



Australian Energy Market Operator (AEMO)

Submitted online via PSMGReview@aemo.com.au

10 February 2023

Dear AEMO Power System Modelling team

**Re: AEMO Amendments to the Power System Model Guidelines Consultation Paper**

Tesla Motors Australia, Pty Ltd (Tesla) welcomes the opportunity to provide the Australian Energy Market Operator (AEMO) with a response to the “Amendments to the Power System Model Guidelines – Consultation Paper” (the Consultation Paper). Tesla is a leading Australian equipment manufacturer for utility scale battery energy storage systems (BESS), residential BESS and electric vehicle (EV) supply equipment (EVSE) in Australia, and we have worked, or are working, with AEMO on the power system modelling requirements on a number of utility scale BESS assets on all states in the National Electricity Market (NEM) with the exception of Tasmania.

We recognise the importance of accurate and robust power system modelling requirements and the role that these models will need continue to play in supporting a future with periods of 100% variable renewable energy (VRE) supported by fast acting, asynchronous, inverter-based BESS assets. We are very supportive of AEMO’s stated need to treble the capacity of dispatchable storage in the NEM, with over 60GW of forming capacity needed by 2050<sup>1</sup>, and we will continue to work with AEMO to support the immediate priorities needed for this transition.

Our response below outlines provides some recommendations for AEMO on how to ensure that changes to power system modelling requirements are introduced in a way that does not disrupt the project development flow that is currently planned or underway and is critical to support the trebling of storage capacity in Australia.

Tesla is happy to discuss the points raised in this response directly with AEMO. Please contact Emma Fagan ([efagan@tesla.com](mailto:efagan@tesla.com)) for more information or any follow-up meetings.

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<sup>1</sup> <https://aemo.com.au/-/media/files/major-publications/isp/2022/2022-documents/2022-integrated-system-plan-isp.pdf?la=en>

## **Tesla Response to Power System Model Guidelines Consultation Paper**

Tesla does not dispute the need for power system models in the NEM, nor the key recommendations made by AEMO in the Consultation Paper. Our main priorities are as follows:

- Ensuring that industry has sufficient timelines to adapt processes and comply with new obligations introduced by AEMO.
- Ensuring that threshold requirements are introduced for load modelling requirements, to ensure that the grid modelling work requested is proportional to the possible grid implications.

More detail on these two points is included below.

### **Modelling requirements for large system power loads**

While we understand that clauses 5.2.4(c) and 5.2.4(d) of the National Electricity Rules (NER) provide AEMO with the discretion to request power system models from market customers where AEMO believes there's a reasonable risk that the load will have an adverse impact on the power system, we think there would be benefit in AEMO setting threshold requirements for both individual traditional large power system loads and inverter based loads.

We would propose that 30MW is a suitable threshold for individual loads connected in the distribution network – above that, AEMO can expect power system modelling to be provided. This would capture the full range of assets considered in Table 3 in the Consultation Paper. It also matches the equivalent generation threshold requirements that also sit at 30MW.

Note that we do not suggest that AEMO needs to review the current 5MW threshold for generation systems including a BESS. However, for non-bi-directional loads we do not believe that there is any need to introduce the lower 5MW threshold. Outside of BESS assets, most loads will not be scheduled and actively bidding into the energy market, so can be modelled within the current AEMO approach of modelling aggregate loads.

### **EMT model compatibility - timelines for introduction of new requirements**

In respect of AEMO's proposed changes to the EMT model compatibility, Tesla has no significant concerns with the proposed changes, however we note that the new model format is less efficient, which requires more computing resources and can result in longer simulation time.

We do, however, have concerns with the potential immediacy that these changes will be implemented. AEMO notes that the final report is to be released 16 June 2023. It will be critical that AEMO provides sufficient time for industry to develop compliant models and work with AEMO to ensure confirm compliance. In addition, all grid models previously provided to AEMO for projects under development should be grandfathered and not considered under these proposed updates to AEMO's power system modelling requirements.

Tesla proposes that 12 months from the release of the final report should be provided to industry to enable compliance. Given that there will be amount of rework of models this timeline also allows for the hiring of additional grid modelling FTE to ensure that updated models can be developed and confirmed with AEMO as quickly as possible. With the changes that AEMO is requesting, all OEMs will need to

develop an Australian specific PSCAD model. This makes the recruitment of additional FTE a necessity to avoid significant delays in the deployment of Australian projects.

A twelve-month compliance timeline would assume the following steps:

- Hiring additional head count to develop Australia jurisdictional PSCAD model: **3 – 4 months**
  - *Note that this has the potential to be a timeline bottleneck given the current skills shortages – both in Australia and internationally – of power system engineers with grid model development expertise.*
- Scoping of new model requirements: **2 months**
- Development of Australian specific DLL-based PSCAD model, and Small Signal Analysis (SSA) model per PSMG: **4 - 5 months**

Following the estimated 12-month development work we also expect that there will be 2 – 3 months work with AEMO to ensure compliance.

Note that these timelines should also apply to the development of new small signal modelling requirements. Updates to small signal models will be undertaken in parallel to the EMT updates, but these parallel workstreams reinforce the need for a 12-month compliance window.

If the OEMs meet the modelling interface and library requirements for PSCAD, PSSE, and SSAT models, there should be no requirements for providing an open box model, model source code or detailed controls block diagrams.