Good afternoon AEMO ISP Team,
Stride Renewables (Stride) welcomes the opportunity to provide feedback to AEMO's draft Integrated System Plan (ISP) 2024 and appreciates the collaborative approach to ensure the ISP is a robust path for our energy transition.
Stride commends AEMO's ongoing efforts in the National Energy Market including the hard work and dedication in delivering these critical 'roadmap' plans for industry and government.

Introduction to Stride

Stride is a boutique advisory firm of renewable energy experts aiming to support the energy transition. We provide strategic advice on government policy, commercial opportunities, social licence, stakeholder engagement and renewable energy developments.

Summary of feedback

This submission is based on Stride's analysis of the draft ISP 2024 with a focus on long duration storage solutions that deliver on national net zero and energy security, including pumped hydro. Stride's feedback is split into three parts which are examined in detail below.

1. The cost of pumped hydro vs competing technologies.
2. Role of pumped hydro during renewable droughts.
3. Emissions associated with the optimal development path.

The cost of pumped hydro vs competing technologies

Stride understands that modelling is only as good as the assumptions it is constrained by. To ensure a robust model, the assumptions must be equally robust, Stride would like to seek clarity regarding the cost assumptions of pumped hydro and gas technologies.

- The cost of pumped hydro is measured against a 50-year life span despite the Aurecon technical parameters report suggesting an 80-100 expected life. This is significantly undermining the economics of pumped hydro projects. We seek clarity on the rationale for using 50 years.
- The costs of pumped hydro are only estimated to a 48-hour duration despite the increasing demand for longer duration storage to meet renewable droughts and seasonal storage functions. Stride believes this is under-valuing pumped hydro as the technology's levelised cost of electricity is known to be inversely proportional to its energy duration. We recommend analysing the costs up to a duration of 192 hours, the length of time used in the renewable drought analysis., to inform the optimal storage mix needed.
- The GenCost report estimates the cost of power and energy for technology's using assumed capacity factors. For variable renewable technologies this is based on wind and solar data however for gas and coal technologies this is based on economic factors and the role of the plant. The ISP indicates a typical gas plant capacity factor will be as a low as 5% yet GenCost assumes a value of 20% which has likely resulted in not all of the costs of a gas plant being reflected in the model. Stride suggests matching the cost assumptions for technologies with the intended capacity factor from the ISP.
- Stride also seeks clarity of the 5% capacity factor stated in section 6.4 of the ISP as Stride's analysis of the chart data suggests the capacity factor will be much higher. The calculations are shown below:
    - Chart data from figure 22 indicates 117,000 TJ of gas generation will occur in 2039-40 for a typical peaking plant.
    - Figure 2 chart states there is 14.8GW of gas generation in the same calendar year which would have a corresponding maximum generating capacity of ~467,000 TJ over the course of the year.
    - 117,000 / 467,000 = 25.1% capacity factor.

- This ambiguity is reinforced by the dual roles given to gas generation in the ISP. Initially it is defined to play a “backup” role yet is later given a “firming” role. Stride would like to seek clarity on the intended use of gas in the ISP.

Renewable drought analysis

- Renewable droughts are expected to occur during winter when our gas markets and pipelines are already stretched thin due to heating demands, not to mention the associated emissions. Australia currently has 23 pumped hydro projects in development, boasting a combined capacity of over 20GW. Pumped hydro can arguably provide a more effective (and net zero) solution than gas in addressing renewable droughts.
- Stride would encourage greater analysis into renewable droughts including a sensitivity analysis to different durations. This will inform the optimal generation and storage mix at different probabilities of renewable drought impacts.

Emissions associated with the optimal development path

- Stride has conducted an analysis regarding the level of emissions associated with the scenario CDP11 optimal development path, with calculations set out below:
    - As aforementioned, Figure 22 chart was used to show the total gas usage is 117,000 TJ in 2039-40.
    - The IASR states the emissions factor of large peaking OCGT to be 580 kg / MWh which equates to 161.4 tonnes / TJ.
    - This would suggest the total emissions in 2039-40 would be (from gas alone) 117,000 * 161.4 = 18.88 Mt.
    - However the supporting material for the generation and storage outlook which forecasts the NEM emissions trajectory suggests there is only 4 Mt of associated emissions.
- Stride seeks to clarify the level of emissions associated with CDP11 (ODP) as the ISP suggests the relatively small impact of using green hydrogen, biofuels or carbon capture technologies at that stage.

Conclusion

Stride appreciates the opportunity to provide feedback to the draft ISP 2024 and actively supports determining the best possible outcome for Australian electricity consumers.
Stride would welcome the opportunity to discuss our submission further. Please don’t hesitate to contact the Stride Renewables director at amy@striderenewables.com or 0477 383 166.

Regards,
Amy

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