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GE Response to Draft 2020 Integrated System Plan (ISP)

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Date: 20 February 2020

Subject: Consultation on the Draft 2020 ISP

To whom it may concern,

We commend AEMO for the investment of time and effort in the preparation of the Draft 2020 ISP. It is clear both methodology and process have evolved since the 2018 ISP, enabling greater detail in the 2020 plan.

GE has been a significant player in the Australian energy space for over 100 years, with an installed base across wind, hydro, gas, battery, steam and transmission equipment of close to 20GW. In addition, GE's service teams directly support more than 50 percent of the total NEM installed base. Across our work with both developers of new projects and operators of existing plants, it's clear our customers and their investors confer great importance on the ISP as a roadmap for the development of our electricity network and the generation plants that connect to it.

On this basis, we have done our utmost to review the plan in detail and provide feedback that we hope will prove useful both in the development of the 2020 plan and also in shaping the approach for the 2022 ISP.

Our feedback is summarised below, according to the prompts provided in Section E of the Draft 2020 ISP.

1. Has AEMO considered the most appropriate development options for Australia's future energy system? If not, what other credible options should AEMO consider for the 2020 ISP?

With the exception of the 'Slow Change' scenario, we note the different scenarios contemplated in the Draft 2020 ISP appear to arrive at relatively similar points by the end of the planning horizon:

- At least 30GW of VRE across wind and solar
- About 17GW of new transmission capacity
- Up to 21GW of additional dispatchable capacity

Furthermore, the work undertaken to identify and assess the various Renewable Energy Zones across the nation means the locations of these investments seem likewise relatively clear.

Given this clarity on what is needed and where it is needed, we would argue a smoother, faster transition should be considered under the Central Scenario than is currently the case.

The present trajectory appears to rely primarily on publicly stated closure dates for coal capacity as the trigger for investment in additional VRE, transmission and dispatchable capacity. This seems to drive relatively muted investment through the 2020s, followed by noticeable spikes in the early and mid-2030s. A smoother, faster pathway could enable the transition to occur at lower cost due to better management of workforce and equipment capacity constraints. It would also provide greater certainty to workers, suppliers and investors involved in the energy sector.



In case the transition did indeed happen at the pace currently contemplated in the Central Scenario, the cost of regret would be limited to the bringing forward of capital costs that were inevitable anyway.

On the other hand, if we pursue a slower path and are surprised by coal capacity retiring earlier than expected, the cost of regret would be far greater (potentially severe economic and technical impacts).

A clear example of a transmission investment that could reasonably be accelerated under such an approach would be MarinusLink, which would unlock several of the country's most cost-effective 'deep storage' pumped hydro sites as well as the nation's top 3 most attractive REZs in terms of wind generation LCOE (per p45 of the Draft 2020 ISP).

Lastly, we note that the Draft ISP assumes that the necessary digital platforms are in place to support the forecast investments in DER. Digital platforms are important in facilitating the appropriate connectivity with DER systems, allowing DER investments to contribute their full potential. GE would encourage AEMO to consider what digital capabilities are required to successfully implement the growth in DER foreseen in the ISP.

2. Has AEMO properly described the identified need for upcoming actionable ISP projects? If not, how can that description be improved?

As outlined above, we believe a faster transition should be considered as the basis of the plan.

Additionally, while several of the key transmission projects contemplated in the ISP have recently completed successful RIT-T processes, we note the same momentum is not observed on the generation side of the ledger.

While we acknowledge the purpose of the ISP is primarily to drive and optimise transmission investment, we believe there is scope for it to play a broader role. In particular, we believe the ISP should aim to play the same 'catalyst' role for generation technologies that it is playing so effectively for transmission ones.

3. What, if any, additional factors should AEMO consider when identifying which Renewable Energy Zones are best suited to further development?

We understand the current approach takes account of:

- Wind, hydro and solar resources within the REZ
- Technology costs
- Transmission costs to connect generation in the REZ with relevant load centres
- The diurnal shape of expected output for the different technologies and REZs (and hence the portfolio effect at the national level)

Other factors driving the economics of the projects within a REZ (and hence the attractiveness of that REZ overall) may include:

- Current land use (and hence the likely availability – or not – of economically viable sites)



4. Has AEMO combined the development options into the most likely candidate development paths? If not, what other combinations should AEMO consider?

As outlined above, we believe the development options identified are robust, but argue a faster development timeline should be considered.

5. Are there any other factors that AEMO should take into account when assessing the merits of candidate development paths?

A range of relevant factors are considered in the Draft ISP to assess the merits of different candidate development paths. One area we believe is worth greater consideration is the risk of long-term outages of ageing dispatchable generators. Recent history has shown that such outages are becoming more frequent and have the potential to cause significant technical and economic disruption. Allowing for such outages in the analysis would further strengthen the case for earlier investment in VRE, transmission and dispatchable capacity.

6. What, if any, additional factors should AEMO consider to assess the development and timing of VNI West?

Considering other projects in the marketplace (both current and proposed), it seems likely the development and timing of VNI West could be impacted by resource constraints from utilities, EPC's and OEMs.

7. Are there any aspects of the Draft 2020 ISP that require further or clearer explanation so that results are transparent and can be easily understood?

It would be helpful for the ISP to provide a clearer view on the role foreseen for large scale battery storage. If we look solely at the current 'Large-scale Battery' category, it looks like they would play a very limited role in the future development of the NEM.

This is inconsistent with the significant activity and interest we are seeing for locating large scale batteries at wind farms, solar farms and inside substations. If projects such as these are considered 'Behind-the-meter Batteries', it would be helpful to split them out to make that clear. Likewise, if there is some component of the grid services currently attributed to Virtual Power Plants / Demand Response that relies of large-scale batteries, it would be helpful for this to be clarified too.

Large scale battery storage is a highly versatile technology capable of supporting not only dispatchability (up to 5-6 hours), but also system strength, inertia, black start, ramping, etc. It would be surprising and concerning for us if it were not to play an important role in the development of the NEM; a role we see as strongly complementary to the longer-duration storage provided by PHES.

8. What, if any, modifications should AEMO consider for the proposed 2020 ISP stakeholder engagement plan and timeline?

While great effort has clearly been taken by AEMO to assess when the system will likely 'demand' a certain project, attention must also be paid to the ability of EPCs, OEMs and utilities to supply these projects according to the ISP timeline. Capacity constraints are a reality in our industry and



providing a smoother timeline of capital works will make them much easier to manage, even if it means bringing forward certain projects ahead of when the system technically 'demands' them.

Consideration must also be given to the development steps needed to bring any given project to completion. Once allowing for approval processes, stakeholder engagement, etc, projects that aren't 'demanded' by the system for years may be already behind schedule if these processes aren't already well advanced.

As such, greater engagement with EPCs and OEMs in framing a 'supply side' view of NEM development works and timelines would be recommended, in order to ensure the resulting plan is achievable.

To conclude this submission where it began, we'd like to thank the AEMO team for their efforts in developing the Draft 2020 ISP and for providing the opportunity for us to participate in this consultation.

We would welcome the opportunity to discuss any of the above in further detail and look forward to further supporting the development of both the 2020 ISP and the others that will follow in the years ahead.

Sincerely yours,

A handwritten signature in blue ink, appearing to read 'S. Maresh'.

Sam Maresh
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