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BayWa r.e. Projects Australia Pty Ltd

Australian Energy Market Operator
530 Collins St, Melbourne
Victoria 3000

24 August 2022

Subject: NER S5.2.5.10 Guideline Consultation

To whom it may concern,
BayWa r.e. Projects Australia (BayWa r.e.) welcomes the opportunity to provide commentary on the AEMO initiated NER S5.2.5.10 Consultation.

BayWa r.e. is a leading global renewable energy developer, service provider, equipment distributor and energy solutions provider, with offices in more than thirty (30) countries. Its Australian subsidiaries have both developed and/or operate renewable projects in Victoria, New South Wales, and Queensland. We are determined to support market and technical reforms in support of Australia's transition towards a cleaner energy future.

BayWa r.e. support this consultation to set out a practical approach and refine the technical requirements of what is required to meet NER clause S5.2.5.10.

Opportunities and challenges of meeting S5.2.5.10.

- *Should S5.2.5.10 be a protection system or monitoring system?*

Caution should be applied to having the S5.2.5.10 protection system automatically disconnect the generator for detection of unstable operation. Oscillations within the power system voltage have and will continue to be detected, the oscillations detected at Red Cliffs Terminal Station are one such example. These events may become more prevalent as large synchronous generators exit the system or as asynchronous generation start to dominate the mix of generation. These oscillations may travel through a large geographic region and may be picked up by many future generators, if automatic access requirements of S5.2.5.10 are adopted as the norm. If settings are not robust or not carefully 'tuned' for the prospective magnitude and V/Q phase angle, then it is conceivable a large number of generators may disconnect from the power system. If this amount of lost generation exceeded the amount of spinning reserve in the network, then a significant power system event may occur which is the counter to what this clause is seeking to achieve.

A better approach may be to have a S5.2.5.10 system that monitors and identifies an oscillation in terms of its magnitude, frequency and V/Q phase angle at the generator connection point. This information could be sent to relevant NSP and AEMO control rooms. In addition to this a remedial

action could be agreed between the parties based on pre-defined thresholds of key stability variables.

- *Challenges of a S5.2.5.10 stability protection / monitoring system.*

Quite clearly oscillations within the power system are a key area of concern and have traditionally been remedied by re-tuning inverter parameters, development of novel inverter control systems or by installing additional equipment. Identifying and responding to an instability in real-time may be a more robust way of understanding and combatting these oscillations. Having said that the technical complexity and cost burden of implementing, maintaining and reporting for the S5.2.5.10 system needs to be considered given there are limited 'off the shelf' solutions. The lack of a proven and robust products is a key challenge to meeting the S5.2.5.10 automatic access standard.

The AEMO technical note on the principles of S5.2.5.10 raise other key questions – what are the thresholds for oscillation detection? What phase angle between reactive power and voltage defines who is behaving in a positive or adverse way? If the oscillation in voltage is small in magnitude, is it of concern? Establishing the acceptable metrics on these key questions will be important in creating greater clarity for project proponents, system integrators / product suppliers and will create greater certainty around this access standard.

Clarity of S5.2.5.10 requirements.

The automatic access standard for S5.2.5.10 directly references the Power System Stability Guidelines as an assessment methodology for instability in voltage, reactive power or active power. The Power System Stability Guidelines may not be prescriptive enough to enable vendors to develop instability algorithms. One remedy to this situation could be to update these guidelines to provide more practical applications of the principles mentioned within. Alternatively worked examples may be provided as an appendix to the guidelines to provide greater clarity on oscillation detection algorithms and thresholds of concern.

S5.2.5.10 access standard development, implementation and commissioning issues.

The development of a project specific S5.2.5.10 access standard may be established in a comparable manner to the way in which S5.2.5.3 or S5.2.5.4 are defined for normal frequency and voltage operating windows respectively. The S5.2.5.10 or updated Power System Stability Guideline could establish an acceptable 'operating window' of stability. Outside of the normal stability operating window is when some form of remedial action is required. BayWa r.e. are cautious around having automatic disconnection of generators for the reasons mentioned above but detection and reporting would seem like a logical first step.

Commissioning of the monitoring system may be achieved through secondary injection of an oscillatory disturbance into the controller summing junction. Testing could include typical pick-up and detection time thresholds to define pass or fail criteria. Any commissioning requirement needs to be clearly stated and defined to ensure project proponents, product suppliers and testing engineers understand AEMO's testing and commissioning expectations of this S5.2.5.10 system.

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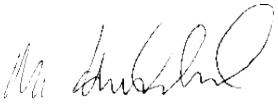
In all aspects of access standard development, implementation and commissioning the S5.2.5.10 system should aim for as low complexity as possible to robustly assess a generators contribution to system stability.

Thank you for the opportunity to comment on this consultation. If you would like to discuss any of the issues raised in this submission, please contact Matt Haddad on 03 9429 5629 or matt.hadad@baywa-re.com.

Yours sincerely,



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