



01 June 2018

Mr John Pierce  
Chairman  
Australian Energy Market Commission  
PO Box A2449  
SYDNEY SOUTH NSW 1235

By online submission

**Draft for consultation: Power System Model Guidelines**

Vestas welcomes the opportunity to make a submission to the Australian Energy Market Commission's (AEMC)'s consultation on the proposed rule change submitted by AEMO.

Vestas is the world's leading supplier of wind power solutions, having installed close to 82 GW of wind turbines in 76 countries across the globe. Vestas is also a member of the Clean Energy Council (CEC).

Vestas would like to reiterate the following comments in line with our first submission on the draft for consultation:

Point #	AEMO's statement	Vestas's view
1.	Section 5.4.4 (Page 28): EMT models have the full representation of switching algorithms of power electronic converters for power system harmonic studies.	Detail model of switching logics of power converter itself is not sufficient for harmonic study.
2.	Section 5.4.4 (Page 29): for transient stability EMT-type models, correctly operate for integer time steps in the range of 10 to 50 microseconds and have consistent performance across this range of time steps.	The time step of 10 to 50 microseconds is not an issue for model, but it is not sufficient for harmonic study.
3.	Section 5.4.6. Table 5. Wind (generating unit) (Page 30)	Required model output quantities for Wind (generating units) in full scale converter system (FSCS) RMS models namely DC link voltage and current, Error/status codes, Generator rotor speed, Mechanical torque or power, Pitch angle may not be necessary since machine side is decoupled from the grid by the grid side converter which behaviour will mainly impact on the grid. Furthermore, these mechanical related parameters are not critical factors for transient studies which are investigated at hundreds ms time frame. In that sense Vestas would like to understand the purpose of accessing these outputs from the grid impact assessment perspective.

4.	Section 5.4.9 (Page 33): AEMO accepts RMS model source code natively developed in FORTRAN 90 or higher. FLECS code is no longer accepted.	Since FLECS code is still supported by PSS/E 34 there is no reason to reject it.
5.	Section 7.2.1 (Page 44): $\pm 10\%$ of the change for 95% of the samples within the transient window	<p>When validating simulation results against actual plant response, the tolerance depends on site wind condition. When conducting model performance crosschecking between different simulation tools, for example PSCAD results against PSSE results, the grid performance characteristics will also impact the tolerance. Thus, wherever the deviations are more than required, AEMO should relax the requirement if a proper explanation based on sound engineering principles is provided. For example, it should be acknowledged that PSSE will have limitations that PSCAD does not have, and as such it is reasonably expected that there will be differences in model performance depending on the software used.</p> <p>In addition, current and voltage signal tolerance requirements should be treated separately: the current response tolerance requirement should be relaxed in comparison to the voltage behavior when benchmarking between RMS model and EMT models.</p>
6.	Appendix C2.1 (Page 55): Turbine model component. Transient stability: RMS model.	As stated above in Point #1, for FSCS type of RMS WTG model, Aerodynamics, Pitch controller, Mechanical, drive train and Torsional damping components in the model may not be necessary for transient studies as their behaviors are very slow comparing the time frame the studies are conducted and they are also decoupled from the grid through the grid converter side.

Please feel free to contact us should you require further information or other supporting documents.

Yours sincerely,



Antonio Martinez  
 Director, BoP & SCADA Engineering  
 Technical Sales Management – Asia Pacific  
 Vestas Australian Wind Technology P/L  
 Tel: +61 3 8698 7080 Mob: +61 458 400 336

E-mail: [aomar@vestas.com](mailto:aomar@vestas.com)