

SMA RESPONSE TO AEMC's DRAFT DETERMINATION ON RULE CHANGE PROPOSAL ERC0222

SMA has undertaken review of AEMC's Draft Determination on National Electricity Rules (NER, the Rules) change as proposed by AEMO (reference no. ERC0222) and a draft Rule as published on 31 May 2018. This letter contains SMA's response on the proposed NER changes.

SMA has also considered in this response the '*GTPS - questions for stakeholders*' as issued by AEMC on 3 July 2018 to stakeholders who attended AEMC's workshop on 26 June 2018.

SMA's comments as well as detailed response to changes proposed are provided below.

Clause 5.3.4A – Negotiating framework

SMA welcomes AEMC's decision to include a new requirement in the Rules that AEMO must provide reasons for rejecting negotiated standards proposed and recommend an alternative acceptable negotiated proposal. The new proposal for this clause also includes additional requirements on connection applicants to provide evidence as to why the proposed negotiated standards proposed at appropriate.

In SMA's view the Rules should treat all parties in the process equally and therefore AEMO and the connecting NSP should also be required to provide evidence when rejecting a negotiated standard proposed.

SMA suggests that in addition to that evidence the clause also states that the reasons that are provided by the AEMO:

- Include all relevant technical details necessary for the applicants to reassess their proposal,
- Are specific to the proposed point of connection (project in question) and,
- Relate to system security or reliability.

For example a reason broadly stating that the proposed standard will be detrimental to system security should not be acceptable.

In SMA's view it would also be beneficial to clarify what type of evidence is expected from the Connection Applicants as a part of negotiations.

Clauses S5.2.5.14 & S5.2.5.11 – Active Power Control

SMA would like to repeat comments on the new standard proposed for this clause that were made in our previous submission on this Rule change proposal. Automatic standard under this clause removes clear requirements and introduces high number of ambiguous terms such as 'proportional', 'sufficiently rapidly', 'sufficient period', 'measurable amounts'. It is not clear how the generating systems could be designed to comply with this standard and how could Connection Applicants propose a standard for this clause (including the newly required 'evidence' in case of negotiated standards) when the requirements are so poorly defined. The proposed wording is opening this standard to wide interpretation.

The lack of clarity in this clause will also make it impossible for SMA and any other OEM to design and implement new control modes that may be required/beneficial for compliance under this clause.

SMA suggests to remove ambiguity from this clause and define the performance requirements clearly including expected amount of power reduction/increase and characteristic to be followed. This will allow Connection Applicants to plan and anticipate what level of performance may be expected and OEM's to design appropriate control schemes.

Clause S5.2.5.13 – Reactive Power Control

SMA would like to note that the requirement for plants to perform in multiple voltage control modes will require Connection Applicants to undertake comprehensive studies for each of the control modes to select appropriate parameters for their application. There is no one set of parameters that will be applicable to each control mode across all plants. This will extend the connection process significantly.

SMA doesn't envisage any issues with switching between different modes from an equipment perspective however impact of carrying that out on the operation of the network should be considered.

Clause S5.2.5.5 – Reactive current response and multiple fault ride through

SMA believes the 2% magnitude of reactive response required by the proposed minimum standard is not practical considering average NEM network conditions and may increase network instability especially in areas where multiple distributed generators are connected. The equipment is capable of providing high levels of injections however in many cases this has detrimental effect on the grid. SMA has observed on many projects in the NEM that high reactive contributions from multiple generators in usually relatively weak Australian network conditions lead to increased network instability and prevent the connecting plant as well as existing generation from regaining synchronisation to the network post-fault.

SMA suggests that the minimum standard under this clause should not ask for a specific level of injection but request an injection of a magnitude as high as possible without leading to destabilisation of the network even if that requires no injection at all during fault.

SMA notes AEMC's intention for the standard to specify capability only not the actual injection required, however we believe allowing the standard to be introduced in the form proposed now, will lead AEMO and the connecting NSPs to require the actual injections from the connecting generation to be above the minimum. This is the case for

example with the current S5.2.5.1 standard that describes capability only yet the actual response from the plant to follow the proposed capability at all times is always requested by AEMO and the NSPs.

We have also already observed on a number of projects AEMO opposing the proposed negotiated standard due to it being lower than the minimum standard proposed under the Rule change even though the new Rules were not in place yet.

Regarding the multiple voltage disturbance part of this clause – SMA suggests that the standard includes a requirement that the connecting NSP/AEMO has to specify a set of realistic network events specific to the connection point in question to be studied, to ensure unlimited amount of scenarios is not requested to be investigated. The limit of consequent network events to be included under each scenario could then be set to 15 (or another number) if necessary. We consider additional information provided by AEMO on the nature of fault scenarios to be studied to be still quite unclear. SMA believes that if the standard is implemented as currently proposed this will allow AEMO and the connecting NSP to request an unlimited amount of studies and investigations under this clause.

SMA also notes the additional general requirement to account for active current injection during faults that was not included in the original proposal from AEMO. The draft rule requires an asynchronous generating system to have the capability to maintain total current (both active and reactive) during a disturbance at the maximum continuous current of the generating system including all operating generating units (in the absence of a disturbance) at all times.

SMA considers this requirement unrealistic, unachievable and neglecting the current technical capabilities of asynchronous generating systems. If implemented it will force generating systems to install costly equipment able to provide additional high fault current.

SMA suggests the standard should specify fault voltage range at which total current is to be maintained. AEMO states the concern is with shallow faults only. SMA suggests to specify the minimum voltage (e.g. 0.8-0.9pu) at which the current is to be provided at the level requested.

Definition of Continuous Uninterrupted Operation

The current interpretation of this clause by AEMO is that the active power delivered to the system must not change at all (even by a small percentage) with voltages at the connection point within the normal operational range. This currently forces the Connection Applicants to significantly oversize their plant (between 10 to 20% of additional capacity depending on the project) increasing project cost.

SMA believes it would be beneficial to specify what ‘substantially varying its active power and reactive power’ means under this definition (e.g. 1-2%) and clarify the voltage range at which the stable power must be provided to prevent future changes in interpretation (e.g. extension of the voltage ranges at which power must not change to much lower voltages).

Clauses S5.1 a.4 and S5.2.5.4– Voltage disturbance capability

SMA notes that in the draft determination AEMC acknowledges that the automatic standard proposed for overvoltage requirements:

- Exceeds requirements of international voltage standards reviewed.
- Is in excess of Australian system standards and if implemented will increase the risk of damage to network and customer-connected equipment.
- Hydro Quebec was the only network worldwide with similar requirements that could be identified in support of the proposal – a network with requirements that are highly unlikely to correlate with requirements and conditions of the NEM.

AEMC's paper advises the referenced Hydro Quebec network has a high penetration of wind energy attempting to make a link between this network and the NEM, however the information provided in Hydro Quebec's 2017 Annual Report states that out of their 47,612MW of installed capacity only 3,508MW is available from wind generation¹ (no solar generation) with majority of the generating stations (36,767MW of capacity) being hydroelectric.

AEMO's Generation Information Page² advises that in March 2018 out of approximately 49,990MW³ of installed generating capacity in the NEM wind and solar energy accounted for 8,694MW³ of capacity with coal generation providing almost half of total capacity (20,916MW³) and hydropower contributing only 7,945MW³ to the mix. It is also stated that proposed new wind and solar generation in the NEM exceeds 30,000MW. This shows that the two networks (NEM and Hydro Quebec) are unlikely to face similar challenges now or in the future.

Further to that voltages observed during black system event in South Australia were provided as the reason for requesting higher over voltage capability.

SMA considers ignoring potential equipment damage and international standards and setting new standard for the NEM using example of one network with a different generation mix and a single network event without appropriate technical assessment is inappropriate.

SMA notes that AEMC is satisfied with the wording of the automatic standard as majority of stakeholders agreed the minimum standard can be met and the Connection Applicants have an ability to propose a negotiated standard for this clause. It should be considered that the negotiation process is already extremely lengthy (in a range frequently exceeding 8-12 months) and difficult and the additional requirements under Clause 5.3.4A will make it ~~even~~ more challenging for the Connection Applicants to propose negotiated standards. This will further prolong the process increasing the cost to all parties with no clear evidence of the higher standards being beneficial for the operation of the network.

¹ Annual Report 2017, Hydro Quebec: <http://www.hydroquebec.com/data/documents-donnees/pdf/annual-report.pdf>

² Generation Information Page, AEMO, March 2018: <https://www.aemo.com.au/Electricity/National-Electricity-Market-NEM/Planning-and-forecasting/Generation-information>

³ Existing and committed less announced withdrawal