

Energy Policy WA
Department of Energy and Economic Diversification
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Via email: energymarkets@deed.wa.gov.au

29 September 2026

RE: Power System Security & Reliability Standards Review: Consult & Information Papers

Dear Jai,

Tesla Motors Australia, Pty. Ltd. (Tesla) welcomes the opportunity to provide a response to the Consultation & Information Papers on WA's Power System Security and Reliability Standards Review (PSSR Consultation). We support a review that keeps the SWIS secure through retirement of synchronous plant and growth of inverter-based resources, including grid-forming inverters (GFM).

Information Paper

On the technical requirements updated in the Information Paper, Tesla commends the commitment to rapidly unlocking GFM tuning and connection in the WEM, to the benefit of the grid and consumers. Whilst Tesla supports most of the updates and proposed drafting, **three areas remain incompatible for GFM:**

- **2.2 Settings used to demonstrate Withstand SCR** - Tuning should be based on the site-specific SCR and network conditions to achieve the best overall performance. A clearer approach would be to specify a common set of settings for $SCR \geq 3$
- **4.3 Negative-sequence control during contingencies** - imposing a requirement for defined positive- versus negative-sequence current prioritisation at current limits is inconsistent with the fundamental voltage-source behaviour expected of a GFM inverter
- **4.9 Use of total current during contingencies** - the proposed "Total Current" should not be used as the basis for overcurrent capability assessment as it is not a physical current quantity.

Consultation Paper

Tesla strongly recommends that DEED reconsider the application of financial incentives to encourage provision of system strength and inertia services in the WEM. It is not an either/or between regulatory mandates and financial incentives – indeed as the NEM experience highlights both levers are necessary and complementary. **Tesla does not agree that regulatory mandates and curtailment are a substitute for an enduring and effective incentive framework.**

In particular, the PSSR review should not treat system strength and inertia as standards to be enforced after a shortfall appears. It should pair any revised standard with a clear, durable incentive framework that rewards parties who can provide those services (i.e. grid-forming inverters) in advance of a declared shortfall.

That framework largely already exists in the Wholesale Electricity Market (WEM). It does not require new legislation. What is missing is a policy signal that those mechanisms will be used as a standing procurement pathway, not only as a last-resort obligation, and that technical standards and payment arrangements will be designed together. This approach recognises:

- Using the PSSR or the Technical Rules to require GFM on every new connection, without payment, will raise the cost of new renewables and storage and still may not put capability where the shortfall actually is
- GFM capabilities have a real resource and operational cost (inverter oversizing, control

hardware, testing, hold-point operation, opportunity cost of headroom). If the only signal is a compliance obligation or a connection requirement, investors will: minimise GFM capability to what is mandatory; avoid locating in weak regions; and leave AEMO / Western Power to fill the gap under time pressure, at higher cost.

- Two out-of-market products already exist for GFM-capable plant: a) Inertia / related security services to AEMO under the Supplementary Essential System Service Mechanism (SESSM); and b) System strength / fault level / voltage stability services to Western Power under Non-Co-optimised Essential System Services (NCESS), including on a regional basis. Neither product needs a new Act or Rule change to be used. SESSM has never been designed into a live inertia contract because a shortfall has not been run through that process.
- PSSR settings (minimum inertia, RoCoF limits, system strength / short circuit ratio, voltage stability) should be expressed as *outcomes* that these products can be contracted against. Avoid locking the standard to synchronous machines.

A standing incentive framework reverses that. It:

- 1) Brings on capability before the shortfall. Shortfall declarations are a lagging indicator. By the time inertia or fault level is formally insufficient, the lead time for a new BESS or a GFM retrofit may already be too short.
- 2) Lowers the long-run cost of security. Competitive EOI-to-contract processes (SESSM and NCESS) select least-cost providers. Emergency or directed procurement does not.
- 3) Gives financiers something to underwrite. A multi-year availability payment for a defined inertia or system-strength service is bankable. A hope that SESSM might one day be run is not.
- 4) Keeps the PSSR standard credible. A standard that cannot be met with available, paid-for plant is not a standard; it is a residual risk transferred to consumers via load shedding or directions.
- 5) Is consistent with the existing WEM architecture. The WEM already separates real-time ESS from out-of-market procurement for services that are locational, lumpy, or not yet co-optimised. System strength is inherently locational. Inertia is system-wide but lumpy. Both fit out-of-market contracts.

We therefore ask EPWA to state, in the final PSSR decision, **that any revised inertia or system-strength standard will be accompanied by an explicit procurement and payment pathway**, using SESSM and NCESS as the default instruments; and any mandate or curtailment as a backstop only. We further recommend that EPWA avoids creating a new legislative product unless SESSM and NCESS are shown to be insufficient.

Further detail on the PSSR Consultation's proposals are included in the tables that follow.

We look forward to ongoing engagement with EPWA as the WEM rules and procedures continue to evolve to support WA's operation of a safe and secure power system, and its energy transition more broadly. We would welcome the opportunity to talk through any of the comments or recommendations (whether commercial or technical) if that is of interest to the EPWA team.

Yours sincerely,

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INFORMATION PAPER		
Review outcomes	Tesla Position	Tesla Comment / Recommendation
2.2 Settings used to demonstrate Withstand SCR	Do not support	While alternative settings may be adopted subject to agreement from AEMO and the NSP, this can create unnecessary negotiation, additional studies, and prolonged back-and-forth during the connection process, ultimately delaying project approval. The proposed AAS requirement of a minimum withstand SCR ≤ 3 introduces ambiguity. If the minimum withstand SCR is 3, then, in principle, the same GFM settings can be applied for all operating conditions down to SCR = 3. However, SCR = 0 also satisfies the condition of being less than or equal to 3, which can lead to unnecessary debate regarding the intended operating range. This ambiguity may result in suboptimal tuning outcomes, additional assessment effort, and delays to the connection process. Tuning should be based on the site-specific SCR and network conditions to achieve the best overall performance. A clearer approach would be to specify a common set of settings for SCR ≥ 3, or alternatively for SCR greater than or equal to the site's minimum credible SCR. Alternative settings are permitted for SCR < 3 or site's minimum credible SCR, where special tuning may be required to maintain stable operation under extremely weak grid conditions. This approach reduces ambiguity, minimizes unnecessary studies and negotiations, and provides a clearer pathway for connection approval.
4.3 Negative-sequence control during contingencies	Do not support	The requirement that "both GFL and GFM IBRs shall follow a defined prioritisation between positive- and negative-sequence current components when current limits are reached" is not necessarily applicable to GFM operation. Under the definition in 1(a), a GFM inverter is required to behave as a controlled voltage source behind an effective impedance. As a voltage source, the positive- and negative-sequence current outputs are not independently prioritised by the controller. Instead, they are determined by the network conditions. Since the internal three-phase voltage source remains balanced, the resulting positive- and negative-sequence current injections naturally arise from the external system conditions rather than from an explicit current-prioritisation mechanism. Therefore, imposing a requirement for defined positive- versus negative-sequence current prioritisation at current limits is inconsistent with the fundamental voltage-source behaviour expected of a GFM inverter and effectively assumes a current-controlled operating philosophy more characteristic of GFL implementations.
4.9 Use of total current during contingencies	Do not support	The proposed definition of "Total Current" is not a physical current quantity. Positive- and negative-sequence currents are components of the symmetrical-component transformation and do not combine through a root-sum-square relationship to produce a measurable phase current. Actual inverter overcurrent should be determined by the resulting phase currents obtained from the inverse symmetrical-component transformation of sequence currents. Consequently, the proposed "Total Current" should not be used as the basis for overcurrent capability assessment.

CONSULTATION PAPER			
Review outcomes		Tesla Position	Tesla Comment / Recommendation
Proposal 1:1	New Electric Storage Resources (ESR) seeking to connect in network regions identified in the System Strength Report as having low system strength will be required to meet Grid-forming (GFM) inverter technical standards	Support in part	Location-specific GFM for new ESR in weak areas is a reasonable backstop. It should not be the main incentive. Mandating unpaid GFM will raise project cost, may delay ESR in the very regions that need it, and still leaves inertia / residual shortfalls unaddressed. Pair any mandate with a clear payment pathway: NCESS for regional system strength and SESSM for inertia where AEMO identifies a (forecast) shortfall. Incremental GFM capability beyond a narrow minimum should be eligible for those contracts. Confirm grandfathering for projects that have reached R0 GPS or a standard access contract.
Proposal 1:2	For new ESR connecting outside locations identified as low system strength regions in the System Strength Report, the existing connection framework will continue to apply, with current “do no harm” provisions remaining in effect.	Support	Avoids a SWIS-wide GFM mandate where system strength is adequate. Keep ‘do no harm’ tightly scoped so it does not become an undeclared GFM requirement by another name. Publish the System Strength Report criteria and regional map with enough lead time for siting and design. Where a proponent chooses GFM outside a shortfall region, that capability should still be able to compete into SESSM / NCESS.
Proposal 1:3	If a System Strength Report identifies a system strength shortfall, AEMO apply operational constraints. This may result in output limitations, e.g. curtailment, for affected ESR proponents (per 1:4 below).	Support in part	Operational constraints must remain available to keep the system secure. They are a poor investment signal if used instead of procurement. Constraint risk is hard to finance and arrives too late to bring on GFM plant. Use 1:3 only after (or alongside) a published adequacy cycle that triggers Western Power NCESS for the affected region and AEMO SESSM if inertia / RoCoF is also short. Do not treat curtailment as the standing incentive for conversion.
Proposal 1:4	The ESM Rules will prescribe a curtailment prioritisation framework to manage system strength in network regions with low system strength, under which facilities will be prioritised for curtailment.	Do not support as primary incentive; only as a last-resort operating rule	Priority (1) is appropriate: non-compliance that creates a security impact should be first. Priority (2) is a punitive signal, not a bankable incentive: it socialises conversion cost onto existing ESR, creates financing uncertainty, and may curtail the storage the SWIS needs. If retained, “otherwise remediated” must include holding an NCESS (or equivalent) system-strength contract, demonstrated GFM contribution, or other paid remediation: not only a full GFL-to-GFM conversion. Priority (3) should not put model-submission delay on the same footing as a physical security impact. Security-first override is correct; the Limit Advice / constraint drafting must be transparent and contestable.
Proposal 1:5	When facilities are tied in a curtailment scenario, the tie will be resolved with high-level principles set out in the ESM Rules and a method detailed in WEM Procedure, such as the application of relevant coefficients	Support, with drafting care	A published, non-discretionary tie-break is better than ad hoc intervention. Coefficients should reflect contribution to the constraint and remediation status, and must not quietly recreate a GFM mandate. Consult the Procedure with the Amending Rules, not after they commence.
Proposal 2:1	The ESM Rules will prescribe that hybrid systems are assessed for Generator Performance Standard (GPS) as integrated systems at the Connection Point or, where applicable at its Measurement Point.	Support	Connection-point (or Measurement Point) assessment is the right compliance reference. Assessing GFM at sub-system level is essential so co-located GFM ESR can still qualify for system strength / inertia services even if the integrated plant is not GFM in every mode. The WEM Procedure must be issued in time for R0, with worked examples. Do not let hybrid assessment become a barrier to offering SESSM / NCESS from the GFM sub-system.
Proposal 2:2	Compliance requirements per operating-mode. Compliance will be assessed using	Support in part	An operating-mode matrix is necessary; otherwise GFM performance can be masked. Limit the matrix to modes that materially affect security - a full combinatorial set will add

	an integrated system model and assessed across credible operating modes that materially affect performance, against the associated compliance obligations at the Connection Point or, where applicable, the Measurement Point.		cost and delay. The most onerous credible mode should set the performance bar, but GFL-only mode (where credible) should not disqualify the GFM sub-system from being contracted. Specify how current-limit / low-SoC behaviour is tested so GFM service availability is clear to AEMO and Western Power.
Proposal 2:3	Registered GPS structuring - A flexible framework will be applied for the allocation and structure of GPS for hybrid systems, reflecting the extent to which sub-systems materially and independently influence performance at the Connection Point or, where applicable, the Measurement Point.	Support	Flexibility is right; multiple GPSs should be the exception, not the default, or registration and dispatch will fragment. A single GPS with structured annexures should be available where the GFM ESR is the binding system-strength / inertia resource. Multiple Registered Facilities must not be forced solely to access NCESS / SESSM. Clarify that one Registered GPS cannot span multiple Registered Facilities, and give proponents a binding classification at R0.
Proposal 2:4	Timing - For new project development the hybrid system assessment and classification will be undertaken at the R0 stage in the connection process.	Support	Early classification avoids late design change. For retrofits, use the existing Relevant Generator Modification path and keep it proportionate - adding GFM ESR should not reopen the whole GPS unless performance at the Connection Point / Measurement Point is materially changed. Transitional time for the Procedure is essential.
Proposal 3:1	Market Participants responsible for Transmission-connected System >10 MVA will be required to obtain and provide EMT models for system studies.	Support in part	OEM-grade EMT models are needed for weak-grid and system-strength studies, and for enabling GFM contracts. Staging by risk is appropriate. Scope, 'adequate' model standard, confidentiality / OEM IP, and realistic timeframes must be in the Rules or Procedure before requests start. Align the 10 MVA threshold with Western Power Technical Rules. Models should also support AEMO SESSM / Western Power NCESS due diligence, not only connection studies.
Proposal 3:2	The Network Operator will be required to reimburse a Market Participant's reasonable costs for the development of the EMT models.	Support	Retrospective modelling of legacy plant is not a cost the original connection could have priced. Reimbursement should cover development, validation and physical testing if required, on a transparent 'reasonable cost' test, and should not be delayed by disputes over scope. Without this, 3:1 will stall and both security studies and GFM procurement will be built on conservative proxies.
Proposal 3:3	This will be a civil penalty provision.	Do not support curtailment as the default lever	Need more clarity on timeframes and reimbursement. Curtailment for a modelling gap (Proposal 1:4 item 3) should be last-resort and only where the missing model prevents a security assessment. Do not curtail a capable GFM / ESR facility for an OEM documentation delay while unpaid GFL plant in the same region keeps running.
Proposal 4:1	Introduce new terms that distinguish between Registered GPS capability and operational settings	Support in principle	Distinguishing capability from settings is the right way to allow targeted changes without a full GPS reopening. Limit the power to settings necessary for security (system strength, control interaction, voltage / fault response) -not a general redesign right. Mandate consultation with the participant and AEMO, technical justification, time to implement, and cost recovery where the change is for system benefit rather than the facility's own non-compliance. Settings that enable GFM grid-support should be compatible with SESSM / NCESS availability obligations. Link this tightly to EMT models (Proposal 3) so required changes are evidence-based.