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Energy Markets, Energy Policy WA

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RE: Power System Security and Reliability (PSSR) Standards Review

Neoen welcomes the opportunity to provide a submission in response to Energy Policy WA's proposed changes to the Electricity System and Market (ESM) Rules (formerly the Wholesale Electricity Market (WEM) Rules). This submission provides our views on the proposed amendments to the PSSR standards framework, with a focus on the amendments to the ESM Rules that govern the connection process.

Neoen is an independent power producer with a long-term vision to produce renewable, competitively priced energy on a large scale. With 8 GW in operation or under construction globally, we are aiming for more than 10 GW by end of 2025. Neoen also has a significant pipeline of renewable generation and storage projects under development in the South West Interconnected System (SWIS), building on the success of our flagship asset in Western Australia, the Collie Battery Energy Storage System (BESS). Located approximately 13 km north-east of the town of Collie, the project's second stage was recently commissioned—taking the total installed capacity to 560 MW / 2240 MWh. Neoen therefore has a strong interest in maintaining an effective and efficient local connections process, and consider we have considerable experience to share in this regard.

As demand grows and we move towards more renewable and inherently intermittent sources of energy, there is a growing need for investment in a range of electricity capacity resources in the SWIS. This includes energy storage, which can provide firming and flexibility services in conjunction with intermittent renewable energy. As such, the efficient and timely connection of large-scale generation and BESS projects will be essential to meet the needs of energy consumers in the SWIS. This can only happen, however, if the ESM Rules that govern connection process for these new assets are technology agnostic, reasonable, unambiguous and fit for purpose. Setting requirements that cannot be met by the capabilities of existing technologies, and the lack of clarity in relation to technical standards, only serves to impede the connection process and undermines timely network development.

Feedback on the proposed amendments

Based on our extensive experience connecting plant to both the SWIS and the National Electricity Market (NEM), developing a robust set of market rules requires comprehensive and earnest consultation with industry stakeholders, including developers and Original Equipment Manufacturers (OEMs) of inverters and controllers.

Neoen appreciates the need to review the PSSR Standards and considers many of the changes proposed to be beneficial supporting the efficient connection of new capacity while maintaining power system security and reliability. However, we urge Energy Policy WA to consider the following proposed changes in more detail in consultation with industry.

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Creating separate requirements for grid forming inverters and misuse of Minimum Standards

Grid forming technology has been proven to provide benefits above the grid following control systems especially to networks with reduced or reducing system strength. Grid Forming technology also offers the most efficient pathway to operating the SWIS with zero carbon emissions. Any investment in system stability should be technology agnostic. However, we have noted the proposal to introduce separate, often more onerous requirements in the ESM Rules for grid forming inverters and new highly specific minimum requirements (such as new minimum requirement Clause A12.4.3.8 under Proposal 10 and minimum withstand short circuit ratio requirements under Proposal 6).

With no specific incentives in the WEM to install or transition existing systems to grid forming technology, such as an inertia or grid forming capability market, the introduction of more stringent requirements has the potential to deter proponents from making additional investment and adopting the grid forming logic. This will only be detrimental to the power system itself.

The OEMs of inverters and controllers are focussed on developing firmware and hardware solutions for grid forming technology compliant with Australian requirements. As it currently stands, the proposal will disincentivise owners of grid following inverter based resources (IBRs) from upgrading firmware and accessing the latest technological advancements. Instead, the Rules should require IBRs to provide services and perform in a way that is beneficial to the power system and require operation consistent with the specific needs at their connection point. Grid forming IBRs should not be required to operate differently simply because they can.

Concerningly, we noted a high number of new minimum standards with highly specific requirements based on what we assume to be the experience of reviewers rather than scientific research, studies or consultation with the industry. Setting specific minimum standards at high performance levels based on narrow past experience alone prevents the negotiation of standards suitable for the location and purpose of a facility. Minimum standards must be defined in a way that allows negotiation with the network owner and system operator while maintaining the security and reliability of the grid. Highly specific requirements should be reserved for Ideal or Automatic levels only.

Further, we could not locate a recommendation to introduce a definition of grid forming or grid following inverters. With most inverters operating with both modes in parallel to some extent, a definition must be provided should separate standards be introduced for different control logics.

Withstand Short Circuit Ratio (SCR) in Proposal 6

As the strength of the network reduces with retirement of conventional generation, we understand the need to introduce requirements for IBRs to withstand certain network conditions. These standards should reflect the needs of the network and abilities of current technologies. Establishing a very low SCR in an automatic or minimum standard for any technology will most likely prevent generating systems, that could otherwise function in a specific network location without issues, from connecting to the network. It has been shown to be possible for IBRs to withstand SCRs of 2 or 3 at the point of connection, however, we do not believe that any current technology (grid forming or following) can stably export or import energy at an SCR of 1.2 without significant effort and investment.

In addition, a requirement to establish and implement one set of settings, that allows inverter operation and compliance with performance standards at site SCR and SCR of 1.2, is highly unrealistic, impractical and detrimental to the operation of the power system. All proponents must have the option to establish a separate set of settings for operation at low SCR without reliance on a special agreement with the network operator. The ability to adjust settings throughout a project's lifetime ensures that optimal performance outcomes are delivered for the current practical application. An alternative that allows for

a future, extreme scenarios will not deliver the most efficient outcome. All systems must be set to provide optimal performance for the grid conditions present at the time of connection and foreseen in the near future. We encourage that the WEM authorities and participants foster an environment that includes regular review and co-operative tuning of facilities to deliver the best outcomes at the time.

Voltage phase angle "jump" in Proposal 7

A requirement for grid forming IBRs to withstand a 60-degree phase angle shift is impractical and overly onerous. Establishing a requirement to withstand a specific phase angle shift fails to add value and adds unnecessary burden in engineering and assessment, without recognising the conditions that might drive such "jumps". A phase angle jump of this magnitude would generally be driven by a particular kind of fault, which is already covered in assessments under multiple disturbance ride-through conditions.

The recent review of Schedule 5.2 of the National Electricity Rules (NER) established a requirement for vector shift protection not operating for an angle shift less than 20 degrees (S5.2.5.8 (b6), NER version 227 commencing 21st August 2025). This is a much more practical than requesting a specific withstand capability.

We also noted that the review quoted 60-degree withstand capability for grid forming technology required by the National Grid ESO Grid Code. This requirement is specifically set for the facilities to participate in a Grid Forming Capability market, the likes of which does not exist in Australia, and it is not a standard requirement for connection to the network.

Additionally, inverter OEMs should be extensively consulted on the proposal to require grid forming inverters to suppress angle changes and a definition of what such "suppression" means should be provided. This proposal is again introducing additional engineering effort (e.g. to prove compliance) and introducing ambiguity only because of potential increased capability of grid forming inverters.

Current response during and after contingencies in Proposal 8

In general the changes proposed are consistent with what is needed to accommodate grid forming technology, which is a move in the right direction. However, we encourage the review panel not to introduce the requirements for specific rise time and commencement time as a minimum standard. As proposed rise time and commencement time of 80 and 40ms respectively should be achievable for IBRs, the specific timeframes may vary and require adjustment according to the connection point and use-case. Introducing such specific requirements in a minimum standard prevents negotiation and undermines the concept of a minimum standard. We noted the review was unable to establish a suitable Rise Time for a minimum requirement for grid forming inverters (providing 'X' as the value) proving that specific numbers are difficult to establish across multiple technologies and network locations and should be reserved for Automatic or Ideal standards.

Maintaining minimum fault levels required for network protection in Proposal 14

We encourage the review panel to consider separating the requirements for System Strength and minimum Fault Level required for network protection. While fault level has historically been used as a measure of system strength it should not be confused as a reliable measure of system stability and the ability of a system to recover from sudden change. Power systems with low fault levels can still operate in a stable manner and therefore high fault current should not be used as the only indication of system health.

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Should you need further information or clarification on any aspect of our submission, please do not hesitate to contact us.

Regards,

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