10 December 2020

WEM Procedure – Generator Model Submission and Maintenance

Western Power requires detailed data on the operating parameters and technical capabilities of any Transmission Connected Generating System. This data is used by Western Power and AEMO to conduct generation system modelling for power system planning, design and operations. Western Power therefore requires data to be provided by Market Participants in a format compatible with Western Power's generation system modelling applications, and in a format able to be shared with AEMO.

Accurate generation system modelling is integral to the safe and secure operation of the power system. The accuracy of Western Power and AEMO's generation system modelling is dependent on the quality and format of input information including Generation System Models. As such, modelling data provided by Market Participants must be sufficient to enable Western Power or AEMO to predict the output of the Transmission Connected Generation System under all power system conditions [clause A12.17.3.2 of Appendix 12].

This document sets out the WEM Procedure for the application of Generation System Model Submission and Maintenance in accordance with clauses 1.38.4, 1.38.6 and 3A.4.2 of the WEM Rules for Market Participants, or prospective Market Participants, with new or modified Transmission Connected Generating Systems.

This procedure will take effect from the GPS Commencement Data of 1 February 2021.

Please provide feedback or any direct any queries to Western Power

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Feedback due before 8 January 2021

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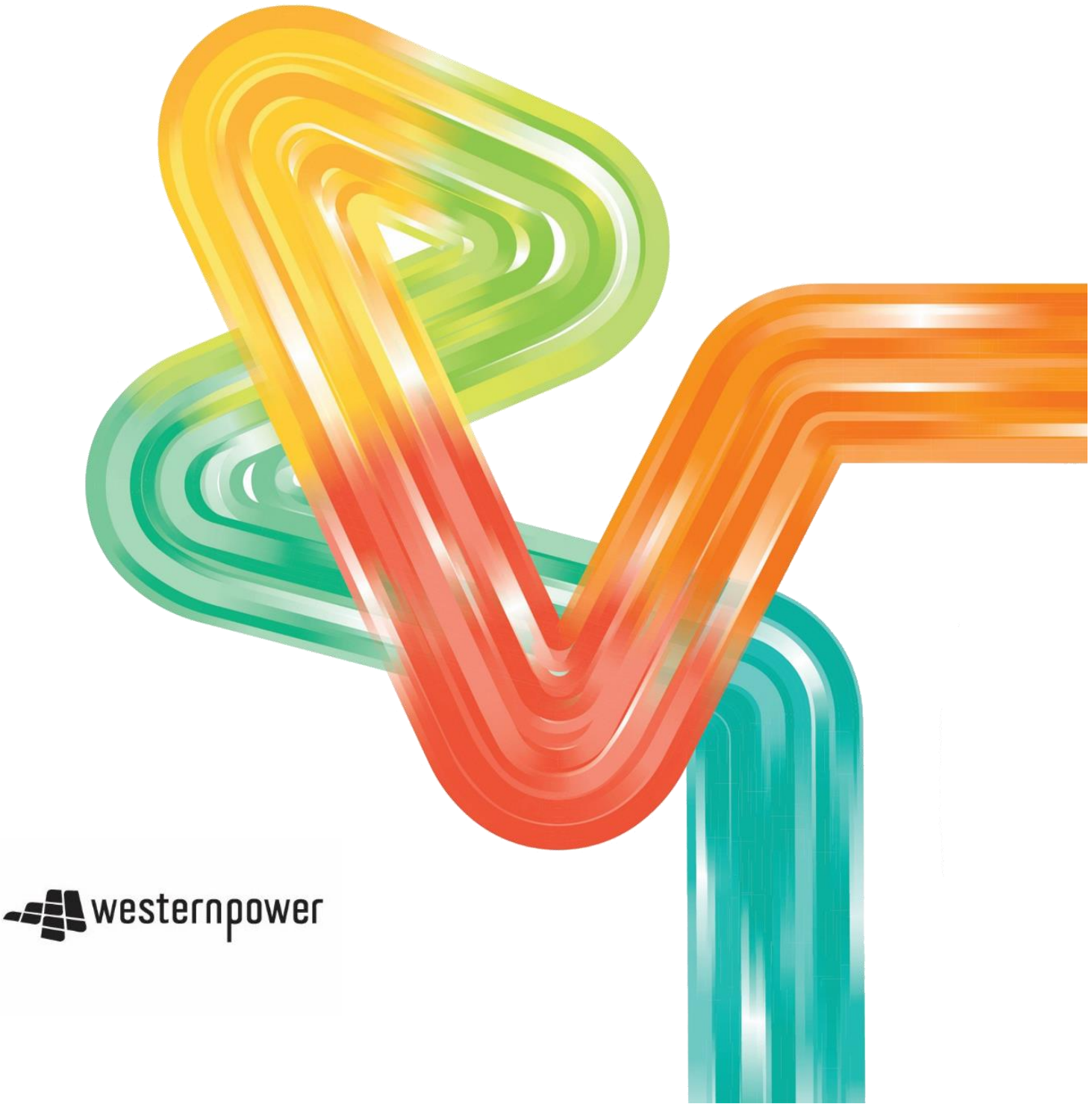
WHOLESALE ELECTRICITY MARKET PROCEDURE

GENERATION SYSTEM MODEL SUBMISSION AND MAINTENANCE

Version 1.0
7 December 2020



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ELECTRICITY INDUSTRY ACT 2004

ELECTRICITY INDUSTRY

(WHOLESALE ELECTRICITY MARKET)

REGULATIONS 2004

WHOLESALE ELECTRICITY MARKET RULES COMMENCEMENT:

This WEM Procedure took effect from 8:00 AM (WST) on [insert date TBC].

Version Release History

Version	Effective Date	Summary of Changes
1.0	dd/mm/yyyy	Initial WEM Procedure: Generation System Model Submission and Maintenance

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Change history

Version	Date	Revision Description	Changed By
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Contents

1. Introduction

1.1 Relationship with the Wholesale Electricity Market Rules

1.1.1 This Wholesale Electricity Market (WEM) Procedure: Generation System Model Submission and Maintenance (Procedure) is made in accordance with clauses 1.38.4, 1.38.6 and 3A.4.2 of the WEM Rules.

1.1.2 The purpose of this Procedure **[clauses 3A.4.2 and 3A.4.3, and section 3A.7]** is to document the:

(a) requirements of a Generation System Model **[section 17 of Appendix 12]** as they relate to root mean square (RMS) and electromagnetic transient (EMT) analysis models, including:

i. format of the model;

ii. model functional requirements;

iii. model documentation and user manual requirements;

iv. model acceptance test and model performance requirements; and

v. model validation, registered data and model accuracy requirements;

(b) methodology Western Power's must use to assess compliance with the requirements of a Generation System Model;

(c) processes and timeframes by which a Market Participant must ensure that the Generation System Model must be provided, and where necessary, amended; and

(d) processes Western Power must follow to establish and maintain information on the Generation System Model in the Generator Register in accordance with section 3A.7 of the WEM Rules.

1.1.3 This Procedure applies to Western Power in its capacity as the Network Operator in the SWIS.

1.1.4 This Procedure does not apply to other Network Operators, or Western Power in capacities other than as the Network Operator in the SWIS.

1.1.5 This Procedure applies to Market Participants or prospective Market Participants with new or modified Transmission Connected Generating Systems.

1.1.6 Where the term Market Participant is used in this Procedure, it should be interpreted to include prospective Market Participants.

1.1.7 This Procedure does not apply to distribution connected generating systems, or generating systems not owned or operated by a Market Participant, or prospective Market Participant in the WEM.

1.1.8 This Procedure only relates to the Generation System Model submitted to Western Power as part of an access application or a request by a Market Participant to modify its existing equipment. It does not include other data that may be required by Western Power as part of an access application or a request by a Market Participant to modify its existing equipment.

1.1.9 The requirements in this Procedure provide general guidance for Market Participants in submitting a Generation System Model.

1.1.10 Western Power may require alternative or additional data or information in respect of a specific Generation System Model.

1.1.11 A Market Participant required to provide a Generation System Model to Western Power for any reason should contact Western Power by email at system.analysis@westernpower.com.au to discuss any specific requirements.

1.1.12 In this Procedure, where obligations are conferred on a Rule Participant, that Rule Participant must comply with the relevant obligations in accordance with **[clauses 2.9.7A, 2.9.7B, 2.9.7C, 2.9.7D and 2.9.8]** of the WEM Rules, as applicable.

1.1.13 References to particular WEM Rules within this Procedure in bold and square brackets **[clause XX]** are included for convenience only and are not part of this Procedure.

1.2 Definitions and interpretation

1.2.1 The following principles of interpretation apply to this Procedure, unless otherwise expressly indicated:

(a) terms that are capitalised, but not defined, have the meaning given in the WEM Rules;

(b) to the extent that this Procedure is inconsistent with the WEM Rules, the WEM Rules prevail to the extent of the inconsistency;

(c) a reference to the WEM Rules, or WEM Procedures, includes any associated forms required or contemplated by the WEM Rules or WEM Procedures; and

(d) words expressed in the singular include the plural and vice versa.

1.2.2 In addition, the words, phrases and abbreviations in Table 1.1 have the meanings set out opposite them when used in this Procedure.

Table 1.1: Defined Terms

Term	Definition
Variation Request	A request made by a Market Participant to Western Power, to provide an exemption from providing all the information required under this Procedure.

1.3 Related documents

1.3.1 The following WEM Procedures and documents are associated with this Procedure and are available on the WEM Website:

(a) WEM Procedure: GPS Monitoring and Generation Compliance Testing;

(b) WEM Procedure: Facility Outages; and

(c) WEM Procedure: Commissioning Tests.

1.3.2 The following supporting documents are associated with this Procedure and are available on Western Power's website:

(a) Generator and Load Model Guidelines.

1.3.3 The Technical Rules also provide background information to this Procedure and are available on the Economic Regulation Authority's (ERA) website.

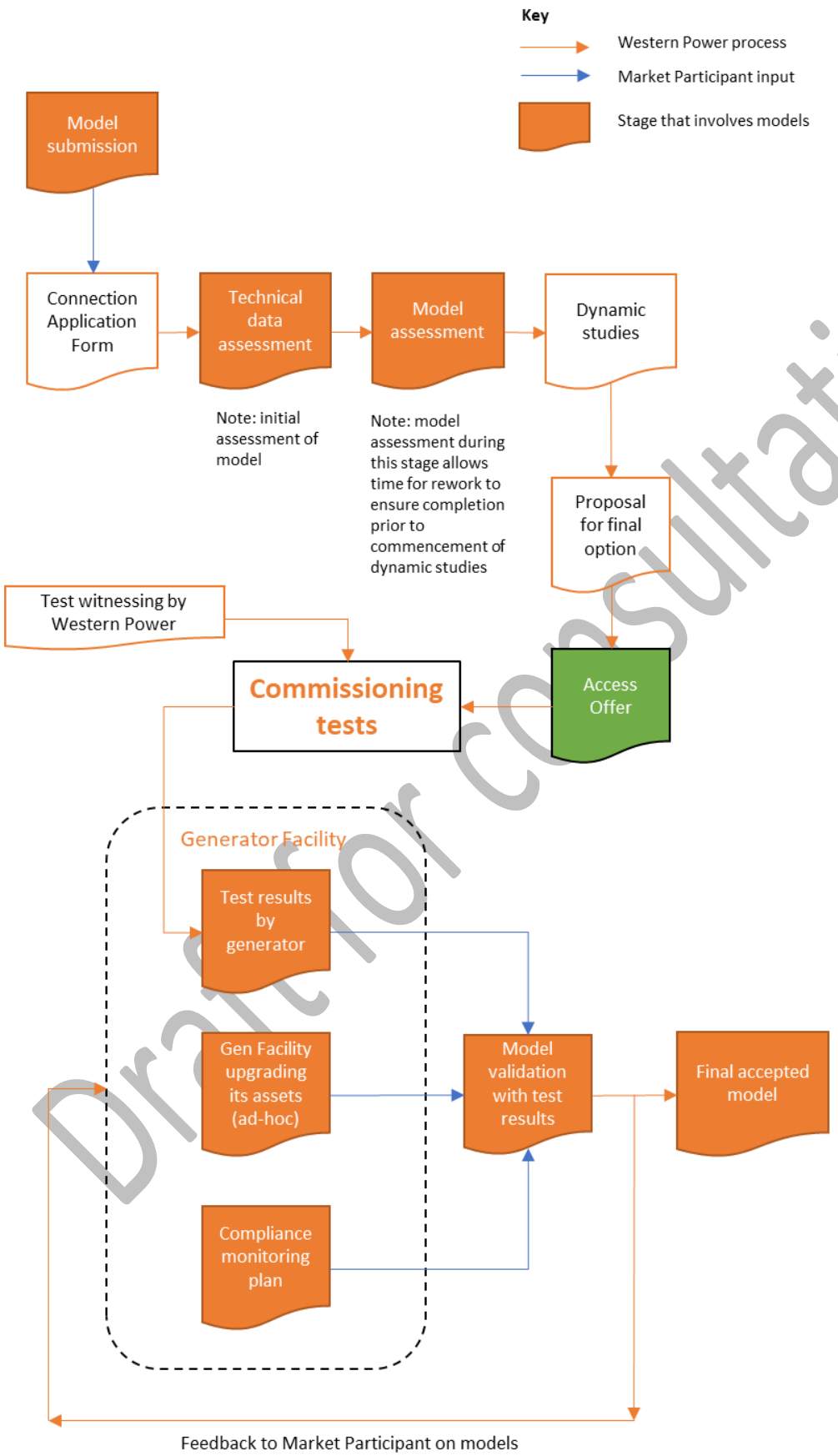
2. Overview of Generation System Model submission process

Western Power requires detailed data on the operating parameters and technical capabilities of any Transmission Connected Generating System. This data is used by Western Power and AEMO to conduct generation system modelling for power system planning, design and operations. Western Power therefore requires data to be provided by Market Participants in a format compatible with Western Power's generation system modelling applications, and in a format able to be shared with AEMO.

Accurate generation system modelling is integral to the safe and secure operation of the power system. The accuracy of Western Power and AEMO's generation system modelling is dependent on the quality and format of input information including Generation System Models. As such, modelling data provided by Market Participants must be sufficient to enable Western Power or AEMO to predict the output of the Transmission Connected Generation System under all power system conditions **[clause A12.17.3.2 of Appendix 12]**.

Figure 2.1 provides a high-level overview of Generation System Model development and submission process.

Figure 2.1: High level process flow for model development and submission



3. Generation System Model requirements

3.1 When a new or updated Generation System Model is required

3.1.1 A new or updated Generation System Model must be provided by a Market Participant to Western Power:

(a) for a new Facility, at the same time as a new access application for a Transmission Connected Generating System;

(b) at the same time as a revised access application for a Transmission Connected Generating System;

(c) where a Market Participant intends to modify[1] a Transmission Connected Generating System, and those modifications are declared by Western Power to be a Relevant Generator Modification **[clause 3A.13.1]**, at the same time it submits the information required under clause 3A.14.1 of the WEM Rules; and

(d) where Western Power performs an upgrade of its PowerFactory software such that of a Market Participant's Generation System Model is no longer in an appropriate form, at a time agreed between Western Power and the Market Participant, which must be no longer than six months.

3.2 Frequency for reviewing and updating a Generation System Model

3.2.1 A Market Participant must review the Generation System Model for a Transmission Connected Generating System:

(a) immediately, where the Market Participant becomes aware that the model is no longer accurate for any reason; and

(b) at least once in every 12 months from the date of issue to Western Power.

3.2.2 A Market Participant's review of the Generation System Model must consider whether the modelling data provided to Western Power matches the current and expected performance of the system.

3.2.3 Where a Market Participant's review of the Generation System Model under step 3.2.1 finds the modelling data:

(a) matches the current and expected performance of the system, the Market Participant must advise Western Power, in writing, as soon as practicable the date the review was completed and state that the modelling data remains within tolerance thresholds; or

(b) does not match the current and expected performance of the system, the Market Participant must advise Western Power, in writing, as soon as practicable and provide an updated Generation System Model within 90 Business Days of completing the review.

[1] Modifications may include upgrades, settings changes and configuration changes.

3.3 Format of a Generation System Model

3.3.1 A Market Participant must provide an RMS Generation System Model to Western Power in the following format:

(a) native unencrypted DIgSILENT PowerFactory format;

(b) suitable for use in the version of PowerFactory currently used by Western Power[2]; and

(c) suitable for integration with the Western Power model of the SWIS.

3.3.2 Where required by Western Power, a Market Participant must provide an EMT Generation System Model to Western Power in the following format:

(a) suitable for use in the version of PSCAD™/ EMTDC™ and Intel Parallel Studio XE used by Western Power[3]; and

(b) suitable for use with free, commonly available redistributable libraries, such as E-TRAN.

3.3.3 Western Power may, but is not required to accept a Generation System Model that is:

(a) not compatible with the version of software currently used by Western Power;

(b) dependent on additional external commercial software that Western Power would be required to purchase;

(c) dependent on a specific Intel Visual FORTRAN version; or

(d) compiled in, or requiring Intel Fortran Composer or Compaq Visual FORTRAN.

3.4 General RMS Generation System Model requirements

3.4.1 A Market Participant must ensure the RMS Generation System Model meets the following requirements:

(a) the model and its associated data and parameters must be consistent with the information provided as part of an access application, or otherwise the Market Participant's modification to an existing Transmission Connected Generating System. This includes, but is not limited to:

i. consistency with single line diagram layouts and other schematics provided to Western Power;

ii. consistency with relevant network data provided including all network impedances and ratings, voltage levels, transformer specifics (location, rating, vector groups, winding configuration, tap changer specifics etc), auxiliary loads and reactive devices; and

[2] To confirm the version of the relevant software currently in use, refer to Generator and Load Model Guidelines.

[3] To confirm the version of the relevant software currently in use, refer to Generator and Load Model Guidelines.

iii. consistency with generating system or load specifics provided such as maximum capability and loading, active and reactive power ranges and generator reactance. Loads, including generator auxiliary loads, must be modelled such that the load power factor is representative of the facility's actual performance under typical operating conditions;

(b) unless otherwise agreed, overhead transmission lines should be modelled using geometric tower models and conductor data; and

(c) the model must be suitable for balanced and unbalanced power flow studies, and for calculation of balanced and unbalanced short-circuit currents using 'Complete' and 'IEC' methods.

3.4.2 A Market Participant should ensure the characteristics of Western Power Network at the nominated connection point is accurately reflected, and tune the model to best meet the performance requirements of clauses A12.17.3.2 and A12.17.3.3 of the WEM Rules.

3.4.3 Upon request from a Market Participant, Western Power must provide a model of the SWIS in a form Western Power considers suitable for the purposes of the tuning of a Generation System Model.

3.5 RMS Generation System Model configuration requirements

3.5.1 A Market Participant must ensure the generator active and reactive power ranges are defined in the RMS Generation System Model according to the generator capability, consistent with the requirements of clause A12.3.1.5 of the WEM Rules.

3.5.2 For a synchronous generating system, the Generation System Model must include the following control systems presented as unique DIgSilent Simulation Language (DSL) models, and not combined into a single DSL model, unless agreed with Western Power:

(a) synchronous machine modelled with exact parameters[4];

(b) excitation system, load drop compensation and exciter;

(c) turbine-governor including speed droop and power control loops, turbine, boiler dynamics, temperature and power control/limiting functions, and other relevant control mode and protection functions;

(d) power system stabiliser including synthesised speed;

(e) under-excitation limiter;

(f) over-excitation limiter;

(g) other limiters, such as stator current limiter, volts per hertz limiter, over-fluxing limiter;

(h) power station controller; and

[4] PowerFactory uses 'Exact' parameters as opposed to other software, which may use 'Classical' parameters (for further details, refer to P. Kundur 'Power System Stability and Control').

(i) other control and protection systems, including loss of excitation protection and pole-slip protection relays.

3.5.3 For a non-synchronous generating system, a Market Participant must ensure the relevant configuration information is included in the Generation System Model. This may include:

(a) generator model(s);

(b) reticulation network including other relevant equipment such as static or dynamic reactive equipment, or batteries, and harmonic filters;

(c) farm-level control system with measurement points/control points (including phase locked loops) appropriately configured; and

(d) other control modes and protection systems including where relevant droop/voltage control/Q control/power factor control, anti-islanding protection and underfrequency/over frequency protection.

3.6 Other RMS Generation System Model requirements

3.6.1 At any point in the Generation System Model submission process, Western Power may inform the Market Participant, in writing, of alternative or additional requirements, including but not limited to:

(a) for a synchronous generating system, distinct models for sub-synchronous resonance studies are not required. An assessment of sub-synchronous resonance will instead be based on transient stability models and the mechanical shaft model provided with the user manual (see section 4.1) and the Market Participant's access application;

(b) for a non-synchronous generating system, harmonic current and flicker emissions in are required;

(c) the provision of a small signal model capable of being executed in eigenvalue studies using both the 'QR method' and 'Arnoldi method' without modification[5];

(d) the provision of protection relay models; and

(e) the aggregation of models where the detailed load models are, and/or the generating system is, complex.

3.6.2 Where Western Power considers the Generation System Model should be aggregated under step 3.6.1(e), it must:

(a) specify the aggregation methodology[6] to be used by the Market Participant; or

(b) require studies demonstrating the equivalence between the detailed and aggregated models to be provided by the Market Participant.

3.6.3 Where a Market Participant aggregates models, it must ensure generator parameters for individual units remain visible.

[5] Damping performance is assessed against the requirements of rule 2.2.8 of the Technical Rules.

[6] For reference, see Kosterov et. al., Method of Equivalencing for a Large Wind Power Plant with Multiple Turbine Representation, NREL, 2009.

3.6.4 Where a Market Participant must demonstrate the equivalence between the detailed and aggregated models, it must, at a minimum, demonstrate the alignment of time-domain simulation overlays for voltage, active power and reactive power for the nearest and farthest generating unit and the aggregated generating unit, for:

(a) zero impedance balanced three-phase to earth and zero impedance two-phase to earth faults at the connection point; and

(b) voltage, reactive power, power factor and active power step response.

3.7 EMT model specific requirements

3.7.1 Where an EMT Generation System Model is required to be provided to Western Power, the Market Participant must ensure the model meets the following requirements:

(a) the model must have a bandwidth of at least 0 Hz to 10 kHz and settle to the correct final value for the applicable power system conditions and applied disturbance(s);

(b) the model must be based on plant design data and rigorously tested against factory acceptance tests for the corresponding version of plant;

(c) the model must include detailed representation of all control loops of the plant (inner and outer control loops);

(d) the model must represent all electrical and control features pertinent to the type of study being done;

(e) the model must have the full representation of switching algorithms of power electronic converters for power system studies;

(f) the model must have all relevant protection systems modelled which are required for EMT studies;

(g) the model must be configured to match expected site-specific equipment settings;

(h) the model must allow plant capacity to be scaled;

(i) the transient stability EMT models must operate with a time-step greater than or equal to one microsecond;

(j) the model must be capable of self-initialisation, with initialisation to user defined terminal conditions within three seconds of simulation time;

(k) the model must warn the user by way of a message to the progress output device when the system conditions are beyond plant operational limits or otherwise not consistent with valid operating conditions for the plant;

(l) the Market Participant must clearly identify the manufacturer's EMT model release version and the applicable corresponding hardware and firmware version;

(m) the EMT model provided must account for the most restrictive electrical, mechanical, or thermal protection of the plant with respect to multiple voltage disturbances in quick succession and calculate dynamically and accumulatively the impact of multiple voltage disturbances; and

(n) the EMT model must have the following components modelled as accurately as possible:

i. source and system side converters including switches, diodes, filters, smoothing reactors and linking capacitors;

ii. source side machines and PV arrays limited to transients being observed at the DC link and/or the system; and

iii. source side and system side converters controller circuits including the pulse width modulation circuits, input filters, RMS and/or component extractions, all control loops including dynamic/static limiters and dead bands.

4. Generation System Model documentation requirements

4.1 User manual

4.1.1 A Market Participant must provide a user manual with the Generation System Model, and ensure it:

(a) provides sufficient information to enable Western Power to understand and use the model effectively; and

(b) does not contain confidential information that would prevent Western Power using the model from time to time to undertake studies and disclosing the results of those studies to third parties who have a legitimate interest in the results.

4.1.2 A Market Participant must ensure the user manual provided in step 4.1.1, includes at a minimum:

(a) a description of the model components and parameters, and data category of each parameter;

(b) information about how the model parameter values vary with the operating state or output level of the equipment or with the operating state or output level of any associated equipment (e.g. excitation system automatic and manual control, configuration of voltage and power factor control modes);

(c) protection system settings and algorithms relevant to load flow or dynamic simulation studies (e.g. under- and over-voltage or frequency protection settings);

(d) any special control or protection schemes that are relevant to load flow or dynamic simulation studies (e.g. runback schemes, low voltage ride-through schemes, active power reduction schemes);

(e) information provided in accordance with **[section 3A.2]** only to the extent that the information is not a part of the model or the model parameters and that it is reasonably necessary to allow modelling of the generating unit, generating system, load or related equipment in power system studies;

(f) connection point details including single line diagrams, its parameters and values, location, associated network augmentations or modifications (if applicable) and other relevant connection information, sufficient to identify where to connect the equipment in Western Power's power system model;

(g) how the model is to be set up for power system analysis including, but not limited to:

i. expected operational practice;

ii. specific software simulation setup such as integration algorithm, EMT or RMS simulation options;

iii. special setup for any associated auxiliary equipment or reactive compensation equipment;

iv. details of modifications required to scale-up an aggregated Generation System Model and/or complex load model; and

v. special setup required to enable, disable and configure protection functions;

(h) for a generating system, generating unit or load incorporating any power electronic devices, a description of how that device should be included in the short-circuit fault calculation;

(i) any other information the Market Participant considers relevant to the performance of the equipment for the model's intended use or to achieve the relevant accuracy requirements; and

(j) any other information Western Power considers relevant to the performance of the equipment for the model's intended use or to achieve the relevant accuracy requirements, as notified by Western Power to the Market Participant.

4.2 Other documentation

4.2.1 A Market Participant must provide the following additional documentation, as applicable for the Transmission Connected Generating System:

(a) equipment data sheets associated with the Generation System Model;

(b) if available, a report describing how the model was developed;

(c) protection settings and model tuning report;

(d) for inverter connected generators, fault ride-through performance and model validation report; and

(e) any other relevant documentation, such as model validation reports or type test reports.

4.2.2 Western Power may require a Market Participant to provide any other relevant information.

5. Model acceptance

5.1 Model acceptance tests

5.1.1 Where a Market Participant seeks to develop a generating system with a particular technology type, but where a site and/or connection point has not yet been selected (e.g. as part of an enquiry), the Market Participant may request Western Power to provide an initial assessment of the Generation System Model and associated information against the requirements of the WEM Rules and this Procedure.

5.1.2 Western Power:

(a) must conduct this assessment using an infinite bus model for a range of system strengths to emulate different connection locations; and

(b) will not assess electromechanical interactions with other Transmission Connected Generating Systems, which could later be assessed using the complete model of the SWIS once the connection point is known.

5.1.3 When a Market Participant finalises site and/or connection point details, the Market Participant may request Western Power to provide a complete assessment of the Generation System Model and associated information against the requirements of the WEM Rules and this Procedure.

5.1.4 Western Power must ensure, as a minimum, simulation plots include terminal voltage, active power, reactive power, applied input signal (e.g. voltage reference step change, grid voltage step change) and other relevant signals (e.g. power system stabiliser output, static var compensator reactive power).

5.1.5 Western Power must perform a thorough investigation of the suitability of the Generation System Model, using detailed power system steady state, dynamic and small signal studies. These studies have due consideration to where the generating system is connected to the Western Power Network so that the impact of the generating system on the surrounding network, as well as the interaction between Facilities, can be assessed.

5.1.6 AEMO may undertake further assessments of the functionality and performance of the Generation System Model for the purposes of Generator Performance Standard testing in accordance with the WEM Procedure: Testing Requirements.

5.1.7 Western Power may consider any further assessment undertaken by AEMO in its assessment of a Generation System Model.

5.1.8 Where Western Power assesses a Generation System Model, and determines that the generating system meets the requirements of chapter 3A or Appendix 12 of the WEM Rules then it must notify the Market Participant of the outcomes of its assessment in writing within 60 Business Days.

5.1.9 Where Western Power assesses a Generation System Model, and determines that:

(a) the Market Participant has not provided sufficient information for Western Power to determine whether the system meets the requirements of chapter 3A or Appendix 12 of the WEM Rules; or

(b) the generating system does not meet the requirements of chapter 3A or Appendix 12 of the WEM Rules,

then it must notify the Market Participant of the outcomes of its assessment in writing within 60 Business Days, providing details of the issue to be addressed through model retuning[7] or augmentation of the generating system.

[7] General information regarding the tuning methodology and requirements for synchronous generators can be found on Western Power's website. The methodology should be adapted based on plant functionality and technology type.

5.1.10 Where Western Power requires a Market Participant to take action under step 5.1.7, following the completion of the necessary rectification(s) the Market Participant must request Western Power to undertake a further model assessment in accordance with this section of the Procedure.

5.1.11 A Market Participant must receive the notification of acceptance from Western Power under step 5.1.8 of this Procedure prior to receiving the final offer to connect and progressing to Commissioning and Testing activities.

6. Model validation and performance

6.1 Validation and testing requirements

6.1.1 A Market Participant must validate all relevant data associated with an access application or any upgrades of the generating system, including but not limited to, the Generation System Model, and generating system configuration and control system parameters:

(a) subject to the tests for performance verification **[section 3A.9]**; and

(b) within the timeframes specified by AEMO in the WEM Procedure: Testing Requirements.

6.1.2 A Market Participant must submit the validated data in step 6.1.1 to Western Power, together with the following supporting documentation to Western Power for it to validate the Generation System Model:

(a) test report(s) including:

i. R2 data, model validation and performance report (with R2 data and performance standards attachments);

ii. model tuning report; and

iii. various study reports conducted by Western Power on behalf of the Market Participant to assess performance of the generating system, including but not limited to any due diligence studies conducted by Western Power;

(b) final Generation System Model and block diagrams;

(c) for demonstrated performance with respect to the relevant technical requirements prior to the Technical Rules (1 July 2007), it is necessary for the existing proponent to show evidence there has been no degradation in performance over previous agreed performance standards;

(d) any special conditions specified in the connection agreement; and

(e) completion and submission of the Market Participant generator register.

6.1.3 Western Power or AEMO may require additional testing to validate the Generation System Model where the data and/or supporting documentation provided by the Market Participant in step 6.1.2 of this Procedure does not align with expected results.

6.1.4 Where additional testing is required, AEMO or Western Power as appropriate will advise the Market Participant in writing, with reasons, and provide further information.

6.1.5 A Market Participant must demonstrate ongoing compliance with the WEM Rules and the relevant connection agreement by conducting routine tests in accordance with an agreed Generator Monitoring Plan as outlined in the WEM Procedure: GPS Monitoring and Generation Compliance Testing.

6.2 Test witnessing

6.2.1 In accordance with the WEM Procedure: Commissioning Tests, Western Power may witness performance testing[8] to assesses whether the test:

(a) is conducted in accordance with the approved test procedure; and

(b) poses any risk to power system security or stability, safety or to other Market Participants, in which case there may be a requirement to omit particular tests (for example, for a synchronous generator, omit some tests with the Power System Stabiliser out of service) or cease testing.

6.2.2 In lieu of attending site for test witnessing, Western Power may request the Market Participant submits test results and plots with relevant performance analysis to Western Power.[9]

6.2.3 For Commissioning Tests, Western Power may require results to be provided prior to its approval for the generating system to be synchronised and before the generating system may operate at progressively higher active power output levels.

6.2.4 Western Power may request a Market Participant to provide specific test result information for loads which require a Generation System Model.

6.2.5 A Market Participant must submit all test results and associated relevant information including final transfer function block diagrams and settings of automatic voltage regulator, power system stabiliser, under excitation limiter and over excitation limiter to Western Power within 10 Business Days after the completion of the test.

6.3 R2 data, model validation and performance report

6.3.1 Throughout the process of a new connection application or modification of a Transmission Connected Generating System, the Market Participant must ensure data accuracy is continually refined until it is validated during a Commissioning Test and R2 validation test.

6.3.2 Within three months of the completion of tests, or as otherwise agreed as a reasonable timeframe between Western Power and the Market Participant, a Market Participant must provide the relevant R2 data, model validation and performance report to Western Power for acceptance.

6.3.3 The R2 data, model validation and performance report in step 6.3.2 must include:

(a) details of the tests undertaken;

8 Test procedures and test plans must be submitted to Western Power, and test plans submitted to AEMO via the website: http://www.westernpower.com.au/electricity-retailers-generators-commissioning-tests.html and in accordance with the WEM Procedure: Testing Requirements.

9 These results must ultimately be included in the R2 data, model validation and performance report (see section 6.3 of this Procedure).

(b) details of any discrepancies between the tests conducted and the agreed test procedures;

(c) results, measurements, analysis techniques used and any relevant information to assist Western Power with performing a due diligence assessment;

(d) specific assessments of the performance against relevant clauses of the WEM Rules documented, and illustrated on results plots[10], tabulated in a registered performance spreadsheet as shown in Table 6.1;

Table 6.1: Performance standard table format

Clause	Sub-clause	Clause description	Compliant (Yes/No/Exempt)	Detailed description of performance including references	Western Power remarks
Clause and relevant Technical Rules version	Sub-clause	Clause description	If exempt, include relevant supporting information	Details of simulated or validated performance and specific references.	-

(e) model validation assessment with respect to the requirements outlined in this document, including overlays of measured and simulated responses with accuracy bands;

(f) final model and model documentation (e.g. computer model, block diagrams and settings, updated user manual); and

(g) updated access application with R2 data (for upgrades or modifications this should be the updated R2 data relevant to the upgrade).

6.4 Review of test reports

6.4.1 Within three months of receiving complete test reports and associated supporting information under section 6.3 of this Procedure, Western Power must advise the Market Participant, either:

(a) it has accepted the test report, associated data, parameters, model(s) and performance assessment, and no further action is required; or

(b) it has not accepted the test report, associated data, parameters, model(s) and performance assessment, and requires further information, further testing and/or model changes, providing reasons.

6.4.2 Where Western Power has not accepted the test report, associated data, parameters, model(s) and/or performance assessment it must use reasonable endeavours to work collaboratively with the Market Participant to expedite the resolution of any issues preventing acceptance of the test report.

6.4.3 Where Western Power requires the Market Participant to carry out additional tests, it must provide reasons and sufficient evidence that further testing is required, and work with the Market Participant to reach agreement on the scope to address any deficiencies within a reasonable period.

[10] More information is provided in the Generator and Load Model Guidelines.

6.4.4 Western Power may accept the R2 data, model validation and performance report as an accurate reflection of the Transmission Connected Generating System where the Facility is non-compliant with the WEM Rules.

6.4.5 Where the final performance does not comply with the requirements of the WEM Rules the Market Participant must address the non-compliance(s). Options may include:

(a) AEMO providing Interim Approval to Generate Notification with conditions (i.e. directing to operate at a particular output until matter is resolved);

(b) AEMO requiring the Market Participant to rectify non-compliance before providing Interim Approval to Generate Notification; or

(c) the Market Participant, Western Power and AEMO agreeing that the Generator Performance Standards will be renegotiated (including potential for trigger events).

7. Variation requests

7.1.1 Unless Western Power agrees otherwise, a Market Participant must provide all the information required under the WEM Rules and this Procedure.

7.1.2 A Market Participant may request an exemption from providing all the information required under this Procedure by submitting a Variation Request to Western Power for consideration.

7.1.3 A Variation Request must not result in the breach of the WEM Rules.

7.1.4 A Market Participant may make a Variation Request to Western Power at any point in time, but should endeavour to do so as soon as practicable after it becomes aware that one is required.

7.1.5 The Variation Request should include the following information:

(a) the specific sections of the Procedure(s) that cannot be met;

(b) documentary evidence (including options considered) of the reasons for being unable to meet a Procedure, sufficient to satisfy Western Power that meeting the guideline is technically unachievable;

(c) if the discrepancy between a Procedure and what can be achieved could be reduced at a later date, an undertaking as to when and how this would be provided; and

(d) the extent to which inability to comply with this Procedure might affect the ability to assess the compliance of the Market Participant under the requirements of the Technical Rules and/or WEM Rules.

7.1.6 In response to a Variation Request, Western Power must assess the impact on the ability of the Market Participant to meet the requirements of this Procedure and consider the request in terms of its impact on:

(a) the computer model (to which the Variation Request is related), and how it should be used;

(b) Western Power's certainty as to its ability to accurately model the Facility in power system studies, including determination of power transfer limits and providing advice to AEMO when requested;

(c) quality or security of supply to other Market Participants;

(d) the ability for Western Power, the Market Participant or any other party to conduct studies for connection applications;

(e) the extent of changes to the operation of the generating system; and

(f) AEMO's ability to ensure secure operation of the power system.

7.1.7 Western Power must endeavour to respond to a Variation Request within 10 Business Days, but may extend this period if reasonably required to properly consider the Variation Request or to seek input from AEMO.

7.1.8 Following consideration of the Variation Request, Western Power must:

(a) accept or reject the Variation Request;

(b) propose alternatives for the Market Participant to consider that would address the issue, and/or lessen the impact of the Variation Request on the market; or

(c) request further information.

7.1.9 Where Western Power:

(a) proposes alternatives for the Market Participant to consider Western Power must work with the Market Participant, and AEMO where appropriate, to reach agreement within a reasonable period; or

(b) requests further information under step 7.1.8, it must re-consider the Variation Request in accordance with this section of the Procedure within 10 Business Days of the receipt of the requested information.