

Sungrow Australia Consultation Submission

Response to Department of Energy and Economic Diversification (DEED)'s Power System Security and Reliability Standards Review (Aug 2026)

Submission Letter

To

Department of Energy and Economic Diversification (DEED)
[energymarkets@deed.wa.gov.au]

Re: Sungrow Submission on DEED's Power System Security and Reliability Standards Review (Aug 2026)

Dear DEED Consultation Team,

Sungrow Australia welcomes the opportunity to provide feedback on the Power System Security and Reliability Standards Review.

Sungrow is a global provider of advanced power conversion technologies, including grid-forming battery energy storage systems (BESS) and inverter-based resources (IBR), with experience supporting renewable integration and grid stability across multiple markets. In the Wholesale Electricity Market (WEM) and National Electricity Market (NEM), Sungrow participates as an original equipment manufacturer (OEM) and technology provider and recognizes the growing capability of inverter-based technologies to support future power system security.

The following feedback is provided by Sungrow Australia, considering our role as an OEM and potential future provider of grid-forming technologies:

Section 2 – System strength incentives framework

Question 1(a) – inverter technical standards.

Sungrow supports for the deployment of GFM capability in areas with demonstrated or forecast system-strength limitations is a technically appropriate approach and recognises the system-support capability of advanced inverter-based resources. However, Sungrow recommends that the identification of “low system strength” areas be based on transparent, quantitative and reproducible criteria, rather than a single static SCR threshold. SCR alone may not adequately represent the stability conditions experienced by an inverter-based resource. The assessment should consider, where relevant, equivalent/effective SCR, network impedance magnitude and

angle (X/R), frequency-dependent impedance, nearby IBR interactions, synchronous-machine commitment and credible network contingencies.

This approach is consistent with the broader system-strength assessment philosophy used internationally, including NERC approaches that consider equivalent short-circuit ratio (ESCR) and weighted short-circuit ratio (WSCR) for areas containing multiple inverter-based resources, rather than relying only on the conventional SCR of an individual plant. Such approaches better represent the aggregate interaction between electrically coupled IBRs and the surrounding network. Sungrow therefore recommends that the System Strength Report clearly publish the metric, network assumptions, operating conditions, contingency assumptions and assessment horizon used to classify an area as requiring GFM capability. Where SCR/ESCR-type screening indicates potentially weak-grid conditions, this should be supplemented by appropriate dynamic EMT assessment to confirm the actual control-stability risk.

In addition, the GFM requirement should remain technology- and control-architecture neutral. Compliance should be demonstrated through measurable external performance—such as voltage-source behaviour, weak-grid stability, disturbance response, current-limiting performance and post-disturbance recovery—rather than prescribing a particular OEM control implementation.

Question 1(b) – prioritisation framework.

Sungrow supports, in principle, the proposal to provide more favourable curtailment treatment to Energy Storage Resources (ESRs) that contribute positively to system security through Grid-Forming (GFM) capability or other demonstrated mitigation measures.

This approach can provide an appropriate commercial incentive for investment in advanced inverter functionality and recognise the additional system-support capability provided by appropriately designed and tuned GFM-enabled BESS. However, Sungrow recommends that curtailment treatment should be technology-neutral and based on demonstrated system performance, rather than solely on whether an ESR is formally classified as GFM or non-GFM. GFM capability itself should not automatically be assumed to eliminate adverse system impacts. A poorly designed, coordinated or tuned GFM control may introduce or exacerbate dynamic stability issues, including poorly damped control modes, transient angle or power oscillations following severe disturbances, voltage or frequency control interactions, and adverse interactions with other GFM, GFL or synchronous resources. These risks can become particularly important in weak-grid conditions and in areas with a high concentration of inverter-based resources, where multiple GFM plants may interact through the network.

The actual contribution of an ESR to system security therefore depends on its demonstrated dynamic performance under the relevant network conditions, including network strength and impedance characteristics, operating point, credible contingencies, control tuning, current-limiting behaviour and interaction with neighbouring resources. Accordingly, Sungrow recommends establishing transparent, technology-neutral and performance-based criteria for determining curtailment priority. Verified GFM capability should be recognised where it demonstrably improves system security, while technically equivalent mitigation measures should also be eligible.

Conversely, GFM designation alone should not automatically provide preferential curtailment treatment where the required stability and interaction performance has not been demonstrated.

This approach would incentivise effective GFM deployment while ensuring that curtailment arrangements reward the actual system-security contribution of an ESR rather than a particular technology label or control architecture.

Section 3 – Hybrid systems framework

Sungrow supports the development of a clear and consistent assessment framework for hybrid facilities comprising both GFM and GFL technologies. The framework should clearly define how GFM classification, Technical Requirements, GPS assessment and the point of compliance apply where only part of a User Facility provides GFM functionality.

For a hybrid facility, the GFM classification criteria should be applied specifically to the equipment nominated to provide GFM functionality, rather than automatically classifying the entire User Facility as GFM. For example, where a facility comprises GFL PV together with a GFM BESS, the BESS should demonstrate the applicable GFM-specific characteristics, while the PV should remain subject to the relevant GFL requirements. Requirements relating to the overall behaviour of the facility should then be assessed based on the combined response of the GFM, GFL, PPC and plant network at the Connection Point.

Accordingly, the framework should provide clear guidance on which Technical Requirements are assessed at component level and which are assessed at the Connection Point. Technology-specific characteristics, such as demonstration of GFM behaviour, may appropriately be assessed at the relevant GFM component, whereas plant-level requirements such as overall voltage and reactive power control, PPC coordination, fault ride-through and overall stability should be assessed at the facility level where appropriate. The same Technical Requirement should not be required to be demonstrated at both component and Connection Point levels unless there is a separate and clearly justified system-level performance requirement.

Sungrow also recommends that the required GFM contribution of a hybrid facility should be determined primarily from demonstrated performance rather than solely from a prescribed percentage of installed GFM capacity. The assessment should recognise that the effective contribution of GFM depends on converter capability, available current/headroom, control characteristics, coordination with the GFL portion and network conditions. For BESS, GFM capability may also remain available during charging, discharging and zero-active-power operation, subject to the technical capability of the equipment. Therefore, instantaneous active-power output or a simple GFM-to-GFL MW ratio should not be used as the sole measure of GFM capability.

Importantly, the framework should also facilitate the retrofit of existing GFL facilities to introduce GFM capability. Where an existing BESS or hybrid facility is converted from GFL to GFM through a firmware, controller or other technically validated upgrade, this should not automatically trigger complete GPS re-registration or reassessment of the entire existing facility. A streamlined GPS modification process should instead identify the Technical Requirements materially affected by the GFM retrofit, assess the new GFM functionality and any consequential impact on overall plant

performance, and retain previously accepted GPS requirements where they remain unaffected. This would reduce unnecessary connection and regulatory barriers while encouraging existing facilities to adopt GFM capability that can provide additional system-strength and security benefits.

Section 4 – Submission of EMT models by existing facilities

Sungrow supports, in principle, improved availability of EMT models to enable Western Power and AEMO to assess system-level behaviour as the penetration of inverter-based resources in the SWIS increases. EMT analysis is particularly valuable for assessing weak-grid operation, interactions between multiple IBRs, GFM/GFL interactions, fault ride-through and fast converter-control phenomena that may not be adequately represented in RMS studies.

However, Sungrow recommends that the EMT model framework be risk-based and fit-for-purpose. The level of model detail required for project-specific connection studies may not be necessary or computationally appropriate for whole-of-system EMT studies. The framework should therefore permit validated aggregated or reduced-order EMT representations where these adequately reproduce the relevant external dynamic behaviour.

The framework should also establish clear provisions for OEM intellectual-property protection, including acceptance of encrypted/compiled black-box models without requiring disclosure of proprietary controller source code, together with appropriate restrictions on model access, distribution and permitted use.

Sungrow further recommends clearly defined model validation requirements, version-control arrangements and criteria for determining when firmware or control-setting changes constitute a material change requiring model updates.

For existing facilities, transitional and alternative compliance arrangements should be provided where detailed EMT models were not required at the time of connection, are no longer available from the original OEM, or cannot reasonably be recreated. The allocation of costs associated with retrospective model development, validation and ongoing maintenance should also be clarified.

Overall, Sungrow supports strengthening SWIS EMT modelling capability, provided that the requirements are technically justified, proportionate to the intended study application and recognise the practical, computational and intellectual-property considerations associated with OEM EMT models.

Section 5 – Framework for control settings changes

Sungrow recognises that changing system conditions and increasing IBR penetration may result in control interactions or system-security issues that were not present when an existing facility was originally connected. Sungrow therefore supports, in principle, an appropriate mechanism for addressing such issues where technically justified.

However, Sungrow recommends that any power to require control-setting changes be performance-based rather than prescriptive. Western Power should identify the relevant system-security issue, applicable network conditions and required performance outcome, while the facility

owner and OEM should retain responsibility for determining the technically appropriate controller modification. Direct prescription of internal OEM controller parameters may create unintended interactions with other control functions and could adversely affect previously validated performance.

Any material setting change should therefore be supported by appropriate root-cause analysis and proportionate technical assessment demonstrating both the facility's contribution to the identified issue and the impact of the proposed modification on its overall performance. Changes to OEM-controlled parameters should require OEM technical involvement and should not compromise equipment protection, capability, certification or warranty requirements.

The framework should also clearly define the scope of settings that may be subject to such directions, the materiality threshold for reassessment, model and GPS update requirements, implementation and verification processes, and responsibility for costs where changes are required primarily because of subsequent changes in network conditions.

Sungrow further recommends that inverter retuning should not be considered an unlimited substitute for adequate system strength or other network-level remediation. Where an identified issue results from interactions among multiple IBRs or material changes in the network, the appropriate remediation should be determined from system-level technical assessment rather than automatically requiring one existing facility to modify its controls.

Conclusion

Sungrow supports the overall direction of the proposed reforms and the recognition of GFM capability as an important contributor to future system strength and security.

To ensure effective implementation, Sungrow recommends that the framework remain technology-neutral, performance-based and focused on demonstrated system outcomes. Requirements and incentives should be supported by transparent technical assessment and provide sufficient flexibility to accommodate different technologies, control architectures and future innovations, while continuing to promote investment certainty and power system security across the SWIS.

Yours sincerely,

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