



1 August 2017

Mr John Pierce  
Chairman  
Australian Energy Market Commission  
PO Box A2499  
**Sydney South NSW 1235**

Dear Mr Pierce

**"ERC0219" National Electricity Amendment (Generating System Model Guidelines) Rule 2017 Draft Rule Determination**

Ergon Energy Corporation Limited (Ergon Energy) and Energex Limited (Energex) welcome the opportunity to provide comment to the Australian Energy Market Commission (AEMC) regarding its Draft Determination on the Generating System Model Guidelines.

This attached submission, which is available for publication, is provided by Energex and Ergon Energy as distribution network service providers (DNSPs) operating in Queensland.

Should you require additional information or wish to discuss any aspect of Energy Queensland's submission, please do not hesitate to contact either myself on (07) 3851 6416 or Trudy Fraser on (07) 3851 6787.

Yours sincerely

A handwritten signature in black ink, appearing to be 'Jenny Doyle', written over a horizontal line.

Jenny Doyle  
General Manager Regulation and Pricing  
Telephone: (07) 3851 6416  
Email: [jenny.doyle@energyq.com.au](mailto:jenny.doyle@energyq.com.au)

*Encl: Ergon Energy and Energex submission*



# **Ergon Energy and Energex**

**Joint submission to Australian Energy  
Market Commission**

**National Electricity Amendment  
(Generating System Model Guidelines)  
Rule 2017 – Draft Determination**

**Ergon Energy Corporation Limited  
Energex Limited  
1 August 2017**

# Contents

- 1 Introduction .....1**
- 2 Key messages .....2**
  - 2.1 Development of guidelines and data sheets.....2**
  - 2.2 Disclosure and sharing of power system modelling data.....3**
    - 2.2.1 Definition of a Registered Participant .....3
    - 2.2.2 Disclosing/sharing of Models in a timely manner.....5
  - 2.3 Modelling Data Accuracy .....6**
  - 2.4 Software Simulation Modelling Platform.....7**
  - 2.5 20,000 MWh per annum threshold .....7**
  - 2.6 Timing .....8**
  - 2.7 Other Issues .....8**

## Contact details

Jenny Doyle  
Phone: +61 (7) 3851 6146  
Email: [jenny.doyle@energyq.com.au](mailto:jenny.doyle@energyq.com.au)

# 1 Introduction

Ergon Energy Corporation Limited (Ergon Energy) and Energex Limited (Energex) welcome the opportunity to provide comment to the Australian Energy Market Commission (AEMC) regarding its Draft Rule Determination on the Generating System Model Guidelines (Draft Determination) and associated Draft Rule. This submission, which is available for publication, is provided by Ergon Energy and Energex as distribution network service providers (DNSPs) operating in Queensland.

Ergon Energy and Energex are committed to providing:

- safe, reliable and affordable electricity supply;
- a great customer service experience;
- customers greater control over their energy consumption;
- efficient and sustainable energy solutions; and
- access to the next wave of energy linked innovative technologies and renewables.

Ergon Energy and Energex are supportive of the Draft Determination released by the AEMC. In particular, we are pleased that the AEMC in the Draft Determination:

- expanded the application of the existing model data provision framework to apply to additional types of participants;
- expanded the model data provision framework to apply to additional equipment;
- require the Australian the Energy Market Operator (AEMO) to specify in a set of guidelines the kind of power system modelling data that it may request; and
- require AEMO to have regard to the sensitivity of highly detailed model data and therefore to set out in its guidelines and data sheets (developed by AEMO no later than 30 September 2018 in accordance with the rules consultation procedure under the National Electricity Rules(NER)) the circumstances in which this model data may be shared with third parties.

As members of Energy Networks Australia (ENA), the peak national body for Australia's energy networks, Ergon Energy and Energex have also contributed to and are supportive of the issues raised in the ENA's submission.

Our key messages in relation to the Draft Determination are included in section 2 of this submission. Ergon Energy and Energex are available to discuss this submission or provide further detail regarding the issues raised, should the AEMC require.

## 2 Key messages

Notwithstanding our support for the Draft Determination, Ergon Energy and Energex have some concerns in relation to particular aspects of the Draft Determination. It is our belief that the Draft Determination can be improved to provide greater clarity and transparency to market participants whilst ensuring security and performance of the power system and balancing the regulatory cost burden. Our key concerns are outlined below.

### 2.1 Development of guidelines and data sheets

Ergon Energy and Energex appreciate that the development of the guidelines and data sheets will occur via a different consultation process under the purview of AEMO. However, we still consider it worthwhile raising matters that AEMO should have regard to when developing the guidelines, including the following, setting explicit requirements for:

- generating systems of less than 30 MW;
- electromagnetic transient models (EMT) type (i.e. Power System Computer Aided Design (PSCAD)/ Electromagnetics Transients including DC (EMTDC)) time domain models to apply to generators 5MWs and greater or 5 % of the system fault level whichever is the lower;
  - the provision of accurate models in a timely manner, particularly at the application to connect through to offer to connect stage under Schedule 5.4B to enable assessment of existing and future close in time clusters of non-synchronous power electronic converter type generating systems;
  - the type of power system modelling data it will require from different participants; and
  - the circumstances in which it will require what type of power system model data;

While we appreciate that AEMO must have regard to the costs and accept a range of software simulation products, we believe that this will be counter-intuitive. We strongly recommend that AEMO instead consider proponents using products that align with the modelling platform used by the relevant Network Service Providers' (NSPs) in their jurisdictional areas. In Queensland it is Power System Simulator for Engineering (PSS®E and PSCAD/EMTDC) and these are used to assess Generator and Network Performance Standards. We suggest they should be submitted during the enquiry and application to connect stage. This will create certainty and clarity regarding the framework and therefore allows participants to plan and account for these costs. This is discussed in more detail in section 2.4.

## 2.2 Disclosure and sharing of power system modelling data

Ergon Energy and Energex are concerned that the Draft Determination does not address our earlier concern<sup>1</sup> regarding the ability to obtain power system modelling data, particularly EMT-type (PSCAD/EMTDC) models of sufficient accuracy from generator proponents in a timely manner, particularly at the application to connect through to offer to connect stage. Alongside this timing issue is;

- the veracity and accuracy of power system models when considering the timelines for provision of S<sup>2</sup>, D<sup>3</sup>, R1<sup>4</sup> and R2<sup>5</sup> power system modelling data does not account for an environment where generators are applying for connection within months of each other; and
- significant commercial and system performance risks when assessing multiple connections at the one time and no one generator has R2 or R1 modelling data.

This timing issue can lead to subsequent obstacles in terms of being able to disclose/share this modelling data with other proponents in a timely manner to enable proponents to accurately model and evaluate their proposed non-synchronous generator connection performance, especially where the connection is or could in future operate in a low system strength area. This is discussed in more detail below at sections 2.2.1 and 2.2.2.

### 2.2.1 Definition of a Registered Participant

While AEMO may now obtain the necessary EMT-type (i.e. PSCAD/EMTDC) models or power system modelling data and may potentially be able to disclose this information, there may be some limitation due to the term Registered Participant. Under the NER a Registered Participant is defined as:

*A person who is registered by AEMO in any one or more of the categories listed in rules 2.2 to 2.7 (in the case of a person who is registered by AEMO as a Trader, such a person is only a Registered Participant for the purposes referred to in rule 2.5A).*

---

<sup>1</sup> Refer to Ergon Energy and Energex submission in response to AEMC Consultation Paper, Generating System Model Guidelines.

<sup>2</sup> Standard Planning Data.

<sup>3</sup> Detailed Planning Data.

<sup>4</sup> R1 data refers to pre-connection data derived from manufacturers' data, detailed design calculations, works or site tests etc.

<sup>5</sup> R2 data refers to post-connection data derived from on-system testing after system connection.

However, as set out in clause 8.2.1(a1) of the NER, for the purposes of some provisions of clause 8.2 only, AEMO, Connection Applicants, Metering Providers and Metering Data Providers who are not otherwise Registered Participants are also deemed to be Registered Participants.

While a Generator registered in accordance with clause 2.2 will clearly be a Registered Participant, a Connection Applicant will not yet be capable of being a registered Generator. Nevertheless, clause 2.7 includes a category to capture Intending Participants. An Intending Participant is a party that is registered by AEMO as an Intending Participant under Chapter 2. Under clause 2.7 any person intending to act in any Registered Participant category may, on application for registration by that person in accordance with clause 2.9, be registered by AEMO as an Intending Participant if that person can reasonably satisfy AEMO that it intends to carry out an activity in respect of which it must or may be registered as a Registered Participant. However, it can be somewhat unclear what would be required to “reasonably satisfy” AEMO, so AEMO has published the following information on its website to provide guidance on the matter:

*AEMO’s internal committee undertake a merit-based assessment on a case by case basis. While each application will be unique in terms of the project’s development stage, typical examples of evidence that has been provided include a mix of:*

- *Board approved business plan*
- *Planning permits*
- *Development approval*
- *Evidence of project funding/finance*
- *Copy of the certificate of title for the land*
- *Copy of the connection inquiry or the connection application*
- *Environmental impact assessment studies*
- *Press releases*
- *Evidence that the development process has been commenced*
- *Project milestones – construction to typically commence within a reasonable period of time from registering as an Intending Participant.*<sup>6</sup>

---

<sup>6</sup> <https://www.aemo.com.au/Electricity/National-Electricity-Market-NEM/Participant-information/New-participants/Intending-Participants>

Based on the above, while a Connection Applicant may be able to reasonably satisfy AEMO at the application stage of the connection process, this may not always be possible at the enquiry stage. Preventing these Connection Applicants from having access to the relevant modelling data/studies of other proponents that are connected, or are in the process of establishing a connection to the network could slow and/or impact the Connection Applicant's progress through the connection process. For example, it is assumed that a Connection Applicant is able to submit proposed negotiated access standards with its connection application for consideration by the NSP and AEMO; however, this should ideally be prepared with reference to the modelling of "first in time" generators.

From the Draft Determination and Draft Rule, it is not clear if this issue has been addressed. As such, Ergon Energy and Energex would appreciate the AEMC having regard to this issue and considering this prior to the release of the Final Determination in terms of third party access/disclosure.

## **2.2.2 Disclosing/sharing of Models in a timely manner**

Ergon Energy and Energex are both concerned regarding the existing confidentiality framework and the associated challenges in terms of the present obligations in respect of allowing other applicants and parties to undertake necessary modelling and studies to understand the impact/interaction of a generator on the network and meet Generator and System Performance Standards. We also note in the Draft Determination that it was suggested by Vestas that a non-disclosure agreement may be a mechanism for sharing information with third parties, including black boxed encrypted EMT-type (PSCAD/EMTDC) models. We are concerned that this approach may allow inconsistencies to develop as each agreement may have different terms and conditions which don't allow uniformity in how this information may be shared. We therefore, suggest that the AEMC further consider the mechanisms available in the NER and how they can be amended to enhance the sharing of sufficiently accurate modelling information and the effect of confidentiality. Potential enhancements may include:

- Amending clause 8.6.2 to include an exception for black boxed encrypted EMT-type models and information;
- Including an exception in clause 5.3.8 that sets out the circumstances where data and information provided under clauses 5.3 and 5.3A may be disclosed and that the provider must ensure the information is capable of being disclosed upon providing. We believe that this explicit requirement would ensure that the proponent and the original equipment manufacturer (OEM) would therefore negotiate appropriate disclosure conditions.

## 2.3 Modelling Data Accuracy

In regional Queensland, there are several renewable energy generation clusters on the network and they range in the connection process from enquiry, to detailed planning to the commissioning phase. The timely provision and accuracy of S<sup>7</sup>, D<sup>8</sup>, R1<sup>9</sup> and R2<sup>10</sup> planning data for system strength analysis can have an adverse impact (i.e. GPS compliance, detailed design and network augmentation mitigation measures) upon the connection of these clusters particularly when assessments transition from an individually high weighted short circuit ratio (WSCR) screening metric to a low cluster WSCR screening metric.

These clusters may have the added complexity of being connected to either TNSP or DNSP networks. As these individual projects could be spaced in time by 18-24 months, the accuracy and veracity of the planning data stages and power system modelling needs to reflect the shorter project timelines from inception to commissioning in modern non-synchronous power electronic connected generation type projects.

Generic models are not considered an acceptable compromise when assessing low system strength generator connections. In addition, confirmation of the individual minimum short circuit ratio (SCR) performance of each generating system is critical for an optimised system strength mitigation proposal and plant parameter tuning of each site.

Several OEM's have recommended that detailed EMT-type modelling in low system strength networks is required. In subsequent assessments, it has been found that the PSS@E modelled performance does not reflect the required model accuracy when compared to EMT-type PSCAD/EMTDC model recommended by OEMs.

Also of concern is that AEMO's Operations and Planning Data Management System (OPDMS) enables subsequent proponents to obtain power system modelling data of the network including;

- recently connected generators that is only truly accurate up to 3 months after commissioning (i.e. via R2 data); and
- PSS@E model platform.

---

<sup>7</sup> Standard Planning Data

<sup>8</sup> Detailed Planning Data

<sup>9</sup> R1 data refers to pre-connection data derived from manufacturers' data, detailed design calculations, works or site tests etc.

<sup>10</sup> R2 refers to post-connection data derived from on-system testing after system connection.

This creates an immediate conflict in ensuring the accurate and timely data provision considering EMT-type models are not registered in OPDMS.

Ergon Energy and Energex suggest that the AEMC should also consider making AEMO the custodian of EMT-type PSCAD/EMTDC models in OPDMS, require pre-validated and accurate models in a timely manner particularly at the application to connect through to offer to connect stage and share these models to subsequent proponents as required.

## **2.4 Software Simulation Modelling Platform**

While AEMO may be required to accept models in different formats to help Registered Participants manage costs, this may not be appropriate for the NSP. This is due to the fact that Ergon Energy and Energex already model the network in an agreed format. We suggest that Registered Participants should be required to submit models that align with the model used by the NSP. If this doesn't occur, then Registered Participants may be faced with additional time delays, increased costs, and upskilling and resource impacts in order to convert to the required jurisdictional software simulation modelling platform.

In our experience, model format inconsistencies has resulted in several costly and inefficient outcomes for both Ergon Energy/Energex and the Registered Participant, particularly where the generator/network model provided a modelling format that was inconsistent with the wider network model developed in the industry standard PSS®E software platform. We would not want to repeat this problem in Queensland for EMT-type models where the EMT-type modelling platform is being developed on PSCAD/EMTDC.

To alleviate this issue, we suggest that AEMO and jurisdictional NSPs consider determining what modelling platform should apply in the jurisdiction. This could occur while AEMO develops the guidelines and data sheets. This approach will ensure consistency and in the long-term, reduce costs.

## **2.5 20,000 MWh per annum threshold**

Ergon Energy and Energex appreciate the AEMC's consideration of our concern that the rule change should apply to generators smaller than proposed under AEMO's initial rule change request.

Whilst the 20,000 MWh is a reasonable load threshold, it does not recognise the distribution system fault level, dynamic plant (i.e. Static var compensators, Statcom, disturbing plant, etc.), load factor nor the internal plant consumption that may be offset by internal generation sources as seen at the connection point. If the threshold is applied for

load connected customers, it should have consideration of the site particulars when considering the power system modelling guidelines.

We are concerned that the introduction of a 20,000 MWh per annum threshold related to the consumption or use of electricity by particular equipment, above which network users are required to provide modelling data to AEMO, will by default apply as a threshold for generating systems (similar to generating system registration rules). In fact, we believe that this threshold will not consider the particulars of the connected site or generating cluster and therefore will not accommodate weaker distribution networks such as Ergon Energy's.

Both, Ergon Energy and Energex are therefore extremely concerned, that an opportunity to ensure the adequate protection of the network, including system strength will be missed if the Final Determination is generalised for loads and generating systems connecting at the distribution network. Accordingly, we therefore reiterate our position in our response to the AEMC's Consultation Paper, that the rule change should apply to generators 5MW and greater or 5 % of the system fault level whichever is the lower.

## **2.6 Timing**

Together, Ergon Energy and Energex are concerned that the proposed commencement date of 30 September 2018 for AEMO to develop and publish revised guidelines and data sheets is too distant. This concern is primarily due to the fact that Ergon Energy is receiving a significant number of connection enquires and applications from renewable non-synchronous power electronic interfaced generators (totalling approximately 6.14 GW) to its network. Additionally, Ergon Energy is also negotiating connections and as such, a transitional proposal would be appreciated to allow Ergon Energy to require proponents to submit power system modelling data, particularly EMT-type models, to ensure adequate modelling in low system strength areas in a timely manner with models of sufficient accuracy as mentioned previously.

## **2.7 Other Issues**

As a Registered Participant is able to request information from AEMO that is reasonably required to carry out power system studies (including load flow and dynamic simulations) for planning and operational purposes,<sup>11</sup> we query whether load flow and dynamic

---

<sup>11</sup> For example, clause 3.13.3(k)

simulations are amended to power system simulation as per the references in the Draft Determination.