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Australia

Anna Collyer
Chair
Energy Security Board
*Lodged via: info@esb.org.au*

10/06/2022

**RE: Energy Security Board – Transmission Access Reform – Consultation Paper**

Dear Anna,

Tesla Motors Australia, Pty Ltd (Tesla) welcomes the opportunity to provide the Energy Security Board (ESB) with feedback on its Transmission Access Reform – Consultation Paper. We commend the ongoing effort that the ESB is undertaking to design a fit for purpose access regime, including the detailed stakeholder consultation undertaken to date.

As AEMO's latest modelling has indicated, there is an optimal pathway to an Australian future that is predominantly reliant on renewable energy and storage, and the ESB has a unique opportunity to ensure its transmission access reform is focused on enabling this future through clear, transparent, and market-based signals that support greater investment certainty. Accordingly, our feedback on the proposed models is summarised as follows:

1. **Tesla supports the multiple reforms and policies that are prioritising and accelerating transmission investment (including the Federal Government's 'Rewiring the Nation' fund), however more focus must still be given to addressing barriers preventing non-network options**
2. **Any ESB access reform must recognise the flexibility of battery storage. This must be demonstrated through a clear market signal improvement relative to status quo, which will require the right incentives and rewards to be included as a central element to scheme design**
3. **For operational time-frame solutions, Edify's Congestion Relief Market (CRM) better demonstrates this improved outcome relative to CMM – with direct links to alleviating congestion through dispatch**
4. **In the investment time-frame, our preferred solution is improved information and planning frameworks – avoiding the introduction of opaque connection charges or queues which would dampen investment signals for storage, an asset already highly sensitive to cost uncertainties**

Further detail on each of these points is provided in the response that follows.

Sincerely,

Tesla Energy Policy Team

## 1. More focus must be given to addressing barriers preventing non-network options progressing

As outlined in the ESB's previous papers on this topic, both the actionable ISP and REZ development reforms are critical for streamlining investment in new transmission infrastructure at scale, with resultant generation investment highly interdependent on the outcomes of any access design process. However, as outlined by the AEMC's recent Transmission Investment and Planning Review, there remain a series of barriers preventing non-network options from being equitably assessed through these network planning frameworks (as well as the RIT-T), which will continue to hamper efficient investment and locational decisions for storage[1].

Before (or at the latest in parallel to) access schemes being introduced, the ESB can accelerate network investment under revised network investment frameworks (e.g. NSW's New Efficiency Test), which can remove distortionary barriers to assets that would otherwise unlock greater network efficiency almost immediately - including deployment of grid-forming battery storage to address system strength, alongside market reforms (e.g. TransGrid's system strength rule change) to help solve priority connection and constraint issues. This also addresses the 'chicken and egg' issue, with state governments effectively supporting transmission network operators to build out the network to unlock committed generation – with generators in return receiving REZ benefits (MLF stability, streamlined connection, access to shared storage etc.). We note this will also now be explored and facilitated at national policy level following the Labor Government's commitment to fund $20billion in projects under 'Rewiring the Nation'.

In contrast, if designed poorly or if too complex, attempts to restrict access through medium-term REZ-linked options can result in transmission under-utilisation, dampen investment in renewables and storage, and create asymmetries across REZs and states. A major benefit of the NEM is its uniformity of rules and administrative arrangements. Tesla supports the ESB pursuing a coherent and consistent approach across the NEM where possible, including a consistent approach to access across both REZ and shared network projects.

## 2. ESB access reform must recognise the flexibility of battery storage. This must be demonstrated through a clear market signal improvement relative to status quo

As the ESB rightly identifies, battery storage will be critical to maximising efficiency of the network and supporting a high renewables energy system. Accordingly, a key focus of any access regime should be to ensure adequate investment signals are given to storage proponents, through clear and direct incentives that reward the dynamic and flexible characteristics of storage assets whilst avoiding imposing any additional penalties or barriers.

The benefits of various proposed access approaches to storage have been regularly claimed, but rarely (if ever) demonstrated. Tesla continues to advocate for detailed and instructive worked examples that will demonstrate clearly the impact on storage, such that participants, investors and policy makers can make assessments of potential future outcomes relative to status quo. This is particularly important for 'edge case' scenarios of min/max price caps, recognising that storage can arbitrage against and effectively dampen volatility outcomes in markets. To take one example, it is still not clear whether a storage system would be better off charging when regional reference prices are -$1,000/MW under status quo, relative to receiving local marginal prices plus a congestion rebate under the proposed CMM (unless the rebate itself is always tied to the delta between RRP and LMP).

The ESB Consultation Paper states:

[1] See Tesla submission to AEMC review: https://www.aemc.gov.au/sites/default/files/2021-11/EPR0087%20-%20initiation%20-%20submisssion%20-Tesla.pdf

> *"If there is high local congestion, there would be system-wide benefits for the battery to charge. However, if the RRP is high at this time, then the battery will not have the appropriate incentive to do so. Conversely, if there is little congestion in its area, the current incentives do not encourage battery exports. This reduces the value that batteries can offer to the system, particularly where they are needed to support flexible resources."*

More quantifiable (and granular) data on how often the RRP is actually correlated vs de-coupled with localised REZ congestion would be helpful to support the rationale and justification for more costly to implement solutions. In other words, at a regional level, we can assume that when there is high renewables output (e.g. high solar coupled with high wind) and low load conditions, then the RRP is expected to be low, and so batteries would already face signals that correspond with optimising system-wide benefits (i.e. charge off the low-cost renewables). Conversely, when there is high demand but low renewables output (e.g. at 7pm on a calm, still day) then RRP is expected to be high, and so batteries are encouraged to discharge power. However, it is still not clear how often and where these general dynamics will start to break down at a local level due to sub-regional network constraints and localised congestion.

The Consultation Paper's Figure 9 attempts to capture how the storage investment dynamic and locational decisions may change over time, going on to state:

> *"the current market design treats batteries as if they were generators and does not reward them for the role that they could play in alleviating congestion. Consequently, it makes commercial sense to build batteries in locations where there is plenty of spare transmission capacity – for instance on the sites of retiring thermal generators."*

We agree with this, but note there is nothing inherently wrong with this outcome – as there may be a suite of very rationale commercial reasons for this - i.e. avoidance of HV network connection costs, non-market contracted services with networks (e.g. SIPS, voltage stability, inertia etc), availability of land, ease of deployment, high social licence relative to greenfield sites etc. However, with AEMO forecasting over 50GW of storage out to 2050, it is likely we will need 'all of the above' forms of deployment - i.e. re-purposing of retired thermal plant sites, storage co-located with renewables in REZs, as stand-alone systems at the boundary of REZs, and spread throughout the distribution layer (both in-front and behind-the-meter). Therefore, under the simplified Figure 9 scenarios, we could still expect that a nearby battery charges due to RRP being low due to abundance of solar and wind (i.e. its midday and the REZ output is complemented by rooftop PV output at the load centre); and could be complemented by a co-located battery within the REZ to act as virtual transmission / provider of network services required in the REZ (i.e. system strength and voltage stabilisation) that avoids, defers or complements other 'traditional' network solutions (e.g. syncons, transmission line upgrades). In theory, it seems a REZ planning framework (e.g. NSW's Roadmap or Victorian REZ Development Plan) would drive this outcome more directly than any potential congestion market uplifts to locational signals.

Importantly, whilst the ESB regards efficient signals for storage as a key objective for transmission access reform, it is likely that any signal from a congestion market would likely be overshadowed by contracted revenue streams - e.g. state jurisdictional programs or network-led procurement of essential system services, and an update to the RIT-T to make it fit for purpose such that non-network solutions can compete with traditional network build-out on an equal footing (as noted above).

Integrating with Access Schemes

The ESB must also ensure the design of an access scheme is flexible enough to recognise storage for the multiple roles it can provide. Storage should be exempt from any generator access requirements (acquiring rights, rebates, or paying compensation) – as this will only hamper investment and distort locational signals further. Storage plays multiple roles in addition to time-shifting energy services (providing system strength, inertia, MLF management & voltage support), has flexible and fast deployment, and enables additional connections, all whilst mitigating congestion. Mandating that standard generator congestion charges apply bluntly to all new storage assets risks unfairly disincentivising storage projects to locate within REZs, could severely undermine their business case, and will limit flexibility and provision of essential system services.

An effective access regime will recognise the benefit of storage as a generator, load, system service and network provider, and avoid introducing additional barriers or disincentives to uptake. In market dispatch, a large share of storage participation is in ancillary and system services – so careful consideration is needed to avoid solving thermal capacity congestion issues whilst creating system security issues (or not rewarding for their resolution). Care must be taken to overcome existing investment barriers without introducing more in REZs – e.g. potential costs from access rights, low capacity thresholds, or additional operating restrictions – otherwise storage projects will simply locate elsewhere in the shared network (given their much greater deployment flexibility and relatively streamlined network connection).

The Victorian REZ Development Plan provides a useful comparison framework that positions storage as an enabler for renewable connections, rather than treating it as additional generation capacity. With this lens, it is critical that storage is exempt from any restrictive capacity threshold requirements or obligations to purchase access rights (or compensate generators who have) if a CMM type model is progressed.

Whilst Tesla is generally supportive of the broader AEMC approach to create new market signals and ultimately unbundle and value services (provided non-network and asynchronous solutions are afforded an equal playing field to incumbent technologies), there does not appear to be strong and direct signal for storage as the CMM is currently conceptualized. Rewards should not just be the avoidance (or rebate) of penalties to slightly lower charging costs (noting storage is already increasingly being paid to charge and the prevalence of negative price events will only increase). Instead, an effective model should directly and proportionately incentivise and compensate for the provision of congestion relief services (see comments on Edify model below).

## 3. Edify's CRM Model better demonstrates improved operational signals (vs status quo), but should not be dampened by additional costs for REZ access or as being considered in the investment timeframe

Tesla continues to recommend Edify's proposed 'Congestion Relief Market' (CRM) model[2] as an elegant real-time solution that includes new constraint equations and relevant adaptations to NEMDE to directly incentivise congestion relief providers (e.g. battery storage) to be dispatched. Notably the CRM avoids the inefficient approach of the ESB's CMM that proposes to 'smear' congestion costs and rebates across all participants through out-of-market constructs. Another key benefit is the ability for the CRM to immediately solve for congestion on the shared network in an efficient and transparent way, whereas introducing CMM tied to REZ areas is insufficient and does not address non-REZ located generators contribution to network congestion (i.e. free-rider issues). Finally, we are unsure of the equity of

[2] https://web.archive.org.au/awa/20211005080356mp_/https://energyministers.gov.au/sites/prod.energycouncil/files/publications/documents/28.%20Edify%20Energy%20Response%20to%20P2025%20Market%20Design%20Consu ltation%20Paper_0.pdf

introducing a CMM type scheme that automatically rebates incumbent generators at the expense of potentially more competitive new entrants.

Beyond the well-articulated benefits in Edify's ESB submission, we provide the following additional points for consideration:

- As a flexible and multi-use asset, battery storage benefits greatly from dynamic and granular price signals with which to optimise power and energy for each interval. Having a spot market that values locational constraint relief is likely to be much more transparent (on volumes and price) and essentially can form another component to the value stack of storage. In practice, this would drive deployment of stand-alone storage and/or co-located storage at renewable sites located in heavily congested nodes of the NEM. However, this would require some form of 'market making' to ensure liquidity is maintained and to prevent potential gaming or inefficiencies occurring.
- We note that a NEM wide approach such as CRM can be easily integrated into the jurisdictionally based REZ schemes (e.g. congestion relief payments can be layered onto NSW, Queensland and Victoria's proposed REZ models, despite the different approaches being progressed for REZ access) without the complexity that double access and rebate rights may have if the CMM is progressed (and subsequent imposts on capital costs for investors due to the additional complexity).
- Despite AEMO's historic reluctance to 'open up NEMDE', we recognise the benefits will outweigh the costs, and in our view the ultimate clean-ness of the design as a pure market mechanism warrants dispatch engine changes. More detail on implementation costs would be helpful here, as costs used during COGATI appear to over-inflate figures when compared to other system changes occurring (e.g. new FFR markets)
- Inherent in the design of a CRM is the level of control given to AEMO (and network system providers) to correctly formularise constraint equations and determine congestion relief contribution coefficients fairly. A key risk in practice would be of a conservative bias against new technologies (such as grid-forming inverters) in place of familiar technology (such as synchronous condensers). The ESB may need to explore guard-rails to ensure decision makers remove these biases and consult with industry to accurately reflect the capabilities of new technologies and services.
- Importantly the CRM recognises the value of not just thermal capacity constraint relief, but system stability and system strength related constraint relief – relying on new studies to underpin related constraint equations. As noted in Edify's ESB submission, the CRM "incentivises and enables generators that are facing significant levels of curtailment to unlock lost generation by either purchasing services to store it, or by purchasing proportional levels of power system stability improvements to release it."

4. **In the investment time-frame, ESB's focus should be on improving information flows and planning frameworks - avoiding the introduction of opaque connection charges or queues which would dampen investment signals for storage, an asset already highly sensitive to cost uncertainties**

As an immediate improvement in the investment time-frame, Tesla supports ESB exploring enhanced information provisions that will facilitate better locational decisions for all generators. For example, NSPs and AEMO could provide detailed forecasts on current and expected congestion (using bottom up information through the ISP), with an output that could form the basis of a NEM wide 'heat map' or traffic light system as suggested by multiple stakeholders. To be clear, our view is that there is no need for connection charges in the near term under this model.

If the ESB does end up progressing a fee-based model, we support the principle that storage providers that commit to operating in ways that alleviate congestion could be exempted from the obligation to pay a connection fee, or even offered a negative fee.

This ties to the broader design element, whereby additional locational incentives for storage (or dynamic load) should appropriately recognise contribution to congestion relief - i.e. negative fees, or upfront payment incentives for congestion service, coupled with ongoing real-time market incentives (e.g. as proposed under the CRM). This approach also aligns with proposed system strength rule change that could see storage facilities procured by TNSPs and be eligible for ongoing system strength or network service contracts.

Tying it all together

From a prioritisation perspective, operational solutions are more valuable than investment reforms, which are necessary, but insufficient and therefore should be considered as an accompaniment to any arrangements seeking to introduce more efficient incentives in operational timeframes first. We recommend against imposing direct operational restrictions, but relying on existing market signals which provide valuable optimisation signal for what service is most valuable across what interval - and avoids risk of distorting these efficient signals and creating perverse outcomes where a storage system is locked out of providing valuable firming service during a peak price event - to detriment of reliability outcomes.

As a broader, and more general point for storage (noting the framework barriers identified above), Tesla recommends the ESB continues to progress a unified framework to assist jurisdictional coordination of central storage assets that would de-risk entire REZ schemes by incentivising scale efficient storage deployment in the near-term. This will help to address existing barriers and ensure delivery of location specific services (e.g. system strength and SIPS N-1 protection) that cannot be easily or efficiently provided from other assets on the shared network. Centralised grid-forming battery storage could also streamline the connections process by delivering system strength, inertia, and other services in a coordinated way, allowing transmission network operators and AEMO to progress necessary grid studies in advance of connection – this will further incentivise generation projects to locate within REZs and could progress ahead of an NEMDE changes required to embed the CRM model proposal.