

24/04/2018

Australian Energy Market Commission (AEMC)
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Stakeholder input to Frequency Control Frameworks Review Draft Report, March 2018 Reference: EPR0059

Dear AEMC,

Lyon Infrastructure Investments 1 Pty Ltd (Lyon) is a leading Australian renewable and storage developer, with a pipeline of 1,700MW of solar and 1,000MWh of storage projects across Australia. In particular, Lyon's experience in configuring utility scale, fast-responding renewable projects throughout the National Electricity Market (NEM) has provided it with a broad understanding of investor and energy consumer needs.

Lyon is developing three grid-scale solar plus battery storage projects across three jurisdictions;

- Cape York Solar Storage Project, 55 MWac solar + 20 MW / 80 MWh battery, in North Queensland ('Cape York Project');
- Nowingi Solar Storage Project, 253MWac solar + 80 MW / 320 MWh battery, in North West Victoria ('Nowingi Project'), and
- Riverland Solar Storage Project, 253 MWac solar + 100 MW / 400 MWh battery, in South Australia ('Riverland Project').

These integrated renewable-plus-storage projects are designed to surpass intermittent power resourcing constraints by providing Fast Dispatchable Renewable capacity to the market. Lyon's southern projects are strategically located in proximity to crucial transmission infrastructure (the MurrayLink interconnector in the case of the Riverland Project, for example) or are located to deliver reliable power to the fringe-of-the-grid (in the case of the Cape York Project). These locations offer the market an improved way to maintain Frequency Control to strengthen the NEM by delivering new projects and products to market in areas where existing constraints and system strength issues have challenged, and continue to challenge, market operators.

Lyon has developed an innovative control philosophy scheme that is poised to place integrated renewable-plus-storage projects as critical providers of dispatchable supply and frequency control services in 2019 and beyond.

We look forward to continued engagements with the AEMC and offer the following comments on some of the AEMC's draft recommendations.

AEMC Draft recommendation 2

That the providers of a primary regulating response should be remunerated for the costs of providing the service, in particular where the opportunity costs of maintaining the capacity to provide the service (e.g. maintaining headroom to be able to increase output) are likely to be high.

The implementation of one of the following two options is likely to build on the existing market frameworks and support improved frequency control during normal operation:

- *provision of a primary regulating response through the existing regulating FCAS markets*
- *changes to the causer pays arrangements to facilitate the provision of incentive payments for primary frequency response during normal operation.*

Further work is required to investigate and describe the potential arrangements for the implementation of these options, and the associated costs and benefits of these arrangements.

Lyon response

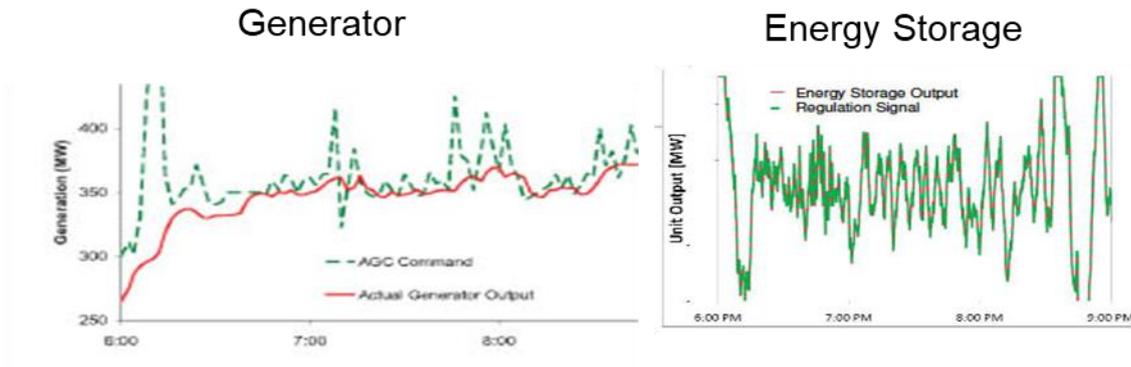
Lyon is supportive of a mechanism that allows the market to assign value and issue clear price signals that consider the speed of response and accuracy of the required regulation service.

Lyon is concerned that AEMC may be considering remunerating incumbent generators for curtailing output for the provision of 'headroom' supply, this behaviour, which may entrench incumbent thermal generators that are not ideally placed to be operated in this relatively inefficient manner. Rather, technologies such as battery energy storage systems - such as those integrated in Lyon's projects by Fluence - are well suited to provide primary regulating requirements almost immediately after a fault materialises and offer this controllable service with flexibility and accuracy to which these systems are intended.

Lyon would encourage AEMC to remunerate and incentivise efficient asset utilisation. Based on the ability of batteries to provide a range of services with full flexibility of capacity, Lyon is confident that inverter-based technologies, such as batteries, are most likely to deliver digital inertia with accuracy and on a least-cost basis. Lyon would encourage AEMC to construct a Frequency Control Framework that values fast and accurate services that will continue to strengthen the National Electricity Market and enable market operators to maintain a reliable network as Australia continues to transition towards a low-carbon future. Fast and accurate responses reduce the total MWs required and have the potential to lower supply requirements in a more cost-effective manner than traditional thermal generators are able to do.

One example of how response accuracy can vary is illustrated below in the charts that were made by PJM, a regional grid operator in the United States.

Figure 1 – Generator and Energy Storage AGC Signal Response



Furthermore, Lyon’s battery system can provide additional ‘unseen capacity’ to fully deliver nameplate capacity (100 MW / 400 MWh throughput capacity, in the case of Riverland Solar Storage). In the same way as incumbent generation with spinning mass has inherent inertia, Lyon’s projects have additional built capacity, which is similar to ‘headroom’ (allowing the system’s full throughput capacity), offering the market flexible, fast and accurate power and/or regulation services.

AEMC Draft recommendation 8

That, in the medium term:

AEMO conduct a broader review of the MASS to recognise the capability, and more accurately value the response profile, of new technologies that are capable of providing frequency control services

- a) *the AEMC and AEMO refine the time frames and develop a work program for making any substantive changes to FCAS frameworks. This process should be informed by:*
 - i) *an assessment of any consequential impacts arising from the implementation of any revisions to frequency control arrangements in the normal operating frequency band*
 - ii) *investigations to be undertaken by AEMO into:*
 - *the emerging capabilities of fast frequency response technologies including trials of various technology types, with a view to sharing the outcomes of the trials with relevant stakeholders, and to inform the development of future service specifications*
 - *the evolving technical and operational requirements of the power system and the inter-relationships between different system services, including frequency response, inertia and system strength*

In the short term, the Commission will consider what recommendation it will make, if any, on the receipt of submissions from stakeholders in response to this draft report.

Lyon response

Lyon are supportive of the AEMC’s intention to conduct trials with AEMO to understand the capabilities of new technologies that can provide Fast Frequency Response capabilities. The location of Lyon’s developments are such that they can support key network infrastructure with ample supply of FFR capabilities.

- Cape York Solar Storage is located in Far Northern Queensland at the ‘fringe-of-the-grid’.
 - FFR capabilities can be made available to support the remote operation of the network that has traditionally seen low system strength due to its distance from generation centres
 - Lyon invites AEMC and AEMO to make this FFR investigation a priority and offers the project as a suitable candidate for consideration

- Riverland Solar Storage is located in South Australia in close proximity to the MurrayLink interconnector.
 - FFR capabilities can be made available to support the interconnector reliability and resilience
 - Lyon and ElectraNet are well progressed with understanding the interrelation of Riverland and the MurrayLink runback scheme and general operation
 - Lyon invites AEMC and AEMO to make this FFR investigation a priority and offers the project as a suitable candidate for consideration

- Nowingi Solar Storage is located in North West Victoria, also in close proximity to the MurrayLink interconnector.
 - FFR capabilities can be made available to support the interconnector reliability and resilience
 - Lyon invites AEMC and AEMO to make this FFR investigation a priority and offers the project as a suitable project for consideration

Lyon welcomes this stakeholder process and shall continue to work with the AEMC to ensure consumers do not pay more than necessary for the quality, safety, reliability and security of supply of electricity as Australia transitions towards a low-carbon economy.

Yours Sincerely,



David Green
Chairman