MASTER ELECTRICIANS AUSTRALIA

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POST 2025 Market Design

Master Electricians Australia

Submission

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Introduction

Master Electricians Australia (MEA) is the trade association representing electrical contractors recognised by industry, government and the community as the electrical industry's leading business partner, knowledge source and advocate. Our website is www.masterelectricians.com.au

The current issue being considered by the Energy Security Board (ESB) is the nature of the grid post 2025. The future course of energy investment and operation is at a turning point. The shift to new technologies and renewables is happening at speed. Australia's power system may well, and we argue should, become the most decentralised in the world. Consumers and producers are taking up renewable opportunities. Consumer choices are driving structural change in the rapid spread of rooftop solar, smart appliances, inverter-based resources (IBR) and other distributed energy resources(DER). Grid-scale renewables are equally important and penetrating the market as State Governments set 50% renewable targets however of utmost importance is the stability and reliability of the network.

In examining the ESB report MEA would highlight some important features that we believe have been seriously undervalued in the post 2025 market paper.

1. 2.6 million PV systems the vast majority of which are currently passive in the network.
2. The opportunity to orchestrate customer storage devices as an option.
3. Location of consumer owned DER and IBR on the network.
4. Vast increase in smart network appliances, storage and ability to control those devices
5. Strata title properties which are effectively locked out of renewable market
6. Little consideration for market operators to coordinate / orchestrate the 2-way nature of the network.

Resource adequacy and aging thermal generator retirement.

MEA is strongly supportive of ensuring that the network is reliable, cost effective and meets all demand. Base load generation, of whatever form, must continue to support the increasing intermittent power being supplied. Base load capacity will move to a supportive role to ensure the network continues to be reliable as dispatchable power intermittency requires more responsive and instantaneous support than what coal generation currently requires. Network frequency variations can be caused by adverse supply events of either base load or intermittent renewable energy generation. The maintenance of frequency can be maintained by either of the forms responding to the others adverse events, however currently base load responsive source such as gas or storage are the more likely to be able to respond with sufficient speed as to ensure the continuation of the network if coal or renewables drop out of the network.

Essential System Services, scheduling and ahead mechanisms

The ESB paper identifies that the four main areas for concern are frequency, operating reserve, inertia and system strength. MEA recognises that inertia and system strength are not a feature that renewable energy, DER and IBR can easily replace and as such support the base load synchronous generation that needs to be retained to ensure the network.

MEA does support however that renewable and intermittent energy sources, IBR including storage can provide significant access and support in the network for frequency control and in our view, operating reserve. MEA also believes that in the longer term IBR either Grid connected, or Consumer based may assist with system strength if the AEM and DNSP work and incentivise consumers to turn passive generation into active and responsive generation controlled.

MEA is concerned however upon examination of the system strength interactive map on the AMEO website (https://www.aemo.com.au/aemo/apps/visualisations/map.html) South Australia and Victoria even in 2034 – 35 continue to have a worrying low level of system strength and in our view that in the next 15 years the ISP makes no discernible improvement in either of the 2 states in relation to system strength. Some may even argue that the overall representation of system strength across the eastern NEM overall reduces during the same time period.

Integration of Distributed Energy Resource and demand side participation

MEA recognises that the ESB is considering the role consumers play in the market with DER and their participation on the demand and supply side. MEA highlights the incongruence that the ESB in considering. In section 4 of the report the ESB wishes to reward and ensure consumers are protected, however section 5 of the report, Transmission and Access, has implemented an additional cost and disincentive for consumers with the imposition of a generator charge.

The ESB report highlights but does not quantify the increasing resource and penetration of DER and IBR in the medium to long term. For the purpose of these submissions, we will make a distinction that IBR are able to be controlled by a third party such as a DNSP or retailer and that DER are an asynchronous resource with no third-party control ability.

Battery technology, smart appliances, and resources (IBR) are increasing in number, size and affordability and are more frequently becoming controllable by third parties. Significantly as reported the 2.6 million PV system are considered largely passive and not currently available for control by a third party. The potential for customer led storage to become incentivised and a significantly controlled asset for network operators we believe is a missed opportunity. The rectification work required to ensure close to 100% of storage to become a partially controlled assets by the network does not appear to have been examined whilst the report points out stored renewable power is important to stabilise both frequency and operating surplus. If consumers are incentivised correctly by AEMO and DNSP to engage with and allow management of the grid we believe significant savings could be achieved.

A significant program to add storage to existing PV arrays will reduce the defect of negative demand, support the grid during peak times and have surplus storage to support customers during outages. A deliberate strategy will allow for increase saturation of affordable PV to all Australian Households.

In addition, electric vehicles will be a feature in the future. Based on vehicle sales in 2019, 70% of all passenger and suv will be electric vehicles by 2040, sum 800,000 vehicles. The Tesla 3 has a battery capacity of 82Kwh[1] where a Tesla Power wall can hold a up to 14Kwh[2].

[1] https://www.electrive.com/2020/11/11/tesla-model-3-greater-range-from-bigger-batteries/

[2] https://www.tesla.com/sites/default/files/pdfs/powerwall/Powerwall%202_AC_Datasheet_en_northamerica.pdf

Vehicle batteries will add up to 6.56 GWh to the network storage in an integrated home system by 2040 each year in 2040. This arrangement will effectively give homes up to 100Kwh of DER/IBR to be utilised 24 hours day 7 days a week. All of which will be located strategically in the network where its directly and responsively needed. Special consideration should be given to the habits of the majority of homeowners. Many will travel to a workplace during the day, an opportunity should be available to connect to the grid in many locations supporting the negative demand during the middle of the day and returning home at night and supporting the grid during the peak. Innovative new tariff structures should encourage the availability of vehicle storage for grid support.

Significantly with 100kwh hours in homes (car plus battery storage) it is foreseeable that if the wrong market environment is created consumers will withdraw totally from the network as they will rely on their own generation and storage. As an example, an average household using 8000kwh[3] hours annually average 22kwh per day. The result of a household with generation supply to last approximately 5 days based on the 100kwh system. If consumers add a small emergency generator there will be no need to interact with the grid, retailers or network providers. MEA members are increasingly quoting on and supplying said standalone systems (without vehicles) even based on much smaller systems of 30Kwh. If incentivised correctly by AEMO and DNSP to manage the grid with consumer packages for allowing control will result in a much more efficient and decentralised system.

The ESB paper does highlight that communication protocols for DER/IBR can vary but only poses this as a possibility. The market is already suffering from a lack of consistency nationally with South Australia Victoria and Queensland well advanced in their implementation and each state implementing a different IEC standard for communication with DER / IBR. The ESB and AEMR need to ensure that the national market operates as a national market, divergence on these basic questions will adversely affect consumers and retailers if communication protocols of equipment are not standardised across the market. We have 12% of the nation's population in border communities alone and such divergence will incur significant additional cost and lack of market mobility that will discourage investment and competition.

The ESB has highlighted in the paper that Retailer/ aggregators will be important to ensure that the economies of the energy market are fulfilled. MEA has highlighted the opportunity for consumers so its imperative that interventions by the market operator are not adversely affecting consumers and disincentivising them to seek alternatives.

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3 https://www.mountalexander.vic.gov.au/files/Environment/What_is_a_Typical_Energy_Consumption_Presentation.pdf

The ESB report does contemplate DER / IER market where these devices are network participants can make full use of them however the perspective seems to be limited to a situation whereby retailers and aggregators are used for simple retail activities possibly between consumers or group of consumers. It seems logical that DNSP with direct control (possibly through retailers) of these assets would be more beneficial. There are a number of moving parts to the network both now and in the future however what is missing is that all of these well intentioned and ready assets are not being controlled and utilised in the best possible way.

The report states that a growing number of storage devices are available so its imperative that the Network operator be able to conduct the demand and supply load to ensure that all 4 major competing sections of frequency, inertia, security and generation excess are available as quickly and coherently to deliver market reliability. MEA sees that the ESB has not placed enough emphasis on the orchestration of the different demand and supply assets that would achieve not only a better outcome and cheaper energy but with reduced and more diverse geographical investment. We will return to this point later in our submission.

Transmission and access

The ESB has highlighted the network is evolving into a two-way transmission network. MEA agrees that energy be supplied at a lower overall cost with a set of targeted investments. The ESB paper seems to focus on the development of and integration only for large transmission of renewable energy from large renewable assets such as solar/wind farms in the Renewable Energy Zones that currently have no or reduced amount of transmission lines. According to the AEMO publication 2020 ISP Appendix 5 the REZ investment of 30 candidate REZ upgrades up to 2040 will be somewhere between $23.095 billion and $7.750 billion[4]. The ISP has settled on 19 of the 30 possible projects however given many projects had multiple augmentation costings final accepted plans have not been identifiable by MEA and therefore projected costings do not seem available.

MEA proposes an economic case should be tested to divert a portion of the funding proposed for large transmission to support customer led storage with the capacity of orchestration as an incentive. Put plainly, incentives are available for homeowners to support storage or vehicle storage on the condition a portion of the capacity is available to the DNSPs to orchestrate to reduce negative demand and support the grid during peaks. MEA believes the investment would have a significant effect on the requirements to increase the capacity of ‘old school’ transmission models.

[4] https://aemo.com.au/-/media/files/major-publications/isp/2020/appendix--5.pdf?la=en

Export tariff charges

The ESB has proposed to introduce a tariff for generation by DER owners and consumers. The proposal has significant issues that will adversely affect the industry and cause more confusion than required. The issues that MEA sees in this area include.

- The significant length of time before certainty is realised about the level and implementation of export charges.
- It is unclear as to who will incur the cost of export charges
- Will export charges apply equally to all generators regardless of size ownership and operation?
- Will consumers be worse off when there is no guarantee that their generation export will exceed the charges installed?
- What is the effect on virtual power plants?

Significantly the ESB proposal will discriminate against those who are generating in high congested areas and foreseeable give an advantage to generators in areas where ISP has planned investment to improve access to new projects.

This disincentive should only be applied to those who refuse to engage with an orchestration plan. Those who are supporting the grid should not pay a Levi for increase transmission requirements.

Orchestration

MEA has identified that the paper has not adequately considered the advantages of alternative strategies in the form of coordinating or "orchestrating" network assets particularly those of consumers.

Consumers with appropriate incentives, as shown in the South Australia, have adopted and adapted new technology and are currently approaching 20,000[5] privately owned batteries or 200 MW hours of additional storage.

The paper stats that many of the 2.6 million PV systems are "passive" however MEA suggest these could be efficiently altered to enable consumers PV systems to become DER/IBR controlled via the network operator. The Network operator should create tariff incentives to allow control of the assets and if paired with a battery / storage device assign control etc from the consumer to the operator.

Australia has the most decentralised energy system in the world. The ESB paper suggests significant investment is needed for transmission, misses the opportunity to engage with an

established 2.6 million PV customers. MEA believes that the orchestration of assets now and those that can be engaged in the future is a wiser investment. The current action for transmission enhancement should continue for currently planned and approved renewable projects however the longer-term investment in significant transmission for potential assets seems misplaced compared to expenditure on assets already in the marketplace. When observed objectively the report is shifting from a centralised hub of coal fired generation to a slightly more decentralised hub of renewable generation that requires replicating past behaviours and not investing in the network to really be its own decentralised generations storage and emergency response mechanism supplemented by base load dispatchable power.

Access by Strata Title holders to PV systems, more support and money invested in changing passive to DER/IBR system that allow DNSP to manage all of the grid reactions but particularly those of frequency, surplus generation and security.

Conclusion

MEA acknowledges some of the transmission/distribution stability and security concerns but believes the paper does not use or value the significant opportunity to use customer led orchestrated storage and the impact it may have on reducing the need for significant additional investment in transmission. MEA strongly recommends an economic case is tested on the level of incentives required to offset transmission investment.

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https://www.premier.sa.gov.au/news/media-releases/news/next-step-in-home-battery-scheme-as-battery-prices-fall