GOLDWIND AUSTRALIA PTY LTD
Level 4, 485 La Trobe Street
Melbourne, VIC 3000
www.goldwindaustralia.com

10 February 2023

Australian Energy Market Operator

Lodged electronically.

Subject: Power Systems Model Guidelines (PSMG)

Dear AEMO PSMG Team,

Goldwind Australia welcomes the opportunity to provide feedback on the Power System Modelling Guideline issues paper. While we have not attempted to directly answer AEMO's consultation questions, our feedback is summarised with direct reference to different sections of the PSMG issues paper in the table below.

Section 3.2.1 – "*Because the DLL is self-contained, it has no dependencies on compilers, linkers or external static libraries*" Although likely of a lower concern to AEMO, we would like to share that in our experience, DLLs can still have dependencies on re-distributable packages (e.g. Visual Studio 2010 Shell or C++ redistributables). We seek clarification if AEMO has particular expectations around such dependencies or whether such dependencies would still be acceptable.
Section 3.2.2 – "*AEMO recommends a standard for DLL format and interface is developed for inclusion in the Guidelines.*" We are generally supportive of this approach considering the challenges described in the issues paper. As part of the development process, we recommend that AEMO engage (if not already engaged) with the IEEE and CIGRE working group with the view to unify requirements that would come out of the working group. Further information on the working group can be found here: http://www.electranix.com/IEEE-PES-TASS-realcodewg/.
Section 3.2.2 – "*open-source interface developed by AEMO and NSPs*" One challenge we have experienced in developing our own models was implementation of the snapshotting feature (which is a requirement of the current PSMG). For our existing models, we have relied on third party proprietary tools to enable the snapshotting feature. In the proposed arrangement, we would expect that the open source interface block would have inherent capabilities around snapshotting.

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Section 3.3.5 – "*AEMO and NSPs have identified that block diagrams received to date of IBR do not include enough details at the inverter level (such as lack of inclusion of PLL and fast current control loops) and/or are in a format that is unsuitable for development of small signal models, making it impossible for AEMO or NSPs to study the plant in the small signal domain.*"

We understand that AEMO's preferred way forward on the topic of small signal model is the provision block diagrams suitable for small signal analysis rather than DLL models developed in SSAT. Our preferences would align, particularly since a set of block diagrams are already provided as part of the connection process. In the issues paper, AEMO has suggested more detailed block diagrams are required and we note that AEMO also rightfully point out the challenges with OEMs releasing very detailed block diagrams which may expose intellectual property. We would like to note that even internally, such detailed descriptions of the generators are only available to select few members of the organisation (generally restricted to research and development).

Our suggestion, in an effort to facilitate sharing of more detailed block diagrams and avoid a situation where OEMs have to adopt another modelling platform (SSAT) to enable connections to the NEM, is for AEMO and the NSPs to define the gaps that exist in the current (relatively standard) approach to development/provision of PSSE block diagrams. Such a list would allow OEMs to evaluate the IP risk of the additional detail required and help inform our assessment on the tradeoffs of providing more detailed block diagrams vs. developing SSAT DLLs internally.

Section 3.3.5 – "*One reason detailed block diagrams have not typically been provided by OEMs is due to concerns around exposure of the intellectual property contained within the control systems which is detailed in the diagrams.*"

We propose an alternative to providing the block diagrams, bypassing the concerns around IP confidentiality, could be for OEMs to provide a table of transfer functions that they derive from their models. Goldwind has developed a method for deriving small signal transfer functions of its generating system using PSCAD. We welcome any feedback from AEMO on whether this would be a feasible approach.

Section 3.2.2 – "*AEMO recommends a standard for DLL format and interface is developed for inclusion in the Guidelines.*"

We are generally supportive of this approach considering the challenges described in the issues paper. As part of the development process, we recommend that AEMO engage (if not already engaged) with the IEEE and CIGRE working group with the view to unify requirements that would come out of the working group.

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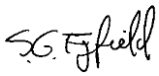
Sincerely,



Sam Fyfield
General Manager – Grid & SCADA
Goldwind Australia Pty Ltd
M: +61 427 306 938
E: Sam.Fyfield@goldwindaustralia.com