included in the market modelling.

AEMO notes that it is extremely complex to model impacts of contract and ancillary services markets, asset portfolio decisions and other commercial or economic factors. That said, AEMO incorporates a bidding behaviour model (section 3.1.2 of the draft Methodology) which is based on data of actual bids that can capture contract and portfolio effects. It would be useful if AEMO could provide further clarity on how and when this would be adopted in place of its SRMC model.

[1] AEMO | RIS Stage 1 Action Progress

For other 'externalities', we accept they may be too complex to model however we recommend AEMO consider the materiality of how these factors affect investment and operational decisions when presenting the findings of its analysis. As noted, one of our main contentions is that various modelling simplifications tend to favour long-duration storage at the expense of batteries. As pumped hydro has different locational requirements than batteries, any storage technology bias will result in different transmission network configurations and, potentially, actionable projects.

Further observations on modelling transmission

Generally in relation to transmission modelling, we support AEMO's move to a zonal/ sub-regional approach. This will provide greater insights into the utilisation of existing assets and spare hosting capacity as thermal plant retires. AEMO has outlined a more detailed approach to define and apply transmission limits in the ISP in section 2.3.3 of the draft Methodology. EnergyAustralia requested AEMO provide much more detail on the technical nature of existing and post augmentation transmission limits in our submission on the IASR. This point is re-iterated in the context of step 4 in AEMO's description of how it aims to identify seasonal transfer limits for use in the ISP. Furthermore, reporting statistics of binding constraints in the market modelling will also be key in providing indicators of dispatch efficiency in both the counterfactual and network investment cases. Accordingly, this work will help guide policy decisions around the declaration and scoping of REZs.

There are two further matters AEMO may wish to consider in terms of inter-zonal transmission limits:

- the concept of operational firmness — for a variety of reasons (forced or planned network outages, market behaviour, latent system strength or security risks, etc) a notional transfer limit may be reduced quite materially. Similar to generation, AEMO could adopt some random partial and full transmission forced outages to reflect that transfer limits, even at times of peak demand (the 'worst-case' limits as defined by AEMO) are not particularly firm.

- the role of fast start and dispatchable plant to be used to increase inter-regional transfer limits — for example an extension of the Victorian System Integrity Protection Scheme project that can be used to materially increase and maximise export between regions through utilisation of flexible dispatchable assets.

Firm capacity requirements

Regarding firm contribution factors for variable renewable energy, we support AEMO's move from an 85th percentile approach to calculating effective load carrying capacities. In previous discussions around resilience to climate change, AEMO proposed adopting alternate wind models to manage the systemic oversupply at times of high wind (i.e. overspeed cut-out) and high ambient temperatures (deratings). We seek clarity on whether this analysis or approaches will be factored into the ISP Methodology.

Further consideration of multi-sector modelling is required

We encourage AEMO to consult further on multi-sector modelling of emissions constraints and of electrification. AEMO's Forecasting Reference Group was recently asked to provide feedback on limited explanatory materials on the AusTIMES model, and the process for how this modelling relates to the ISP methods and inputs is not clear.

Section 2.4.5 of the Draft ISP Methodology explains that the outputs of multi-sectoral emissions modelling will be reflected in AEMO's SSLT and DLT. Presumably AEMO's modelling analysis would produce feedbacks in terms of cost or other constraints back into AusTIMES. There is also a need to ensure consistency in the calibration of scenarios and inputs across both sets of models may which will affect the optimal allocation of carbon budgets across sectors. The treatment of electrification is also vital, particularly in terms of intraday and seasonal patterns. Growth in electrification could be shaped to absorb surplus output and benefit the system, or could be used to justify large investment in generation and transmission at great cost to end users. These and other feedbacks would affect the relative abatement costs of different decarbonisation pathways, and hence emissions reductions to be achieved by the electricity sector. The assumptions and methodology adopted by AEMO in treating these issues therefore need to be clear, and stakeholders should be provided an opportunity to provide informed input, prior to modelling for the ISP in order to build industry and stakeholder confidence in this unprecedented process.

The role of offsets and biofuels warrants further closer attention. For example, modelling may place heavy reliance on offsets and negative emission technologies as marginal abatement costs of other technologies and in specific sectors increase significantly at deep levels of decarbonisation. The feasibility of land use for these purposes should be appropriately tested. Some uncertainty exists around the accounting of emissions arising from biofuels, so heavy reliance on these fuel sources in the modelling should also be considered further i.e. biofuel emissions may eventually be counted rather than being considered self-offsetting through replacement crops.

We appreciate the AusTIMES model is likely considered to be outside of AEMO's modelling suite and so not covered in the ISP Methodology, and such multisector modelling is still relatively new. Even so, stakeholders should be informed on how different models are integrated, and when feedback will be sought on these and other detailed matters.

If you would like to discuss this submission, please contact me on 03 8628 1655 or Lawrence.irlam@energyaustralia.com.au.

Regards

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