

10 February 2023

Australian Energy Market Operator (AEMO)

Lodge via email to: ssiag@aemo.com.au

Subject: Amendments to the System Strength Impact Assessment Guidelines

Amp Power Australia (Amp) welcomes the opportunity to make this submission to the AEMO's Second Stage Consultation – Amendments to the System Strength Impact Assessment Guidelines. The System Strength Impact Assessment Guidelines (SSIAG) is critical to the implementation of the new System Strength Framework (SSF) which will have a significant impact on the development of new generation and large inverter-based load projects in the National Electricity Market (NEM) in the coming years.

Amp is global developer of flexible clean energy infrastructure. Headquarters in Canada, with operations across North America, Japan, India and Australia, our international team brings deep expertise and thought leadership to every aspect of the energy industry.

We build, own and operate clean energy assets both behind and in-front of the meter. Our strategy allow us to provide dispatchable, affordable and resilient clean power to enhance system reliability and security for our customers and the grid, including in Australia's National Electricity Market (NEM): Hillston Solar Farm (85MW) and Molong Solar Farm (30MW) in New South Wales. We have a rapidly growing pipeline of new generation projects (solar, wind, BESS, hybrid) as well as green hydrogen projects under development across the NEM. As a result,

AEMO's draft SSIAG and Amp's feedback

Amp acknowledges that the draft SSIAG has to cover a wide range of matters related to the new SSF with significant complexity. Amp also agrees with AEMO that there are several matters prescribed by the new SSF (referred to as Amending Rule in the draft SSIAG) that are likely to prove impracticable or deliver outcomes that were not envisaged by the AEMC when it made the Amending Rule. Below are Amp's feedback on some of the key aspects of the draft SSIAG and the new SSF:

1. The **Available Fault Level (AFL)** calculation is used in the current SSIAG (2018) as a proxy to assess the risk of new connection causing adverse system strength impact in the Preliminary Impact Assessment (PIA) stage. This is an appropriate approach since the AFL is a concept to approximate the impact of asynchronous generators on system strength and then a Full Impact Assessment (FIA) will be conducted to appropriately evaluate the actual adverse impact (if any). In the new SSF and the draft SSIAG, the reduction of AFL at the connection point of a 4.6.6 Connection as a measure of general system strength impact is used. This means this approximate concept will be used to determine the general system strength impact and the system strength quantity (SSQ) of a new connection. Both of them will have a significant impact on a project's CAPEX and/or OPEX. We strongly believe that a more technically solid and practical definition/concept should be developed for the general system strength impact.
2. The **SSQ** is calculated as the multiplier of the Withstand SCR (WSCR) and rated active power. WSCR is heavily reliant on inverter control tuning. Therefore, there are potential scenarios in which a new inverter-based generation connection will try to tune their control system so that their WSCR is as low as possible to reduce the SSQ (and project cost) which means they may not deliver the best performance they are capable of at the connection point or vice versa.

3. The recommendation to use **Withstand SCR** in the SSQ calculation is appropriate. However, it is unclear why the Withstand SCR can not be zero (as noted in Section 3.4.2). For example, if a grid forming BESS system can operate in a network without any synchronous machines in service, its Withstand SCR should be considered zero in our opinion.
4. The draft SSIAG does not provide sufficient details to explain why the minimum value of **the stability coefficient** in the calculation of AFL reduction is 1.2 (Section 3.4.2).
5. It is unclear if an existing plant wants to expand its generating system, how will its general system strength impact and SSQ be calculated (i.e., only the additional generating units vs the total site after expansion).
6. It is unclear in the draft SSIAG how the general system strength impact can be assessed using more detailed modelling (Section 4.2.2). The current FIA process is to address adverse system strength impact.
7. For clause 6.4 (iv) of the draft SSIAG, what if a new connection's location is near the border of two TNSPs and it is electrically closer to the SSN in the other TNSP than the nearest SSN in the Connecting TNSP.
8. It is widely accepted that PSS/E may not be the right simulation platform to simulate weak grid conditions (e.g., generally with an $SCR < 3$). Is it appropriate to require PSS/E tests for the assessment of Withstand SCR if it is less than 3 (or even 2)? (Section 7.4.3)

Conclusion

Amp would like to thank AEMO for your great work in developing the draft SSIAG and the recognition that there are still a number of complex issues which need to be resolved to deliver the outcomes that the AEMC envisaged when it made the Amending Rule regarding the new System Strength Framework.

The consultation is a great chance for the Industry to provide feedback to this important SSIAG and Amp is very keen to contribute to this process. We look forward to engaging further with AEMO at your convenience.

Should you have any questions or seek to follow up this submission at any time, please feel free to contact me at hnguyen@amp.energy.

Kind Regards,



Hieu Nguyen

Head of Grid

M +614 99 083 052

hnguyen@amp.energy

Amp Power Australia