11 December 2017

Ms Anne Pearson
Chief Executive
Australian Energy Market Commission
PO Box A2449
SYDNEY SOUTH NSW 1235

Dear Ms Pearson,

EPR0059 – Frequency Control Frameworks Review – Issues Paper

Energy Queensland Limited (Energy Queensland) welcomes the opportunity to provide comment to the Australian Energy Market Commission (AEMC), on its consultation on the *Frequency Control Frameworks Review – Issues Paper*. This submission is provided by Energy Queensland, on behalf of its related entities Energex Limited (Energex), Ergon Energy Corporation Limited (Ergon Energy) and Ergon Energy Queensland (EEQ).

Should you require additional information or wish to discuss any aspect of this submission, please do not hesitate to contact either myself on (07) 3851 6416 or Trudy Fraser on (07) 3851 6787.

Yours Sincerely

Jenny Doyle
General Manager Regulation and Pricing

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Encl: Energy Queensland's submission to the Issues Paper

Energy Queensland Submission on the Frequency Control Frameworks Review

Issues Paper

Energy Queensland Limited

11 December 2017

About Energy Queensland

Energy Queensland Limited (Energy Queensland) is a Queensland Government Owned Corporation that operates a group of businesses providing energy services across Queensland, including:

- Distribution Network Service Providers, Energex Limited (Energex) and Ergon Energy Corporation Limited (Ergon Energy);
- a regional service delivery retailer, Ergon Energy Queensland Pty Ltd (Ergon Energy Retail); and
- affiliated contestable businesses, Metering Dynamics, Energy Impact and Ergon Energy Telecommunications.

Energy Queensland's purpose is to "safely deliver secure, affordable and sustainable energy solutions with our communities and customers" and is focussed on working across its portfolio of activities to deliver customers lower, more predictable power bills while maintaining a safe and reliable supply and a great customer service experience.

Our distribution businesses, Energex and Ergon Energy, cover 1.7 million km^2 and supply 37,208 GWh of energy to 2.1 million homes and businesses. Ergon Energy Retail sells electricity to 740,000 customers.

The Energy Queensland Group also includes new energy services businesses which will provide customers with greater choice and control over their energy needs and access to the next wave of innovative technologies and renewables. The energy services businesses are key to ensuring that Energy Queensland is able to meet and adapt to changes and developments in the rapidly evolving energy market.

Contact details

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1 Introduction

Energy Queensland Limited (Energy Queensland) welcomes the opportunity to provide comment to the Australian Energy Market Commission (AEMC) on its Frequency Control Frameworks Review – Issues Paper (Issues Paper). This submission is provided by Energy Queensland, on behalf of its related entities Energex Limited (Energex) and Ergon Energy Corporation Limited (Ergon Energy) and Ergon Energy Queensland Limited (EEQ)). Energy Queensland is a recently established Queensland Government Owned Corporation that operates a portfolio of businesses providing energy services across Queensland, including:

- Distribution network service providers (DNSPs), Energex and Ergon Energy; and
- A regional service delivery retailer, EEQ, limited in its scope of operations by jurisdictional legislation.

Energy Queensland's DNSPs are both members of Energy Networks Australia (ENA), the national industry association that represents businesses operating Australia's electricity transmission and distribution and gas distribution networks. The ENA has prepared a response to the Issues Paper and we are supportive of the positions presented in their response.

In response to the AEMC's invitation to provide comments on the Issues Paper, Energy Queensland has provided responses to a number of the questions raised in the Issues Paper in the following section. Energy Queensland is available to discuss this submission or provide further detail regarding the issues raised, should the AEMC require.

2 Table of detailed comments

Consultation Paper Feedback Question	Energy Queensland Comment
Issue 1: Scope	
Are there any other issues relating to frequency control that should be included within the scope of this review?	No. We support the inclusion of the issues raised in the review.
Issue 2: Drivers of degradation of frequency performance in the NEM	
(a) Do stakeholders agree with the drivers of the observed long term degradation of frequency performance as identified by DIgSILENT? (b) Are there any other drivers of frequency degradation in the NEM that are not mentioned here?	We agree with the drivers identified and are not aware of any others that should be included.
Issue 3: Materiality of frequency impacts from non-dispatchable capacity	
(a) What are the likely impacts on frequency of increasing proportions of non-dispatchable capacity, and reducing proportions of scheduled generation?	Energy Queensland suggests removing the non-scheduled generator class, given that it is not part of the National Electricity Market Dispatch Engine (NEMDE). Further, they can have conflicting operation with those generators that are semi-scheduled or scheduled and therefore competitive while also able to be controlled in emergencies via NEMDE.
(b) Are there any significant impacts on frequency that may occur from changes in output from individual large scale semi-scheduled generation (large solar and wind farms)?	Energy Queensland suggests that forward planning of changes to the synchronous generator fleet and the associated system modelling is desirable so that the totality of the impact of losing individual large scale semi-scheduled generators is mitigated.

(c) Does the analysis for wind generation above hold true for large scale solar PV? Does large scale solar PV output change more rapidly than wind output? Are changes in solar output more difficult to forecast?	Energy Queensland suggests that further analysis is required. However it is unlikely that large scale solar PV output changes more rapidly than wind output. Energy Queensland supports modern forecasting tools such as Solacast[1] to forecast solar output. We note that skycams and satellite tools are being used in island networks such as Hawaii to do immediate and long range solar forecasting. We suggest that AEMO and NSPs would benefit from the use of these tools and that further investment is needed in this area in Australia.
Issue 4: Drivers of change	
Are there other drivers of change affecting frequency control that are not set out in this section? If so, how material are they?	No comment.
Issue 5: Assessment principles	
(a) Do stakeholders agree with the Commission's proposed assessment principles?	We support the proposed assessment principles.
(b) Are there any other relevant principles that should be included in the assessment framework?	We have not identified any other relevant principles.
Issue 6: Assessment approach	
Are there any comments, or suggestions, on the Commission's proposed assessment approach?	No comment.
Issue 7: Materiality of frequency control risks in relation to primary frequency control	

[1] http://www.nickengerer.org/research-blog/2017/8/16/launching-our-grid-based-solar-forecasting-api-at-cider17

Are stakeholders aware of any other costs or impacts linked to the degradation of frequency control performance in the NEM?	No comment.
8. Are there any other risks that stakeholders are aware of with respect to degradation of frequency control as represented by the flattened frequency distribution within the normal operating frequency band shown in Figure 5.1?	No comment.
Issue 9: Options for improving frequency control in the NEM	
Are stakeholders aware of any other international experience in relation to primary frequency control that is relevant for this review of frequency control frameworks in the NEM?	Energy Queensland suggests that further analysis of international experience is undertaken. In particular, Energy Queensland notes that Oahu (through Hawaii Electric Company with the National Renewable Energy Laboratory) has undertaken significant analysis and work recently on the management of power frequency control due to significant non-synchronous generation connection (both Distributed Energy Resource (DER) and utility scale). We also suggest there would be benefit in analysing the ERCOT (Texas) region.
Issue 10: Mandatory primary frequency control	
(a) What are the advantages and disadvantages of mandating primary control for all generators in order to improve frequency control during normal power system operation?	The requirement for the control to exist at the generator, while remaining technology neutral, may lock out certain types of generation and inadvertently result in a higher cost of energy. That is, the frequency control may have been able to be provided cheaper from another source as an added service provision.
(b) What factors should be considered in the specification of a mandatory primary frequency control response?	Energy Queensland suggests the following factors be considered: • System size – i.e. scheduled / semi-scheduled vs non-scheduled vs market exempt; and • Growing rate of DER as a quantity and proportion of capacity in the market or specific region.
(c) Are there any regional issues that should be considered in assessing whether primary frequency response should be a mandatory obligation for registered generators in the NEM?	No comment.

(d) Should an obligation for generators to be responsive to changes in system frequency outside a pre-defined dead band include a required availability reserve, such as 3 per cent of a generators registered capacity, as is the case in Argentina?	No comment.
11. What are the advantages and disadvantages of procuring primary control through bilateral contracting as a means to improve frequency control during normal power system operation?	Energy Queensland suggests that procuring primary control through bilateral contracting supports a lower cost option and more efficient delivery arrangement (i.e. leverages latent ability of another site). The disadvantage of this approach is an increased complexity of managing and assurance of operation.
Issue 12: Market based options for primary frequency control	
(a) What are the advantages and disadvantages associated with the two options presented for earlier provision of primary frequency control: (i) Using the existing contingency FCAS for provision of primary frequency control and narrow the normal operating frequency band to trigger a primary frequency response closer to 50Hz. (ii) The establishment of a new primary regulating service to provide primary frequency control within the normal operating frequency band, separate from contingency FCAS	Energy Queensland supports the latter option on the basis that it would result in a lower cost outcome over the long-run, despite the higher cost to administer. We suggest that further modelling is undertaken by the AEMC.
13. Are there any aspects of the existing Causer pays procedure that stakeholders believe are acting to discourage the voluntary provision of primary frequency response?	No comment.
Issue 14: Frequency monitoring and reporting	
(a) What are the potential benefits or costs associated with a requirement for AEMO to produce regular frequency monitoring reports?	We suggest that this level of information / data will need to be regularly produced to inform investment decisions.

(b) What metrics should such frequency monitoring reports include?	We recommend alignment of time and rate within the defined operating bands.
Issue 15: Defining FFR	
What are your views on AEMO's advice on how and when FFR might emerge in the NEM?	No comment.
Issue 16: Potential options for making changes to FCAS frameworks	
What are your views on the above indicative approaches to varying the design of FCAS services, and on other potential changes?	We agree the approaches sound reasonable.
Issue 17: Technical characteristics of emerging sources of FCAS	
What other emerging sources of FCAS should the Commission be aware of?	No comment.
Issue 18: Managing the frequency impacts of non-dispatchable capacity	
(a) Is the existing FCAS framework sufficient to maintain frequency as greater proportions of non-dispatchable capacity enter the power system? (b) Would it be more efficient to improve the forecasting of non-dispatchable capacity to reduce imbalances in supply and demand, or to rely on higher levels of regulating FCAS to manage those imbalances?	No comment.

(c) What other efficient options are there to manage imbalances in supply and demand resulting from the variability of non-dispatchable capacity within the five minutes dispatch interval?	
Issue 19: Cost recovery arrangements	
(a) Do you consider existing cost recovery arrangements for contingency FCAS to be appropriate? (b) If not, how should cost recovery arrangements be changed?	No comment.
Issue 20: Co-optimisation with other markets	
(a) Are there other system services, such as inertia, system strength or system stability, that should be co-optimised with FCAS markets? (b) If so, can one service (such as inertia) be optimised first and, if so, why? (c) Would co-optimisation impact on cost recovery and, if so, how?	No comment.
Issue 21: Consistency in the provision of system security services	
To what extent is it important that the NER arrangements for the provision of system security services are consistent between providers of such services, e.g. large, transmission-connected generators and distributed energy resources?	Energy Queensland suggests that all generation covered by Chapter 5 of the NER should be subject to the same set of system security requirements (i.e. >5MW). However, this may not be logical at an individual level <1MW for low voltage connected DER from a practical perspective (i.e. technological ability) and an economic perspective. While there are certain minimum requirements that can be imposed, it should not expect to seek to address all of the system security impact caused by DER.

Issue 22: Frameworks for the connection and operation of distributed energy resources	
(a) Do the existing connection frameworks inhibit the ability of the owners of distributed energy resources to provide system security services?	While the framework doesn't necessarily inhibit DER owners from providing system security services, it hasn't been explicitly considered in their development.
(b) If distributed energy resources are to play a bigger role in supporting power system security, would it be more appropriate for the distributed energy resources to be required to provide system security services, or to be incentivised to provide them?	While some minimum capability can be required, it is likely that an incentive will be necessary for capability beyond this, as part of an aggregation role to the market.
(c) Are there any other regulatory barriers or opportunities relevant to the provision of system services via distributed energy resources that are not discussed in this section?	No comment.
Issue 23: Frameworks for the connection and operation of distributed energy resources	
Are there any other regulatory barriers or opportunities relevant to the provision of system services via distributed energy resources that are not discussed in this section?	No comment.
Issue 24: Technical challenges	
(a) Is the aggregated capability of distributed energy resources sufficiently 'firm' for aggregators to provide the system security services that AEMO needs?	Energy Queensland suggests that there is a need for more research to prove what levels of DER control is required to provide such services.
(b) Are there any other technical challenges relevant to the provision of system services via distributed energy resources that are not discussed in this section?	Energy Queensland believes that a large portion of the technical challenges involve communication and control. Furthermore, we suggest that aggregation is likely to be needed to be defined within an electrically appropriate area. Such areas would also need to be defined.

Issue 25: Commercial challenges	
Are there any other commercial challenges relevant to the provision of system services via distributed energy resources that are not discussed in this section?	The value offered for providing system security services or firmness to AEMO may be lower than other competing values such as network limitation, tariff signal or wholesale market signal. It is likely that the aggregator would act in the customer's interest and therefore prioritise the most financially attractive signal.