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Ms Merryn York
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Via email: ssiag@aemo.com.au

Dear Merryn

SUBMISSION ON DRAFT SYSTEM STRENGTH IMPACT ASSESSMENT GUIDELINES

Powerlink Queensland (Powerlink) welcomes the opportunity to provide input on the Australian Energy Market Operator's (AEMO's) Draft System Strength Impact Assessment Guidelines (SSIAG).

We consider that the centralised planning of system strength by System Strength Service Providers (SSSP) will deliver cost effective and timely solutions for renewable generators and electricity loads that utilise Inverter Based Resources (IBR) and efficient investment in the power system for the benefit of electricity consumers.

Our submission to the Draft SSIAG reflects our commitment to continue to provide safe, secure, reliable and cost-effective transmission services to our five million Queensland customers.

In developing the final SSIAG, Powerlink considers AEMO should address the following points:

- System Strength Locational Factor (SSLF): Consistent with the intent of the recent system strength rule changes, an SSSP is required to use reasonable endeavours to plan, design, maintain and operate for the required level of system strength. We consider that it is not reasonable to plan for system strength for every potential future connection irrespective of its size and location in the network. We can envisage that there will be situations of new plant connecting to the remote part of the network (especially in the distribution network) where an SSSP cannot provide system strength services as part of their centralised planning and development. In these situations, an option should be made available to the SSSP to advise the new proponent that it is not practical to calculate the SSLF for the proposed location.
- In the absence of this provision, there will be unintended expectations on SSSPs to plan for providing the system strength even for small IBR/IBL connecting deep within distribution networks. Therefore, if AEMO maintains the SSLF methodology as set out in the draft SSIAG we suggest that a Network Service Provider (NSP) should consult with the relevant SSSP before providing a SSLF to the new connection and if an SSSP believes that the new connection cannot be supported from the centralised planned sources of the system strength, it is considered that a SSLF cannot be reasonably calculated.

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- If an SSSP considers that a SSLF cannot be reasonably calculated, we propose that the materiality threshold for a reduction in Available Fault Level (Δ AFL) due to a new connection should be based on there being an adverse system strength impact and the Δ AFL should only be calculated if a new IBR connection is shown to have an adverse system strength impact as per the criteria in the draft SSIAG
- Calculation of the Δ AFL in section 3.4.2 proposes to use a stability coefficient (α). As per the proposed calculation method, α can have a significant impact on Δ AFL, which then would directly affect the size of system strength remediation for those proponents who opt to not pay the prescribed system strength charges. The draft SSIAG also suggest that the value of α can be changed according to the power system conditions as per section 5.1.2 (f). It is not clear in the draft SSIAG how a thermal or stability limit could be used to estimate the value of α . A worked example of the calculation of α based on transient stability, voltage stability and thermal limits would be very helpful.
- Section 4.1.7 'Consultation with AEMO' requires a NSP to provide AEMO with the indicative System Strength Quantity (SSQ) and the SSLF for the connection point and the relevant System Strength Node (SSN). We note that the clause 5.3.4B(b) of the National Electricity Rules (NER) only requires an NSP to provide results of the preliminary assessment. We believe that SSQ, SSLF and the relevant SSN go beyond the preliminary assessment results that an NSP needs to provide to the connection applicant at the time of the connection enquiry. These are not the results of the preliminary assessment. Moreover, SSQ, SSLF and the relevant SSN are required for the system strength charging which is managed by the relevant SSSP, which is not necessarily the relevant NSP. Therefore, we suggest that section 4.1.7 limits the requirements to the result of the preliminary assessment only.
- For clarity, it is suggested the draft SSIAG describe situations where preliminary assessment could indicate that there will be no general system strength impact and therefore full system strength impact assessment is not required.
- Section 4.2.4 (c)(i) suggests that NSPs must include System Strength Services that would otherwise apply to the network under consideration. New connections that do not opt to pay the prescribed system strength charges, will be required to propose System Strength Remediation Scheme (SSRS). This SSRS should be capable of addressing adverse system strength impact, if there is any, and the Δ AFL. It is not guaranteed that an SSRS that addresses the Δ AFL, will always also address the adverse system strength impact. Powerlink suggests that this could unduly benefit the new connections that do not opt to pay the prescribed system strength charges and therefore full assessment should also include test cases without the System Strength Services that would otherwise apply to the network under consideration.
- As the responsibility to plan for system strength is on the SSSP, we suggest that under section 4.2.10 of the guidelines, an NSP that is not also the SSSP should consult with the relevant SSSP on the results of the Full Assessment. Similarly, an NSP should consult with the relevant SSSP on the results of stability assessment studies if a generator agrees to pay the prescribed system strength charges.
- Section 5.1.2 (a) of the draft guidelines suggests that generally, SSRSs must be implemented behind the connection point. There are existing examples in the NEM where the efficient SSRS is located remote from the connection point to mitigate any broader adverse system strength impact. Therefore, section 5.1.2 (a) could be misleading for the cases where SSRS is most efficiently located remote from the connection point.
- Section 5.1.2 (e) (ii) suggests that installation of a grid-forming technology could be used by an applicant to address the reduction in Available Fault Level. A working example of addressing Δ AFL with a grid-forming technology would be useful. Also, to recognise that a grid-forming plant doesn't rely on system strength support from the network, it would be beneficial to describe tests in appendix B that a grid-forming plant can conduct to prove the withstand Short Circuit Ratio (SCR) up to zero.

- In section 7.4.1 'SCR withstand assessment', it is not clear why the requirements of the actual system SCR conditions which may be an $SCR \leq 3.0$ need to be considered. We understand that it is in proponent's best interest to demonstrate SCR withstand with the lowest possible value in order to minimise their prescribed system strength charges. However, this should not be imposed by the NSP. Plant would meet the minimum access standard for NER S5.2.5.15 if SCR withstand is proven at $SCR = 3.0$.
- Section 7.4.3 requires test results using PSS/E and PSCAD models and benchmarking against each other for the purposes of demonstrating compliance with the proposed access standard for NER S5.2.5.15. To understand a plant's SCR withstand capabilities, especially at low SCR, we consider PSS/E results will add very little to no value. Therefore, to avoid unnecessary work for the new connections and NSPs for the purposes of withstand SCR and NER S5.2.5.15, requirements for the test results from PSS/E model and benchmarking against PSCAD results should be removed.
- It is important to acknowledge that the planned system strength solution by an SSSP may change as a result of the RIT-T process. Therefore, it could have some impact on the Generator Performance Standard (GPS) that was agreed for a plant that agreed to pay for the system strength charges and may require some changes. We believe that guidelines should emphasise that the relevant NSP and AEMO must accept the changes in the GPS that are due to the change in system strength solution planned by SSSP.

While not strictly part of the draft SSIAG we also wish to clarify our approach to determining the quantity of system strength provided by those system strength sources to be procured by Powerlink. The standard that an SSSP is required to meet for the hosting of IBR is to achieve stable voltage waveforms for the level and type of IBR projected by AEMO. This is a different standard that applies to a plant which elects to adopt its own SSRS. In those circumstances, the requirement of the SSRS is to remedy a general strength impact, which is a change in AFL at the connection point. For this reason we infer the level of system strength provided to be the rating of the capacity of the plant able to be hosted (in MVA) multiplied by the withstand SCR of that plant. This approach allows for a more efficient use of the available system strength planned by SSSP and we consider this to be aligned with the policy intent of the enhanced system strength framework.

Powerlink is willing to further discuss these matters with AEMO in one on one meetings. If you have any questions in relation to this submission or require further clarification, please contact Sachin Goyal.

Yours sincerely,



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