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9 December 2017

John Pierce, Commissioner
Australian Energy Market Commission
Lodged Electronically

Dear John,

RE: CEC Response to the AEMC Frequency Control Frameworks Review Issues Paper

The Clean Energy Council (CEC) is the peak body for the clean energy industry in Australia. We represent and work with hundreds of leading businesses operating in solar, wind, energy efficiency, hydro, bioenergy, energy storage, geothermal and marine along with more than 4,000 solar installers. We are committed to accelerating the transformation of Australia's energy system to one that is smarter and cleaner.

We welcome the opportunity to provide this submission to the Australian Energy Market Commission (AEMC) and support the ongoing need to consider the status of the National Electricity Market in light of the significant technological change underway.

As these changes occur it will be important that the market's frameworks recognise that there are inefficiencies in the current frequency control market design that need to be addressed in the immediate term. The Clean Energy Council is supportive of market-based solutions to manage the power system. Moving forward these markets need to adapt to new technological capability and encourage participation from a broad range of technologies, including by tapping into rapid response capabilities that have not existed in the NEM to date.

The future resilience of the NEM will depend on and be strengthened through technology diversity.

Primary Frequency Control

The Clean Energy Council acknowledges that the current status of poor frequency control within the normal operating frequency band is not tenable for the operation of synchronous generation in the NEM. The simplest approach to resolving this issue appears to be mandating tighter governor control for all generators, although this approach may not

balance outcomes with the long-term expectations of technology change. A market-based solution may be a more adaptive approach to ensuring adequate response and encouraging new technologies to participate to support the power system as it transitions to a lower reliance on conventional generation technologies.

Market-based solutions to primary frequency control should focus on rewarding performance based on speed and accuracy to ensure that new technologies are encouraged to enter the market.

Conversely, if considering mandating primary frequency control the Australian Energy Market Commission should consider its comments on requiring revision of generator performance standards following subsequent changes to control systems. Control system changes to open the deadband have clearly already occurred in the past few years. The Australian Energy Market Operator should be re-examining performance standards for all plant that has made control system changes to date, if this view is correct.

Frequency Control Ancillary Services (FCAS) markets

The NEM's FCAS markets have historically been characterised by oversupply, and subsequently very low costs. In the context of increasing renewable energy over recent years this dynamic has had two effects

- Firstly, potential revenue from the provision of frequency services has not supported investment decisions for new renewable energy entrants, when compared to revenue from energy that may have been foregone.
- Second, the efficiency of the FCAS markets has not been considered a priority for revision or review as inefficiencies have not been of consequential impact or been identified.

Both factors discourage new entrants from participating in FCAS. As the market dynamics have changed (either due to constraints on local procurement in South Australia, or due to exiting thermal generation) prices have risen and inefficiencies have become more evident and of greater impact. However, as historic low prices also bring an expectation of first mover disadvantage for any new entrant this situation does not imply that new supply will enter the market.

In order to understand this issue in more detail the Clean Energy Council held a workshop in April 2017 with its members and key staff from the Australian Energy Market Commission

and Operator. The outcomes of this workshop are publicly available on our website[1]. These set out our views on the FCAS regime.

Further to the above the Clean Energy Council supports the need to encourage faster response capability into the NEM and encourages this review to undertake a comprehensive revision of FCAS and the causer pays regime with an aim to ensure its efficiency. It should seek to introduce a sub-one-second market for primary response services. As above this market should reward participants for response speed and accuracy.

Further consideration should also be given to the market operator's request to mandate frequency control capability for new entrants under in the generator performance standards rule change[2]. While it may be technically possible to mandate this capability, the mere presence of significant volumes of the capability will continue the perception of first mover disadvantage and discourage participation.

Ramping

The Australian Energy Market Commission has assessed the implications of forecasting errors for semi-scheduled generation and the dispatch engine (NEMDE). These arrangements were introduced under the premise that renewable energy would remain a small part of the NEM's generation portfolio. Clearly this is no longer the case.

While the forecasting techniques applied to the Australian Wind Energy Forecasting System are delivering a reasonable accuracy on a portfolio basis, this aggregation approach over-rides the positions of individual wind farms. The FCAS regime calculates its Causer Pays factors by comparing the measured generation of each wind farm against the aggregate forecast from AWEFS, not the wind farms' expected performance. This approach has three effects:

- It creates risks from causer-pays costs that wind farms cannot take action to control/limit because the AWEFS calculation is developed from a black-box buried within the market operator's systems.
- It discourages active participation in the energy and FCAS market by semi-scheduled generators by promoting a set-and-forget approach to operation.
- It increases the needs for FCAS by artificially creating dispatch errors because NEMDE is comparing actual generation to modelled aggregate generation, not *expected* generation.

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[1] https://www.cleanenergycouncil.org.au/events/fcas-workshop.html

[2] http://www.aemc.gov.au/Rule-Changes/Generator-technical-performance-standards

A more efficient approach would provide semi-scheduled generators with the opportunity to bid into NEMDE to override the AWEFS calculation with their own expected generation for the coming immediate dispatch intervals (i.e. 5-15 minutes ahead). In many instances individual wind farms have better information about the operation of their plant and local resource conditions. Enabling them to utilise this information would enable them to manage their risk by substantially refining their forecasts while also reducing forecasting error and demand for regulation FCAS.

During 2016 the Australian Energy Market Operator was examining[3] the option of semi-scheduled generators providing a 'Possible Power' signal to NEMDE to serve this purpose. This new option should be expedited. The Australian Energy Market Commission should examine this process in detail to understand its status and any issues that may have arisen to date.

Ramping may become an increasingly pressing issue in the NEM in the future. Some factors that add to this requirement will include increasing contributions from large scale solar generation and the reducing reliability of thermal generators as they age. It may be necessary to consider alternative market mechanisms beyond FCAS which could deliver ramping services into the NEM. This could include day-ahead market arrangements that contract for specific ramping capabilities to be available and triggered when needed for example. These arrangements should be considered.

Distributed energy resources (DER)

Moving forward the NEM needs to consider and account for increasing contributions from distributed energy resources. The management of frequency relates to any given point in time and it is feasible to assume that some NEM regions will have significant contributions from DER at some points in time. For example South Australia may have DER generation in excess if peak demand on low demand days in the coming few years. As generation from thermal plant will be greatly discouraged at these same points in time the Australian Energy Market Commission's goal should be to design a frequency control regime that either:

a) Ensures DER is participating in providing frequency control services, or
b) Ensures the value of enabling FCAS services exceeds the short-run marginal cost of thermal plant.

The former is preferred and would deliver a more efficient outcome in light of market objectives. This review must provide solutions that remove barriers to participation for

[3] See AEMO Energy Conversion Model Guidelines Consultation.

frequency control markets by aggregators and DER generally, and seek to design market-based solutions that encourage participation by aggregators and DER.

We trust that this submission assists in your deliberations and welcome continued discussion of important issue. Please contact Emma White (03 9919 4107) for any queries regarding this submission.

Sincerely,

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