

Australian Energy Market Operator
Level 22 530 Collins Street
Melbourne VIC 3000

For the Attention of AEMO

10 April 2018

National Electricity Rules consultation in accordance with rule 8.9 of the NER

System Strength Impact Assessment Guidelines Consultation (Rule 4.6.6 of the NER)

Reach Solar energy ('Reach') is very pleased to provide its response to the guidelines prepared by the Australian Energy Market Operator (AEMO) titled "System Strength Impact Assessment Guidelines" dated 5 March 2018.

By way of background, the intent of Reach is to develop 1000MW of large-scale solar photovoltaic (PV) by 2020/21. Reach develop and structure the finance for utility-scale solar PV projects such that they can compete with wind and black coal-fired generation and also provide certain ancillary services to assist the grid.

Reach management (see www.reachsolarenergy.com.au) have a proven track record with operations, development and raising large-scale capital for both energy and infrastructure projects in South Australia, other States in Australia and internationally. In mid 2017 Reach developed and raised \$500 million for the 275MWdc Bungala solar project which is currently under construction near Port Augusta in South Australia (currently the largest solar PV in Australia).

This response builds on the submission made by Reach to the AEMC on 20 April 2017 on the Directions Paper titled "Systems security frameworks review" and to AEMC on the 22 September 2017 on the Inertia Ancillary Service Market consultation paper.

Reach provides the following specific comments on the proposed AEMO Guidelines:

- 1 **Clause 2.4.1 timing of provision of EMT Models** – the proposed wording is reliant on all generators, including existing generators, to provide up-to-date PS-CAD models each time a system strength assessment is undertaken. This means the Applicants process will stop if one generator does not provide an up-to-date EMT model of their plant in a timely manner.

Reach suggest the guidelines must introduce a response time limit on AEMO to address the deficiency as best as it possibly can and not enable the connection process to be stalled e.g. because existing long-lived generators do not have the required EMT models in place and have no incentive to produce such a model.

- 2 **Clause 2.5.4 methodologies and implementation** – the proposed wording does not exclude a retrospective application of the rule to a project where the *system strength requirements methodology* determines a *fault level shortfall* exists. The guidelines should make clear the rule will not be applied retrospectively to projects which have received GPS approval.
- 3 **Insufficient feedback from trials** - Reach consider the ongoing trials at Hornsdale 3 (windfarm) and battery systems, will reaffirm its long-held view that fast-acting inverter technology (used by wind and solar PV) can:

3.1 operate responsively to automatic generator control by AEMO and provide certain frequency regulation services; and

3.2 materially dampen the rate of change of frequency under severe network disturbances which in turn is expected to reduce the amount of system inertia required to maintain the frequency within acceptable limits.

Reach consider the proposed guidelines do not include appropriate feedback and/ or lessons-learned from Hornsdale 3 and/ or the Power Reserve trials on renewable generators and/or lithium energy storage providing FCAS, frequency control and adequately addressing low system strength. Please include the same.

In mid 2017 Reach supported in-principle a market-based mechanism to procure effectively 'instantaneous FCAS' but advocated a delay to an inertia market until ongoing trials by AEMO are completed at Hornsdale 3 and energy storage, and the results are known.

Reach reaffirms that renewable sources with inverter technologies are able to remain connected to the grid at very low short circuit ratio (in the order of less than 2), and can provide certain ancillary services especially in response to over-frequency events and reactive power.

Reach considers this important work overlaps with the inertia market being proposed and underscores the need for a more information to be gathered including the use of a capacity payment. An energy-only market such as the NEM does not encourage a "raise" service i.e. no value to hold-back generation on a "hope" that a raise ancillary service will be required.

Australia is not alone in tackling this. Ireland and California are devising market structures to incentivise such a transition and successful trials completed e.g. NREL and First Solar trial using a 300MW solar PV in California (<https://www.nrel.gov/docs/fy17osti/67799.pdf> dated January 2017). Work is in progress to devise a mechanism which incentivises the generation plant to maximise production or be compensated to "hold back" production to provide reserve for such services.

4 **Cost allocation of TNSP system strength obligation**

4.1 Reach consider the TNSP and/ or AEMO should procure the required service/solution via a least-cost market-based mechanism, and it be treated as network services. The costs should be charged to the users through the network connection charges.

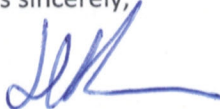
System strength and/ or system inertia are not always local to the project site (e.g synchronous condenser may be best located near to demand) and the above enables a least-cost solution to be secured.

4.2 The AEMO guideline remains too biased to traditional generation. Reach considers:

- (a) The need for system inertia remains important and will be provided by synchronous generation in the near-term, but it will be increasingly provided from other sources including fast-acting asynchronous inverter technologies and/or aggregated consumer generation, controlled load shedding (financial options paid to willing consumers), installation of frequency control on Murraylink, and energy storage. The AEMO guidelines are too focused on traditional generation.
- (b) The AEMO guideline does not consider the mitigation will only be required at certain times of the day or year and not 24/7. This infrequent requirement would be addressed in a market-based mechanism and the AEMO guidelines provide no consideration that it may not be required for the life of the project ie. the mitigation may only be required for 5 years as a new synchronous generator or a mitigation described in 4.2 (a) may connect addressing the low strength at some point in the future.
- (c) The proposed AEMO guidelines do not envisage or cater for a better technological solution to be developed in the future. The AEMO guideline is therefore not future-proof and instead locks in the cost of the solution for the consumer to fund the life of the project, approximately 30 years. It is possible a better technological solution is developed within solar inverter themselves well within this timeframe.
- (d) AEMO is able to constrain certain generation and/ or transmission lines in response to system disturbances i.e. avoiding or reducing the additional capital cost required for what are likely to be infrequent events. There is no mention of this in the AEMO guidelines.

I hope this is of interest to AEMO and please do not hesitate to contact me if you have any questions on the same (0447 350 442 or julian@reachsolarenergy.com.au).

Yours sincerely,



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