



Dr John Tamblyn  
Chairman  
Australian Energy Markets Commission  
Level 5, 201 Elizabeth Street  
Sydney NSW 2000

6 June 2008

Dear Dr Tamblyn,

**Re: National Electricity Rules: Rule Change Proposal  
Confidentiality Arrangements in Respect of Information Required for Power  
System Studies**

Thank you for inviting comment in the First Round Consultation on this proposed Rule change. Econnect's comments on the proposed Rule change are provided in the attached submission, in the interest of progressing the efficient operation of the National Electricity Market. This submission is not confidential.

Please feel welcome to contact us if further clarification is required.

Kind regards,

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# **First Round Submission to AEMC on Rule Change: Confidentiality Arrangements in Respect of Information Required for Power System Studies**

## **1. Introduction**

Econnect Australia is an independent consulting firm specialising in the electrical grid connection of renewable energy projects. Since 2003 Econnect has assisted in feasibility and due diligence studies, design, Connection Agreement negotiations and site engineering for wind farm and other generation projects in the NEM and other jurisdictions. Our clients include large and small renewable energy developers, wind turbine manufacturers and government agencies.

Econnect welcomes the National Generators Forum's Rule change proposal in regard to confidentiality of generator data in the NEM. A large part of Econnect's work on behalf of participants and intending participants in the NEM is the conduct of static and dynamic power system analysis studies to assess the compliance of generators with proposed performance standards and balance outcomes between generators, Network Service Providers and other stakeholders in pursuit of an optimal solution. Our ability to accomplish this task on behalf of our clients has been severely curtailed by what we believe to be unintended side effects of the recent Rule change of March 2007 in regard to generator technical requirements.

We agree with the NGF that the breadth of confidentiality restrictions introduced with the March 2007 Rule change works against the interest of NEM participants, and that the NEM objective is better served by clarifying the extent of generators' interest in intellectual property protection, and the extent to which this is does not in fact conflict with the interest of NEM participants and connection applicants in obtaining information sufficient to conduct their own studies into the impact of their own proposed connections.

Econnect does however believe that there are some remaining ambiguities and barriers to efficient information sharing in the NEM that have not been adequately addressed by the proposed Rule change. Below we outline some of the issues in detail and recommend some improvements to the Rule change proposal that we believe fulfil the original purpose of the proposed Rule change, and promote the NEM objective by facilitating the efficient planning of new connections and network augmentations.

## **2. Background to the Rule Change**

Prior to 2007, any Registered Participant in the NEM could request and receive network model information from NEMMCO or an NSP in order to carry out both static and dynamic power

system studies relating to their plant. Typically this information would be supplied as load flow and dynamic data files for the PSS/E software package. Software models for generators and other system plant were provided as precompiled object code, to avoid the disclosure of sensitive intellectual property embodied in these models. The identifiable parameters for generators were limited to those contained in a PSS/E load flow case and included actual real and reactive power output, maximum and minimum capability limits, voltage setpoint, MVA rating, transformer data, and equivalent short-circuit impedances for positive, negative and zero-sequence networks.

As part of the Rule change in respect of Technical Standards for Wind Generation and Other Generator Connections enacted in March 2007, it was determined that in order to provide certainty in the availability of information sufficient to model generation plant in the NEM for the indefinite future, Generators would be required under Rule S5.2.4 to provide NEMMCO with model source code, block diagram descriptions and other detailed information in respect of their generating systems. The full extent of this more detailed information was finalised in February 2008 with the publication of the final NEMMCO *Generating System Data Sheets* and *Generating System Model Guidelines*.

The detailed information now required under S5.2.4 includes information that is regarded as sensitive intellectual property by Generators, and specifically by wind turbine manufacturers. While conventional thermal and hydro generating plant is a mature and standardised technology, wind generators and other emerging power technologies are rapidly evolving and subject to intense competition in the market. Manufacturers of these technologies have an understandable interest in limiting the disclosure of critical information concerning their plant and control systems, lest this compromise their market position.

In recognition of this need for non-disclosure, the March 2007 Rule change introduced more stringent confidentiality requirements for all information concerning generators. Rule 8.6.2(m), which previously enabled the provision of modelling information to any Network User, was altered to specifically exclude generator information provided under S5.2.4(a) (data sheets), S5.2.4(b)(5) (model block diagram) and S5.2.4(b)(6) (model source code). This effectively limits the disclosure and sharing of this generator information solely to NEMMCO and Network Service Providers under Rules 5.3.8 and 8.6.1.

We understand that as a consequence of this Rule change, NEMMCO has determined that:

1. The Rules prohibit the disclosure of dynamic power system models to anyone other than an NSP, even in precompiled form, as this would entail the disclosure of generator information provided under S5.2.4. This effectively converts the performance of dynamic power system studies – whether for due-diligence assessment of new generator connections or for other planning and operational purposes of Registered Participants – into non-contestable work to be undertaken solely by NSPs.
2. The Rules even prohibit the disclosure to anyone other than an NSP of load flow snapshots of the NEM, as are required for the conduct of load flow and short-circuit studies. This is due to the fact that load flow cases include information on generator capabilities, short-circuit impedances and transformer data, which are included in NEMMCO Data Sheets and are therefore within the scope of Rule S5.2.4(a), hence excluded from disclosure under Rule 8.6.2(m).

While it is theoretically possible to modify the load flow and dynamic models of the NEM maintained by NEMMCO in a way that obscures all generator information and prevents its disclosure, in practice this is a labour-intensive exercise which it is not feasible for NEMMCO to undertake except at prohibitive cost. Our opinion in this regard is based on experience in

obtaining network information for studies on behalf of a number of Connection Applicants and Registered Participants over the last twelve months.

We agree with the NGF that these two consequences of the Rule change were not intended, and run contrary to the NEM objective, both in the sense of restricting competition and in the sense of preventing Registered Participants and Connection Applicants from undertaking planning and operational activities for their (actual or proposed) plant in an efficient manner. We do however point out that the restrictions apply not only to the dynamic model information provided under S5.2.4(b)(5) and (6), as stated in the NGF proposal, but *also to any information appearing on the NEMMCO Data Sheets* and thus falling under the scope of S5.2.4(a).

### **3. What is Required for Effective Power System Studies?**

Power system static and dynamic studies are conducted by or on behalf of Registered Participants and Connection Applicants in the NEM other than NSPs for a variety of reasons, including:

- The formulation of appropriate Performance Standards by Connection Applicants under the technical requirements of Schedule S5.2.
- Assessment of compliance with proposed Performance Standards as part of the Connection Application process as per Section 5.3.
- Validation of generating system 'R2' data by Generators, required under Schedule S5.5.
- Verification of ongoing compliance with Access Standards by Generators under Section 4.
- General planning and operational activities by Generators and Market Customers to facilitate efficient operation in the NEM.

Most such studies require the performance of the Registered Participant or Connection Applicant's plant to be evaluated in the context of an entire NEM region (or at least a large subregion thereof), which context includes other generating plant present in the NEM.

For this reason it is necessary for those conducting the studies to be provided with limited information about other NEM generators, sufficient to construct a power system model in appropriate power system analysis software, but not so detailed as to disclose information identified by interested parties as commercially sensitive.

At the same time it is important that this information be, as far as practicable, relatively easy for an entity such as NEMMCO or an NSP to provide. For if the regulatory restrictions on information provision create significant work for these entities in preparing this information for release, and this does not have the effect of concealing *actual* commercially sensitive information, then this additional work has no justification and subtracts from the efficiency of the NEM. It is 'confidentiality theatre', not protection of the legitimate commercial interests of plant providers.

#### **Requirements for Load Flow and Short Circuit Studies**

Accordingly, for the purpose of load flow and short-circuit studies, the information provided should be in a form as close as practicable to a routine NEM load flow snapshot, without disclosing commercially sensitive information. This means that, as a minimum, the supplied load flow model will encode the following information about third-party generators, for a given system operating condition:

- Actual sent out real and reactive power at the generator terminals.

- Generator terminal voltage.
- Generator MVA rating.
- Generator transformer sequence impedances, vector group and off-nominal tap ratio.

To our knowledge, there has been no case made that any of the above information constitutes sensitive intellectual property, and that this information cannot therefore be treated in the same manner as other network data and provided in confidence to Registered Participants and Connection Applicants. Conversely, if restrictions remain on the provision of any of this information, then a NEM load flow case would require extensive and possibly impractical modification before it could be supplied for study purposes.

Typically a NEM load flow case will include a somewhat wider but still limited range of information concerning third-party generators. Thus in addition to the data above, the case will typically also specify:

- Nominal maximum and minimum capability for sent out power at generator terminals.
- Nominal maximum and minimum reactive power limits for steady state voltage control.
- Voltage setpoint and controlled busbar for load flow solution.
- Nominal short-circuit impedance for positive, negative and zero sequence networks.
- Generator transformer MVA rating.
- Generator transformer tapping range and voltage control limits.

If these items of information are withheld from Registered Participants, it generally remains possible to conduct load flow studies, but these will provide a more limited picture of the behaviour of the power system. While the effort required to obscure this information is less than for information in the first category above, there is still significant work required which imposes additional cost on operation of the NEM. There has also to our knowledge been no case made by any interested parties for the commercial sensitivity of this information. Accordingly there is in Econnect's view a benefit to making this additional information for all generators available under the Rules to Registered Participants and Connection Applicants.

### **Requirements for Dynamic Studies**

For the purpose of dynamic studies, the load flow data above are still required to provide the initial condition for dynamic simulations. In addition, detailed dynamic model information will be required for relevant plant, including generators. Generally, however, a Registered Participant or Connection Applicant has no legitimate interest in understanding the detailed behaviour of third-party plant, which will generally include details that are commercially sensitive. The information required is merely that which will technically accomplish a simulation, and provide some limited control over plant so as to assess behaviour that might be expected in a real operating scenario.

For this purpose it suffices to provide the model information in precompiled or encrypted form, plus the numerical parameters needed to configure each model instance and a limited description of these parameters. This is consistent with the manner in which dynamic system models were provided to Registered Participants prior to 2007.

### **Scope of Provision of Data for Power System Studies**

The question of who may undertake studies should also be considered. It is common practice for both Registered Participants and Connection Applicants to contract study work to independent consultants, both to achieve optimal allocation of resources and to take advantage

of consultants' particular expertise. Rule 8.6.2(b) currently provides for the disclosure of confidential information by a lawful Recipient to a Recipient's consultant for the purpose of advising the Recipient.

However, consultants, academics and independent researchers also undertake study work for government agencies and research organisations in the broader public interest and consistent with the NEM objective, for example to study the effect on power systems of greater penetration of renewable energy and embedded generation technologies. While such projects often involve NSPs as partners, the purpose of the studies may not always strictly be the provision of advice to the NSP, and the NSP does not act in the role of the client.

Consultants who undertake power system studies on a regular basis for a broad client base, and therefore are in receipt of power system data on an almost continual basis for legitimate study purposes, also have a legitimate interest in being able to retain this power system data internally, to reduce the overhead involved in data assimilation for each new project and to facilitate training and development.

Accordingly there is a case to be made for the registration of bona fide power system consultants and researchers as a special category of NEM participant for the purpose of receiving and retaining data in confidence for power system studies, as detailed above.

#### **4. The NGF Rule Change Proposal**

The National Generators Forum have proposed a Rule change whose purpose is to rectify the issues identified in Section 2 with the provision of information to Registered Participants, as well as the sharing of this information between NSPs for their own planning purposes.

We agree with the NGF proposal's objectives and support the NGF's case that the proposed Rule change meets the market objective and provides benefits for NEM participants.

The additional generator information able to be released to Registered Participants in the proposed Rule change is limited in scope to:

- a 'releasable user guide' covering the generator dynamic model; and
- the dynamic model code in precompiled, encrypted or otherwise secured form, unless the supplier consents to provision in an alternative form.

As explained in Section 2, this does not address all of the current issues with the provision of data for power system studies, because the current Rules also restrict the provision of static information contained in the Generating System Data Sheets, and therefore prevent the release to Registered Participants of much of the data required for both static and dynamic power system studies outlined in Section 3.

To address these additional issues, it is recommended that Rule 5.3.8 be further amended to provide for a new category of *releasable data* in regard to generator connections. This new category would cover the load flow data specified in Section 3, and these data would be able to be disclosed by an NSP or NEMMCO to a Registered Participant in order to carry out power system studies for planning and operational purposes.

Subject to this modification to enable the provision of load flow cases, the proposed releasable user guide and precompiled or encrypted source code will generally be adequate for the performance of static and dynamic studies as discussed in Section 3. This assumes that the scope of the 'model source code' required under the Rules includes the numerical parameter data required to configure the model. This would appear to be implied by the NEMMCO Model Guidelines and by the established practice of including this numerical data with the model

software packages provided by suppliers. However, if there is potential for ambiguity in this regard, this point should be clarified in the new Rule 3.13.3(k2).

Under the proposed Rule change, as currently, disclosure of power system data is limited to Registered Participants. Under Rule 2.7 this also includes Connection Applicants provided they register as an Intending Participant prior to requesting data. However, this still does not provide for the additional benefits of making data for power system studies available to bona fide consultants and researchers for purposes consistent with the NEM objective.

In other jurisdictions, including New Zealand and the UK, a broad range of network data such as would be required for power system studies is required to be published and made available in the public domain. The Commission may wish to consider the arguments for broader information provision in furthering the NEM objective, in particular by lessening the overhead incurred by NSPs in responding to network data requests in regard to often speculative projects.

However, if the objective is conceived more narrowly as enabling bona fide consultants and researchers to receive and retain data in confidence, this may be accomplished by a minor Rule change in at least two ways:

- a. Amend Rule 2.6 to allow a bona fide consultant or researcher engaged in routine study work in regard to the NEM to be registered by NEMMCO as a new category of Special Participant; or
- b. Make a new Rule 8.6.2(m) to replace the deleted Rule 8.6.2(m), providing that Rule 8.6 does not prevent the disclosure of data held by NEMMCO or an NSP under a Confidentiality Agreement to a bona fide consultant or researcher, who is engaged in routine study work in regard to the NEM, for purposes consistent with the NEM Objective. Rule 5.3.8 would also require amendment to permit the disclosure of releasable data to these parties.

## 5. Other Submissions

A submission by DIgSILENT Pacific raises a similar issue to that in our submission, that the current Rules preclude the provision of data for load flow studies in addition to models for dynamic studies. We agree with the statements by DIgSILENT in relation to this issue.

The DIgSILENT submission also suggests that the reference to terms such as 'object code' in the NGF proposal may act to preclude the provision of models for software other than PSS/E. However, the wording of the proposed Rule change does not refer to 'object code' but rather 'compiled information', 'encrypted information' or 'a secured format'. This, we would argue, is consistent with the manner in which models are 'obscured' to conceal sensitive intellectual property in not only PSS/E, but also DIgSILENT PowerFactory, TSAT, Mudpack and other software packages. We do not agree with the implication that the wording precludes provision of dynamic models in software other than PSS/E; however, the Commission may want to consider alternative wording that avoids doubt on this issue.

A submission by Vestas proposes some changes to wording, to ensure that the original discloser of a dynamic model is notified of the release of the information, and to clarify the role of numerical parameters in the dynamic model. We support and agree with these changes, and note that the second addresses the issue raised above in our submission to clarify that numerical parameter data are releasable. Under this recommended change, for example, we would assume that a PSS/E dynamic data (\*.dyr) file, or its equivalent in other packages, would fall within the scope of a 'releasable user guide', allowing dynamic model data to be provided in much the same way it was provided prior to 2007.

A submission by McLennan Magasanik Associates raises a similar issue to that in our submission, concerning the ability of bona fide consultants to receive and retain data for power system studies other than as direct contractors of Registered Participants. We support the submission by MMA, but would note that not only consultants, but also academics and other parties involved in power system research, have an interest in obtaining data for power system studies consistent with the NEM objective.

## 6. Recommendations

We recommend that in addition to the changes in the NGF proposal, the Rules be further amended as set out below, to give effect to the purpose of the proposed Rule change.

Define a new term *releasable data* as follows:

**releasable data:** in connection with a *generating unit* or *generating system*, the following items of information provided subject to Rule S5.2.4:

- a) Generator and transformer MVA rating;
- b) Maximum and minimum sent out real power capability;
- c) Maximum and minimum sent out reactive power capability;
- d) Voltage setpoint and controlled busbar for load flow solution purposes;
- e) Nominal short-circuit impedance for positive, negative and zero-sequence;
- f) Transformer vector group and off-nominal tap ratio;
- g) Transformer positive, negative and zero-sequence impedance; and
- h) Transformer tapping range and voltage control limits.

With this definition, add a new Rule 5.3.8(b1) as follows:

(b1) Where the data and information provided under this rule 5.3 is *releasable data*, it may be disclosed by NEMMCO or a *Network Service Provider* to a *Registered Participant* for the purpose of enabling the *Registered Participant* to undertake power system static and dynamic studies for operational and planning purposes.

We also recommend that the Commission consider the benefits of requiring greater public domain disclosure of limited power system data, as already occurs in New Zealand, the UK and other jurisdictions.

In any case we support the position of DlgSILENT Pacific and McLennan Magasanik Associates in their submissions that the Rules should permit the supply to and retention of power system static and dynamic data by a broader range of recipients, including bona fide consultants and legitimate researchers. We recommend this be accomplished in one of two ways:

- a. Amend Rule 2.6 to allow a bona fide consultant or researcher engaged in routine study work in regard to the NEM to be registered by NEMMCO as a new category of Special Participant; or
- b. Make a new Rule 8.6.2(m) to replace the deleted Rule 8.6.2(m), providing that Rule 8.6 does not prevent the disclosure of data held by NEMMCO or an NSP under a Confidentiality Agreement to a bona fide consultant or researcher, who is engaged in routine study work in regard to the NEM, for purposes consistent with the NEM Objective. Rule 5.3.8 would also require amendment to permit the disclosure of *releasable data* to these parties.