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Dear Ms Cusworth

2017/18 WHOLESALE ELECTRICITY MARKET REPORT FOR THE MINISTER

AEMO welcomes the opportunity to provide this submission in response to the ERA's Discussion Paper for its Report to the Minister for Energy on the Effectiveness of the Wholesale Electricity Market (WEM) 2017/18. AEMO supports the yearly review on the effectiveness of the market and the role it can play in ensuring the WEM continues to serve its stakeholders and consumers. AEMO suggests that the scope of the report could be extended to capture some of the other significant challenges and opportunities that the power system and market are experiencing. AEMO has highlighted some of these challenges and opportunities in this submission and of the need for urgent action including progressing with WEM reform.

The changing energy landscape

The energy sector in Australia is undergoing unprecedented transformation in rate, scale and scope. Some of the core factors changing the way AEMO manages the WEM include:

- **Continued changes to the daily profile of electricity consumption** reflected in more pronounced morning and evening periods of peak demand and ramping more steeply on either side.
- **Consumers becoming more active in their energy supply with increasing penetration of distributed energy resources (DER)**, which are now collectively the largest energy source in the WEM.
 - Over 1,000 MW of rooftop solar photovoltaic (PV) is installed behind the meter.
 - AEMO's 2018 *WEM Electricity Statement of Opportunities (ESOO)*¹ forecasts the installed rooftop solar PV DER to more than double by 2028, to 2,400 MW.

¹ Refer to https://www.aemo.com.au/-/media/Files/Electricity/WEM/Planning_and_Forecasting/ESOO/2018/2018-WEM-ESOO-Report.pdf.

- **A changing wholesale electricity supply mix** with around 900 MW of new large-scale renewable generation forecast² to connect to the South West Interconnected System (SWIS) in the coming years. This is expected to be new lower cost and low emission providers of energy³, in a context where traditional thermal generation is ageing and reaching end of economic life, and synchronous generation is dispatched at reduced levels.
- **Increasing complexity of the WEM.** The initial WEM design was relatively basic, but the complexity has progressively increased through incremental changes since its commencement in 2006. In general, these incremental changes have been aimed at improving the overall efficiency of the market and better supporting the market objectives.

The landscape is changing; system security and market effectiveness challenges, opportunities and solutions are emerging:

- The SWIS is experiencing continued rapid growth of both utility-scale renewable resources and DER. The existing 1,000 MW of rooftop solar PV DER has reduced emissions, reduced power bills for its owners, and can already serve over 50% of the native demand in the SWIS at times of low demand, yet it is not centrally monitored or controlled, is variable in its output, and does not respond autonomously to contribute to the secure operation of the system.
- As the levels of installed DER grow, the minimum operational demand in the SWIS is declining and low operational demand levels are occurring more frequently. The changing profile of the operational demand is resulting in greater movement of the output of scheduled generators, including coal generators.
- With the increasing penetration of DER, the market is experiencing increased occurrences of negative pricing, particularly during the daytime. Whilst placing downward pressure on wholesale prices is beneficial in the short-term, this may be unsustainable in the longer term as generators may be compensated below their short run marginal cost. Increases in negative pricing will challenge the economics of synchronous generation, potentially compromising the availability of essential ancillary services required to ensure system security and reliability.
- The changing supply mix, combined with the islanded nature of the SWIS, means that at times of high DER output and low demand, there are increasing challenges in controlling voltage given the generation that has been dispatched, to achieve the most economically efficient outcome.
- As more large-scale asynchronous renewable generation enters the market in these conditions, and dispatchable synchronous thermal generation is dispatched less frequently, the availability of system security services such as inertia, frequency control, system strength and voltage control traditionally provided by synchronous generators will need more active management and ultimately provision by alternative resources.
- Due to the variable output of renewable generation and DER and the reduced dispatch of synchronous generation, more frequent real-time matching of total system generation with total system load will be required. This is likely to increase the cost of ancillary services.

² Refer to Western Power's media release <https://westernpower.com.au/community/news-opinion/western-power-green-lights-900mw-of-new-green-energy>.

³ The GenSet 2018 report by CSIRO and AEMO confirms that solar and wind generation technologies are currently the lowest-cost ways to generate electricity for Australia, compared to any other new-build technology. Refer to <https://www.csiro.au/en/News/News-releases/2018/Annual-update-finds-renewables-are-cheapest-new-build-power>.

- As the profile of operational demand continues to change, increased management of demand variability, such as through ancillary services, will be required due to more frequent and rapid fluctuations (ramping up and down). This may also affect the operation of generation facilities that are not designed for frequent changes in output as they are likely to face challenges, leading to additional maintenance requirements, a reduced economic return, and potentially higher failure rates.
- Improved DER visibility and options for the direct or aggregated control of DER and/or participation of DER in the WEM, is needed. This will allow AEMO to manage these generation sources as part of maintaining power system security and reliability, and will reduce the need for ancillary services and/or provide alternative resources for the provision of system security services.
- Emerging technologies – such as energy storage and enhanced inverter capabilities – have the potential to play an important role in the economically efficient, safe and reliable management of power system security within technical limits. Careful consideration of technical standards and regulatory and market constructs is required to implement and incentivise these technologies in a secure and efficient way in the SWIS.

AEMO is working to manage these challenges, future risks and opportunities within the current framework. However, significant change is required to do this effectively, with the Public Utilities Office's (PUO) WEM reform program providing the key platform to facilitate the energy transition in Western Australia.

Increasing challenges in forecasting for operation and investment

AEMO welcomes the consideration of forecasting challenges in the discussion paper and agrees that forecasting is becoming more difficult, both in long-term and short-term timeframes. Robust, accurate forecasts are vital to enable efficient decision-making by industry participants that can minimise the long-term cost of electricity.

AEMO considers that a range of measures will be needed to support **short-term** forecasting in the face of increased variability of both supply and demand. These include:

- increased automation in the WEM's market and dispatch processes to support later gate closure and five-minute dispatch cycles;
- stronger incentives for market participants to assist in managing variability, including through the service specification, pricing and cost allocation for ancillary services;
- improved visibility of DER through a comprehensive register of these resources; and
- new opportunities and incentives for end consumers with DER to participate in the WEM (including through aggregators), encouraging these consumers to operate their devices and offer services in predictable ways that contribute to the achievement of reliability and security standards and improved market outcomes.

The PUO's current WEM reform program provides the best opportunity to implement these measures in the short-term, and is the only program of the required scale underway.

Transparent, timely **long-term** forecasts of both demand and supply are also vital to underpin investment signals. AEMO's annual ESOO provides 10-year forecasts of electricity demand. However, existing rules limit AEMO's ability to provide transparent supply forecasts that capture future

investment and retirement.⁴ With negligible growth in electricity demand and governments considering policies to reduce carbon emissions, transparent forecasts of the timing of generation retirement is critical to support efficient and timely investment.

The PUO has proposed new obligations for market participants to provide at least three years' notice prior to retirement of generation facilities.⁵ While this will provide valuable confirmation of retirement intentions, AEMO considers there would be benefit if this measure is supported by requirements for market participants to advise AEMO of the expected closure year for each of their generation facilities larger than a particular threshold, and for AEMO to publish a register of these participant-provided closure years. This register would strengthen long-term investment signals by providing earlier (albeit less firm) notice of retirement intentions, and would be superior to speculative closure dates derived by AEMO. AEMO is currently preparing to implement such a process in the National Electricity Market following the recent approval of a rule change.⁶

Effectiveness of the market mechanisms in the WEM

AEMO acknowledges that the WEM reform program aims to address several of the above issues that affect the overall effectiveness of the WEM.

AEMO strongly supports a competitive market and one that avoids discrimination against diverse energy options and technologies, as this will ultimately minimise the long-term cost of electricity. AEMO is actively supporting the WEM reform program to ensure that some of the fundamental changes necessary to facilitate the energy transition are implemented effectively, so that power system security and reliability is achieved over the long-term, ideally as efficiently as possible.

AEMO notes that the ERA's analysis, which is focused on wholesale electricity prices in the Short Term Energy Market and the Balancing Market, has found that 'wholesale electricity prices continue to rise in spite of downward pressure from demand and fuel prices' (p.6). The ERA suggests that market power, a lack of competitive pressure, and the use of gas-fired generation could be contributing factors (p.11).

While AEMO recognises that these prices may form the basis of power purchasing agreements and are eventually passed through to consumers, wholesale energy prices represent a relatively small component of the costs borne by the WEM. As shown in Figure 1, the value of the energy traded in the Balancing Market represented approximately 26 per cent of the total market quantity settled by AEMO in 2017/18.

⁴ Clause 4.5.7 of the Wholesale Electricity Market Rules requires AEMO to treat information provided by rule participants (or voluntarily provided by non-rule participants) to support the preparation of the ESOO as confidential unless the provider grants permission for the information to be released or as otherwise provided in the WEM Rules.

⁵ Department of Treasury, Public Utilities Office, *Improving Reserve Capacity pricing signals – a proposed capacity pricing model*, Draft Recommendations Report, pp.38-39, 22 August 2018, http://www.treasury.wa.gov.au/uploadedFiles/Site-content/Public_Uilities_Office/Industry_reform/Draft-Recommendations-Report-Improving-Reserve-Capacity-pricing-signals.pdf.

⁶ Details of the rule change are available at <https://www.aemc.gov.au/rule-changes/generator-three-year-notice-closure>.

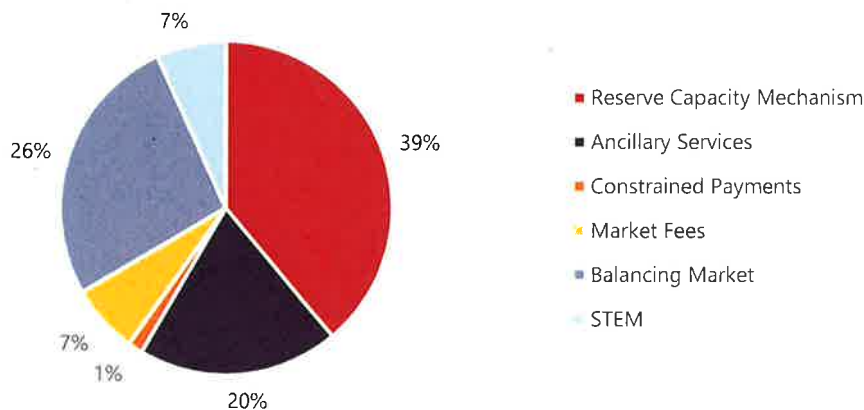


Figure 1 Value of Wholesale Electricity Market quantities settled by AEMO

In analysing the long-term cost of electricity supplied to consumers, AEMO suggests the economic effectiveness of the other mechanisms in clause 2.16.12(b) of the WEM Rules could be explored by the ERA in its annual review. This would provide further insight to market participants, provide a more comprehensive view of the effectiveness of the current WEM design, and support data-led decision making. AEMO notes that the ERA has access to all data associated with the market through the data warehouse, provided in accordance with clause 2.16.1 of the WEM Rules, and will continue to assist the ERA wherever possible with data enquiries.

The benefits of improved WEM efficiency

In response to Question 15, AEMO considers that market operation, administration and development expenditure is prudent given the size and complexity of the WEM, and is delivering benefits to market participants.

The ERA is responsible for determining the allowable revenue and forecast capital expenditure that AEMO can recover for the services it provides on a three-yearly basis. These services currently include:

- operating the WEM market and system management functions as set out in clauses 2.1A and 2.2 of the WEM Rules; and
- preparing for and facilitating the implementation of WEM and constrained network access reform as per clause 1.20.1 of the WEM Rules.

The ERA's determination forms the basis for AEMO's annual budgets and AEMO's market fees. The ERA must take the factors outlined in clause 2.22A.11 of the WEM Rules into account when reviewing AEMO's allowable revenue and forecast capital expenditure submission. These factors are designed to ensure that the allowable revenue:

- is **sufficient** to cover the forward-looking costs of providing the relevant services;
- includes only those costs that would be incurred by:
 - a **prudent provider** of the services;
 - acting **efficiently**,

- seeking to achieve the **lowest practically sustainable cost** of delivering the services in accordance with the WEM Rules,
- while **effectively promoting the wholesale market objectives**.
- (where possible) is **benchmarked** against the costs of other market operators providing similar services in other jurisdictions.

AEMO notes the ERA's comment that it presently is not required to undertake an ex-post review of AEMO's projects, and that there is no mechanism to determine whether projects deliver net benefits. AEMO considers that there is some merit in ex-post project reviews, particularly for projects relating to changes to the market or regulatory arrangements (e.g. changes to the WEM Rules), to ensure that lessons are learned and anticipated benefits are achieved. AEMO would be happy to provide its actual costs to support such ex-post reviews, but would note three key points:

- Any assessment would need to include a 'total' cost and benefit assessment including the implementation costs of both AEMO and other market participants.
- An assessment of benefits is dependent on a robust benefits management plan to ensure that benefits are appropriately owned and tracked.
- In the context of managing overall administration costs and fees of the market, a prudent approach to carrying out these reviews would need to be agreed, minimising administrative complexity and impacts on parties who would be required to provide supporting information.

In relation to a specific ex-post review of AEMO's projects and expenditure, AEMO considers that the existing ex-ante allowable revenue and forecast capital expenditure processes have provided a robust basis for the review of market administration costs. An ex-post review by the ERA that results in budget reduction would have significant ramifications for AEMO given its not-for-profit status.

However, in the interests of transparency, AEMO intends to outline in its upcoming allowable revenue and forecast capital expenditure submission the basis for its expenditure over the existing three-year review period. This would provide the information for the ERA and market participants to assess AEMO's actual expenditure against forecast, and the rationale for any material deviations. AEMO looks forward to providing further insight into how it proposes to address the changing energy landscape and the impacts to market administration costs in the upcoming allowable revenue and forecast capital expenditure submission for the 1 July 2019 to 30 June 2022 period, which is due for submission to the ERA on 15 March 2019.

We welcome discussion on this submission and would be pleased to provide further assistance to the ERA regarding the matters highlighted. If you would like to discuss or have any questions, please do not hesitate to contact me.

Yours sincerely



Cameron Parrotte
Executive General Manager, Western Australia