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7 July 2020

AEMO's Renewable Integration Study, April 2020

AGL Energy Limited (**AGL**) welcomes the opportunity to respond to the Australian Energy Market Operator's (**AEMO**) Renewable Integration Study (**RIS**), April 2020.

AGL is one of Australia's leading integrated energy companies and the largest ASX listed owner, operator, and developer of renewable generation. Our diverse power generation portfolio includes base, peaking and intermediate generation plants, spread across traditional thermal generation as well as renewable sources. AGL is also a significant retailer of energy and provides energy solutions to over 3.7 million customers in New South Wales, Victoria, Queensland, Western Australia, and South Australia. We have delivered multiple trials and projects that draw upon customers' distributed energy resources (**DER**). Our current DER product and service offerings include our Virtual Power Plant (**VPP**),[1] our retail offer for electric vehicle (**EV**) owners,[2] and our Peak Energy Rewards Managed for You program.[3]

AGL welcomes the opportunity to comment on this RIS, which provides a useful insight into some of the potential implications associated with the energy market transition, including maintaining power system security in a high renewables penetration scenario. AGL acknowledges the challenges identified by AEMO, specifically the dispatchability and predictability of a power system with increasing levels of variability and uncertainty. The inputs and assumptions from the draft ISP's projections are taken as given in the RIS analysis[4]. AGL encourages AEMO to consider the adjustments to the inputs and assumptions between the draft and final ISP and how this might impact the RIS.

The RIS also provides recommendations to address a range of technical issues that have been identified. AGL encourages AEMO to focus its efforts on analysing these issues and to provide valuable operational input into the implementation of regulatory reform processes determined by the ESB and AEMC, rather than identifying an AEMO preferred solution. AGL notes that there may be different approaches to consider based on the range of options currently being explored by ESB and AEMC, and that therefore the best operational solution will need to work within the context of the wider market reform program.

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[1] For further information regarding AGL's Virtual Power Plant, please refer to https://www.agl.com.au/solar-renewables/solar-energy/bring-your-own-battery?cide=sem-r&gclid=EAIaIQobChMIicjKmKuP5wIVyjUrCh2eXwvVEAAYASAAEgLZRPD_BwE&gclsrc=aw.ds.
[2] See further, AGL EV Plan, available at https://www.agl.com.au/electric-vehicles.
[3] See further, AGL Peak Energy Rewards Managed for You, available at https://www.agl.com.au/solar-renewables/projects/peak-energy-rewards-managed-for-you.
[4] AEMO RIS page 4

In developing appropriate policy solutions to assist the energy market transition, we believe it is important to make fact-based and 'no regret' regulatory and market changes to the energy markets framework. In terms of the broader wholesale market reform program, we welcome AEMO's technical insights on market operations to support robust policy decision-making. AGL acknowledges AEMO's broad findings and recommended approach to address the identified challenges through the ESB's Post-2025 market frameworks review. AGL is supportive of the ESB's processes and remains committed to working with the ESB and market stakeholders to identify the appropriate market design and settings.

In addition to the insights developed on distributed solar PV (**DPV**), we would recommend further analysis on the potential for energy storage and EV's to provide grid support services for the benefit of all energy consumers, through orchestration and managed charging. In our view, innovation in business and service offerings will also play a key role in addressing the challenges associated with DER integration[5].

To ensure 'no regrets' regulatory and market changes, we also support industry and market participants trialling and piloting innovative technologies and business models in Australia's energy markets. We have been an active participant in AEMO's VPP Demonstrations and see these trials as an important step in the integration of these kinds of business models into Australia's energy markets. We also believe the regulatory framework should better enable innovation and we welcome the AEMC's proposed regulatory sandbox arrangements as an important opportunity to accelerate progress[6].

Consumer impacts should also be appropriately considered and quantified together with greater market reforms, to ensure that DER can effectively participate in the broader energy market system where customers choose to offer control of their asset or orchestrated services. In developing proposed actions, we would recommend that AEMO commission a formal cost benefit analysis, to ensure that the impact of proposed solutions to DER customers is appropriately valued.

For a more detailed assessment and feedback on the technical insights and proposed actions presented in the RIS, please refer to the **Attachment.**

If you have any queries about this submission, please contact Shevy Moss-Feiglin on (02) 8633 7880 or smossfeiglin@agl.com.au.

Yours sincerely,

Elizabeth Molyneux

GM Energy Market Regulation

[5] See further, AGL submission in response to the AEMC Retail Competition Review, Electric Vehicles Issues Paper (27 March 2020), Available at https://thehub.agl.com.au/-/media/thehub/documents-and-submissions/2020/agl-submission_-2020-retail-energy-competition-review_-electric-vehicles-issues-paper_final_redacted.pdf?la=en&hash=0FAAC560256915B04CA125A50F184EB0

[6] See further, AGL submission in response to Regulatory Sandbox Draft Rules (21 February 2020), Available at https://thehub.agl.com.au/articles/2020/02/submission-in-response-to-regulatory-sandbox-draft-rules.

ATTACHMENT

Economic considerations and broader market reforms

Given that the draft ISP assumptions are applied in the RIS modelling scenarios, AGL is concerned that the generation build, and mix projected in all scenarios would not be realised. It is unlikely that all generation projects identified by the draft ISP would be commercially viable under the current market rules. While we understand that it is not necessarily the role of AEMO to make commercial judgements we are concerned these judgements could result in a very different generation mix.

AGL has approached the costs associated with all the RIS actions and recommendations with caution. We note these need to be carefully considered as part of the overall enduring ISP assessment. Every iteration of the ISP will consider a range of steady and variable factors applicable during its development process. However, the ISP cannot perfectly account for every scenario, especially external decisions and developments that are outside of its scope.

For example, the counterfactual scenario in the draft ISP does not include Project EnergyConnect, a significant transmission investment decision, because the appropriate authorities had not concluded their assessment at the time of draft ISP publication. However, post publication of the draft ISP, the AER has determined that EnergyConnect satisfied the requirements of the Regulatory Investment Test for Transmission (**RIT-T**). Although there is a theoretical possibility of EnergyConnect not going ahead, it would seem to be as committed as other projects which AEMO has included in the draft ISP counterfactual scenario. AGL also notes that the draft 2020 Gas Statement of Opportunities (**GSOO**) includes the impact of the EnergyConnect project in its forecast. The power system's ability to respond to increasing ramping requirements as the RIS has identified, depends heavily on interconnector headroom. Therefore, AGL encourages AEMO to ensure that the next version of the RIS reflects this position.

Further, AGL also notes AEMO's references to the ESB's Post-2025 market frameworks review and statement that *"the ESB considers that new system services need to be established and remunerated and an ahead market is required to ensure system security going forward"*[7]. While we welcome AEMO's technical insights on market operations to support robust policy decision-making, AEMO's recommendations should not pre-empt the industry consultation process and decision-making that is being managed through the ESB.

AGL supports the ESB's coordinated approach through its Post-2025 market frameworks review and we are actively engaged in industry consultations to ensure that the ESB's advice and any policy and regulatory decisions that follow are informed by relevant industry expertise, thereby guarding against any unintended consequences or poor customer outcomes.

Technical considerations

The RIS modelling relies heavily on the inputs and assumptions from the draft ISP. We note that any significant changes made between the draft and final ISP will likely influence RIS outcomes. AGL encourages

[7] https://aemo.com.au/-/media/files/major-publications/ris/2020/renewable-integration-study-stage-1.pdf?la=en page 8, 2.3

AEMO to consider the adjustments to the inputs and assumptions between the draft and final ISP on the possible modelling implications and how this might impact the RIS analysis.

In addition, AGL considers that defining the penetration limits as they relate to specific required solutions would provide a better understanding of the power system's technical limitations. For example, what degree of penetration can be supported by the power system today? And at what level of penetration will certain identified solutions be required? The RIS should clearly articulate the power system concerns being addressed at particular penetration levels, for example, inertia or system strength. This will aid stakeholders to understand the proposed actions and recommendations as they relate to each challenge.

System Strength

The way system security services are provided for and compensated in the NEM is changing, as many synchronous generators approach the end of their technical life. The ESB is working on this as part of a broad marker reform process. System Strength as outlined by the AEMC in their 'investigation into system strength frameworks in the NEM' is one of these essential system security services[8].

AEMO currently defines System Strength as the *"Ability to maintain the voltage amplitude, waveform, and phase angle under system normal and contingent conditions within specifications"*[9].

AGL, through our engagement with the AEMC's System Strength Review understands that there is no commonly accepted definition of 'System Strength' and what it means in the NEM context. The AEMC's newly formed technical working group is working through this issue. The findings and conclusions from the AEMC's review will likely impact the current position put forward in the RIS. AGL encourages AEMO to actively participate in the Review and ensure that the next iteration of the ISP and RIS appropriately reflects its decision.

Frequency management

AGL acknowledges the growing challenges relating to frequency control in the NEM including reduced primary frequency response, a decline in system inertia and reduced load relief.

The impact of the mandatory Primary Frequency Response (**PFR**) rule on Frequency Control Ancillary Services (**FCAS**) remains largely unknown, AEMO expects this rule change to improve the resilience on the system for both credible and non – credible events as well as AEMO's ability to model and analyse system performance [10]. AGL considers this rule change to have a significant impact on overall frequency management in the NEM, and even though theoretical implications are somewhat considered, actual power system performance with PFR enabled has not been considered in the RIS. AGL recommends considering the impacts of PFR as part of stage 2 of the RIS.

Further, AGL believes that the decline in load relief should be addressed at both the generation and load side. AGL expects that there is greater capability on the load side for active management to provide artificial load relief through inverter-based resource (**IBR**) characteristics. This should be considered in the RIS as a cost-effective option for frequency management services that can supplement any unit upgrades that may be needed on the generation side.

[8] https://www.aemc.gov.au/market-reviews-advice/investigation-system-strength-frameworks-nem

[9] AEMO RIS page 11
[10] RIS appendix B p45

Distributed energy considerations

We consider that the RIS provides a useful snapshot on network voltage issues and the range of mitigation approaches available to Distribution Network Service Providers (DNSPs) to manage these. In AGL's view, the effective management of voltage levels across low voltage distribution networks will be a key enabler for the integration of DER.

Through AGL's trialling of innovative programs that draw upon customers' DER, including our SA VPP, we have been able to draw upon operational data to develop a range of important insights into the interaction of DER with the low voltage distribution network, including on voltage management.[11] Among a range of insights, we have observed that voltage levels across the grid are generally high, regardless of whether customers are exporting solar. We note that the ESB and Australian Energy Regulator's (**AER**) commissioned UNSW report,[12] also found that high voltages are due to a range of factors, especially historic circumstances of distribution network operation, with implications for compliance and consumer losses.

Accordingly, we support DNSPs' approach to engaging with the overvoltage issue and seek to understand a range of potential solutions that support customer value.

We note that the RIS proposes a range of near-term actions to address distributed solar PV including:

- Aggregated performance of the DPV fleet (including AEMO's rule change proposal establishing the setting of minimum technical standards for DER); and
- Active management capability (including the setting of mandatory minimum device level requirements to enable generation shedding capabilities for new DPV installations).

We would recommend that AEMO commission appropriate cost benefit analysis of these proposed actions, to accurately understand the potential impact of these solutions to customers and the anticipated market benefits. We would also recommend further assessment of alternative management strategies, including market-based solutions, which may prove more cost efficient in delivering appropriate grid-support benefits. While we appreciate the need to better manage DER for the benefit of all consumers, we believe that control approaches to customer assets should only be applied in rare instances where services cannot be procured through a market framework. We would welcome further consideration of market-based approaches, including through the Distributed Energy Integration Program (DEIP) Market Development Working Group.

AGL supports the development of market-based solutions as the most efficient and effective way to allow customers to engage and share in DER value. We are actively engaged in a range of policy and regulatory reforms to enable DER integration. In our view, key enabling reforms include:

1. The development of a market-based framework for DER beyond AEMO's VPP Demonstrations. We believe that further work is required to test a market-based framework that:

- Enables DER to bid as scheduled resources for wholesale and ancillary services.
- Opens the network value pool to the competitive market through enhanced transparency and opportunities for non-network solutions; and

[11] For further information regarding AGL's ARENA SA VPP program, including the two milestone reports published to date, please refer to https://arena.gov.au/projects/agl-virtual-power-plant/.
[12] ESB cover note on UNSW voltage report: https://prodenergycouncil.energy.slicedtech.com.au/sites/prod.energycouncil/files/200502%20ESB%20cover%20note%20on%20UNSW%20Voltage%20Report.pdf

- Provides greater accountability for network constraints management.

2. Connection, access and pricing arrangements to better incentivise networks to support DER services and enable greater certainty for DER market participation.
3. The network expenditure assessment framework to ensure that networks effectively facilitate the interaction of DER with the broader energy market system.
4. Establishment of technical standards that promote safety but offer open access and interoperability.