Level 12
171 Collins Street
Melbourne VIC 3000

Postal address
GPO Box 2008
Melbourne VIC 3001

T 1300 858 724
F 03 9609 8010
E info@aemo.com.au

22 January 2026

Mr Rainer Korte
Chair
Reliability Panel, Australian Energy Market Commission
Level 15, 60 Castlereagh Street
Sydney NSW 2000

Dear Mr Korte,

Submission to the Reliability Panel's Compliance Template Review 2026 issues paper

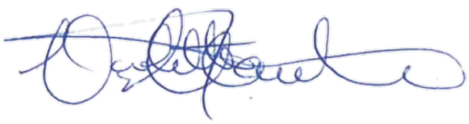
AEMO appreciates the opportunity to make this submission to the *Reliability Panel's Compliance Template Review 2026 Issues Paper*.

This review is necessary to update the Compliance Template to reflect recent changes to access standards and the evolving mix of technologies connecting to the National Electricity Market (NEM). Technology is changing, and it is important the Compliance Template is updated to account for these developments. Subject to reviewing stakeholder feedback and more detailed assessment, it seems most of the existing tests in the template remain valid and amendments should focus on tests for standards introduced by recent rule changes.

AEMO supports broadening the Template to cover Schedule 5.3 plant types. This is because loads have obligations to meet their applicable standards. AEMO agrees with the Panel's initial view that S5.2 and S5.3 be separate templates, reflecting the different standards specified in each of these schedules and recognising that different tests may applicable. Notwithstanding this, AEMO requests the Panel consider the application of the Template to loads who are not registered participants under the NER.

Please contact Hannah Heath at hannah.heath@aemo.com.au if you have any inquiries regarding the submission.

Yours sincerely,



Violette Mouchaileh

Executive General Manager – Reform Delivery

Attachment 1: AEMO Submission: Compliance Template Review 2026 Issues Paper

AEMO
AUSTRALIAN ENERGY MARKET OPERATOR

Level 12
171 Collins Street
Melbourne VIC 3000

Postal address
GPO Box 2008
Melbourne VIC 3001

T 1300 858 724
F 03 9609 8010
E info@aemo.com.au

AEMO submission - Compliance Template Review 2026 Issues Paper

AEMO welcomes the opportunity to respond to the Reliability Panel's *Compliance Template Review 2026 Issues Paper (the Issues paper)*. As new technologies connect, compliance frameworks must adapt accordingly to remain effective. AEMO supports effective and risk-based approaches to compliance.

1. The importance of effective, efficient and risk-based compliance programs

System security requires connected plant to meet performance standards (their technical requirements for connection). Non-compliance with performance standards can have immediate and significant implications for system security and increases the difficulty of efficiently operating the market.

The Compliance Template (Template) supports system security by defining testing and monitoring regimes for each performance standard. Registered participants have an obligation to maintain a compliance program that is consistent with the Template.

Under the National Electricity Rules (NER), participants must comply with their performance standards. As such, guidance on how to test and monitor compliance with performance standards can provide registered participants with confidence that they are compliant.

The responsibility to monitor compliance, and audit compliance programs resides with the Australian Energy Regulator (AER). Non-compliances are self-reported to the AER and rectification is agreed with AEMO.

Compliance with technical performance standards is critical to enabling AEMO to understand how the power system will respond to a disturbance.

2. Expanding the Compliance Template's scope

AEMO supports expanding the scope of the Template. The Reliability Panel proposes to update the Template so it applies to a broader set of technologies, including batteries, synchronous condensers, loads, and HVDC links. This expansion aligns with the modern NEM, where various technologies increasingly contribute to overall power system performance and can materially affect system security.

All Registered Participants connecting plant to the NEM, regardless of type, must meet their access standards under the NER. End user loads must also do so if imposed upon them by their network

Level 12
171 Collins Street
Melbourne VIC 3000

Postal address
GPO Box 2008
Melbourne VIC 3001

T 1300 858 724
F 03 9609 8010
E info@aemo.com.au

service provider. Effective compliance programs for all connected plant support system security. Updating the Template would provide guidance to more participants on suitable testing and monitoring regimes to provide them with confidence that they are compliant with the NER.

3. Alignment with Rule Changes

AEMO notes this review is to incorporate changes required following the '*Improving the NEM access standards - Package 1'* rule change proposal (Package 1).

AEMO notes that potential changes to the NER by the '*Improving the NEM access standards – Package 2*' rule change (Package 2) are considered currently out of scope. The Package 2 rule change could require consequential changes to the Template, so while it may not be practical to delay further the current consultation, we encourage the Panel and AEMC to consider how they may be able to consider, consult and expedite any further amendments to the Template for Package 2.

4. Response to the Reliability Panel's questions

This section responds to the questions posed by the Reliability Panel. AEMO welcomes ongoing engagement with the Reliability Panel and can support the Reliability Panel as necessary as the review progresses.

4.1. Criteria for assessing the compliance template

AEMO supports the proposed criteria to assess the compliance templates being:

1. Safety, security and reliability;

2. Innovation and flexibility; and

3. Principles of good regulatory practice.

AEMO notes NER 4.15 sets out requirements for the design of the compliance template which should be considered.

4.2. Proposed revised compliance principles

The compliance principles focus on ensuring that compliance programs are effective, efficient, and risk-based compliance programs. AEMO broadly supports the new condensed principles as they should be easier to interpret and apply. In response to the AEMC's questions, AEMO makes the below specific comments on the principles.

Level 12
171 Collins Street
Melbourne VIC 3000

Postal address
GPO Box 2008
Melbourne VIC 3001

T 1300 858 724
F 03 9609 8010
E info@aemo.com.au

4.2.1. Does AEMO agree with the revised compliance principles?

Discretion

The compliance principles allow participants discretion in the implementation of a compliance program, but use of such discretion, however, should not adversely impact or increase the risk to maintaining power system security nor demonstrating compliance with performance standards.

Principle 2 – frequency of testing

This principle appears appropriate but could potentially be simplified. AEMO considers that it might be beneficial to simply state that the frequency of testing should be guided by the risk of non-compliance with performance standards. Additional testing is only necessary when the risk of non-compliance has increased.

References to *plant parameters* in this clause may cause confusion here as it isn't a defined term or used elsewhere in the Template.

Principle 4 – assurance

The new Principle 4 consolidates the existing principles 4, 5 and 10. The old Principle 4 required a "compliance program that is consistent with the approved template and the Generator's compliance management framework will provide a reasonable assurance of compliance with the Generator's registered performance standards". The new principle changes the emphasis to providing "reasonable assurance of compliance with the *Registered Participant's* compliance management framework", rather than to registered performance standards. The reason and effect of this change of emphasis is unclear, and AEMO wonders whether it was intended.

4.3. Structure and form of the Compliance Template

4.3.1. Endorsement of the Panel's Proposed Template Structure

AEMO supports the Panel's initial view in section 3.1.1 of the Issues Paper: that the Template should be structured by plant type, with separate sections for Schedule 5.2 plant (generating systems, integrated resource systems, synchronous condensers), Schedule 5.3 plant (loads and distribution networks), and Schedule 5.3a plant (HVDC links).

Whilst it seems possible that numerous plant types can be incorporated into Schedule 5.2 and therefore use a single compliance program Template, for Schedules 5.3 and 5.3a, a separate schedule may be more appropriate to reflect the distinct technical requirements and compliance expectations for these categories based on in both their operational characteristics and the nature of the performance

Level 12
171 Collins Street
Melbourne VIC 3000

Postal address
GPO Box 2008
Melbourne VIC 3001

T 1300 858 724
F 03 9609 8010
E info@aemo.com.au

standards that apply. As a result, the types of tests, monitoring regimes, and even the frequency of compliance activities can differ between these categories.

For example, Schedule 5.2 plant is subject to detailed requirements for reactive power capability, fault ride-through, and active power recovery, which are not directly applicable to Schedule 5.3 loads, (albeit a fault ride through requirement is presently being considered for inverter-based loads under Package 2). Conversely, Schedule 5.3 plant may require compliance with standards that are specific to load behaviour. HVDC links under Schedule 5.3a have their own set of technical standards, particularly around control systems and interoperability with AC networks.

Structuring the Template by plant type could allow the guidance to be tailored to each category. This approach, although resulting in some duplication, could help registered participants develop compliance programs that are both effective and efficient, without imposing unnecessary or irrelevant requirements. It could also make the Template clearer and easier to use, as participants can quickly identify the sections relevant to their plant.

4.3.2. Basis to enforce a Compliance Program on S5.3 loads

The Panel's Issues Paper (section 3.2, p. 21) recognises that compliance programs for Schedule 5.3 plant (loads and distribution networks) "may be significantly different to Schedule 5.2 plant" and suggests that "testing and monitoring regimes, as well as suggested testing frequencies, should account for these differences between plant types." The Paper further notes that "operating profiles, maintenance schedules and degradation rates of plant can all significantly differ between plant types," and that "technology-specific testing or monitoring methods… would result in more effective and efficient compliance programs."

However, the Issues Paper does not consider that there are very few Schedule 5.3 plant which are owned, operated or controlled by Registered Participants. NER 4.15(b) requires Registered Participants to institute and maintain compliance programs for plant that are subject to performance standards. However, for most loads, the entity responsible for compliance with performance standards, defined in the NER as a "Schedule 5.3 Participant", is not a Registered Participant, but rather the counterparty to the connection agreement with the Network Service Provider (NSP), as provided for in NER S5.3.1a(a1). The NSP applies Schedule 5.3 standards through the negotiation and execution of the connection agreement under NER S5.3.1a(d)(1)&(2).

While AEMO supports the Panel's approach to address the challenge of plant diversity (through a separate Schedule 5.3 compliance template), there appears to be a gap in the compliance framework regarding how loads owned, operated or controlled by non-registered participants would be required

Level 12
171 Collins Street
Melbourne VIC 3000

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GPO Box 2008
Melbourne VIC 3001

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F 03 9609 8010
E info@aemo.com.au

to comply with such a Template. AEMO considers that the Panel should consider avenues to rectify this to ensure appropriate compliance steps are in place for all plant covered by Schedule 5.3.

For example, an option may be to recognise that the connection agreement is the most suitable mechanism to require a compliance program and template. The NSP, in applying Schedule 5.3 standards via the connection agreement, could also require the counterparty (the unregistered participant) to have a compliance program and template that is like the one specified by the Panel. In effect, the connection agreement would oblige the load to be subject to a compliance program, just as it obliges the load to meet Schedule 5.3 performance standards. This approach may ensure the intent of the compliance template is achieved, even though the Rules do not directly impose the obligation on the responsible party.

4.4. Testing and monitoring regimes for schedule 5.3 plant

The Panel's review of the Template recognises that, while there are areas of overlap in the technical requirements across Schedules 5.2 and 5.3, there are also important differences in both the nature of the plant and the specific obligations set out in each Schedule. This has direct implications for the suitability of existing Schedule 5.2 testing and monitoring regimes for other plant types.

In many instances, the testing and monitoring methods developed for Schedule 5.2 plant, (such as those for reactive power capability, voltage and reactive power control, power quality (harmonics and voltage fluctuations), and protection system performance), are like those for loads and distribution networks. For example, periodic verification of reactive power capability, step response tests for voltage control, and continuous power quality monitoring are all established practices in the Schedule 5.2 Template and may be adapted for use with Schedule 5.3 plant.

However, there are also several areas where the obligations in Schedules 5.3 are different from those in Schedule 5.2, and where the standard 5.2 tests may not be directly applicable or may require significant adaptation. For instance, Schedule 5.3 includes requirements for loads to maintain a specified power factor at the connection point and to limit rapid voltage fluctuations caused by load switching, which are obligations that do not apply to 5.2 plant (because these plant do not switch load in the same way) and therefore require different test approaches, such as load-side metering and flicker analysis.

Moreover, the operational profiles of loads can differ significantly from those of generators, and this may affect not only the frequency and timing of compliance tests but also the types of events that should trigger monitoring or review.

Given these differences, while using the compliance methods from the Schedule 5.2 Template where standards overlap is sensible, it is equally important to recognise where plant-type-specific

Level 12
171 Collins Street
Melbourne VIC 3000

Postal address
GPO Box 2008
Melbourne VIC 3001

T 1300 858 724
F 03 9609 8010
E info@aemo.com.au

requirements demand tailored approaches. The unique technical and operational characteristics of loads mean that a one-size-fits-all approach would risk either omitting necessary tests or imposing irrelevant obligations.

For these reasons, the Panel's proposal to structure the Template with separate tables for each plant type is justified. This approach allows for the clear identification of common compliance methods, ensuring consistency where possible, while also providing the flexibility to address the distinct requirements of each Schedule. It will help Registered Participants and the AER to develop and assess compliance programs that are both robust and appropriately targeted, supporting the ongoing reliability and security of the power system.

4.5. Existing testing, monitoring regimes and new rules

AEMO has reviewed the amendments to Schedule 5.2 of the NER, as summarised in Table 4.1 of the Issues Paper (REL0095, December 2025). These amendments reflect a series of rule changes, including the Efficient Management of System Strength, Integrating Energy Storage Systems, Efficient Reactive Current Access Standards for Inverter-Based Resources, and Improving the NEM Access Standards, Package 1 (AEMC Rule Change ERC0393, finalised May 2025).

A high-level comparison of the amended clauses against the existing Template for Generator Compliance Programs suggests that, for most technical requirements, the current Template already provides guidance on ongoing testing and monitoring regimes for most of the amended clauses. The Template's methods for demonstrating compliance with requirements such as reactive power capability (NER S5.2.5.1), voltage and frequency disturbance response (NER S5.2.5.3-5), continuous uninterrupted operation (NER S5.2.5.4, S5.2.5.6), protection systems (NER S5.2.5.8-10), voltage and reactive power control (NER S5.2.5.13), and others remain appropriate and should accommodate the recent amendments to the NER. These methods are generally technology-neutral with only minor clarifications or updates to terminology required.

Most of the existing tests in Table 1 were designed at time when synchronous machine analogue electronics would drift and performance may change over time. Yet today, with increasing inverter-based resources, drift of excitation system performance should not be the primary focus, and greater emphasis should be placed on reviewing plant response to disturbances, because performance can go awry because of firmware and software updates, including what could be well intentioned changes to control hierarchy that is programmed into the control hardware. In summary, in addition to the chosen method of compliance monitoring, thorough post event analysis provides greater confidence in the performance and compliance, thus reducing risks of unexpected response.

Level 12
171 Collins Street
Melbourne VIC 3000

Postal address
GPO Box 2008
Melbourne VIC 3001

T 1300 858 724
F 03 9609 8010
E info@aemo.com.au

It is important to note that the Template's existing compliance methods cover most of the changes introduced in recent amending rules. In many cases, the practical approaches to testing and monitoring, such as periodic verification, event-based analysis, and continuous monitoring, remain valid and effective for both legacy and new plant types. This suggests that, excepting the new S5.2 clauses, for most of the existing clauses, it may be only minimal changes are needed to ensure ongoing alignment with the Rules.

4.5.1. Active power recovery and reactive current injection (NER S5.2.5.5A)

The Package 1 rule change[1] introduced NER S5.2.5.5A, which sets out explicit requirements for active power recovery after a fault, and for the timing of reactive current injection (commencement time, rise time, settling time). These requirements are more prescriptive than previous standards and are supported by updated definitions in Chapter 10 of the Rules.

The Template does not currently contain a dedicated compliance method for NER S5.2.5.5A, as this clause did not exist at the time of the last review.

A change is necessary to ensure compliance programs provide clear, auditable evidence of performance against the new, time-based standards for post-fault recovery and reactive current response, which are needed for system security in a high-IBR environment. AEMO proposes the inclusion of a NER 5.2.5.5A compliance regime requiring high-speed, time-synchronised data (to test commencement, rise, settling times) and post-fault active power recovery thresholds, which are aligned with Chapter 10 definitions.

4.5.2. Short Circuit Ratio (SCR) compliance (NER S5.2.5.15)

The Efficient Management of System Strength introduced NER S5.2.5.15 and Package 1 rule changes updated NER S5.2.5.13[2], requiring plant to operate stably at low short circuit ratios (SCR), typically MAS 3.0 or as negotiated. This is supported by the AEMO System Strength Impact Assessment Guidelines (SSIAG).

The Template does not have an explicit SCR compliance regime in Table 1. Explicit SCR compliance is now a system security requirement for IBR. The Template could ensure compliance programs include model-supported evidence of stability at low SCR.

[1] AEMC Final Determination, Section 4.6, pp. 50–59
[2] AEMC, Final Determination, Voltage & reactive power control (impedance-based tuning, etc.) Section 4.10, pp. 71–79

Level 12
171 Collins Street
Melbourne VIC 3000

Postal address
GPO Box 2008
Melbourne VIC 3001

T 1300 858 724
F 03 9609 8010
E info@aemo.com.au

4.5.3. Dispatch tracking (NER S5.2.5.14, NER 4.9.5(a)(3)/(a2)(3))

While Package 1 did not materially amend S5.2.5.14, AEMO considers that the current Template does not include an explicit method for testing ongoing compliance with dispatch following obligations. In practice plant must ramp linearly to dispatch targets where no ramp rate or target time is specified, in accordance with NER 4.9.5 as described in AEMO's Dispatch Procedure (SO_OP_3705).

The Existing Template for Generator Compliance Programs (2019) contains no provision for addressing S5.2.5.14 (active power control and dispatch following). While Table 1 provides suggested test methods for other Schedule 5.2 clauses, there is nothing applicable to dispatch tracking. Therefore, the Panel may want to consider introducing a dedicated "dispatch tracking" compliance regime, including periodic target vs actual analytics and event-based checks, to provide clear, auditable evidence the plant can comply with S5.2.5.14.

4.5.4. Reactive power capability (NER S5.2.5.1, S5.2.5.13)

The current Template does not include an explicit test or monitoring regime for verifying zero-MW reactive behaviour. The introduction of NER S5.2.5.1(a2) means the Template should be updated to support operational verification that the plant does not alter connection-point voltage when at zero active power, and demonstration that the plant remains voltage-neutral even at the "highest system impedance" identified under NER S5.2.5.13(m).

4.5.5. Data and model obligations (as per PSMG, R2 validation)

Section 2.9 of the Template identifies model validation as part of the compliance program. Ideally, models should be kept up to date. The Panel may wish to consider the merits of including this in Section 2.9. Outside Section 2.9, the existing Template contains no explicit references to the Power System Model Guidelines (PSMG) or to the modelling and data requirements that will be set out in the Commissioning Guideline. This gap affects the quality compliance programs across multiple Schedule 5.2 clauses.

Although the Template predates the introduction of S5.2.5.5A and the system strength and impedance based obligations clarified in Package 1, the absence of PSMG aligned requirements is now more significant. The updated Rules require higher fidelity, time-synchronised data and consistent model measurement alignment to demonstrate compliance with disturbance-response timings, voltage/reactive control performance under varying impedances, and stable operation in low-strength conditions.

At present, the Template Table 1 only makes general references to "models" "model validation" without specifying:

- the required model types, formats or levels of fidelity defined in PSMG;

AEMO
AUSTRALIAN ENERGY MARKET OPERATOR

Level 12
171 Collins Street
Melbourne VIC 3000

Postal address
GPO Box 2008
Melbourne VIC 3001

T 1300 858 724
F 03 9609 8010
E info@aemo.com.au

- the expectation for high-speed, synchronised disturbance data;
- the requirement for model-measurement consistency as part of acceptance criteria;
- where compliance evidence must be model-supported, event-validated, or both.

This ambiguity in terms of model quality for different S5.2 standards in Table 1 may be improved. Given the increasing reliance on model evidence to establish compliance with the technical requirements in Schedules 5.2, especially S5.2.5.5 (response to disturbances), S5.2.5.5A (reactive current injection timing and active power recovery), S5.2.5.13 (voltage and reactive power control), and possibly S5.2.5.15 (operation at low SCR), this omission reduces the clarity and effectiveness of compliance programs.

Accordingly, the Panel it may want to consider whether the updated Template should incorporate explicit model and data requirements, with cross-references to both the PSMG and the Commissioning Guideline[3], so that compliance programs can provide evidence that meets AEMO's expectations. Options could include:

1. An overarching "Data & Models" statement be added in the introduction to Table 1.
2. A "Data & Models" note be added under each relevant clause row in Table 1, specifying when model-based evidence is required and what standards apply.
3. References to PSMG and the Commissioning Guideline be included so that participants understand the requirements.

4.5.6. Conclusion

The existing Template seems broadly suitable for most of the amended Schedule 5.2 requirements, and minor clarifications or updates are needed for most clauses, albeit AEMO recommends more focus on post-event analysis in the choice of test methods for inverter based plant to validate performance against models. However, the introduction of NER S5.2.5.5A and S5.2.5.15, as well as for the absence of S5.2.14 active power control and references to data/model quality in the Template, require the addition of new or revised compliance methods to ensure that compliance programs address these specific requirements. By making these amendments, and by adopting a plant-type structure for the Template, consistent with amendments in Package 1, the Reliability Panel will ensure that the Template continues to provide guidance for registered participants in meeting their obligations under the NER.

[3] AEMO's Commissioning Guideline is expected to be published Q1 2026

AEMO
AUSTRALIAN ENERGY MARKET OPERATOR

Level 12
171 Collins Street
Melbourne VIC 3000

Postal address
GPO Box 2008
Melbourne VIC 3001

T 1300 858 724
F 03 9609 8010
E info@aemo.com.au

4.6. Suggestions for new testing or monitoring regimes

4.6.1. Concurrent or priority of capability

The existing template does not prompt consideration of validating that plant can successfully meet multiple Schedule 5.2 clauses concurrently or in priority order, for example frequency control and active power control are to be provided concurrently, and primary frequency response should be maximised over satisfying the linear dispatch trajectory. As plant go through various upgrades and rectification work through their life there is a risk that the correct priority of these standards may be compromised and not identified during post maintenance works. Including a method to periodically validate any specific requirements that are included in a plant's negotiated access standard, for example prioritising runback response over frequency response, would support mitigating this risk.

4.6.2. Degradation of storage for BESS

Battery Energy Storage Systems (BESS) storage degrades and may impinge on performance of the plant for extreme State of Charge (SoC) conditions. Oscillations or unexpected behaviour may occur when discharging into very low SoC or charging up to very high SoC and may affect the plant performance in respect of S5.2.5.13(1)(iii) and this may require a *note* in the relevant row of the Template. Therefore, periodically checking the performance at those extreme conditions is important. The current template does not include these battery tests.

4.6.3. Communications, controls

Communication system failures present a risk to power system security. Accordingly, during commissioning, the plant's response to communication failure modes is tested and verified. However, the current Template does not include rows for either of the standards - remote monitoring (S5.2.6.1) or communications equipment (S5.2.6.2).

Given that these clauses link directly to the participant obligations in NER 4.11, and that ongoing performance of remote monitoring and communications equipment managed operationally by AEMO's Power System Data Communications Standard (PSDCS[4]), the Panel may consider whether the Template could include a *note* directing Registered Participants to these requirements. This could ensure that periodic testing of communications, aligned with PSDCS performance, reliability and security criteria, is incorporated into compliance programs, reflecting the importance of communications to secure power system operation, highlighting these capabilities are performance standards and subject to the penalties and enforcement thereof. AEMO has noted[5] that compliance with the PSDCS could be improved, and that participants are often unaware that communications failures constitute potential

[4] AEMO (2023), "*Power System Data Communication Standard*", Version 3.0, effective 3 April 2023
[5] AEMO (2022), *Review of Power System Data Communication Standard – Final Report*, 16 November 2022

Level 12
171 Collins Street
Melbourne VIC 3000

Postal address
GPO Box 2008
Melbourne VIC 3001

T 1300 858 724
F 03 9609 8010
E info@aemo.com.au

NER non-compliances requiring reporting under NER 4.8.1 and, under the relevant performance standards.

4.6.4. Runback, S5.2.5.5, SPS (linked to S5.2.5.10)

Where a generator has a **negotiated** performance standard under either S5.2.5.5 or S5.2.5.10 that requires the plant to respond in a defined manner to runback commands, SPS actions, or other power system initiated control signals, this should be included in the Template. Periodic verification should confirm the continued operability of the signalling interface, that the plant responds in accordance with the agreed S5.2.5.5 or S5.2.5.10 performance requirements, and that any negotiated timing or ramp-rate obligations remain satisfied. Broader aspects of scheme performance, such as system-wide coordination, logic, timing, arming conditions, and failure management are out of scope of the Template and instead governed under NSP responsibilities (S5.1.8, S5.1.10), EFCS processes in clause 4.3.4(b1), the AEMO GPSRR (5.20A), the Protected Event framework (8.8.4), and AEMO operational procedures including SO_OP_3715. For avoidance of doubt, NSPs should have obligation to ensure the correct operation of these schemes and reporting of their availability to AEMO.

4.6.5. Control mode operation and switching (S5.2.5.13, including 2A(iii))

Under the automatic access standard or as **negotiated** under S5.2.5.13, generating plants are generally required to operate in one of three reactive power control modes, voltage, reactive power, or power factor. Operators should be able to select these modes locally, or the modes may be commanded remotely by the NSP/DNSP. While mode transitions are typically verified during commissioning to ensure correct behaviour, this “bump-less” transition capability is not mandated under S5.2.5.13 unless included in a negotiated performance standard. Accordingly, only those aspects explicitly forming part of the plant’s negotiated S5.2.5.13 obligations should be included in the Template.

Where a generator has a negotiated performance standard under S5.2.5.13, including obligations related to voltage control, reactive power control, or the specific requirement in S5.2.5.13(a)(2A)(iii) for switching between control modes, these elements should be incorporated into the Template. Compliance monitoring should confirm that each required mode remains available, performs as specified, and that any required mode-switching behaviour continues to meet the negotiated standard.

Conversely, where a plant has no negotiated obligations relating to mode transitions beyond S5.2.5.13’s core capability requirements, these matters should not be included in the Template. In such cases, ongoing assurance of transition behaviour (where the plant is capable of it) is more appropriately managed through NSP operational practices, AEMO commissioning processes, and ongoing model validation rather than through periodic performance-standard compliance reporting.