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Dominic Adams  
Australian Energy Market Commission  
PO Box A2449  
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9 November 2017

**Re: National Electricity Amendment (Generator Technical Performance Standards) Rule 2017 – Consultation Paper (ref. code: ERC0222)**

Dear Dominic,

Tesla Motors Australia Pty Ltd (Tesla) welcomes the opportunity to provide the Australian Energy Market Commission (AEMC) with feedback on the National Electricity Amendment (Generator Technical Performance Standards) Rule 2017 Consultation Paper (the Consultation Paper).

Tesla understands the importance of the Australian Electricity Market Operator (AEMO) proposing a rule change to properly account for the volume of connection applications currently being received by AEMO for asynchronous generation assets.

In general, we believe that any long-term changes to the Generator Technical Performance requirements need to ensure that they're addressing an issue that is not being addressed through business as usual behaviour of generation assets; or they address barriers to entry/ difficulties for emerging technologies in meeting the existing AEMO requirements. We note that in this instance AEMO has not detailed the specific negative system security outcomes that may be faced.

Changes to technical performance parameters will have a flow-through impact on both reliability and system security – so this Rule Change needs to also align with the parallel AEMC work-streams on System Security Frameworks and the Reliability Frameworks Review.

**Summary of our position**

Updating the rules to reflect an increased focus on reliability is important, provided they are introduced in a way that does not have an adverse impact on renewable developments in Australia.

Tesla also believes that the rule change impacting on the Generator Technical Performance Standard should not be considered in isolation. To ensure that the market adopts what is true lowest cost technology for the services required, it will be important to ensure that redundant regulatory requirements are not placed onto generators, when the identified issues may be better served using market based mechanisms.

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A brief summary of our position is included below.

- **Generator Access Standards** - changes to the Access Standards – all of these changes are technically possible, but will also result in cost implications for renewable developments. The AEMC should make sure to consider alternatives that are going to represent true lowest cost value to consumers – specifically whether precinct scale energy hubs with the appropriate technical capabilities could address some of the network concerns that AEMO has flagged.
- **System size thresholds** – Tesla supports an approach that is less onerous in administrative and cost implications for behind the meter commercial and industrial projects.
- **Negotiation Framework** – Tesla does not support this change, as it is likely to result in cost impediments for a number of projects.

## **Tesla response to Consultation Paper questions**

In respect of the timing for the adoption of the Rule Change (as outlined in section 3.3.2 of the Consultation Paper) Tesla recommends the following:

- The changes should apply only to connection applications received only after the rule change has been finalised, rather than retrospectively.
- The exemptions that constitute no adverse impact on power system security, which have been flagged by AEMO in the Consultation Paper need to be clearly outlined.

As a broad recommendation to all questions below, we ask that the AEMC also considers whether precinct or energy hub based non-network solutions may offer a lower cost alternative to meeting these technical requirements as opposed to imposing these new requirements on all generation assets at the point of connection.

Under an energy hub approach, generation assets would still be responsible for ensuring that the requisite network support in their region is addressed; but this approach provides an alternative pathway to properly ensuring ‘least cost’ to consumers, whilst also maintaining system security in the absence of synchronous generation.

To address the specific questions raised by the AEMC, Tesla has provided responses to each of the relevant questions included within the Consultation Paper below.

### **Question 2: Role of Access Standards**

Tesla broadly agrees that the current generator access standards require changes to help maintain power system security. New technologies such as energy storage can improve system security.

The practical implications of these changes, when considered together, is that energy storage or smart inverter technologies appear to be required to meet the reactive power support requirements and other proposed changes to the Access Standards.

As noted above, Tesla believes that any Rule Change resulting in this requirement be considered in the context of the broader work being undertaken by the AEMC, so as not to result in redundant technical requirements. This will be particularly important in respect of the current and future work undertaken in respect of reliability to ensure that the focus is not just on increased capacity, but also considers the broader energy and dispatchability implications that will support a broader penetration of renewable energy in Australia.

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### **Question 3: Proposed changes to generator access standards**

#### **Reactive power injection and support**

Tesla agrees with AEMO's analysis of the issue in relation to the proposed change to the access standard. Notwithstanding our comments above regarding non-network solutions that may be used to solve this issue, we also believe that the proposed change addresses the issues raised by AEMO.

#### **Low voltage ride-through**

Tesla does not see any issues with this proposed requirement.

#### **High voltage ride through**

An increase to the HVRT magnitude and timing (1.4pu) does have a large impact on inverter based Generators. This requires the reduction of the inverter terminal voltage (via the MV transformer) which in turn results in a reduction in the apparent power rating of the inverter. This proposed requirement would therefore reduce the inverter power during normal operation and increase the cost of generation by requiring additional inverter power to be installed. Although the paper suggests that the Transmission Network Service Provider (TNSP) may sustain this increase, it is unlikely that existing Generators will meet this requirement and therefore uncertain how this will benefit the system.

Again this requirement should be considered in the context of the other changes asked for under both this rule change request; and in parallel with the broader suite of System Security Framework review work being undertaken by the AEMC.

#### **Active power recovery**

Tesla does not note any concerns with this proposed change.

#### **Partial load rejection**

Tesla does not note any concerns with this proposed change.

#### **RoCoF**

Tesla does not note any concerns with this proposed change. We support this change and believe it is a step in the right direction.

#### **Remote monitoring and control**

Tesla does not note any concerns with this proposed change.

### **Question 4: System strength access standard**

Tesla conceptually agrees to AEMO's analysis in respect of the issues related to system strength. Current inverter technology can enable the provision of continuous uninterrupted operation, and provide suitable system strength support.

In practice we would support an approach that allowed for generator negotiation on their continuous uninterrupted operation requirements based on the individual network context. This can be done with the network service provider (NSP) who will be responsible for managing minimum SCR levels, and will likely result in a better outcome than mandating the standard for any SCR to a minimum of 3.0 at the connection point.

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## **Question 5: Mandating active power control**

### **What impact will this have on FCAS markets?**

Tesla understands the position that AEMO has taken, and the points made regarding the lack of asynchronous generators currently registered in FCAS markets. We don't agree that the best approach to remove these barriers is by requiring all generating assets to be in a position to offer a measureable amount of market ancillary services to the spot market for each of the market ancillary services.

Asynchronous generating assets are still able to be retrofitted with battery energy storage technologies to participate in the FCAS markets, however there are broader market design flaws preventing a number of generation assets from pursuing this option.

The barriers to entry in most cases are due to the fact that the FCAS market set-up was not designed to account for fast-acting non-synchronous generation assets and the so-called Fast Frequency Response (FFR) in the 100-250ms range

In the event that all generators were required to be able to participate in the FCAS market, we would see significant market saturation. A saturated FCAS will likely make the ability to access appropriate FCAS revenue more difficult, due to the potentially redundant oversupply of frequency support capability.

As opposed to mandating that all new generation assets are able to participate in the FCAS markets, Tesla recommends that AEMO considers the market design factors that are limiting the participation by asynchronous generators. Key examples include:

- AEMO requirement to register energy storage as both a load and generator due to limitations within NEMDE and the subsequent operational / registration limitations;
- The max enablement (MW) registration limitation for FCAS 6s, 60s, and 5 minute second contingency services are based on a theoretical frequency ramp that is not representative of the current power system; and
- The limitation due to the frequency ramp and range (i.e., 0.125Hz/s and 49.5Hz) for which these services are registered, as presented in the Market Ancillary Services Specifications (MASS) and accompanying FCAS verification tool. This under-estimates the capability of FFR that can operate over much more aggressive ramps and ranges to benefit the power system.

## **Question 6: Reduction in system size thresholds**

### **Do you agree with AEMO's view that 'standards should not consider generator system size in their application' appropriate?**

AEMO suggests that in general, access standards should not consider generating system size in their application. They therefore propose removing or adjusting the existing 30MW threshold for a number of standards including voltage and reactive power control, frequency control and active power control.

Tesla believes that requiring all generating assets over 5MW to meet the full NER requirements may be onerous and create costly administrative requirements and complexity for generators that don't necessarily have a significant impact on system security and reliability (for example, behind the meter commercial and industrial applications).

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We support the imposition of additional requirements that will be relevant to improving system security, and encourage the AEMC to explore options that are the least onerous to smaller scale generation assets.

**Would the proposed changes to the thresholds for certain generator access standards represent an unnecessary barrier to entry?**

This proposed requirement may create barriers to entry for smaller projects. In effect, this requirement would capture commercial and industrial sized solar + energy storage projects; making the development process more expensive. The full set of NER requirements are not required for smaller installations, and the broader impacts of these systems on networks can be managed through NSP connection and export limitation requirements.

Tesla supports minimum requirements for voltage and reactive power control, frequency control and active power control, for all generating assets >5MW to be assessed during connection approval stage. These requirements should be consistent across NSP processes and will remove the need for all generating assets to also meet the access standard requirements, however we would encourage the AEMC to do so in a way that is the least onerous on new projects.

**Question 7: Definition of continuous, uninterrupted generation?**

Tesla does not note any concerns with the proposed updated definition of continued, uninterrupted generation as proposed by the AEMC.

**Question 8: Negotiated access standard requirements**

Notwithstanding any of the above comments, Tesla does not note any further issues with the negotiated access standard requirements.

**Question 9: Technical standards relevant to the alteration of generating plant/ system**

Notwithstanding any of the above comments, Tesla does not note any further issues with the technical standards relevant to the alteration of the generating plant/ system. We do note that these requirements will potentially result in additional costs for generation assets.

**Question 10: How important is a consistent approach to generator access standards across regions?**

Tesla believes it is very important to take a consistent and transparent approach to generator access standards across the regions. This does not necessarily mean that AEMO needs to be rigid in mandating requirements across the board.

Regional variances need to be taken into account, and AEMO should be flexible in negotiating with regions where it is less critical to meet the automatic access standards. The key will be transparency in the approach. This will be particularly important if a hub based solution is deemed appropriate.

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**Question 11: Issues with current negotiating framework?**

A concern with the proposed negotiating framework, is that the onus is on the applicant to demonstrate 'as close as reasonably practicable' to automatic access standards, which will require a cost investment up-front to determine the best approach to meet these requirements and extensive negotiation.

Taking into account our above comments, applicants should also be able to assess options that aren't based on the technology installed at the connection point. This approach may reduce costs, depending on the location of the project within the NEM.

**Is AEMO's view that connection applicants generally aim for the minimum access standards an accurate representation?**

We believe that this approach is likely to impose more cost than may actually be required, depending on the location of the project within the NEM. Proving 'reasonably practicable' has been applied will take effort from applicants during the GPS negotiations. This may also result in unnecessary delays in the approvals process with more work required at the project development and deployment stage.

**Question 12: Rationale for a negotiating framework?**

As noted above, Tesla believes that the proposed approach to the negotiating framework is that it's likely to impose more costs than those actually required to deliver the necessary system security.

**Question 14: What are the potential negative impacts on system security that could arise from the connection of new equipment under existing arrangements?**

Some of the changes proposed by AEMO above (specifically in respect of the proposed reduction in system size thresholds and the negotiated access standard requirements) are likely to result in significant administrative burden or costs to renewable projects already in development. This may result in project delays or create additional investor uncertainty.

**Conclusion**

Notwithstanding the issues raised above, rather than creating a transitional process that applies retrospectively, the AEMC should establish a timeline that explores all options for meeting the updated system strength requirements, in a way that represents the lowest cost to consumers.

We look forward to continuing our engagement with both the AEMC and AEMO on this proposed rule change.

Kind regards



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Mark Twidell

APAC Director – Energy Products