

30 September 2019

COAG Energy Council Secretariat
Department of the Environment and Energy
GPO Box 787
CANBERRA ACT 2601

Submitted via email: info@esb.org.au

Dear Sir/Madam

Re: Response to Post 2025 market design issues paper

Thank you for the opportunity to comment on the Energy Security Board's Post 2025 Market Design Issues Paper published on 2 September 2019. This letter outlines a submission from the International Microgrid Association.

The COAG Energy Council requested advice from the Energy Security Board (ESB) regarding a long-term, fit-for-purpose market framework to support reliability so as to meet the needs of future diverse sources of non-dispatchable generation and flexible resources, including demand side response, storage and distributed energy resource participation.

This submission identifies the opportunities, challenges and risks that need to be considered as the project looks to identify market design options for microgrids and the implications for market design resulting from microgrid opportunities, and the associated challenges and risk. It is understood that feedback received on the Issues Paper will inform the development of the next phase of the post 2025 market design project.

About International Microgrid Association

The International Microgrid Association's vision is to unite organisations who are committed to building global microgrid capability by integrating emerging energy and information technologies to generate, distribute, and consume energy more efficiently, cleanly, and cost-effectively.

Our members are representatives from the global microgrid value chain, including microgrid designers, developers, utilities, technology providers, manufacturers, capital providers, project developers, research organisations and governments.

Overview

Across the globe, the energy industry is witnessing increased penetration of distributed generation resources, such as rooftop solar PV, energy storage, and microgrids – which are small-scale versions of a centralised electricity system.

For most of the past century, electricity systems have experienced gradual change. Electricity has flowed in one direction from centralised utility scale fossil fuelled generation to consumers. Electricity systems were predominantly comprised of long lived and expensive generation and network assets. However, over the past 10 years, those same electricity systems have been forced to confront a transformational period of change. The widespread adoption of distributed energy resources (DER) such as rooftop solar PV and small scale energy storage and energy-efficiency efforts have led to declining asset utilization rates. This has forced the traditional electricity industry to re-evaluate the way it manages and invests in the electricity network.

Given the anticipated growth rate of DER, within the next five years, whole regions of a traditional electricity system will need to be transformed such that they are capable of operating securely, reliably and efficiently with conceivably 100% of instantaneous demand met by DERs. While central generation is expected to continue to provide supply at higher voltage transmission levels, DERs located at the opposite end of the power lines, and even behind electric meters will more than provide for the energy needs of distribution connected residential customers. Given the need to also maintain the whole system with it's technical operating limitations (e.g. voltage and frequency), this presents monumental technical challenges for systems that were designed and built for an entirely different purpose.

Industry Trends

Historically the electricity system was managed using a combination of manual controls, supervisory control and data acquisition (SCADA), and distribution management systems (DMS), which provided basic information and control to system and network operators.

These systems enable the management of traditional capabilities such as voltage, reactive power (VAR), and monitoring of power flow, but they were designed to support centralised generation and very limited amounts of renewable resources, and of course, DER. As DER penetration levels increase, utilities and power system operators must look to new control solutions.

SCADA, DMS, and remote microgrid control providers are thus adapting their systems to de-centralised assets with often unpredictable and intermittent generation profiles. Because system monitoring and control solutions are still based on a centralised framework, they prevent operators and owners from fully leveraging the capabilities of distributed generation. This, in turn, hinders the development of new value streams and system optimization opportunities derived from DERs' inherent scalability and flexibility.

As DER systems expand and proliferate, all actors in the power system (distribution networks, retailers, generators, third-party aggregators, communities, and end-customers) want the value they contribute to it, or the reasonable costs they add to it, to be recognised. A platform is needed to manage as a coordinated and efficient system such diverse assets as solar, wind, energy storage, combined heat and power, and conventional generators.

If implemented correctly and integrated properly with existing monitoring and control systems, distributed energy resource management systems (DERMS) will facilitate higher amounts of DER, lower overall system costs, and create new value streams for other local utilities, consumers, service providers, developers and site owners.

Value of DERMS

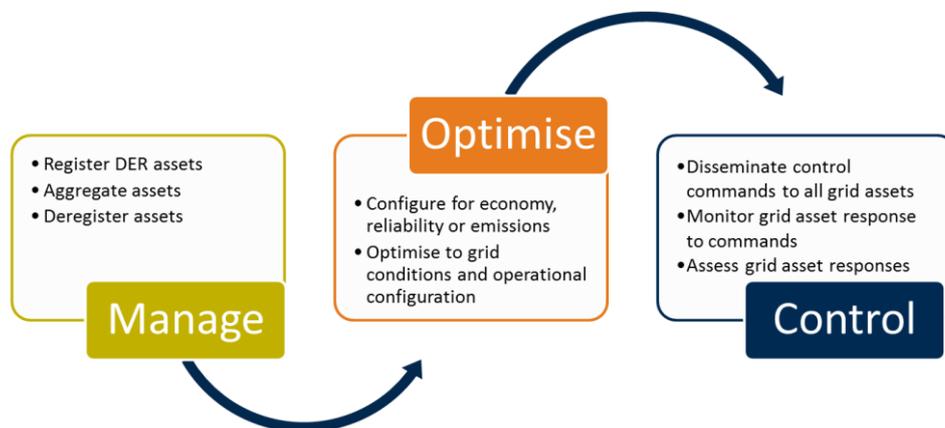
In the future, energy markets will compensate DER owners who provide valuable services to the electricity system. Incentives and financing mechanisms will create new opportunities and business models that spur the installation of additional distributed generation. With customer protections and regulatory arrangements in mind, DERMS solutions must be allowed to adapt to ensure that DER add value, not just shift costs from one user group to another. As policies and regulation change, a

DERMS must be able to extract from the same underlying architecture and DER capabilities values that simultaneously complement different business strategies.

Across the industry, power purchase agreements (PPAs) continue as an important financing instrument for clean energy projects. PPAs between an electricity generator (seller) and retailer (buyer) of electricity, typically establish terms to help both parties deal with uncertainties and volatilities around energy cost and supply. New customer level incentives and financing mechanisms will create new business opportunities and models to encourage the efficient installation of distributed generation.

As an example, virtual power plants (VPPs), establish a virtual version of either generation or load. In many areas, VPPs are moving from the early adoption phase to a more mainstream phase. As this happens, the underlying regulatory environment needs to encourage grid-friendly behaviour and appropriate incentives.

Policy changes must support DERMS solutions to ensure that the DER is adding value, not just shifting costs from one user group to another. DERMS platforms will undertake the following roles:



- **Aggregate** – take services from individual distributed energy resources and aggregate them in a manageable number
- **Organise** – manage DER settings and provide simple grid-related services
- **Optimise** – harness the multitude of DERs economically and enhance reliability
- **Translate** – communicate to many resources that may use different communication protocols, but interface cohesively through DERMS.

The International Microgrid Association considers that DERMS platforms will provide the following benefits:

- **New business models** – encourage new product and service development and new revenue streams from these offerings
- **Customer empowerment** – provides customers with choice of services, through which customers can sell back to the grid
- **Economic value** – reduces cost of ownership while increasing reliability, efficiency and overall system utilisation. Exposes resources to a larger market at the distribution level
- **Regulatory flexibility** – allows jurisdictions to implement higher penetration of DERs, while maintaining power quality within prescribed limits
- **Societal value** – reduces emissions with prolific deployment of DERs and improves management of renewable intermittency and volatility.

Path Forward

Electricity network businesses and system operators are coming under increasing pressure to cope with variable generation resources that they don't own and can't operate or control. Increased frequency, voltage and economic volatility has become the norm. With the introduction of stable and mature DERMS products readily available in the marketplace today, distribution network businesses should be able to start to address these challenges. However, they are constrained in their ability to efficiently invest in these technologies due to the prevailing regulatory arrangements. These constraints can be relieved with the appropriate policy settings for the market and regulatory arrangements.

The bottom line is that this is not new science. Products are available today for immediate deployment. The time for trials and pilots is over.

Subsequent to the publication of the Issues Paper it is noted that on 26 September 2019 the AEMC released the report *Integrating distributed energy resources for the grid of the future* in which they call on distribution network businesses to lead implementation of major reforms urgently to open the way for renewable energy and avoid the need for significant new network investment. The International Microgrid Association supports the AEMC giving energy businesses more tools and opportunities to understand the impacts of these new technologies on their networks. We encourage the Energy Security Board's Post 2025 Market Design to work in tandem with these reforms.

Recommendations

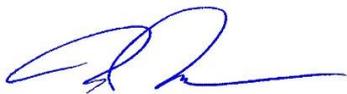
The International Microgrid Association recommends that the market and regulatory arrangements need to continue to evolve to provide incentives to deploy innovative measures to:

1. enable electricity system operators and retailers to work directly with DER owners
2. offer tariffs that properly reward owners of assets for the services they provide to the electricity system, and ensure that costs are appropriately allocated to the users of the electricity system.

These changes to the market and regulatory arrangements need to be put in place well before 2025 but importantly must be consistent with and support the post 2025 market design.

If you have any questions or would like to discuss any of these matters further please do not hesitate to contact me.

Yours sincerely



Terry Mohn
Chair