

29/05/2018

AEMO
Level 22 Collins Street
Melbourne 3000

To Whom It May Concern,

System Strength Impact Assessment Guidelines – Draft Report and Determination

System Strength Guidelines

Pacific Hydro, as one of Australia's leading clean energy companies, is committed to maximising Australia's renewable energy opportunities while supporting regional growth and the reduction of Australia's greenhouse gas emissions. To date, Pacific Hydro has invested around \$650 million in the Australian renewable energy market, \$560 million of this in wind farm developments and now multiple solar farm developments.

Being an owner of distribution and transmission connected wind farms and now developing solar farms, Pacific Hydro has significant experience in the development, operation and management of wind farms and maintains strong working relationships with the network service providers (NSPs), to whom the renewable energy projects are connected. Each connection brings different challenges and frequently requires careful consideration of local network issues.

As a company which recognises Australia's incredible wind and solar resources and the opportunity they create for our energy future, Pacific Hydro welcomes the opportunity to comment on the System Strength Impact Assessment Guidelines Draft Report and Determination.

Pacific Hydro's key concern is that the recent rule change allows AEMO to impose obligations on participants for information and data models that do not exist for existing plants, rather than limiting the obligation to new or potential facilities. This primary issue outweighs to some degree the value of responding to the consultation process for both system strength and system model guidelines.

Risk of Delay if EMT models not available

In Section 4.2, , AEMO concludes that the regulated solution is not warranted as it is possible for connection applicants and NSPs to manage the risk of delay caused by NSPs not having full system models. These delays lead to unnecessary expense for connecting applicants, either due to delaying a project until models become available, or implementing less efficient mitigation methods based on a preliminary assessment. One resolution would be to only enforce these rules once NSPs have the relevant models. Another option would be to use a hybrid modelling method between EMT and the existing RMS model to study the connections of new inverter-based generator (IBG) projects. This would remove the requirement for existing projects to provide PSCAD models, and warrants further investigation.

Pacific Hydro is concerned that AEMO has recently adopted a practice of requesting these highly detailed expensive models for all equipment as a means to solve the "system strength" issue. There is still much debate internationally on the correct way to treat this problem and AEMO has made an unprecedented decision to adopt an expensive, highly detailed modelling

method that may or may not prove to be any better than using a hybrid modelling method between EMT and RMS type models.

Regarding PSCAD models from registered participants, it is noted that failure to provide models in due course would be a breach of the NER. On this point, AEMO appears to be reverse engineering an obligation on to the market in a manner that has not been undertaken in the past. It is anticipated that there are likely to be numerous participants who do not hold the detailed control data necessary to make meaningful EMT models. In the case of older wind farms, the data does not exist and in some cases the manufacturer has confirmed that it does not have the expertise to provide such a model. In Pacific Hydro's view, it should be a collaborative approach between AEMO and participants to develop and test these models where relevant data exists. Furthermore, participants may not own or have licence to use AEMO's choice of software. If registered participants are tempted to rush the development of these models in order to avoid penalties this may lead to inaccurate results from the system strength impact assessment.

Concerns regarding lack of accuracy in network case studies

As all models are an approximation, the case studies of the power system are also an approximation; this is why cases are a "state estimated solution". As a network is by and large the biggest influence on any plant, the ability to provide "accurate" generator models is highly problematic. The consequence of this approach is that generators whose models are considered inaccurate because they cannot and do not anticipate the infinite possible responses of the network model could be required to incur considerable amounts of additional cost to address an "inaccuracy" caused by the network model.

Optimising mitigation measures

In section 4.6, AEMO concludes that it is up to NSPs and Applicants to choose the most efficient mitigation measures. Where PSCAD network models are unavailable, and mitigation measures are being based on a preliminary impact assessment, this is likely to result in a less efficient mitigation solution. It may be that the only option for a connection applicant is to proceed with a less efficient mitigation method rather than delay the project while waiting for the PSCAD models to become available.

It may be appropriate to have incentives and requirements for NSPs (and applicants) to collaborate to find the most efficient solution when several applicants are proposing to connect in the same area.

Responses to specific issues in Appendix B

In response to issue No. 23 in Appendix B, Summary of Submissions and AEMO Responses ("Appendix B"), AEMO responds to Pacific Hydro's concern about the additional 10% deduction from the SCR obtained in the preliminary assessment being too conservative by stating that the purpose of the preliminary assessment is to act as a screening process to determine whether a full assessment is necessary. The full assessment, stated to be based on better data, is used to determine whether mitigation is required. AEMO states that "Mitigation Measures will not be determined based on the outcomes of a Preliminary Assessment". This statement does not reflect the reality where there are NSPs which do not yet have PSCAD network models and therefore cannot currently perform the full assessment. If projects want to avoid delays due to the PSCAD models not yet being available, then mitigation methods are being determined based on the preliminary assessment.



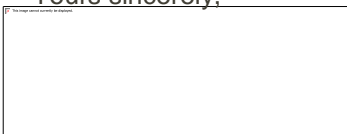
In response to issue No. 31 in Appendix B on defining the SCR, AEMO mentions that the guidelines permit NSPs to use one of four methods of calculating the SCR, based on the CIGRE TB 671. The use of four methods is explained to be due to differences between regions. In this case, it could be specified which method should be used for which region. Pacific Hydro does not believe that it is appropriate to force Participants to join CIGRE or pay fees in order to access the SCR calculation methods. Furthermore, NEM participants should not be asked to accept a technical brochure that is not yet an IEC standard.

Pacific Hydro notes AEMO's statement that "*No explanation is provided for the view that the methods used for estimating SCRs appear overly conservative.*" This is difficult to do without having access to the methodology, but reasoning was provided in our submission. These included the deduction of 10% from the SCR value and modelling being performed in a network with the minimum number of synchronous generators online, under the most severe contingency. Each of these points introduces conservatism into the methodology.

With regard to Protected Events, the definition according to the National Electricity Amendment (Emergency frequency control schemes) Rule 2017 No. 2 is "A **protected event** means a *non-credible contingency event* that the *Reliability Panel* has declared to be a *protected event* under clause 8.8.4, where that declaration has come into effect and has not been revoked. *Protected events* are a category of *non-credible contingency event*." According to this definition, it appears that *any* possible event could be declared a protected event, thus possibly making system strength estimates even more conservative. As no "protected events" have been declared by the Reliability Panel, the requirement to study them is even more onerous. For example, a participant may not be studying any now, as none have been declared. Does AEMO therefore exempt that participant from the obligation to ride through a "protected event" if one is declared in the future?

In issue No. 20 in Appendix B, AEMO considers it would be impractical to provide a definition of 'electrically close'. In the absence of a definition, the term is left too open to interpretation and may introduce further inaccuracy in WSCR calculation when using a calculation method that requires this.

Yours sincerely,



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