

Power System Model Guidelines and Data Sheets and System Strength Impact Assessment Guidelines consultation

Joint response to the Australian
Energy Market Operator

17 April 2018



Part of the Energy Queensland Group

ABOUT ERGON ENERGY

Ergon Energy Corporation Limited (Ergon Energy) is part of the Energy Queensland Group and manages an electricity distribution network which supplies electricity to more than 740,000 customers. Our vast operating area covers over one million square kilometres – around 97% of the state of Queensland – from the expanding coastal and rural population centres to the remote communities of outback Queensland and the Torres Strait.

Our electricity network consists of approximately 160,000 kilometres of powerlines and one million power poles, along with associated infrastructure such as major substations and power transformers.

We also own and operate 33 stand-alone power stations that provide supply to isolated communities across Queensland which are not connected to the main electricity grid.

ABOUT ENERGEX

Energex Limited (Energex) is part of the Energy Queensland Group and manages an electricity distribution network delivering world-class energy products and services to one of Australia's fastest growing communities – the South-East Queensland region.

We have been supplying electricity to Queenslanders for more than 100 years and today provide distribution services to almost 1.4 million domestic and business connections, delivering electricity to a population base of around 3.4 million people via 52,000km of overhead and underground network.

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1 INTRODUCTION

On 5 March 2018, the Australian Energy Market Operator (AEMO) published the Power System Model Guidelines and System Strength Impact Assessment Guidelines (the Guidelines) for consultation. AEMO is required to develop the Guidelines, which are to take effect on 1 July 2018, following the System Security Market Frameworks Review undertaken by the Australian Energy Market Commission. AEMO has requested that interested parties make submissions on the first stage of consultation by 12 April 2018. Energex and Ergon Energy's detailed comments on each of the Guidelines are provided in sections 2 and 3 of this submission.

Energex and Ergon Energy strongly support the introduction of measures to ensure that increasing volumes of distributed generation can be efficiently integrated into the National Electricity Market (NEM) without impacting power system safety or security. As Distribution Network Service Providers (DNSPs), Energex and Ergon Energy are currently facilitating approximately 1,190 MW of committed (5,500 MW of enquired) renewable and distributed generation connections to their networks, with many of these in rural areas. The Transmission Network Service Provider (TNSP), Powerlink, is also facilitating an additional 1,544 MW of committed generation connections across Queensland. Consequently, Energex, Ergon Energy and Powerlink are in a unique position compared to other Australian DNSPs and TNSPs.

There are two key issues arising from these changes which Energex and Ergon Energy would like to continue working with AEMO to resolve, namely:

- The facilitation of model sharing and the associated roles and responsibilities with respect to the Full Assessment process which remain a significant ongoing concern for Energex and Ergon Energy. It is still unclear as to how this process can be facilitated by the Network Service Provider (NSP) to efficiently enable the customer connection whilst not being involved beyond our jurisdiction in the tuning of generation plant. We are very keen to ensure that this process does not result in an inadvertent transfer of risk between parties due to uncertainty around roles and responsibilities.
- The role and expectations of the Single Machine Infinite Bus (SMIB) model and how it can be used in conjunction with the automatic access standards to identify and manage generator performance risks early in the project lifecycle. Energex and Ergon Energy consider that the identification and management of risk at this stage of the connection process (i.e. before designs are finalised and equipment is ordered) provides the best opportunity for proponents to resolve technical concerns. We therefore consider that further clarity on the use of the SMIB model to both streamline the application process and identify generator performance risks would be beneficial.

Given the degree of change and complexity in the connection process for generators, it is critical that these points are clarified (including the corresponding impact on related processes)

to ensure NSPs can provide a consistent and efficient process for customers. The role of the Guidelines in providing clear direction in this regard is paramount.

Energex and Ergon Energy appreciate the opportunity to comment on the Guidelines and look forward to continuing to work with AEMO on these issues.

2 COMMENTS: SYSTEM STRENGTH IMPACT ASSESSMENT GUIDELINE

Section	Energex and Ergon Energy Comments
1.2.1	<p>"Synchronous fault level" is a term already widely used to denote a fault level calculated using synchronous impedances. However, it has been defined differently in the Guideline. In order to avoid confusion, Energex and Ergon Energy recommend that the term should be amended to "synchronous generation three phase transient fault level" (which may be abbreviated to "synchronous generation fault level").</p>
2.1	<p>With respect to the first dot point, Energex and Ergon Energy consider that further clarity is required as to what is meant by "fault levels at all busbars of the power system". Currently, we have an obligation to report on and maintain our maximum fault levels and it is unclear whether there will be a requirement for AEMO and NSPs to determine minimum fault levels for embedded generation on their networks.</p>
2.3	<p>The third dot point requires NSPs to consult with AEMO before providing the Connection Applicant with the results of the Preliminary Assessment and the Full Assessment. However, it should be noted that NSPs have specific timeframes within which to provide a response to the proponent. It will therefore be necessary for AEMO to commit to providing timely responses to NSPs to enable those timeframes to be achieved. Energex and Ergon Energy recommend that a one to two week timeframe would be reasonable.</p>
2.3	<p>It would be beneficial for AEMO to provide guidance as to the stage at which NSPs need to inform one another about proponents to ensure a complete Preliminary Assessment can be undertaken. We also recommend that AEMO should retain a database or register of committed generators across all NSPs so that all parties are aware of committed projects and the factors that must be taken into account. We refer to the work performed by Energex and Ergon Energy with input from AEMO on the Capacity Allocation Policy as something that may help guide this discussion.</p>
2.4	<p>Further clarity is required as to whether a standard requirement, e.g. Essential Services Commission of South Australia minimum short circuit ratio (SCR) of 1.5 and ratio of system inductive to resistive impedance of 2.0 at the high voltage inverter terminals, will be enforced by AEMO or, alternatively, whether there will be a requirement for NSPs to develop an industry standard. The timing for the development of this standard is also critical.</p>

Section	Energex and Ergon Energy Comments
2.4.1	<p>Energex and Ergon Energy recommend that this clause be amended to read as follows:</p> <p style="padding-left: 40px;">“An Applicant will be required to provide up-to-date EMT models if required by the NSP undertaking a Full Assessment as these are the only types of models that will result in an accurate assessment. These models are to be provided within 20 business days. When such a model is not readily available, the NSP will not commence the Full Assessment until the Applicant provides the required updated model.”</p> <p>The NSP cannot bear responsibility for design or tuning advice and should only be providing performance feedback during the Full Assessment. Further clarity will therefore be required as to how proponents will adjust their tuning without access to the full models. (This point relates to our concerns referred to in section 1 with respect to inadvertent transfer of risk.)</p>
2.5.4	<p>The Guideline specifically states that the remediation of a fault level shortfall is a TNSP obligation. Consequently, further guidance is required as to how this obligation will be applied when the fault level shortfall exists at sub-transmission or distribution level.</p>
4	<p>Energex and Ergon Energy consider that a definition for the word “proposed” is necessary. We suggest that the definition should be:</p> <p style="padding-left: 40px;">“Where a proponent has made an Application to Connect, but has not yet accepted an Offer”.</p> <p>Additionally, there are often many systems which are in the Application phase that will ultimately not proceed. Therefore, we recommend that point two is changed from “proposed” to “committed”.</p>
4.1.1	<p>Energex and Ergon Energy consider that a definition for the term “withstand capacity” is required. We suggest that the definition should be:</p> <p style="padding-left: 40px;">“The 3-second fault current withstand capability of the plant”.</p>
4.1.2	<p>Energex and Ergon Energy will require detailed information from the TNSP on fault levels. Therefore, we recommend that additional information regarding the exact network state / conditions should be included in the fault level information provided by the TNSP or AEMO, including, for example, items of plant and / or generators that are out of service.</p>

Section	Energex and Ergon Energy Comments
4.1.2	<p>With respect to Weighted Short Circuit Ratio (WSCR) calculations, clarification is required as to whether static var compensators (SVCs) and static synchronous compensators (STATCOMS) should be included. Energex and Ergon Energy request that it is clearly defined that:</p> <ul style="list-style-type: none"> - SVCs and STATCOMs are not to be considered in the WSCR calculation; and - If an SVC or STATCOM changes the voltage at the busbar of interest by more than three per cent (or as agreed by the NSP), a Full Assessment should be carried out to study the possible interactions. <p>The Guidelines should also make clear that where screening methods indicate a Full Assessment is not required, the risk / obligation for correction remains with the proponent.</p>
4.1.2	<p>Energex and Ergon Energy consider that an agreed definition of “electrically close” is required. Both 100km and five busbars away have been put forward previously, but no consensus has yet been reached. We recommend that AEMO should lead the discussion and resolution of this issue.</p>
4.1.2	<p>Clarification is required as to whether the SCR calculation should consider the worst case with an intact network, or the minimum in the worst contingency.</p>
4.2	<p>The wording of this clause places responsibility for completing the Full Assessment on the NSP. Further clarification is required to ensure that there is no expectation that the NSP will be providing specific tuning or system design advice and that general advice only regarding system performance will be provided. Guidance is also required on how a proponent will tune their model without access to all the other models.</p> <p>At the Application stage, there are still uncertainties with respect to control systems, harmonic interactions and changes in the model. The S5.2.5.13 and S5.2.5.5 model validation may not happen until well after Hold Point Commissioning and the NSP cannot be held accountable for such unknowns / model variations when undertaking system strength assessments.</p>
4.2.1	<p>A definition for the word “committed” is required. Energex and Ergon Energy suggest the following:</p> <p style="padding-left: 40px;">“A generation proponent is considered ‘committed’ when they have accepted an Offer to Connect, have an agreed GPS and / or 5.3.4A letter, and an accepted PSCAD/EMT model.”</p>

Section	Energex and Ergon Energy Comments
4.3	It will be necessary for NSPs to know the minimum generation dispatch profiles to accurately conduct stability studies. Further clarity is required as to which party will be calculating those profiles, when they will be calculated, and how NSPs will be able to obtain this information.
5.1	Some discussion on the long-term implications of maintaining system stability would be appreciated. Where a generator is connecting into aged network, the NSP should be able to nominate plant retirement outside the five year window (for example, the retirement of a sub-transmission line leading to a change in system strength) to ensure future system stability.

3 COMMENTS: POWER SYSTEM MODEL GUIDELINES

Section	Energex and Ergon Energy Comments
2.1	Energex and Ergon Energy support the requirement for generators to provide their models to NSPs to enable them to perform system stability studies and ensure network security.
2.2(a)	It is noted that NSPs will be required to provide models and other information to AEMO within specified timeframes. However, we are concerned that it will be administratively onerous to provide this information on an ad hoc basis via email. We therefore suggest that consideration is given to a mechanism to manage this obligation, for example, an annual upload into a central repository established and maintained by AEMO.
5.4.7	We concur with the statement that the SMIB model may not reflect reality and the interactions with the full system. Clarifying the use and expectations of the SMIB model as part of the connection process is critical to ensuring that performance risks are appropriately identified early in the project lifecycle.
5.4.9	This clause requires that Root Mean Square models submitted to AEMO must be compatible with Power System Simulator for Engineering (PSSE) version 34. However, our understanding is that there have been some issues with PSSE version 34 and that version 32 is still being used by proponents and NSPs for GPS compliance studies. We recommend that it would be prudent to continue using version 32 for the time-being and update the Guideline when participants have more confidence in version 34.
7.2	Energex and Ergon Energy highlight the need to encourage Applicants to optimise their performance. For example, a Power Quality Analyser (PQA) may create a 0.8 sec delay, but as long as the GPS is complied with, the PQA inefficiency is acceptable.
8.2	Energex and Ergon Energy agree that it is appropriate for AEMO to have responsibility for providing model data as required.
8.3.2	Further consideration may be required as to whether the Guideline should provide detail regarding single-cast versus aggregated models. There has been some concern raised previously regarding whether those models can be encrypted to a sufficient level to address issues currently being experienced by proponents with respect to obtaining consent from the manufacturer to share models.