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Australian Energy Market Operator
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Clean Energy Council submission: AEMO Power System Model Guidelines / System Strength Impact Guidelines

The Clean Energy Council (CEC) is the peak body for the clean energy industry in Australia. We represent and work with hundreds of leading businesses operating in solar, wind, hydro, bioenergy, marine and geothermal energy, energy storage and energy efficiency along with more than 5,000 solar installers. We are committed to accelerating the transformation of Australia's energy system to one that is smarter and cleaner.

We welcome the opportunity to respond to the draft Power System Model Guidelines (PSMG) and System Strength Impact Assessment Guidelines (SSIAG). The National Electricity Market (NEM) is currently in transition. At a minimum, 6553 megawatts (MW) of new wind and solar projects will be entering the market by 2020, with the actual project investment pipeline expected to be much higher. This presents an opportunity to achieve a system of diverse supply mix, low carbon and low costs.

The pace of transition does present a new environment for the secure integration of new generation supply with the transmission network. The Australian Energy Market Operator's (AEMO) draft guidelines for Power System Models and System Strength Impact Assessment are important approaches for addressing the challenges of maintaining a strong system. The CEC acknowledges the requirement to conduct Power System Computed-Aided Design (PSCAD) studies and supports approaches to understanding system strength impacts. However, proponents require certainty and confidence in the connection process. This certainty is essential for ensuring efficient connections and operation of the network at least cost to consumers.

System Strength Impact Assessment Guidelines (SSIAG)

The SSIAG represent an important procedure for negotiating parties to navigate the connection process and understand the impacts of new connection on system strength. The CEC appreciates the detail provided in the guideline. However, we request some points of clarification or justification in the procedure.

Definitions and calculations must be clearly stated and justified

Clarity in the definitions of terms and calculations of values is critical for impact assessments to have validity. It is important that terms are used as defined in the National Electricity Rules (NER), and if not defined in the rules, that they are clear and specific. Similarly, calculations of values must be clearly defined, and their basis justified. Failure to do so results in difficulty and ambiguity for all negotiating parties in the connection process.

The following terms are used in the draft determination and either appear inconsistent with the NER or should be defined more clearly:

- Committed projects: AEMO has provided a definition of this term which varies from that stated in the NER. To ensure consistency, reference should be made to the NER definition.
- Electrically close existing plant: The SSIAG states in its relationship with the PSMG that the completion of a Full Assessment depends on the submission of detailed Electromagnetic Transients (EMT)-type models of new or modified connections, and of electrically close existing plant and network facilities. It is unclear what is considered as *electrically close*. This must be clarified in the PSMG.
- Generating system stability: When defining and identifying adverse system strength impacts, it should be clarified that the stable operation of a generating system is determined by reference to whether it can meet its performance standards at any level of MW output *as documented in its performance standards*, rather than at any level of MW.
- Expanded definition of credible contingency events: AEMO notes that an expanded definition is included for the purposes of the SSIAG provision. Credible contingency events are currently defined in the NER, and it is unclear what the expanded definition is or its justification.

The following calculations or assumptions should be justified:

- Contingency events: In identifying whether a generator is unable to meet its proposed performance standards following contingency events, clear guidance is required on dispatch assumptions during contingency events as dispatch patterns will vary according to generator location. It is recommended that the Network Service Provider (NSP) state these assumptions prior to undertaking the Full Assessment.
- Impact on protection systems for a transmission network or distribution network is to be excluded from the system strength impact assessment process: Consideration of protection elements is an important aspect of assessing the capability of the power system to maintain stable operation. Omitting this detail could be problematic in assessing power system stability.

Preliminary Assessment stage

The CEC welcomes the approach requiring NSPs to notify the Applicant of the method the NSP will use for the Preliminary Assessment and how the method will be implemented. Information provision in relation to the results of the Preliminary Assessment is important, and it would be useful to include a requirement that the methods and assumptions used to undertake the studies are shared with the proponent.

Full Assessment stage

The detail provided on the Full Assessment process in the SSIAG is valuable for allowing visibility of requirements for industry. The CEC welcomes the consideration of control system and protection system representation in EMT-type models. However, it is preferable that all terms are clear for the benefit of all negotiating parties. The Assessment stages should be clear that reference to the generating systems modelled refers to committed generating systems only. It would also be beneficial to be provided detail on when stability impact assessments are being undertaken, and what specific power quality issues will be expected to have an impact on asynchronous generator stability as this has not been defined.

At both stages of the Assessment process, it is important that the SSIAG provide a clear definition and statement of data and information that is required by the parties.

The CEC does not support the approach to conduct harmonic assessments in EMT-type models as part of the connection application. It is not demonstrated that NSPs will have the capability to provide the relevant network information required in EMT-type software packages.

Power System Model Guidelines (PSMG)

The PSMG are an important component guiding the connection process and robust guidelines are essential for the operation of the system. They also have the potential to have a strong impact on connecting generators. It is important that the PSMG clearly defines the modelling process.

The PSMG should identify the specific problem that needs to be addressed for the benefit of system security to justify its requirements. The lack of a defined problem has the potential to create requirements which result in uncertainty in cost and schedule to connecting parties.

It appears that the costs of model provision as required by AEMO in the PSMG are very high for generators, and the benefits of these modelling requirements have not been demonstrated. It is unclear and undemonstrated whether the model requirements are achievable for any negotiating parties, including generators and NSPs. This lack of clarity increases costs for all participants. We understand AEMO's concern around the capability to ride through multiple disturbances, however believe that assessing this through EMT modelling is not the most efficient method.

The position of the Original Equipment Manufacturers (OEMs) and connecting parties in this process is important. OEMs may not be able to meet the PSMG requirements and this may present a barrier for entry and delays to the connection process. AEMO states that depending on the expected impact of the plant on the power system, pre-commissioning model confirmation results may be required before the connection can proceed. In order to provide certainty to OEMs and connecting parties, AEMO should provide clear guidelines as to when model confirmation tests are required. Additionally, the requirement for extensive modelling on a NEM model is likely to result in increased cost, complexity and barriers to entry for OEMs into the Australian market.

We suggest that the requirement to provide models in a different software package nominated by the NSP should be optional and only if such a model exists by the OEM and the correct version. Maintaining the model in multiple software packages can be problematic due to increased costs and assurance of model performance.

We thank you for the opportunity to provide our views on these matters. Please contact Emma White on 03 9929 4107 or ewhite@cleanenergycouncil.org.au in the first instance.

Sincerely,

A handwritten signature in black ink, reading "Lillian Patterson". The signature is written in a cursive style with a large, prominent initial "L".

Lillian Patterson
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