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Australian Energy Market Commission
PO Box A2449
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For the Attention of Mr Sebastien Henry
02 8296 7800

20 April 2017

Dear Mr Sebastien Henry,

RESPONSE TO AEMC
Directions Paper | System security Market Frameworks Review

Reach Solar energy ('Reach') is very pleased to provide its response to the findings described in the Directions Paper prepared by the Australian Energy Market Commission (AEMC) titled "System security Market Frameworks Review", dated 23 March 2017.

1. General

Reach agrees with the AEMC concept of a staged approach for system inertia and fast frequency response ("FFR") services recognising both are inter-related.

Reach considers the Directions Paper has an emphasis on solutions from transmission network service provider (TNSP) and generation but not customer-led solutions e.g. use of customer-based synchronous machines and/ or interruptible demand are likely to offer cost effective solutions in the future.

It is suggested therefore that customer-led offerings should therefore feature more in the AEMC paper. The market design should permit participation from such sources including aggregated consumer generation, controlled load shedding (financial options paid to willing consumers where there is no noticeable inconvenience from a short-term interruption of power eg refrigeration and/ or heating loads).

AEMO is also able to constrain certain generation and/ or transmission lines in response to system disturbances i.e. avoiding or reducing the new rules, and additional cost, required for what are likely to be infrequent events. The AEMC Directions Paper appeared silent on this technique.

Reach does have reservations with the TNSP procurement role for the system inertia and FFR services and would welcome AEMC thoughts on what safeguards are proposed to avoid a repeat of what was recently tabled by the Australian Energy Regulator to the COAG Energy Council on 6 February 2017 (i.e. see footnote 41 in the AEMC paper)?

2. Fast Frequency response (FFR)

2.1 Procurement

See above general comment.

2.2 FFR obligations on new-entrant asynchronous power plant

The generator performance performance standard ("GPS") sets down the design intent for the power plant. The GPS is approved by both the relevant TNSP and AEMO.

The GPS approval process modelling now includes an assessment of a new entrant on the grid "system strength" as well as a detailed review of the generator's ability to stay connected (ride through capability for voltage and frequency events), and contribute not only reactive power but also active power (Watts) under certain rate of change of frequency within National Electricity Rules (NER).

A FFR obligation should therefore be in conformance with the agreed GPS.

2.3 International experience

Reach would recommend the AEMC and AEMO refresh the review of FFR arrangements overseas. The FFR programmes appear to be progressing quickly and Reach management would be surprised if lessons cannot be learnt by Australia.

3. Impact on existing synchronous generation

3.1 Rate of change of frequency (RoCoF)

The DGA report[1] dated October 2016 assessed the RoCoF concerns expressed by numerous synchronous generation but concluded there was no material basis for concern (with the ranges provided). Please advise if the AEMC is privy to new opinion ?

3.2 Minimum short circuit ratio (SCR)

Reach consider no "causer pays" costs are necessary for a change to SCR (if any) due to a new-entrant generator because the SCR is modelled and therefore known by both AEMO and the TNSP as part of the comprehensive GPS approval process (described in 2.2 above).

[1] DGA Consulting, *International Review of Frequency Control Adaption*, 14 October 2016,

4. System Inertia

4.1 Minimum level required

Reach considers the system inertia needed on a real-time basis (shown in blue in Figure 1.4) should be quantified by AEMO (even using a range) i.e. this is suspected to be less than the "absolute minimum threshold". It means that beyond this "kernel" there is time to consider other solutions to reduce the need (and cost) for the required system inertia.

Intuitively, the system inertia required for a future electricity system (with a mixture of centralised, distributed synchronous and asynchronous generation and consumer-led aggregation solutions) is likely to be less than what has been inherent in a centralised synchronous generation system.

4.2 Procurement of service

See above general comment.

5. Other matters

5.1 An energy-only market such as the NEM does not encourage an FFR (or FCAS) "raise" service. The NEM is now one of the few energy markets (world-wide) with no reward for capacity in it. This is unlikely to be sustainable and/ or encourage a smooth transition over the next 5 to 10 years.

5.2 Renewable energy forecasts can be improved (from the current AEMO based system). The revised paper dated December 2016 is a step in the right direction but the view within industry is that more can be done.

5.3 The National Electricity rules need a review. Annex A reaffirms some suggested topics.

I trust this is of interest to AEMC and please do not hesitate to contact me if you have any questions on the same (0416 490 393 or tony@reachsolarenergy.com.au).

Yours sincerely,

Tony Concannon
CEO

Encs: Annex A: Suggested topics for review within the NER

ANNEX A

SUGGESTED TOPICS FOR REVIEW WITHIN THE NER

There has been no material review of the NER to consider a scenario which consists of a mix of grid connected, distribution generation, sophisticated aggregation (generation and/ or demand), and more consumer led technology.

Key areas for consideration include:

i) The technical specification of the new technology e.g. large-scale solar (PV and thermal), wind, energy storage, high inertia Synch condensers etc) are currently not reflected in the Chapter 5 technical requirements for GPS compliance.

ii) Reserve procurement and management: The current market mechanism has little to no incentive for load participation, use of storage devices to provide voltage regulation and fast reserve as against the conventional (much slower) devices such as conventional thermal units.

iii) Frequency operating standards: The adequacy of current mainland frequency standards needs to be reviewed to assess if they are appropriate for a future energy system which consists of largely renewable and distributed generation.

iv) Some level of relaxation of the frequency tolerance combined with reclassification of events (e.g. generation event, Load event, and/ or network) such that it permits controlled (and pre-paid) demand-side management will materially assist with security and reliability of the power system.

v) System operation procedures: A review of system operation procedures including how reserves are procured and dispatched need to be reviewed. For example, use of storage device to provide fast reserves to manage hourly events will allow slow reserve sources to act as sustained reserves, thus allowing storage devices to recharge and be ready for next event; and

vi) Largest Unit size in each region in light of renewables for a Generator event: the classification of generation size should be reviewed e.g. the size of the individual units is reducing e.g. wind 2 to 3 MW each, and solar inverters are 2.5 to 5MVA each.

Which in turn will limit the loss of a large unit or more importantly permit some limited demand-side management to occur to restore frequency during a disturbance.