Sungrow Australia Consultation Submission

Response to AEMC's Compliance Template Review 2026 (11 December 2025)

Submission Letter

To
Australian Energy Market Commission (AEMC)
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Re: Sungrow Submission on AEMC Compliance Template Review 2026 (11 December 2025)

Dear AEMC Consultation Team,

Sungrow Australia thanks AEMC for the opportunity to provide feedback on the Reliability Panel's Issues Paper for the 2026 Review of the Template for Compliance Programs.

As one of the world's leading suppliers of inverter-based renewable energy and storage technologies, Sungrow recognize the critical role of the Template in ensuring power system security and providing a clear regulatory framework for Registered Participants.

Question 1: Effectiveness of the Template in providing guidance for compliance programs

The current Template for Compliance Programs provides useful high-level guidance for establishing compliance programs and monitoring frameworks under the NER. It has generally been effective in supporting plant-level compliance programs, particularly for synchronous generation, while allowing participants flexibility to tailor monitoring and testing approaches to their specific plant configuration and operational constraints. However, several areas could benefit from clearer guidance to better reflect the evolving generation fleet and modern compliance practices.

From Sungrow's perspective, the template would benefit from greater emphasis on continuous monitoring and event-based assessment rather than routine periodic testing, particularly for inverter-based technologies where control settings are stable and plant performance can be effectively assessed through high-resolution operational data. Continuous monitoring provides a more representative view of plant behaviour under real network conditions and reduces the need for disruptive or resource-intensive routine testing that may not add additional value once plant capability has been demonstrated.

In addition, clearer guidance would be helpful for clause S5.2.5.13, which currently appears more aligned with synchronous generator behaviour and does not clearly translate to inverter-based technologies. Providing clearer expectations on appropriate verification approaches for inverter-based resources would improve the usability of the template. Further clarification would also be beneficial for clause S5.2.5.5, particularly regarding model validation methodologies and how disturbance recordings, operational data, or event playback can be used to validate plant models in practice. Similarly, recently introduced requirements such as clause S5.2.5.15 may require additional guidance on suitable compliance demonstration approaches given the limited industry experience with these provisions.

For clause S5.2.5.2, demonstrating a generator's harmonic contribution and differentiating it from background network harmonics remains challenging in practice. Clearer guidance on measurement or analytical approaches that can separate plant contribution from background harmonic levels would assist participants in establishing more robust compliance assessments.

Finally, the reporting and compliance documentation aspects of the template would benefit from further clarification, particularly regarding expectations around the form, scope, and frequency of reporting. Clearer guidance on how often compliance reviews should be performed, how monitoring results should be documented, and what level of reporting is expected following events or periodic assessments would improve consistency across participants and reduce ambiguity in compliance program implementation.

Overall, while the template remains a useful framework, clearer guidance on continuous monitoring approaches, inverter-based technologies, model validation methods, harmonic contribution assessment, and reporting expectations would improve its effectiveness and practicality for modern generation technologies.

Question 2: Proposed assessment principles and rationale

The proposed high-level assessment criteria—namely safety, security and reliability; innovation and flexibility; and principles of good regulatory practice—are broadly appropriate and align well with the objectives of the compliance framework. In particular, ensuring that compliance programs support power system security while remaining practical for participants to implement is essential. The criterion relating to innovation and flexibility is also important given the rapid evolution of generation technologies in the NEM, particularly the increasing penetration of inverter-based resources.

However, based on a review of the issues paper, the current template, and practical experience implementing compliance programs, several aspects could be more explicitly reflected in the assessment framework. First, the criteria could place greater emphasis on practicality and proportionality of compliance approaches. Compliance programs should ensure ongoing verification of plant performance while avoiding unnecessary operational

burden or testing requirements that do not materially improve system security. In this context, continuous monitoring and event-based assessment should be recognised as an effective and often preferable approach compared with routine periodic testing, particularly for inverter-based technologies where plant control settings remain stable once commissioning is complete. Continuous monitoring also provides a more representative view of plant behaviour under real network conditions.

Second, the assessment framework could more clearly recognise the growing role of data-driven compliance monitoring. Modern generating systems increasingly rely on high-resolution operational data, disturbance recordings, and automated monitoring platforms to assess compliance. Recognising these approaches within the assessment criteria would support more efficient compliance programs while maintaining robust system security outcomes.

Third, it would be beneficial for the framework to emphasise the importance of clarity and consistency in compliance expectations, particularly for newer or evolving performance standards. As technologies evolve, clearer guidance on monitoring approaches, model validation methodologies, and interpretation of certain access standard requirements would assist participants in developing consistent and effective compliance programs.

In addition, as compliance programs increasingly rely on continuous monitoring, remote data acquisition, and digital control systems, consideration could also be given to the cybersecurity aspects associated with compliance monitoring infrastructure. Ensuring the integrity, availability, and authenticity of operational data used for compliance assessment is important, particularly where monitoring systems, data loggers, SCADA platforms, or plant controllers provide evidence of compliance. While detailed cybersecurity requirements may fall outside the scope of the template itself, acknowledging the importance of secure data handling and protection of monitoring systems would support confidence in compliance evidence and align with the increasing digitalisation of modern generating systems.

Finally, it may also be useful for the assessment framework to recognise the importance of cost and operational practicality when designing compliance methodologies. Compliance approaches should achieve their intended system security outcomes while remaining efficient and proportionate for participants to implement.

Overall, the proposed criteria provide a suitable foundation for the review. Strengthening the emphasis on practicality, proportionality, modern monitoring approaches, and secure data management would help ensure the updated template remains effective for a generation fleet that is increasingly dominated by inverter-based technologies and digital monitoring systems.

Question 3: Proposed revised compliance principles

The revised compliance principles generally provide a reasonable framework for developing compliance programs and better reflect modern compliance practices. In particular, the increased emphasis on materiality, efficiency, and continuous monitoring is appropriate given the growing penetration of inverter-based technologies and the availability of high-resolution operational data. From Sungrow's perspective, these principles support the development of practical and proportionate compliance programs that rely on operational evidence rather than excessive routine testing. However, some principles—particularly the reference to "good electricity industry practice"—could benefit from clearer interpretation or examples to ensure consistent implementation across participants. Providing additional guidance on how continuous monitoring and event-based assessment align with these principles would further improve clarity for participants developing compliance programs.

Question 4: Structure and form of the Template

From Sungrow's perspective, the proposed approach to structure the Template by plant category (e.g. Schedule 5.2, 5.3 and 5.3a plant) is reasonable and broadly supported, as it aligns the guidance with how compliance programs are typically implemented at the registered participant or plant level. This approach can improve clarity and reduce the need for participants to interpret requirements that may not apply to their plant type. At the same time, given the significant differences between technologies within Schedule 5.2—particularly between synchronous generation and inverter-based resources (IBRs)—it may also be beneficial for the template to provide clearer differentiation or guidance within these categories. This would help ensure that compliance approaches and monitoring methodologies remain relevant to the underlying technology while maintaining the overall structure of the template. Additionally, maintaining flexibility in the structure will be important so that the template can accommodate emerging technologies such as hybrid plant configurations without requiring significant structural changes in future reviews.

Question 5: Testing and monitoring regimes for schedule 5.3 plant and schedule 5.3a plant

From Sungrow's perspective, the testing and monitoring regimes for Schedule 5.3 and 5.3a plant are likely to differ from those traditionally applied to generating systems, and the template should recognise these differences rather than directly extending methodologies developed for Schedule 5.2 plant. While some existing approaches may still be applicable, the template should maintain sufficient flexibility to reflect the operational characteristics and compliance requirements of different technologies. Providing clearer guidance on suitable testing and monitoring methodologies for these plant types would assist participants in developing practical and consistent compliance programs.

Question 6: Appropriateness of existing testing and monitoring regimes

From Sungrow's perspective, many of the existing testing and monitoring regimes in the current template remain broadly applicable and can continue to support compliance demonstration for several Schedule 5.2 performance standards. In particular, tests associated with generator capability, dynamic response and disturbance performance are still relevant and should largely be retained. However, some of the suggested testing approaches and frequencies may benefit from further clarification to ensure they remain practical and proportionate as technologies evolve. In some cases, the testing requirements may require plant outages, specialised OEM support, or significant operational coordination, which may not always provide additional value once plant capability has been demonstrated.

It would therefore be beneficial for the template to provide clearer guidance on how compliance may be demonstrated through a combination of commissioning tests, operational evidence, and targeted assessments where appropriate. From Sungrow's perspective, additional clarity on the intent and applicability of certain testing methodologies would also help ensure consistent interpretation across participants, particularly where the same approach may not translate directly across different technologies. Improving flexibility while maintaining the overall testing framework would help ensure the template remains practical and effective for both existing and emerging plant technologies.

Question 7: Suggestions for new testing or monitoring regimes

From Sungrow's perspective, the template could benefit from recognising a broader set of modern compliance verification methods, particularly for inverter-based plant and recently introduced access standards. In addition to conventional commissioning and in-service testing approaches, it would be useful to recognise methods such as automated event-triggered compliance assessment with defined thresholds, validation of alternative dispatch or communication pathways, and testing of stability detection or protection-related control functions where these are relevant to the applicable performance standard. Some of these capabilities are increasingly implemented in modern plant control and monitoring systems but are not clearly reflected in the current template.

Sungrow also acknowledges that hardware-in-the-loop (HIL) testing can be a useful supplementary validation tool. Sungrow currently utilises control-HIL platforms within its R&D environment as part of controller development and pre-commissioning validation to assess control behaviour under simulated grid conditions. These platforms can provide additional confidence in controller performance prior to plant energisation. However, there are limitations in relying on HIL as a primary method for compliance monitoring, as the test environment depends on the accuracy of the plant and network models and may not fully capture site-specific balance-of-plant behaviour or real network interactions. For this

reason, HIL is better suited as a supporting or complementary validation tool, rather than a standalone method for ongoing compliance demonstration.

This is particularly relevant for newer requirements such as clause S5.2.5.15, where practical field-testing options may be limited and staged testing may not always be feasible. In such cases, HIL or other structured validation approaches could potentially form part of the compliance evidence; however, this would require further industry consideration and clearer guidance on acceptable methodologies.

Similarly, for clause S5.2.5.10, which relates to instability detection capabilities, there is currently limited industry experience and understanding of how ongoing compliance should be demonstrated in practice. While certain commissioning tests or functional validation exercises may be possible, demonstrating operational compliance over time—particularly through disturbance observations or monitoring-based approaches—remains less clearly defined. Providing additional guidance on acceptable compliance methodologies for this clause would assist participants in implementing consistent and practical compliance programs.

More broadly, international practices in other jurisdictions increasingly combine commissioning tests, disturbance-based validation using operational data, and targeted functional verification when demonstrating compliance of inverter-based resources. Allowing a similar range of complementary verification approaches within the template would help ensure compliance programs remain practical while maintaining confidence in plant performance.

Question 8: Reflecting changes in technology and cost in the Template

From Sungrow's perspective, the current template generally provides a useful foundation for demonstrating compliance; however, it would benefit from further updates to better reflect the rapid growth of inverter-based technologies. In particular, the template should recognise that different technologies may require different approaches to testing and monitoring and therefore maintain flexibility rather than prescribing a single methodology across all plant types.

For inverter-based resources, many control settings and performance characteristics are established during commissioning and remain relatively stable during operation. In this context, it may not always be necessary to repeat certain routine tests at fixed intervals, particularly where compliance can be reasonably demonstrated through operational evidence, disturbance analysis, or targeted functional checks. Providing flexibility in how compliance can be demonstrated would help ensure that compliance programs remain practical and proportionate while still meeting the underlying objective of maintaining system security.

The template could also benefit from recognising the increasing role of data-driven monitoring and automated compliance assessment tools, which are now commonly used to evaluate plant behaviour during real network disturbances. These approaches can often provide more representative evidence of plant performance than scheduled testing under artificial conditions.

In addition, given the increasing diversity of plant technologies—including hybrid plants, inverter-based generators, batteries, synchronous condensers, and HVDC facilities—the template should ensure that compliance methodologies remain adaptable to different plant characteristics and operational profiles. Clearer guidance on how compliance evidence may be demonstrated for newer or evolving access standards would also help improve consistency across participants.

Overall, updating the template to better reflect modern technologies, practical monitoring approaches, and proportional compliance frameworks would help ensure it remains effective for the future generation fleet while continuing to support the NEM's safety, security and reliability objectives.

Sungrow would be pleased to engage further with AEMC to clarify any of the points raised.

Yours sincerely,

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