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Jess Boddington  
Australian Energy Market Commission  
PO Box A2449  
Sydney South NSW 1235

6 August 2019

**Re: Coordination of Generation and Transmission Investment – Directions Paper (ref: EPR0073)**

Dear Ms Boddington,

Tesla Motors Australia, Pty Ltd (Tesla) welcomes the opportunity to provide the Australian Energy Market Commission (AEMC) with feedback on its Directions Paper on the Coordination of Generation and Transmission Investment (COGATI) (the Directions Paper).

Tesla looks forward to working with the AEMC in addressing the overall objective to coordinate generation and transmission investment in the National Energy Market, but with reference to the issues raised in the Directions Paper, seeks the following:

- Additional detail on how storage assets would be treated under locational marginal pricing scenarios when behind a constraint, to assist developers properly work through potential impacts and assess reforms holistically – given the level of complexity that would be introduced under the AEMC's proposal.
- Clarification of the disorderly bidding issue – and the range of options being considered to address it (locational marginal pricing being one), recognising that simplicity in the reform agenda has significant advantages for contributing to investment certainty in the interim period;
- Improved clarity on the issues that the AEMC is looking to solve through new charging arrangements, and whether options alternative to the transmission hedges or locational marginal pricing arrangements have been considered;
- Alignment with the work being developed by AEMO and the ESB in actioning the Integrated System Plan (ISP) – which already provides strong recommendations for priority transmission investments that will unlock the level of new generation and storage assets required in the years to come, addresses timing issues, and may remove the need for various components of the COGATI reform framework;
- A better understanding of how these charging arrangements are likely to align with the next iteration of the ISP, noting the recent insight from AEMO on the role of energy storage in building power system resilience;
- Alignment with other parallel, related work-streams underway – such as the AEMO proposed approach to Primary Frequency rule change request and work underway in respect of marginal loss factors; and
- Eliminating specific suggestions that storage assets have more impact on disorderly bidding than other generation assets, when the efficiency benefits provided by storage assets is clear and demonstrated.

Additional detail relating to Tesla's position for how storage should be considered is included in the response following. For further information on any of the points raised in this submission please contact Emma Fagan at [efagan@tesla.com](mailto:efagan@tesla.com).

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## General Comments on COGATI Directions Paper

Consideration of whether locational based pricing regimes and transmission hedges are the best approach to optimise the participation of storage (or generation more broadly) warrants further exploration, particularly given the level of complexity that would be introduced through the reform framework as currently proposed.

From first principles, fast-responding flexible battery storage might be expected to only benefit as pricing regimes become more dynamic when the network is under constraint - i.e. batteries charging from lower regional prices (when there is excess local generation); and optimising dispatch to ensure energy can be exported (or at least rewarded) based on any expected constraints (particularly with a financial uplift provided from congestion hedges).

However, the AEMC's proposal would also introduce much greater uncertainty and market risks, e.g.:

- The potential for wealth transfers to neighbouring generators behind constraints who may extract revenue from lower-cost/more responsive battery storage assets (through hedging contracts) and reducing potential revenue that might have otherwise been earned from an efficient market;
- Additional risks of gaming from generators - both behind and in-front of the constraint; and
- Additional complexity of contracting provisions, which may increase project development costs.

It is also unclear why the AEMC continues to focus on the theoretical disorderly bidding of future storage<sup>1</sup>. A future state of locational-based pricing may not resolve disorderly bidding for any type of generator – it may just complicate it (e.g. generators knowing they will not be dispatched but still obtaining a transmission hedge). It would be useful for the AEMC to outline further detail on the issue of disorderly bidding as it stands, and how it may be addressed. It is also worth recognising that any perception of theoretical disorderly bidding by future storage assets would still be outweighed by the significant efficiency benefits that storage could unlock under a locational pricing regime (e.g. utilising excess generation and optimising dispatch of generators behind constraints).

Creating additional uncertainty for generation investments (particularly for renewable projects already grappling with complexity) should be progressed with caution and warrants much greater levels of industry consultation on potential impacts. For example, one un-intended consequence of the proposed approach progressing quickly may be a slowing of investment in storage assets as financiers are already seeking risk minimisation for projects and greater levels of certainty from future revenue streams.

Compounding this complexity are parallel reforms currently under development and at varying stages of progress (e.g. system strength requirements; MLF updates; 5-min settlement; ESB-led post 2025 reforms; AEMO's Emerging Generation and Energy Storage work stream) as well as potential Federal and State Government policies that could also underpin and act as a catalyst for new modes of large-scale infrastructure funding.

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<sup>1</sup> See page 18 of Directions Paper: "Disorderly bidding may also become particularly prevalent and result in inefficiencies if grid scale storage devices become commonplace in the NEM. Storage devices behind a constraint have an incentive to disorderly bid (as a seller of electricity) in order to receive the regional reference price."

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## Clarifying the problem

To address the above issues and concerns, the AEMC should provide greater clarity and quantification of the disorderly bidding problem being addressed, potential benefits that would accrue from the proposed method of locational pricing, as well as provide more detail on how different scenarios would be treated ahead of progressing through the expedited reform program in the remainder of 2019.

### Locational Marginal Pricing

Should an appropriate local pricing framework be introduced, storage is likely to play an important role in addressing network congestion behind constraints. It is therefore critical that the framework encourages storage of requisite duration (e.g. 2 hours and above) and recognises that storage can have a positive impact for system strength. This should ensure that in areas where local price signals encourage more storage to be built to alleviate constraints, there are no perverse outcomes driving unnecessary network asset investments (e.g. additional deployments of synchronous condensers). AEMC must work closely with AEMO in reviewing system strength guidelines (and related storage settings and classifications) through parallel reforms, rule changes and trials.

The AEMC should also clarify the interplay between locational marginal pricing and transmission hedges – i.e. whether they can be considered mutually exclusive or as contingent reforms. Should dynamic pricing be successful in addressing the worst areas of constraint on the network (e.g. through incentivising grid-scale storage or efficient generation entry or exit) will the need for transmission hedges be re-assessed? There has been ongoing uncertainty on the staging and timeline of reforms and it is vital for industry to have clear forward direction for investment planning.

Clarifying any impacts for distribution connected assets facing constraint would also help participants assess the merits of dynamic pricing regimes – particularly as deployments of DER connected across distribution networks accelerates and starts to create similar concerns at key regional nodes and feeders.

### Transmission Hedges

Whilst the Directions Paper largely focuses on locational marginal pricing, upfront detail (i.e. ahead of the September Draft Report) on how transmission hedging would operate is critical to allow participants to adequately explore the benefits and risks of the proposal over the longer-term (e.g. how transmission hedges are funded, applied, transferred and vest). As currently proposed, there appears to be a timing issue in the expectation that generator investment in transmission hedges will fund new transmission infrastructure that will take an order of magnitude longer to build than the new generation itself.

Currently, existing generators hedge against new entrants on their local network by entering into more attractive PPA's than would otherwise be obtainable by prospective generators (which may dissuade the new entrants from locating).

Free-riding is an issue that needs to be addressed. However, even in the example where transmission assets are specifically built for one generator (and paid for by it) then special treatment is warranted, but this doesn't necessarily mean firm access is the most efficient or pragmatic answer.

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## Treatment of storage under locational pricing

We note the AEMC has included high-level detail on how storage assets may participate under a locational marginal pricing approach. However, given the ability for storage to fully optimise its market participation and act as both a generator and a load based on wholesale market conditions, additional consideration is required for how storage should be treated when behind a constraint.

As the AEMC detail in the Directions Paper, from a market efficiency perspective, storage should be incentivised to charge when constraints apply, which would mean paying the lower locational marginal price, as this would unlock the ability for other generators behind the constraint to dispatch in order to charge storage, and would maximise the utilisation of the local network and simultaneously reduce congestion and minimise losses. Further clarification is required for how these principles apply to Virtual Power Plants (VPPs) – for example, if they were to register as scheduled generation and scheduled load. As the AEMC acknowledge, locational pricing would provide the right signal for storage assets that reflect the short-run costs of network for both charging and discharging.

Forcing storage to pay the regional reference price (i.e. treating it like an end-use market customer) would:

- Create perverse incentives that might result in storage exporting instead;
- Is unlikely to lead to efficient bidding behaviour; and
- Fails to recognise the unique capabilities of storage to provide network benefits by complimenting the output of neighbouring generation (e.g. time shifting energy to avoid congestion).

The AEMC acknowledges that “storage will continue to play an increasing role in the electricity market”, and AEMO similarly notes in the 2018 ISP that storage will be a critical part of the lowest cost generation portfolio. As such, it is critical that more consideration is given to the most appropriate pricing signals to drive this uptake. Tesla recommends that the AEMC releases examples of pricing structures that would encourage appropriate bidding behaviour from storage assets.

It is also unclear, based on the information included to date, as to how these charging arrangements will apply when a single market classification is introduced for battery storage. If that rule change is adopted then assets will be able to rapidly transition from charging to discharging. It is currently unclear how the locational pricing approach will drive the appropriate transition from charging to discharging based on market needs.

This ability to rapidly transition from charging to discharging is also extremely valuable in providing accurate and rapid frequency control ancillary services (FCAS)<sup>2</sup>. Tesla requests that the AEMC provides more detail in the Draft Report, regarding the consideration given to how the locational marginal pricing approach interacts with current FCAS signals, including whether it may result in disincentives to providing FCAS services during frequency excursions.

## Charging Reforms

An approach differentiating storage from other end-use market customers under locational pricing would be consistent with the position proposed by AEMO and AEMC relating to the application of Transmission Use of System (TUOS) charges, where it is recognised that storage should not be treated as a traditional end-use market customer and should be exempt from paying TUOS charges - ahead of the expected AEMO rule change to create a specific registration category that can clarify this position.

Tesla supports the AEMC continuing to clarify this point for storage assets as a priority – as ongoing uncertainty on charging will continue to add additional risk and financing costs for new storage projects seeking to connect to either the Transmission or Distribution network, and there have already been significant delays in waiting for AEMO’s rule change to clarify this position.

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<sup>2</sup> [https://www.aemo.com.au/-/media/Files/Media\\_Centre/2018/Initial-operation-of-the-Hornsedale-Power-Reserve.pdf](https://www.aemo.com.au/-/media/Files/Media_Centre/2018/Initial-operation-of-the-Hornsedale-Power-Reserve.pdf)

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## Conclusion

The complexity in respect of the issues being raised by COGATI has caused confusion and uncertainty for many energy market participants, and should this uncertainty continue, it will have significant repercussions on the future development of new generation projects in Australia.

From a system planning perspective, there is an established consensus of the need to promote the uptake of storage in the NEM to ensure continued safe, secure and reliable operation over the coming decades, as well as promote efficient investment infrastructure in the interests of consumers. As AEMO state in its Integrated System Plan: "There is a growing need for energy storage over the next 20 years to increase the flexibility and reliability of supply"<sup>3</sup>.

Tesla supports the efforts being undertaken by both the AEMC and AEMO to address and coordinate generation, storage and network planning and investment, particularly at such a critical period as the energy system confronts significant transformation.

With significant investment still to come to drive the integration of new generation and network infrastructure (as highlighted in the ISP), any decision or reform that introduces additional complexity, financing risk, or directly restricts new generation projects from being developed or fully participating in the market should be avoided.

Tesla welcomes further opportunity to progress these critical reforms with the AEMC to ensure a fit for purpose regulatory framework enables efficient investment in the decades to come.

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<sup>3</sup> "modelling shows that retiring coal plants can be most economically replaced with a portfolio of utility-scale renewable generation, storage, DER, flexible thermal capacity, and transmission." – AEMO "Integrated System Plan", available at: [https://www.aemo.com.au/-/media/Files/Electricity/NEM/Planning\\_and\\_Forecasting/ISP/2018/Integrated-System-Plan-2018\\_final.pdf](https://www.aemo.com.au/-/media/Files/Electricity/NEM/Planning_and_Forecasting/ISP/2018/Integrated-System-Plan-2018_final.pdf)