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19 September 2023

Ms Kate Degen
A/Executive General Manager, Economics and System Security
Australian Energy Market Commission
[By email]

Dear Ms Degen,

Rule change proposal - Calculation of System Strength Quantity (SSQ)

This letter informs you AEMO has submitted a proposal to amend the NER. The proposal is directly related to the implementation of National Electricity Amendment (Efficient management of system strength on the power system) Rule 2021 No. 11 (System Strength Rule).

The amendment proposes to clarify the calculation of SSQ, which is used for transmission charging for those connecting inverter generators that have elected to pay system strength charges and rely on the service of the relevant transmission company (as opposed to remediating their connecting plant's system strength impact).

Because this problem was revealed during the development of AEMO's System Strength Impact Assessment Guidelines, AEMO requests it be fast tracked through the consultation process.

You will find attached a draft proposal and mark-up versions of chapters 4, 5 and 6A of the NER. AEMO investigated in detail the need for this amendment, looking at substitutes like amending the System Strength Impact Assessment Guidelines (SSIAG), but found this amendment to be necessary.

If you have any questions or wish to arrange a meeting to discuss, please contact Kevin Ly, Group Manager Reform Development & Insights.

Yours sincerely,

Violette Mouchaileh
Executive General Manager – Reform Delivery

Attachments: AEMO rule change proposal, Mark-up versions of Chapters 4, 5 and 6A

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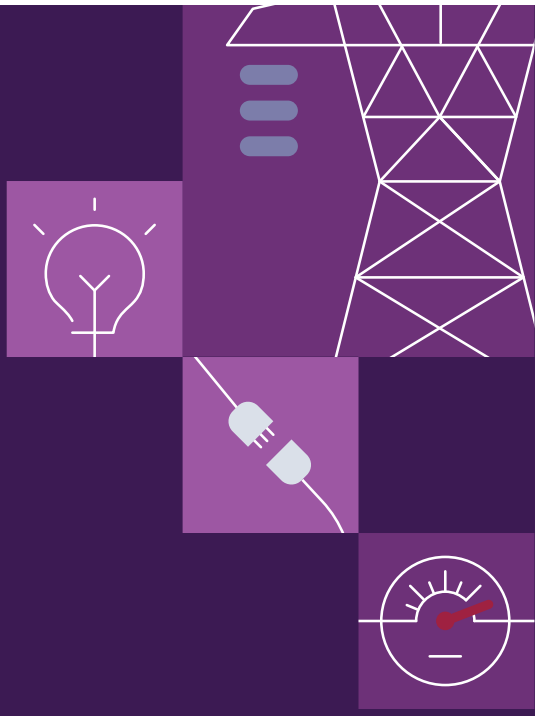

Electricity Rule Change Proposal

Calculation of System Strength Quantity

September 2023

aemo.com.au

New South Wales | Queensland | South Australia | Victoria | Australian Capital Territory | Tasmania | Western Australia

Australian Energy Market Operator Ltd ABN 94 072 010 327

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1. Summary

1.1. Background

On 21 October 2021, the Australian Energy Market Commission (AEMC) made the *National Electricity Amendment (Efficient management of system strength on the power system) Rule 2021 No. 11* (System Strength Rule).

This introduced a system and transmission planning standard in the National Electricity Rules (NER) for a minimum and efficient level of system strength at designated system strength nodes. The standard is to be met from December 2025 through the provision or procurement of system strength transmission services by the System Strength Service Providers (SSSP) in each region, being the jurisdictional planning body or co-ordinating transmission network service provider (TNSP) for the region.

To support the efficient system strength standards, the System Strength Rule also evolved the previous 'do no harm' arrangements for the connection of large inverter based resources. From 15 March 2023, relevant connecting parties have a choice to pay a charge to use the system strength services provided by SSSPs, or to remediate their own system strength impact. Implementation of both options depends on a new access standard for inverter-based resources[1], which determines the minimum short circuit ratio (SCR) at which the connecting plant is able to remain in stable operation (withstand SCR capability).

The following elements of the System Strength Rule are particularly relevant in the context of this proposal:

- for remediation purposes, the rule introduced an expanded concept of 'general system strength impact', including the change (reduction) in available fault level (ΔAFL) resulting from a connection at its connection point[2]. The ΔAFL is to be calculated using a methodology established by AEMO in its system strength impact assessment guidelines (SSIAG), which in practice depends on the plant's withstand SCR capability; and
- where a connection applicant elects instead to pay the system strength charge, this is determined by three parameters:
  - a locational factor (SSL) to be calculated in accordance with the SSIAG, also to be based on available fault levels and to be representative of the impedance between the connection point and its assigned system strength node;
  - a system strength quantity (SSQ), defined by a formula in the NER that, like ΔAFL, depends on the plant's withstand SCR capability; and
  - the system strength unit price, determined by each SSSP in accordance with its regulated pricing methodology.

The AEMC's final determination on the System Strength Rule indicated that SSQ should be equivalent to the general system strength impact, and specifically ΔAFL[3]. As the implementation of the System Strength Rule has progressed, a range of interpretation and

[1] NER S5.2.5.15 (generation), S5.3.11 (load) or S5.3a.7 (market network services).
[2] In addition to any 'adverse system strength impact' that might result from a given connection.
[3] AEMC, *Efficient management of system strength on the power system, Rule determination*, 21 October 2021. See for example paragraphs E.4.1 (page 153), E.7 (page 164-165), E7.1 (page 167).

application issues have been identified by market bodies and participants. These include elements and components of the SSQ, SSL and SSUP calculation, the application of the withstand SCR capability access standard, and how cross border system strength is treated. In AEMO's view, however, the calculation of SSQ is a pressing NEM issue that needs to be progressed separately and resolved more urgently than the others identified above, ideally under an expedited process as a non-controversial rule.

1.2. The problem

In the course of AEMO's consultation on the SSIAG amendments required by the System Strength Rule, it became apparent that applying the SSQ formula specified in the NER, without adjustment, will overstate the quantity of system strength required to support each connection. Importantly, this may deter connection applicants from paying the system strength charge to mitigate their impact, reducing the efficiencies intended to be realised by the System Strength Rule and transferring a greater share of system strength service costs to consumers.

This issue arises for the reasons explained below.

1.2.1. The SSQ calculation is fixed in the NER

At present, the calculation of SSQ is fixed in NER 6A.23.5(j) as the product of the *short circuit ratio* at the connection point and the rated MW capacity of the plant, each as recorded in its performance standard for withstand SCR capability[4].

There are no provisions for any allowances or adjustments in the SSQ calculation to reflect the individual configuration or circumstances of the network point of connection or the technology type or contribution that could be made by the connecting party. Although the SSIAG must prescribe a methodology to assess SCR for the applicable access standards[5], this methodology cannot change the defined meaning or concept of *short circuit ratio* in the NER; it relates only to the method of assessing the SCR at which the plant will remain capable of stable operation.

1.2.2. Why the SSQ formula must be capable of adjustment

The SCR at a connection point represents the three phase fault level available to support a connection. A certain minimum fault level will always need to be available in the network to support broader minimum operability requirements (irrespective of a connection), including network power transfer and voltage stability limitations. The withstand SCR capability value necessarily incorporates this minimum network fault level requirement, meaning that only a portion of the withstand SCR value can be attributed to the incremental change in available fault levels resulting from a connection.

As described above, the determination of both SSQ and ΔAFL (for general system strength impact assessment) depend on the withstand SCR capability of the connecting plant. Because the assessment of ΔAFL is left for the SSIAG to specify in the SSIAG, AEMO was able to account for these broader network stability requirements in the ΔAFL calculation. Under the current NER, however, it is not possible to do the same for SSQ.

[4] The performance standard will record the lowest SCR that the connected plant can withstand, not the actual SCR at the connection point. In this context, AEMO interprets *short circuit ratio* as the withstand SCR capability.
[5] NER 4.6.6(a)(3)

Under the current SSIAG, the ΔAFL caused by a relevant connection is adjusted using a stability co-efficient that accounts for non-linear behaviour and other network limitations, e.g. thermal and voltage stability limits. This represents the stability requirements inherent within the wider power system that have not been caused by the connection, and therefore should not be expected to be compensated for by the connection. If those considerations are not accounted for in the SSQ, its value overstates the incremental system strength impact of the plant in the network to which it connects.

1.2.3. How this works against the intended efficiencies

Where a connection applicant opts to remediate its system strength impact through a dedicated remediation scheme or connection works, the ΔAFL assessment under the SSIAG means the remediation does not extend to the minimum fault levels that must be available for stable operation of the broader network. However, if the connection applicant elects not to self-remediate, its system strength charge will be based on the full withstand SCR capability value. This means mispricing could occur, as the SSQ will be inherently greater than the general system strength impact of the connection.

For the System Strength Rule to deliver its intended efficiencies, and all other things being equal, a connection applicant should be presented with a reasonable and equivalent choice between remediating its general system strength impact where it may suit the applicant to do so, or contributing to the cost of system strength services. As already noted, this was the AEMC's explicit intent in making the System Strength Rule. The current prescription of SSQ in the NER works against this outcome.

Because SSQ does not reflect the incremental need for system strength caused by a connection, its definition in the NER inhibits marginal decision making by connection applicants, reducing allocative and dynamic efficiency, and lessening the economic efficiency of the rule.

1.3. Overview of the amendment proposal

AEMO proposes an amendment to the NER providing for the SSQ calculation to be determined in accordance with the SSIAG, as is currently the case for the SSL component of the system strength charge and the ΔAFL assessment for general system strength impact assessment purposes.

AEMO has considered that including an SSQ adjustment factor in NER 6A.23.5(j), such as a stability coefficient or equivalent value, may represent an alternative solution to the immediate issue identified in this rule change proposal. AEMO's proposal is intended to address the unintended mismatch between SSQ and ΔAFL on an ongoing basis, however. It will allow all values relevant to the system strength impact of connections to be reassessed as a whole, as and when needed to consider future developments in technology, network requirements or other relevant issues. Any revision of the determination of any of these values would be subject to the SSIAG consultation process prescribed in the NER.

AEMO proposes that, as for SSL, the NER would include appropriate principles to be applied to the calculation of SSQ, which AEMO must follow.

This proposed amendment would require AEMO to initiate a consultation to amend the SSIAG, to include the SSQ calculation method in accordance with the principles.

2. Narrative

2.1. How the proposal will address the issues

AEMO proposes that NER 4.6.6 and 6A.23.5(j) are amended so that the SSQ is determined in accordance with the SSIAG, in a similar way to how the SSL is currently determined. The NER would define how and when the SSQ is applied in relation to a relevant new or altered connection.

The AEMO proposal is for the NER to specify that the SSQ calculation must use the withstand SCR capability, but importantly the SSIAG would also be able to include other considerations in the SSQ calculations, which would initially accommodate something like the stability coefficient currently applied in the SSIAG to calculate ΔAFL and in the longer term may accommodate more comprehensive consideration of the interaction between the level to be supported through central provision and self-remediation, noting the importance of certainty for generation and storage investors.

This will result in:

1. The SSIAG addressing the determination of all technical parameters that influence a decision by a connection applicant to pay the system strength charge or self-remediate.
2. The NER setting boundaries for those parameters, consistent with what they are intended to represent.

As engineering knowledge improves, this structure allows the SSIAG to be updated in consultation with participants and other interested parties to better estimate the change in system strength that a connection will impose on the power system, accounting for the relevant network requirements and technologies at the time of connection. This should avoid any recurrence of the current problem, as all relevant components can be amended, enhanced and evolved over time through a single consistent review and consultation process, without the regulatory burden of submitting a rule change proposal in each instance.

2.2. SSIAG amendments

AEMO would be required to consult with industry on how the SSQ methodology should appropriately recognise the minimum fault levels that must be provided to operate the network. AEMO expects to propose, for consultation, the application of a stability coefficient or similar adjustment factor in the short term, like the ΔAFL methodology already in the SSIAG.

The stability coefficient is an approximate value providing a representation of minimum factors, such as power transfer and voltage stability limitations, below which recent studies indicate voltage instability is likely to occur without any additional system strength or reactive power support[6],[7].

[6] B. Badrzadeh, Z. Emin, S. Goyal, S. Grogan, A. Haddadi, A. Haley, A. Louis, T. Lund, J. Matevosyan, T. Morton, D. Premm, S. Sproul, ''System Strength'', CIGRE Science and Engineering Journal, Vol. 21, February 2021

[7] T. Lund, H. Wu, H. Soltani, J. G. Nielsen, G. K. Andersen and X. Wang, "Operating Wind Power Plants Under Weak Grid Conditions Considering Voltage Stability Constraints," in IEEE Transactions on Power Electronics, vol. 37, no. 12, pp. 15482-15492, Dec. 2022.

A constant value of 1.2 is currently assumed for this coefficient. As for ΔAFL assessment, this would yield a formula for SSQ of:

$$SSQ = (\text{SCR}_{withstand} - 1.2) \times P_{rated}$$

Applying this coefficient would therefore equate the SSQ for a connection with its ΔAFL used for self-remediation.

2.3. Stakeholder engagement

AEMO identified the need to include a stability coefficient to obtain a true representation of the system strength impact caused by a connection in the course of its consultation on the System Strength Requirements Methodology (SSRM), and the SSIAG[8].

More specifically, AEMO outlined concerns regarding the calculation of SSQ in the Amendments to SSIAG draft determination[9], published on 12 January 2023, and first proposed the alternative approach to the SSQ calculation in Appendix C of this report. It was noted that AEMO was seeking feedback on whether a change to the Amending Rule would be appropriate and, if so, whether it should align with the alternative.

AEMO received eight written submissions to the SSIAG draft determination which were addressed in the final report, published on 15 March 2023. In these submissions, there was general support for adoption of a stability co-efficient in the calculation of both the SSQ and ΔAFL as outlined below. TasNetworks' submission recognised the necessity of the adjustment, but raised concerns about how to address the discrepancies between the proposed guidelines and the System Strength Rule.

Energy Australia

> EA supports AEMOs revised methodology for assessing the short circuit ratio (SCR) of connecting projects as SCR withstand and agrees with their position that the metric derived by the Rule to calculate System Strength Quantity (which is a product of SCR and rated active power of a project's connection) could result in excessive and impractical System Strength Charges (SSC), particularly for inverter-based resources in stronger areas of the network.

Energy Queensland

> Ergon Energy Network and Energex support the calculation methodology for the reduction in available fault level (AFL) proposed in Section 3.4.2 of the draft System Strength Impact Assessment Guidelines (SSIAG). However, we would like to see more detail regarding how the Stability Coefficient should be determined.

Goldwind

> While we understand and support the premise behind introducing a stability coefficient, there was no clarification from AEMO on how the lower bound value of 1.2 was determined.

TasNetworks

> TasNetworks is conscious AEMO have departed from the formulation of system strength quantity (SSQ) as adopted by the Australian Energy Market Commission (AEMC) in the Final Rule. There is also variation between the AEMC's final determination and AEMO's draft Guidelines with respect to SSLFs and available fault level (AFL). Although, these amendments are necessary to practically implement the new system strength framework, TasNetworks is concerned about the discrepancy between the draft Guidelines and the Final Rule. TasNetworks seeks clarification that SSSPs are permitted to apply the definitions adopted in the draft Guidelines and are not bound by the Final Rule.

[8] AEMO consultation materials published at:https://aemo.com.au/en/consultations/current-and-closed-consultations/ssrmiag

These consultations were open to all NEM participants, market bodies, consumer groups, and other interested parties such as technical consultants and original equipment manufacturers. The application of a stability coefficient in the ΔAFL calculation was proposed in AEMO's draft SSIAG (second stage). AEMO also held online forums explaining the reasons for the coefficient and how it would apply.

Following its determination of the SSIAG amendments resulting from the System Strength Rule, AEMO also published guidance[10] on its preferred methodology for calculating SSQ, explaining the problem of the SSQ being calculated directly from the full withstand SCR capability value. A subsequent minor amendment to the SSIAG[11] was made to facilitate the application of AEMO's preferred methodology. There was one formal submission to the minor amendment consultation[12], which supported the proposed change.

AEMO also discussed the issue with the AER and with NSPs to consider whether there could reasonably be an alternative to raising this Rule Change Proposal. AEMO's alternative SSQ calculation was presented at several meetings and working groups, including:

- Executive Joint Planning Committee (EJPC) including all TNSPs and the Energy Networks Association on 25 May 2023, and subsequent TNSP joint planning and committee meetings.
- Industry webinar on 15 June 2023
- Clean Energy Council (Technical and Operations working group) on 11 July 2023
- SSSP working group.

AEMO has had no indication that the calculation approach is not supported.

[10] AEMO, Calculating system strength quantities in the NEM: https://aemo.com.au/-/media/files/stakeholder_consultation/consultations/nem-consultations/2022/ssrmiag/amendment/guidance---calculating-system-strength-quantities-in-the-nem.pdf?la=en

[11] AEMO Minor amendments determination, 6 June 2023: https://aemo.com.au/-/media/files/stakeholder_consultation/consultations/nem-consultations/2022/ssrmiag/amendment/ssiag-minor-amendment-decision-paper.pdf?la=en

[12] BayWa.re.: https://aemo.com.au/-/media/files/stakeholder_consultation/consultations/nem-consultations/2022/ssrmiag/amendment/baywa-submission.pdf?la=en

3. Proposed Rule

3.1. Summary of proposed rule

The proposed rule:

- removes the SSQ calculation formula from NER 6A.23.5 and instead, requires AEMO to include the methodology in the SSIAG, similar to SSL;
- inserts a new clause 4.6.6(b1) which specifies the principles that the SSQ needs to be based on, which:
    - includes the use of the short circuit ratio;
    - is consistent with the concept of a general system strength impact; and
    - allows for an indicative value to be calculated in response to a connection enquiry, and a final value to be calculated following the negotiation of performance standards;
- includes SSQ in the NER generally where SSL is referenced, since SSQ is treated in the same way. The main exception is that TNSPs and DNSPs publish SSLs in their annual planning reports, but the SSQ should not be published because it is confidential to a particular generator as it is based on their specific generator details;
- separates the impact assessment process from charging. This means the SSIAG specify requirements for determining the methodology for the impact assessments. Separately, the methodology for calculating SSL and SSQ, and so the amendments in 4.6.6 to add a new (b1), make that separation between impact assessments and charging clearer;
- clarifies when in the connection process the "final" SSQ value is provided for connection applicants, since the Rules are silent on this currently, and only refer to the indicative value being provided in response to the connection enquiry;
- provides that where the SSL is not required to be calculated, because it is not technically feasible, the SSQ also need not be calculated;
- preserves the current AEMO SSIAG consultation process including the requirement for engagement and considering input from industry and regulators.

3.2. List of affected clauses, proposed changes and reasons

Table 1 List of proposed amendments

Clause	Applies to	Description of clause and proposed amendment
4.6.6(a)(1)	AEMO	Specifies the SSIAG must, in accordance with 4.6.6(b), set out the methodology to be used by *NSPs* when undertaking *system strength impact assessments* under clause 5.3.4B and calculating a *system strength locational factor*.
		Change: Reference additional clause 4.6.6(b1). Include "and *system strength quantity*" in (a)(1). Separate *system strength impact assessments* (as per 4.6.6(b)) and calculate SSL and SSQ (as per the additional clause 4.6.6(b1)).

Clause	Applies to	Description of clause and proposed amendment
		Reason: To allow the SSQ calculation method to be specified in the SSIAG, subject to new clause 4.6.6(b1). Formalises the separation of impact assessments and the calculation of the charging components.
4.6.6(b)(1)(i) and (1A)	AEMO	Specifies first stage must be a preliminary assessment to screen for the need for a full assessment and calculate the applicable *system strength locational factor*. Preliminary assessment to be carried out using a simple isolated model such as a single machine infinite bus model.
		Change: Delete "calculate the applicable *system strength locational factor*"
		Reason: To ensure the preliminary assessment is not confused with calculation of the SSL, which is not assessed using a single machine infinite bus model. This is required to clarify that the SSL and SSQ are separate from the preliminary assessment, as expressed in 4.6.6(a). The charging parameters are not part of a system strength impact assessment and are provided separately in response to a connection enquiry.
4.6.6(b1), and (b1)(1)&(2)	AEMO	New clause
		Change: Add a new paragraph after 4.6.6(b) that states what the SSIAG must include in relation to the SSQ. Old clauses (b)(9) and (b)(10) moved into (b1)(1) and (b1)(2) – referencing SSL.
		Reason: Allows the calculation methods for SSL and SSQ to be included in the SSIAG, whilst remaining separate from the impact assessment process.
4.6.6(b1)(3)	AEMO	New clause
		Change: Specify that the SSIAG must set out a method to calculate the SSQ, which must: - use the withstand SCR capability and *rated active power*, maximum demand or power transfer documented in the applicable performance standard; - be consistent with *general system strength impact;* and - allow for both an indicative and final value for SSQ to be calculated at different stages of the connection process.
		Reason: To set out the requirements for the methodology for SSQ, that the SSIAG must contain under new clause 4.6.6(a)(1)(ii). - SCR and rated active power are included here rather than in 6A.23.5, but their use has to be consistent with concept of *general system strength impact* under the impact assessment process; - SSQ is calculated at the enquiry stage, yet also confirmed later, being formally recognised in the connection agreement after finalising the withstand SCR capability access standard. Accordingly, the clause requires the methodology to allow the SSQ to be first, an indicative value and second, a final value. For clarity the new clause (iii) references the relevant clauses in 5.3.3, 5.3.4B, and the methodology to assess SCR in 4.6.6(a)(3).
6A.23.5(e)	NSP	Specifies NSP calculation of the annual SSC.
		Change: SSQ reference is now to paragraph (h) and not (j), which is deleted.
		Reason: The SSQ is to be determined in accordance with the SSIAG, similar to SSL, so both are defined in the same way in this clause.

Clause	Applies to	Description of clause and proposed amendment
6A.23.5(h)(1)(2)	NSP	This clause provides for the SSSP to calculate the SSL where relevant connection points are on its own network, or otherwise request it from the connecting NSP.
		Change: Amend to add a requirement to calculate (and request) the *system strength quantity*.
		Reason: The SSQ is to be determined in accordance with the SSIAG, similar to SSL, so both are included in this clause.
6A.23.5(j)	NSP	Defines the SSQ as the product of SCR and rated active power as recorded in performance standards.
		Change: Delete entire paragraph.
		Reason: No longer required because the method to calculate SSQ will be set out in the SSIAG (subject to clause 4.6.6 (b)(11)), similar to SSL.
5.3.3(b5)(3)	NSP	In response to a connection enquiry, unless not required to calculate the SSL under clause 5.3.4B(a3), the NSP is to provide: - indicative system strength quantity (SSQ in MVA) at the connection point; - system strength locational factor (SSL) at the connection point; and - $/MVA price at the system strength node, which when coupled with the locational factor, can allow the system strength charge to be estimated.
		Change: Amend to include *system strength quantity* in relation to the reference to clause 5.3.4B(a3).
		Reason: To confirm that 5.3.4B(a3) provides for circumstances in which both SSL and SSQ are not required to be calculated.
5.3.4(b)(5)	Connection Applicant	Provides for an election to pay the charge – this option is not available if SSL cannot be calculated.
		Change: Amend to include *system strength quantity*.
		Reason: SSQ is treated in the same way as SSL.
5.3.4B(a2)(2)	NSP	Provides for the NSP to conduct a preliminary assessment and, subject to (a3) calculate the SSL.
		Change: Amend to include a requirement to calculate the *system strength quantity*. Clause now references 5.3.3(b5)(3) for SSL and indicative SSQ. For final SSQ, clause references the finalisation of access standards under S5.2.5.15. Similar clauses are included for proposed alterations.
		Reason: SSQ is treated in the same way as SSL.
5.3.4B(a3)	NSP	Sets out that an NSP is not required to calculate a locational factor if, as per the SSIAG, it cannot reasonably be calculated or would be manifestly excessive.
		Change: Add a provision that the NSP is not required to calculate SSQ if an SSL is not required to be calculated
		Reason: A system strength charge requires both the SSL and SSQ. If SSL is not determined, there is no point in seeking to determine the SSQ
5.3.4B(a4)	NSP	A connection applicant can request the SSL and PIA be recalculated, subject to a fee.
		Change: Amend to include *system strength quantity*.
		Reason: SSQ is treated in the same way as SSL.
5.3.4C(b)(1) and (c)(1)	NSP	Calculation and notification obligations on connecting NSPs that are not also the SSSP for the region.
		Change: Amend to include *system strength quantity*.
		Reason: SSQ is treated in the same way as SSL.

Clause	Applies to	Description of clause and proposed amendment
Glossary	N/A	*System strength quantity* is defined as – "Has the meaning given to it in clause 6A.23.5(j)"
		Change: Define as - "A *system strength quantity* determined by a *Network Service Provider* in accordance with the *system strength impact assessment guidelines*."
		Reason: To define SSQ in the same way as SSL.
Chapter 11	AEMO	New clause.
		Change: Include transitional requirement for AEMO to consult on amendments to the SSIAG to take account of the final rule as soon as practicable after the rule is made, in accordance with the rules consultation procedures[13].
		Reason: To allow a reasonable period for the SSIAG to be amended to comply with the requirements to include a methodology for calculating SSQ in accordance with the final rule, Given that the timing of consultation is not always predictable, AEMO suggests the NER should not prescribe a date by which the SSIAG amendments must take effect.

3.3. Proposed amendment in mark-up

A mark-up of Chapters 4, 5 and 6A NER, showing the proposed rule amendments, is included as an attachment to this rule change proposal. The mark-up does not include the proposed change to the definition of *system strength quantity* in Chapter 10, as described above in Table 1.

3.4. Request for an expedited rule change process

AEMO does not consider that requiring the SSQ methodology to be set out in the SSIAG, rather than the NER, would disadvantage transmission customers, or consumers overall. On the contrary, the long-term interests of consumers can expect to be better served by removing the prospect of unintended divergences between the basis for calculating the impact of a connection for remediation and system strength charging purposes. This will facilitate economically efficient decisions to pay for system strength transmission services or self-remediate.

Addressing this issue should be prioritised to provide the necessary certainty for NSPs and connection applicants to give effect to the policy intent of the System Strength Rule. AEMO considers it is desirable for the rule to start working as intended at the earliest possible opportunity.

AEMO therefore requests the AEMC to consider consulting on this rule change proposal using an expedited process under the National Electricity Law (NEL), either:

- as a 'fast track' rule under section 96A given the public consultation AEMO has undertaken on the underlying issue in relation to ΔAFL for the SSIAG, which also highlighted the corresponding issue for the calculation of SSQ, as well as subsequent AEMO publications and industry discussions; or

[13] Given the consultation on the issues that will have occurred during consultation on this rule change proposal, AEMO expects that the expedited rules consultation procedure could be applied, however it is not necessary for this to be specified in the transitional provisions.

- as a non-controversial rule under section 96 on the basis that the proposed rule, if made, is unlikely to have a significant effect on the NEM, but rather would address an issue that may otherwise prevent the intended outcomes of the System Strength Rule from being achieved.

Based on its stakeholder engagement to date on the issue, as described in section 2.3, AEMO is not aware of any objection to addressing this issue.

4. How the Proposed Rule Contributes to the National Electricity Objective

The national electricity objective as currently stated in the NEL is:

> *"to promote efficient investment in, and efficient operation and use of, electricity services for the long term interests of consumers of electricity with respect to:*
>
> - *price, quality, safety and reliability and security of supply of electricity`*
> - *the reliability, safety and security of the national electricity system."*

AEMO expects this rule amendment proposal will enhance the allocative and dynamic efficiency of the system strength framework because it aims to encourage connection applicants to make better decisions regarding whether to:

- invest capital to self-remediate their plant's general system strength impact; or
- pay the system strength charge for system strength services provided by the SSSP.

Efficient marginal decision making requires the party, in this case the connection applicant, to compare the incremental cost associated with one decision against alternatives. The decision in this case is to self-remediate, pay the SSC, or not proceed with the connection. This should be a rational decision based on a like for like comparison of alternatives, which the current framework does not facilitate.

The inflexibility of the SSQ calculation does not allow this value to account for fundamental stability limits and non-linearities governing the maximum power transfer and voltage stability between two buses, which are the responsibility of the connecting TNSP under the network standard specified under clause S5.1.8, and not within the design responsibility of the connecting party. SSQ calculated as specified under 6A.23.5(j) will overstate the incremental change resulting from a connection and will dull the economic incentive to connect or alternatively force too many applicants to self-remediate, by imposing higher SSC than is likely efficient.

5. Expected Benefits and Costs of the Proposed Rule

The expected benefits of this amendment proposal are in trying to preserve economic incentives for the connecting party to either remediate or pay the SSC. If one option is systematically overestimated compared to the other, these decisions will impose unnecessary costs on connecting plant, requiring electricity prices to increase before investors are willing to commit capital to generation projects, and thus increasing costs for consumers.

5.1. Timing, charges, and decisions to self-remediate

The new system strength standard needs to be met by the TNSPs who are system strength service providers from December 2025.

By that time, AEMO will have published three system strength reports under clause 5.20C.1, with the one published in 2022 setting the requirements for the SSSPs for the first year, commencing 1 Dec 2025. NER 11.143.13 and 11.143.15 require the existing "shortfall" arrangements under the Fault Levels Rule to continue until 1 December 2025, meaning TNSPs will therefore supplement reductions in system strength before the commencement of the network standard for system strength S5.1.14.

The application of clauses 11.143.4 to 11.143.6 mean each TNSP will have now updated their pricing methodologies and can charge system strength charges from 1 July 2023. Any applicants that submitted a connection enquiry before 15 March 2023, but have not yet submitted an application to connect, are subject to the System Strength Rule. Any applicants that submitted a connection application before 15 March 2023, but had yet to receive a connection offer at that date, have the option to be subject to the System Strength Rule, or be assessed under the previous 'do no harm' framework.

The SSQ calculation matter, the subject of this rule change proposal, needs to be resolved promptly. There is the possibility that the community of investors, developers and connection applicants lose confidence in the provision of the transmission service, and perversely self-remediation may be perceived as the better option, when the opposite was predicted by the AEMC to be true in the long run. The AEMC expected that connecting parties relying on the SSSP rather than remediating would be able to access the service at prices that reflect the economies of scope and scale that the transmission monopoly can achieve.

5.2. Revenue recovery and effect on transmission customers

As prescribed common transmission services, the costs of system strength transmission services are fully recoverable by an SSSP from its transmission customers. Further, under NER 5.15A.1 and 5.16.3, investments made to provide system strength transmission services are subject to the RIT-T, can be actionable under the ISP, and are no longer subject to pass through provisions under 6A.7.3 (unlike system strength support services under the previous framework). Investments by the SSSP to meet the system strength standard are included in its regulated asset base, contribute to maximum allowable revenue, and are projected forward for the setting of prescribed common transmission prices.

The annual system strength revenue from connecting parties who elect to pay the system strength charge is a deduction from the prescribed common transmission charges to be recovered from transmission customers (and ultimately from all electricity consumers). Several factors will influence both the total revenue requirement revenue to be recovered for system strength services, and the proportion allocated to consumers, for example:

- The SSSP is expected to invest in services to support a forecast of minimum and efficient system strength requirements. The forecast is made three years ahead, and may differ from the actual requirements, potentially leaving shortfall in amounts received to pay for the transmission services within a regulatory period. This dynamic will be influenced by whether the forecast system strength requirements are ahead of, or behind, actual demand for the services. AEMO notes the intent of the System Strength Rule was for investment in system strength transmission services to occur ahead of demand;
- The SSSP's investment may be based on expected performance of inverters. If inverter performance in connecting plant improves, participants who are paying the system strength charge might pay less (through an alteration process) and any deficit in the revenue requirement will be paid for by transmission customers.

The differential calculation of a connection's requirement for system strength is expected to affect the balance of payments between connection applicants and transmission consumers. At face value, a higher SSQ value might appear to increase the share of revenue to be paid by connection applicants, but this ignores the impact of a higher SSQ on their election to pay the system strength charge at all. In an extreme case, if no applicant elects to pay the charge, then the full cost of the SSSP's investment must be recovered from consumers. At the same time, the inefficiencies resulting from a potentially larger number of individual remediation schemes may cause over-investment by SSSPs in system strength transmission services at a greater overall cost than is actually necessary.

CHAPTER 4

4. Power System Security

…

4.6.6 System strength impact assessment guidelines

~~(a)~~

(a) *AEMO* must make, publish and may amend *system strength impact assessment guidelines* that:

(1) in accordance with paragraphs (b) and (b1), set out the methodology to be used by *Network Service Providers* when:

(i) undertaking *system strength impact assessments* under clause 5.3.4B; and

(ii) calculating a *system strength locational factor* and *system strength quantity* for the purposes specified in clause 5.3.4B(a2)(2);

(2) define, and provide guidance on the calculation of, *available fault levels* at *system strength nodes* including for the purposes of forecasts under clause 5.20C.3(f)(3) and for the calculation of the *system strength locational factor* for a *connection point*;

(3) prescribe, for clauses S5.2.5.15(b), S5.3.11(b) and S5.3a.7(b), the methodology for assessing the *short circuit ratio*;

(4) provide guidance on the information that must be provided to demonstrate compliance with the *minimum access standard* in clause S5.2.5.15(b), clause S5.3.11(b) or clause S5.3a.7(b) (as applicable), or if the procedures in clause 5.3.4A have been followed, the relevant *negotiated access standard*;

(5) prescribe, for the purposes of the definition of *inverter based load* in Chapter 10, the criteria for classification of a *load* as an *inverter based load*;

(6) prescribe, for the purposes of the definition of *large inverter based resource* in Chapter 10, the criteria for classification of an *inverter based resource* as a *large inverter based resource* which must take into account *plant* type and size and other matters *AEMO* considers relevant to identifying *inverter based resources* that may have a *general system strength impact* above the threshold referred to in subparagraph (b)(7);

(7) describe how *AEMO* assesses *adverse system strength impacts*; and

(8) provide guidance on the methodology to be used by *Network Service Providers* when undertaking modelling to verify the stability of *plant* in accordance with clause 5.3.4B(a2)(4).

(b) For subparagraph (a)(1)(i), the *system strength impact assessment guidelines* must:

(1) provide for a two-stage assessment process comprising:

(i) a preliminary assessment to screen for the need for a full assessment~~, calculate the applicable *system strength locational factor*~~; and

(ii) a full assessment to be used in the circumstances described in clause 5.3.4B(a2)(3);

(1A) require the preliminary assessment to be carried out using a simple isolated model such as a single machine infinite bus model;

(2) require the full assessment to be carried out using a *power system* model that is reasonably appropriate for conducting *system strength impact assessments* and applicable to the location the *transmission network* or *distribution network* at which the *facility* is or may be *connected* and specified by *AEMO* from time to time for this purpose;

(3) exclude from the assessment of and the *general system strength impact* the impact on any *protection system* for a *transmission network* or *distribution network*;

(4) provide guidance about the different *network* conditions and *dispatch* patterns and other relevant matters that should be examined when undertaking a full assessment;

(5) specify the nature of the impacts that *AEMO* considers to be *general system strength impacts* for the purposes of clause 5.3.4B;

(6) provide guidance about the matters that must be considered when determining whether a *connection* or alteration will result in a *general system strength impact*;

~~(7)~~

(7) include if applicable any thresholds below which an impact may be disregarded for the purposes of clause 5.3.4B(f)(3); and

(8) provide general guidance about options for *system strength remediation schemes* and *system strength connection works*.~~;~~

(b1) For subparagraph (a)(1)(ii), the *system strength impact assessment guidelines* must:

(1~~9~~) specify a methodology for calculation of the *system strength locational factor* for a *connection point*, which must be representative of the impedance between the *connection point* and the applicable *system strength node* and must use *available fault level* as the basis for the methodology; ~~and~~

(2~~10~~) provide guidance about the circumstances in which a *system strength locational factor* is not reasonably able to be determined or would be manifestly excessive~~.~~; and

Example

Where the *system strength locational factor* tends to infinity, or where it would result in a *system strength charge* that could not reasonably be expected to be paid in preference to *system strength connection works* or a *system strength remediation scheme*.

(~~11~~3) specify a methodology for calculation of the *system strength quantity* for a *connection point*, which must:

(i) include the use of *short circuit ratio*, and either the *rated active power*, the rated *power transfer capability*, or the *maximum demand* (as applicable) for the *system strength connection point*, as agreed in accordance with clause S5.2.5.15, clause S5.3.11 or clause S5.3a.7 (as applicable) and recorded in the relevant *performance standards* for the *plant connected* at the *system strength connection point*;

(ii) be consistent with the concept of *general system strength impact*;

(iii) allow for an indicative *system strength quantity* to be calculated for the purposes of clause 5.3.3(b5)(3)(i) and for a final *system strength quantity* to be calculated for the purposes of clause~~s xxx~~5.3.4B(a2)(2)(ii) ~~and , S5.2.5.15, clause S5.3.11 or clause S5.3a.7 (as applicable),~~ where the *short circuit ratio* has been assessed under the methodology prescribed in accordance with paragraph (a)(3).

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(c) Subject to paragraph (d), *AEMO* must comply with the *Rules consultation procedures* when making or amending the *system strength impact assessment guidelines*.

(d) *AEMO* may make minor or administrative amendments to the *system strength impact assessment guidelines* without complying with the *Rules consultation procedures*.

(e) *AEMO* must provide the model referred to in subparagraph (b)(2) to a *Local Network Service Provider* or, subject to paragraph (f), to a person seeking a *connection* or proposing to alter *connected plant* referred to in clause 5.3.4B(a)who requests the model in connection with a *system strength impact assessment*.

(f) If *AEMO* receives a request under paragraph (e) from a person seeking a *connection* or proposing to alter *connected plant* referred to in clause 5.3.4B(a):

(1) *AEMO* must treat the request as if it were information reasonably required by a *Registered Participant* under clause 3.13.3(k)(2) and *AEMO* is only required to provide the model referred to in subparagraph (b)(2) (or the source code for that model) in the form contemplated by clause 3.13.3(l)(2); and

(2) *AEMO* may require a *Connection Applicant* who is not a *Registered Participant* to give an undertaking in a form satisfactory to *AEMO* to comply with rule 8.6 as if the *Connection Applicant* were a *Registered Participant* as a condition of providing a model to the *Connection Applicant* under paragraph (e).

CHAPTER 5

5. Network Connection Access, Planning and Expansion

Part B Network Connection and Access

…

5.3 Establishing or Modifying Connection

5.3.1 Process and procedures

(a) For the purposes of this rule 5.3:

(1) **establish a connection** includes:

(i) modify an existing *connection* or alter *plant* but does not include alterations to *plant* in the circumstances set out in clause 5.3.9 or clause 5.3.12; or

(ii) incorporating a *designated network asset* into a *transmission network*.

(2) **connect** includes the incorporation of a *designated network asset* into a *transmission network*.

(b) Subject to paragraph (b1), a *Registered Participant* or person intending, or required by the *Rules*, to become a *Registered Participant* who wishes to *establish a connection* to a *network* must follow the procedures in this rule 5.3.

(b1) If a *Registered Participant*, or person intending to become a *Registered Participant*, wishes to establish a *connection* to a part of a *network* that is a *designated network asset* either through a *dedicated connection asset* or by way of a new *designated network asset*, then:

(1) for *connection*, the process in rule 5.3 applies; and

(2) for access to *DNA services* from the existing *designated network asset*, the access is governed by the relevant *access policy* that applies.

(c) A *Generator* wishing to alter *connected generating plant* must comply with clause 5.3.9 and a *Network User* or *Market Network Service Provider* to whom clause 5.3.12 applies must comply with clause 5.3.12.

(d) *AEMO* must comply with clause 5.3.11 in relation to requests to change *normal voltage*.

(e) For *connection* to a *transmission network*, there may be more than one *Connection Applicant* in relation to a *connection* where there are different persons developing and owning *contestable IUSA components*, *dedicated connection assets*, *designated network assets* and *Transmission Network User facilities* in relation to that *connection*.

5.3.1A Application of rule to connection of embedded generating units

(a)

[**Deleted**]

(b) If a *Connection Applicant* wishes to *connect* an *embedded generating unit*, then:

(1) unless otherwise provided, rule 5.3A applies to the proposed connection and clauses 5.3.2, 5.3.3, 5.3.4 and 5.3.5 do not apply to the proposed *connection*; and

(2) for the avoidance of doubt, the application of the balance of Chapter 5, Part B to the *Connection Applicant* is otherwise unaffected by this clause 5.3.1A.

(c) A reference to a *Connection Applicant* in paragraph (b) is to a:

(1) person who intends to be an *Embedded Generator*;

(2) person who has applied or intends to apply to *AEMO* for an exemption from the requirement to register as a *Generator* in respect of an *embedded generating unit* (and is not eligible for an automatic exemption under the *registration information resource and guidelines*);

(3) *non-registered embedded generator* who has made an election under clause 5A.A.2(c); or

(4) a person (including a *non-registered embedded generator*) who is seeking *connection* for a *large inverter based resource*,

and who makes a *connection* enquiry under clause 5.3A.5 or an *application to connect* under clause 5.3A.9 in relation to any *generating systems*, or any *network elements* used in the provision of a *network service*, as the case may be.

5.3.2 Connection enquiry

(a) A person referred to in clause 5.3.1(b) who wishes to make an *application to connect* must first make a *connection* enquiry by advising the *Local Network Service Provider* of the type, magnitude and timing of the proposed *connection* to that provider's *network*.

(b) If the information submitted with a *connection* enquiry is inadequate to enable the *Local Network Service Provider* to process the enquiry the provider must within 5 *business days*, advise the *Connection Applicant* what other relevant preliminary information of the kind listed in schedule 5.4 is required before the *connection* enquiry can be further processed.

Note

This paragraph is classified as a tier 3 civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

(c) The *Local Network Service Provider* must advise the *Connection Applicant* within 10 *business days* of receipt of the *connection* enquiry and the further information required in accordance with paragraph (b) if the enquiry would be more appropriately directed to another *Network Service Provider*.

Note

This paragraph is classified as a tier 3 civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

(d) The *Connection Applicant*, notwithstanding the advice received under paragraph (c), may if it is reasonable in all the circumstances, request the *Local Network Service Provider* to process the *connection* enquiry and the provider must meet this request.

Note

This paragraph is classified as a tier 3 civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

(e) Where the *Local Network Service Provider* considers that the *connection* enquiry should be jointly examined by more than one *Network Service Provider*, with the agreement of the *Connection Applicant*, one of those *Network Service Providers* may be allocated the task of liaising with the *Connection Applicant* and the other *Network Service Providers* to process and respond to the enquiry.

(f) A *Network Service Provider* must to the extent that it holds technical information necessary to facilitate the processing of a *connection* enquiry made in accordance with paragraph (a) or an *application to connect* in accordance with clause 5.3.4(a), provide that information to the *Connection Applicant* in accordance with the relevant requirements of schedule 5.1, 5.2, 5.3 or 5.3a.

Note

This paragraph is classified as a tier 3 civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

(g) If applicable, a *Primary Network Service Provider* may charge a *Connection Applicant* an enquiry fee, the amount of which must not be more than necessary to cover the reasonable costs of work required to provide the information in clauses 5.3.3(b)(5A) and (7) to (10).

5.3.3 Response to connection enquiry

(a) In preparing a response to a *connection* enquiry, the *Network Service Provider* must liaise with other *Network Service Providers* with whom it has *connection agreements*, if the *Network Service Provider* believes, in its reasonable opinion, that compliance with the terms and conditions of those *connection agreements* will be affected. The *Network Service Provider* responding to the *connection* enquiry may include in that response the reasonable requirements of any such other *Network Service Providers* for information to be provided by the *Connection Applicant*.

(b) The *Network Service Provider* must:

(1) within:

(i) 40 *business days* after receipt of the *connection* enquiry which relates to a *designated network asset* and all such additional information (if any) advised under clause 5.3.2(b);

(ii) 30 *business days* after receipt of any other *connection* enquiry and all such additional information (if any) advised under clause 5.3.2(b); or

(2) within 30 *business days* after receipt of a request from the *Connection Applicant* to the *Local Network Service Provider* to process the *connection* enquiry under clause 5.3.2(d),

provide the following information in writing to the *Connection Applicant*:

(3) the identity of other parties that the *Network Service Provider* considers:

(i) will need to be involved in planning to make the *connection*; and

(ii) must be paid for *transmission services* or *distribution services* in the appropriate jurisdiction;

(4) whether it will be necessary for any of the parties identified in subparagraph (3) to enter into an agreement with the *Connection Applicant* in respect of the provision of *connection* or other *transmission services* or *distribution services* or both, to the *Connection Applicant*;

(5) in relation to *Distribution Network Service Providers* and *Network Service Providers* for *declared transmission systems*, whether any service the *Network Service Provider* proposes to provide is *contestable* in the relevant *participating jurisdiction*;

(5A) whether any service a *Transmission Network Service Provider* proposes to provide in relation to the *connection* enquiry is a *prescribed transmission service*, a *negotiated transmission service* or a *non-regulated transmission service* including, if applicable:

(i) whether the capital cost of any *identified user shared asset* is reasonably expected to exceed $10 million; and

(ii) if so, the *contestable IUSA components* and *non-contestable IUSA components*;

(5B) whether the *connection* enquiry relates to *connection* to a part of a *network* that is a *designated network asset*;

(6) a *preliminary program* showing proposed milestones for *connection* and access activities which may be modified from time to time by agreement of the parties, where such agreement must not be unreasonably withheld;

(7) the specification of the interface required to provide the *connection*, including plant and equipment requirements for the *connection* of a *dedicated connection asset* or *designated network asset* (as applicable), to the *transmission network* and of the interface between the *transmission network* and any *contestable IUSA components* or *designated network asset*;

(8) if applicable, the scope of work for any *non-contestable IUSA components*;

(9) if the response to the *connection enquiry* specifies the need for an *identified user shared asset* the capital cost of which is reasonably expected to exceed $10 million or includes a *designated network asset*, a functional specification:

(i) setting out the technical parameters for that asset as described in the table in clause 5.2A.4 with sufficient detail to enable the *Connection Applicant* to obtain binding tenders for the provision of detailed design, construction and ownership services for the *contestable IUSA components* or *designated network asset*; and;

(ii) at the *Primary Transmission Network Service Provider's* option in respect of an *identified user shared asset*, that is above those minimum requirements in subparagraph (i) subject to the *Primary Transmission Network Service Provider* separately identifying the additional requirements and agreeing to fund the additional works related to those requirements;

(10) an indicative costing for operation and maintenance services for any *identified user shared asset* or *designated network asset*, based on the functional specification provided pursuant to subparagraph (9); and

(11) the amount of any enquiry fee under clause 5.3.2(g).

Note

This paragraph is classified as a tier 3 civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

(b1) The *Network Service Provider* must:

(1) within 30 *business days* after receipt of the *connection* enquiry and all such additional information (if any) advised under clause 5.3.2(b); or

(2) within 30 *business days* after receipt of a request from the *Connection Applicant* to the *Local Network Service Provider* to process the *connection* enquiry under clause 5.3.2(d),

provide the *Connection Applicant* with the following written details of each technical requirement relevant to the proposed *plant*:

(3) the *automatic access standards*;

(4) the *minimum access standards*;

(5) the applicable *plant standards*;

(6) the *negotiated access standards* that will require *AEMO's* involvement in accordance with clause 5.3.4A(c); and

(7) the *normal voltage* level, if that is to change from the *nominal voltage* level.

Note

This paragraph is classified as a tier 3 civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

(b2) A *Registered Participant*, *AEMO* or *interested party* may request the *Reliability Panel* to determine whether, in respect of one or more technical

requirements for access, an existing Australian or international standard, or a part thereof, may be adopted as a *plant standard* for a particular class of *plant*.

(b3) Where, in respect of a technical requirement for access, the *Reliability Panel* determines a *plant standard* for a particular class of *plant* in accordance with clause 8.8.1(a)(8) as an acceptable alternative to a particular *minimum access standard* or *automatic access standard*, a *plant* which meets that *plant standard* is deemed to meet the applicable *automatic access standard* or *minimum access standard* for that technical requirement.

(b4) In making a determination in accordance with clause 5.3.3(b2) the *Reliability Panel* must consult *Registered Participants* and *AEMO* using the *Rules consultation procedures*.

(b5) For a *connection point* for a proposed new *connection* in relation to which clause 5.3.4B applies, within the time applicable under paragraph (b1), the *Network Service Provider* must provide the *Connection Applicant* with the following written details:

(1) the minimum *three phase fault level* at the *connection point*;

(2) the results of the *Network Service Provider's* preliminary assessment of the impact of the new *connection* undertaken in accordance with the *system strength impact assessment guidelines* and clause 5.3.4B; and

(3) except where, under clause 5.3.4B(a3), the *Network Service Provider* is not required to calculate the *system strength locational factor* and the *system strength quantity*:

(i) the indicative *system strength quantity* for the *connection point*;

(ii) the *system strength locational factor* for the *connection point*; and

(iii) the relevant *system strength node* and the indicative *system strength charge* using the then applicable *system strength unit price*.

Note

This paragraph is classified as a tier 3 civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

(c) Within 30 *business days* after receipt of the *connection* enquiry and all such additional information (if any) advised under clause 5.3.2(b) or, if the *Connection Applicant* has requested the *Local Network Service Provider* to process the *connection* enquiry under clause 5.3.2(d), within 20 *business days* after receipt of that request, the *Network Service Provider* must provide to the *Connection Applicant* written advice of all further information which the *Connection Applicant* must prepare and obtain in conjunction with the *Network Service Provider* to enable the *Network Service Provider* to assess an *application to connect* including:

(1) details of the *Connection Applicant's connection* requirements, and the *Connection Applicant's* specifications of the *facility* to be connected,

consistent with the requirements advised in accordance with clause 5.3.3(b1);

(2) details of the *Connection Applicant's* reasonable expectations of the level and standard of service of *power transfer capability* that the *network* should provide;

(3) a list of the technical data to be included with the *application to connect*, which may vary depending on the *connection* requirements and the type, rating and location of the *facility* to be *connected* and will generally be in the nature of the information set out in schedule 5.5 but may be varied by the *Network Service Provider* as appropriate to suit the size and complexity of the proposed *facility* to be *connected*;

(4) commercial information to be supplied by the *Connection Applicant* to allow the *Network Service Provider* to make an assessment of the ability of the *Connection Applicant* to satisfy the prudential requirements set out in rules 6.21 and 6A.28;

(4A) the *DER generation information* that the *Network Service Provider* requires;

(5) the amount of the application fee which is payable on lodgement of an *application to connect*, such amount:

(i) not being more than necessary to cover the reasonable costs of all work anticipated to arise from investigating the *application to connect* and preparing the associated offer to *connect* and to meet the reasonable costs anticipated to be incurred by *AEMO* and other *Network Service Providers* whose participation in the assessment of the *application to connect* will be required; and

(ii) must not include any amount for, or in anticipation of, the costs of the person using an *Independent Engineer*; and

(6) any other information relevant to the submission of an *application to connect*.

Note

This paragraph is classified as a tier 3 civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

5.3.4 Application for connection

(a) A person who has made a *connection* enquiry under clause 5.3.2 may, following receipt of the responses under clause 5.3.3, make an *application to connect* in accordance with this clause 5.3.4, clause 5.3.4A and clause 5.3.4B.

(b) To be eligible for *connection* the *Connection Applicant* must submit an *application to connect* containing:

(1) the information specified in clause 5.3.3(c);

(2) the relevant application fee to the relevant *Network Service Provider*;

(3) for services related to *contestable IUSA components* that the *Connection Applicant* has not obtained from the *Primary Transmission Network Service Provider* or a *designated network asset* (as applicable):

(i) the *Connection Applicant*'s process for how the *Primary Transmission Network Service Provider* will undertake a review of the detailed design and inspect the construction of those components or assets and how risks of defects will be addressed;

(ii) the detailed design of those components or assets; and

(iii) if the *Primary Transmission Network Service Provider* will not own the *contestable IUSA components* or *designated network asset*, the *Connection Applicant*'s proposed changes (if any) to the form of *network operating agreement* published pursuant to schedule 5.10; and

(4) if the *Connection Applicant* has obtained services related to *contestable IUSA components* or a *designated network asset* other than from the *Primary Transmission Network Service Provider*, all information reasonably required for the *Primary Transmission Network Service Provider* to properly provide operation and maintenance services for the life of those components or assets, including details of the *contestable IUSA components* or *designated network assets*' construction, instructions for operation and maintenance and health safety and asset management manuals; and

(5) except where, under clause 5.3.4B(a3), the *Network Service Provider* is not required to calculate the *system strength locational factor* and the *system strength quantity*, the *Connection Applicant's* election under clause 5.3.4B(b1).

(b1) The *Connection Applicant's* detailed design under paragraph (b)(3)(ii):

(1) must be consistent with the minimum functional specification provided by the *Primary Transmission Network Service Provider* under clause 5.3.3(b)(9)(i);

(2) must not unreasonably inhibit the capacity for future expansion of the *identified user shared asset* or preclude the possibility of future *connections* to that asset; and

(3) subject to the *Connection Applicant* considering the *Primary Transmission Network Service Provider*'s additional requirements under clause 5.3.3(b)(9)(ii) in good faith, may be (but is not required to be) consistent with those additional requirements.

(c) In relation to *Distribution Network Service Providers* and *Network Service Providers* for *declared transmission systems*, the *Connection Applicant* may submit *applications to connect* to more than one *Network Service Provider* in order to receive additional offers to *connect* in respect of *facilities* to be provided that are *contestable*.

(d) To the extent that an application fee includes amounts to meet the reasonable costs anticipated to be incurred by any other *Network Service*

Providers or *AEMO* in the assessment of the *application to connect*, a *Network Service Provider* who receives the *application to connect* and associated fee must pay such amounts to the other *Network Service Providers* or *AEMO*, as appropriate.

(e) For each technical requirement where the proposed arrangement will not meet the *automatic access standards* nominated by the *Network Service Provider* pursuant to clause 5.3.3(b1), the *Connection Applicant* must submit with the *application to connect* a proposal for a *negotiated access standard* for each such requirement to be determined in accordance with clause 5.3.4A.

(f) The *Connection Applicant* may:

(1) lodge separate *applications to connect* and separately liaise with the other *Network Service Providers* identified in clause 5.3.3(b) who may require a form of agreement;

(2) lodge one *application to connect* with the *Network Service Provider* who processed the *connection* enquiry and require it to liaise with those other *Network Service Providers* and obtain and present all necessary draft agreements to the *Connection Applicant*; or

(3) lodge a combined *application to connect* with the *Primary Network Service Provider* where the *connection* involves more than one *Connection Applicant* due to different persons developing and owning *contestable IUSA components*, *dedicated connection assets*, *designated network assets* and *Transmission Network User facilities* in relation to that *connection*.

(g) A *Connection Applicant* who proposes a *system strength remediation scheme* under clause 5.3.4B must submit its proposal with the *application to connect*.

5.3.4A Negotiated access standards

(a) *AEMO* must advise on *AEMO advisory matters*.

(b) A *negotiated access standard* must:

(1) subject to subparagraph (1A), be no less onerous than the corresponding *minimum access standard* provided by the *Network Service Provider* under clauses 5.3.3(b1)(4) or S5.4B(b)(2);

(1A) with respect to a submission by a *Generator* under clause 5.3.9(b)(3), or a *Network User* or *Market Network Service Provider* under clause 5.3.12(b)(3), be no less onerous than the *performance standard* that corresponds to the technical requirement that is affected by the alteration to the *generating system* or *plant* (as applicable);

(2) be set at a level that will not adversely affect *power system security*;

(3) be set at a level that will not adversely affect the quality of *supply* for other *Network Users*; and

(4) in respect of *generating plant*, meet the requirements applicable to a *negotiated access standard* in Schedule 5.2.

(b1) When submitting a proposal for a *negotiated access standard* under clauses 5.3.4(e), 5.3A.9(f), 5.3.9(b)(3), 5.3.12(b)(3) or subparagraph (h)(3), and where there is a corresponding *automatic access standard* for the relevant technical requirement, a *Connection Applicant* must propose a standard that is as close as practicable to the corresponding *automatic access standard*, having regard to:

(1) the need to protect the *plant* from damage;

(2) *power system* conditions at the location of the proposed *connection*; and

(3) the commercial and technical feasibility of complying with the *automatic access standard* with respect to the relevant technical requirement.

(b2) When proposing a *negotiated access standard* under paragraph (b1), the *Connection Applicant* must provide reasons and evidence to the *Network Service Provider* and *AEMO* as to why, in the reasonable opinion of the *Connection Applicant*, the proposed *negotiated access standard* is appropriate, including:

(1) how the *Connection Applicant* has taken into account the matters outlined in subparagraphs (b1)(1) to (3); and

(2) how the proposed *negotiated access standard* meets the requirements of paragraph (b).

(c) Following the receipt of a proposed *negotiated access standard* under clauses 5.3.4(e), 5.3A.9(f), 5.3.9(b)(3), 5.3.12(b)(3) or subparagraph (h)(3), the *Network Service Provider* must consult with *AEMO* as soon as practicable in relation to *AEMO advisory matters* for that proposed standard.

Note

This paragraph is classified as a tier 2 civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

(d) Within 20 *business days* following the later of:

(1) receipt of a proposed *negotiated access standard* under clauses 5.3.4(e), 5.3A.9(f), 5.3.9(b)(3), 5.3.12(b)(3) or subparagraph (h)(3); and

(2) receipt of all information required to be provided by the *Connection Applicant* under clauses S5.2.4, S5.5.6, S5.3.1(a1) or S5.3a.1(a1),

AEMO must advise the *Network Service Provider* in writing, in respect of *AEMO advisory matters*, whether the proposed *negotiated access standard* should be accepted or rejected.

(d1) When advising the *Network Service Provider* under paragraph (d) to reject a proposed *negotiated access standard*, and subject to obligations in respect of *confidential information*, *AEMO* must:

(1) provide detailed reasons in writing for the rejection to the *Network Service Provider*, including:

(i) where the basis of *AEMO*'s advice is lack of evidence from the *Connection Applicant*, details of the additional evidence of the type referred to in paragraph (b2) *AEMO* requires to continue assessing the proposed *negotiated access standard*; and

(ii) the extent to which each of the matters identified at subparagraphs (b)(1), (b)(1A), (b)(2) and (b)(4) contributed to *AEMO*'s decision to reject the proposed *negotiated access standard*; and

(2) recommend a *negotiated access standard* that *AEMO* considers meets the requirements of subparagraphs (b)(1), (b)(1A), (b)(2) and (b)(4).

(e) Within 30 *business days* following the later of:

(1) receipt of a proposed *negotiated access standard* in accordance with clauses 5.3.4(e), 5.3A.9(f), 5.3.9(b)(3), 5.3.12(b)(3) or subparagraph (h)(3); and

(2) receipt of all information required to be provided by the *Connection Applicant* under clauses S5.2.4, S5.5.6, S5.3.1(a1) or S5.3a.1(a1),

the *Network Service Provider* must accept or reject a proposed *negotiated access standard*.

Note

This paragraph is classified as a tier 2 civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

(f) The *Network Service Provider* must reject the proposed *negotiated access standard* where:

(1) in the *Network Service Provider*'s reasonable opinion, one or more of the requirements at subparagraphs (b)(1), (b)(1A), (b)(3) and (b)(4) are not met; or

(2) *AEMO* has advised the *Network Service Provider* under paragraph (d) to reject the proposed *negotiated access standard*.

Note

This paragraph is classified as a tier 2 civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

(g) If a *Network Service Provider* rejects a proposed *negotiated access standard*, the *Network Service Provider* must, at the same time:

(1) subject to obligations in respect of *confidential information*, provide to the *Connection Applicant*:

(i) where the basis for the *Network Service Provider's* rejection is lack of evidence from the *Connection Applicant*, details of the additional evidence of the type referred to in paragraph (b2) the *Network Service Provider* requires to continue assessing the proposed *negotiated access standard*;

(ii) detailed reasons in writing for the rejection, including the extent to which each of the matters identified at subparagraphs (b)(1),

(b)(1A), (b)(3) and (b)(4) contributed to the *Network's Service Provider's* decision to reject the proposed *negotiated access standard*; and

(iii) the detailed reasons and recommendation (if any) provided by *AEMO* to the *Network Service Provider* in respect of an *AEMO advisory matter* under subparagraphs (d1)(1) and (2); and

(2) advise the *Connection Applicant* of a *negotiated access standard* that the *Network Service Provider* considers meets the requirements of subparagraphs (b)(1), (b)(1A), (b)(3) and (b)(4).

Note

This paragraph is classified as a tier 2 civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

(h) The *Connection Applicant* may in relation to a proposed *negotiated access standard* advised by a *Network Service Provider* in accordance with subparagraph (g)(2):

(1) accept the proposed *negotiated access standard*;

(2) reject the proposed *negotiated access standard*;

(3) propose an alternative *negotiated access standard* to be further evaluated in accordance with the criteria in paragraph (b); or

(4) elect to adopt the relevant *automatic access standard* or a corresponding *plant standard*.

(i) An *automatic access standard* or if the procedures in this clause 5.3.4A have been followed a *negotiated access standard*, that forms part of the terms and conditions of a *connection agreement*, is taken to be the *performance standard* applicable to the *connected plant* for the relevant technical requirement.

5.3.4B System strength mitigation requirement

(a) This clause applies in relation to:

(1) a proposed new *connection* of a *generating system* or *market network service facility* to which rule 5.3 or 5.3A applies;

(2) a proposed new *connection* for a *Network User* to whom schedule 5.3 applies where the *facility* to be *connected* includes an *inverter based resource*; and

(3) a proposed alteration to a *generating system* where clause 5.3.9 applies or to other *connected plant* where clause 5.3.12 applies.

(a1) In this clause, a reference to a *Connection Applicant* includes a reference to a *Generator* to whom clause 5.3.9 applies and a *Network User* or *Market Network Service Provider* to whom clause 5.3.12 applies.

(a2) For each proposed new *connection* or proposed alteration to a *generating system* or other *connected plant* to which this clause applies, a *Network Service Provider* must:

(1) undertake a preliminary *system strength impact assessment* in accordance with the *system strength impact assessment guidelines*;

(2) subject to paragraph (a3), calculate, in accordance with the *system strength impact assessment guidelines*:

(i) the *system strength locational factor* pursuant to clause 5.3.3(b5)(3) for the new *connection*;

(ii) the indicative *system strength quantity* pursuant to clause 5.3.3(b5)(3), and the final *system strength quantity* following the finalisation of *access standards* under clause S5.2.5.15, clause S5.3.11 or clause S5.3a.7 (as applicable) for the new *connection*; or

(iii) the *system strength locational factor* and *system strength quantity* pursuant to clause 5.3.9(b)(4) or 5.3.12(b)(4) for a proposed alteration; ~~in accordance with the *system strength impact assessment guidelines*;~~

(3) undertake a full *system strength impact assessment* following the preliminary assessment, unless:

(i) the preliminary assessment indicates there will be no *general system strength impact* or the impact is below any threshold specified in the *system strength impact assessment guidelines* for the purposes of paragraph (f)(3); or

(ii) where applicable, the *Connection Applicant* has elected in accordance with paragraph (b1) to pay the *system strength charge* in relation to the *connection*; and

(4) where the *Connection Applicant* has elected in accordance with paragraph (b1) to pay the *system strength charge* in relation to the *connection* or proposed alteration, undertake modelling in accordance with the *system strength impact assessment guidelines* to verify the stability of the *plant.*

(a3) A *Network Service Provider* is not required to calculate:

(i) the *system strength locational factor* where it determines in accordance with the *system strength impact assessment guidelines* that a *system strength locational factor* cannot reasonably be calculated or would be manifestly excessive;

~~(i)~~(ii) the *system strength quantity*, if the *system strength locational factor* is not required to be calculated pursuant to subparagraph (i).

(a4) A *Connection Applicant* in receipt of the *Network Service Provider's* calculation of the *system strength locational factor* and the indicative *system strength quantity* may request the *Network Service Provider* to undertake a further preliminary *system strength impact assessment* in accordance with the *system strength impact assessment guidelines* and provide a revised *system strength locational factor* and *system strength quantity* for a new *connection* or proposed alteration to a *generating system* or other *connected plant*. The *Network Service Provider* may require payment of a fee to meet the reasonable costs anticipated to be

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incurred by the *Network Service Provider* in undertaking any further preliminary assessment.

Note

This paragraph is classified as a tier 2 civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

(b) The *Network Service Provider* must give the results of the preliminary assessment and where applicable the full assessment to the *Connection Applicant* concerned following consultation with *AEMO*.

(b1) A *Connection Applicant* must elect in its *application to connect*, its submission under clause 5.3.9(b) or its submission under clause 5.3.12(b) (as applicable) whether the *system strength charge* will be payable in relation to the new *connection* or alteration to the *generating system* or other *connected plant* (as applicable). The election cannot be revoked.

(c) A dispute referred to in paragraph (d) between any of:

(1) *AEMO*;

(2) a *Network Service Provider* required to conduct an assessment under paragraph (a);

(3) a *Connection Applicant* who has submitted an *application to connect* for which a full assessment is required under paragraph (a2)(3);

(4) a *Generator* who proposes an alteration to a *generating system* to which clause 5.3.9 applies and for which a full assessment is required under paragraph (a2)(3); and

(5) a *Network User* or *Market Network Service Provider* who proposes an alteration to *connected plant* to which clause 5.3.12 applies and for which a full assessment is required under paragraph (a2)(3),

may be determined under rule 8.2.

(d) Paragraph (c) applies to any dispute relating to the assessment of the *general system strength impact* as a result of conducting a *system strength impact assessment* including a dispute in relation to:

(1) whether the model specified by *AEMO* for the purposes of clause 4.6.6(b)(2) was reasonably appropriate for conducting the *system strength impact assessment*; and

(2) the application of the *system strength impact assessment guidelines* when undertaking a *system strength impact assessment*.

(e) Subject to paragraph (f), a *Network Service Provider* must undertake *system strength connection works* at the cost of the *Connection Applicant* if the full assessment undertaken in accordance with the *system strength impact assessment guidelines* indicates that the *Connection Applicant's* proposed new *connection* or proposed alteration will have a *general system strength impact.*

Note

This paragraph is classified as a tier 2 civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

(f) Paragraph (e) does not require a *Network Service Provider* to undertake, nor permit a *Network Service Provider* to require, *system strength connection works* in the following circumstances:

(1) the proposed new *connection* or alteration does not proceed;

(2) ~~(2)~~ to the extent that the *general system strength impact* referred to in paragraph (e) is or will be avoided or remedied by a *system strength remediation scheme* agreed or determined under this clause and implemented by the *Connection Applicant* in accordance with its *connection agreement*;

(3) to the extent that the impact is below any threshold specified in the *system strength impact assessment guidelines* for this purpose; or

(4) the *Connection Applicant* has elected for the *system strength charge* to be payable in relation to the new *connection* or proposed alteration.

(g) A *Connection Applicant* must include any proposal for a *system strength remediation scheme* in its *application to connect* or its proposal under clause 5.3.9(b)(4) or under clause 5.3.12(b)(4).

(h) A *Connection Applicant* proposing to install *plant* as part of a *system strength remediation scheme* must include a description of the *plant* and other information (including models) reasonably required by the *Network Service Provider* and *AEMO* to assess the *system strength remediation scheme*.

(i) A *Network Service Provider* must, following the receipt of a proposal for a *system strength remediation scheme*, consult with *AEMO* as soon as practical in relation to the proposal.

Note

This paragraph is classified as a tier 2 civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

(j) Following the submission of a proposal for a *system strength remediation scheme*, *AEMO* must use reasonable endeavours to respond to the *Network Service Provider* in writing in respect of the proposal within 20 *business days*.

(k) A *Network Service Provider* must within 10 *business days* following the receipt of a response from *AEMO* under paragraph (h) to a proposal for a *system strength remediation scheme*, accept or reject the proposal.

Note

This paragraph is classified as a tier 2 civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

(l) The *Network Service Provider* must reject a proposal for a *system strength remediation scheme* if the scheme is not reasonably likely to achieve its required outcome or would:

(1) in the reasonable opinion of the *Network Service Provider* adversely affect quality of *supply* for other *Network Users*;-or

(2) on *AEMO's* reasonable advice, adversely affect *power system security*.

(m) If a *Network Service Provider* rejects a proposal for a *system strength remediation scheme*, the *Network Service Provider* must give its reasons but has no obligation to propose a *system strength remediation scheme* that it will accept.

(n) The *Connection Applicant* submitting a proposal for a *system strength remediation scheme* rejected by a *Network Service Provider* may:

(1) propose an alternative *system strength remediation scheme* to be further evaluated following the process initiated under paragraph (i); or

(2) request negotiations under paragraph (o).

(o) If a *Connection Applicant* requests negotiations under this paragraph, the *Connection Applicant*, the *Network Service Provider* and *AEMO* must negotiate in good faith to reach agreement in respect of the proposal for a *system strength remediation scheme*.

(p) If the matter is not resolved by negotiation under paragraph (o):

(1) in the case of a *connection* to a *transmission system* other than the *declared transmission system* of an *adoptive jurisdiction*, the matter may be dealt with as a dispute under rule 5.5 (but not rule 8.2); or

(2) otherwise, may be dealt with under rule 8.2 or as a *distribution service access dispute* as applicable.

(q) The parties to a *connection agreement* containing a *system strength remediation scheme* must not modify the scheme unless the modified scheme has been agreed or determined under this clause. A *Registered Participant* proposing to modify a *system strength remediation scheme* must submit its proposal for modification to the *Network Service Provider* for evaluation by the *Network Service Provider* and *AEMO* under this clause. Once agreed or determined, the modified scheme must be incorporated as an amendment to the *connection agreement* and notified to *AEMO* under clause 5.3.7(g).

Note

This paragraph is classified as a tier 2 civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

5.3.4C Information about system strength connection points

(a) A *Network Service Provider* for a *system strength connection point* who is not also the *System Strength Service Provider* for the *system strength connection point* must notify the information in paragraph (b) to the relevant

System Strength Service Provider within 10 *business days* of either of the following occurring:

(1) an election being made under clause 5.3.4B(b1) for the *system strength charge* to be payable in relation to a new *connection* or proposed alteration; or

(2) agreement being reached under clause 5.3.9 or clause 5.3.12 to vary the performance of *plant* at a *system strength connection point*, relative to the technical requirements in clause S5.2.5.15, clause S5.3.11 or clause S5.3a.7 (as applicable).

(b) The *Network Service Provider* must notify the:

(1) *system strength locational factor* and *system strength quantity*;

(2) *short circuit ratio* and *rated active power*, rated *power transfer capability* or *maximum demand* (as applicable) for the *system strength connection point* agreed in accordance with clause S5.2.5.15, clause S5.3.11 or clause S5.3a.7 (as applicable);

(3) the expected date from which the *system strength charge* for the *connection* will commence or the amendment take effect; and

(4) information reasonably required by the *System Strength Service Provider* to identify the relevant *connection*.

(c) A *Network Service Provider* for a *system strength connection point* must, within 20 *business days* of a request of the relevant *System Strength Service Provider*:

(1) calculate in accordance with the *system strength impact assessment guidelines* and notify to the *System Strength Service Provider*, the *system strength locational factor* and the *system strength quantity* applicable to the *system strength connection point* for each year of the *system strength charging period* specified by the *System Strength Service Provider*; and

(2) provide any other information reasonably required by the *System Strength Service Provider* for the purposes of calculating and billing *system strength charges* for the *system strength connection point.*

(d) A *System Strength Service Provider* must establish and maintain arrangements to enable other *Network Service Providers* to provide information to the *System Strength Service Provider* in accordance with this clause 5.3.4C.

(e) A *System Strength Service Provider* must establish and maintain a record of all *connections* subject to the *system strength charge* and for which it is the *System Strength Service Provider* and must include in the record all information reasonably required by the *System Strength Service Provider* to identify the relevant *connection* for the purposes of calculating and billing *system strength charges.*

…

5.3A Establishing or modifying connection - embedded generation

5.3A.3 Publication of Information

(a) A *Distribution Network Service Provider* must *publish* the following in the same location on its website:

(1) an enquiry form for *connection* of an *embedded generating unit*;

(2) a register of completed embedded generation projects under rule 5.18B; and

(3) an *information pack.*

(b) An *information pack* must include:

(1) a description of the process for lodging an *application to connect* for an *embedded generating unit*, including:

(i) the purpose of each stage of the *connection* enquiry and application processes;

(ii) the steps a *Connection Applicant* will need to follow at each stage of the *connection* enquiry and application processes;

(iii) the information that is to be included by the *Connection Applicant* with a *connection* enquiry and the information that will be made available to the *Connection Applicant* by the *Distribution Network Service Provider* at each stage of the *connection* enquiry;

(iv) the information that is to be included with an *application to connect* and the type of information that will be made available to the *Connection Applicant* by the *Distribution Network Service Provider* after lodgement of the application;

(v) the factors taken into account by the *Distribution Network Service Provider*, at each stage of the *connection* enquiry and application, when assessing an *application to connect* for an *embedded generating unit*;

(vi) the process for negotiating *negotiated access standards* under clause 5.3.4A and any *system strength remediation scheme* under clause 5.3.4B and a summary of the factors the *Distribution Network Service Provider* takes into account when considering proposed *negotiated access standards* and *system strength remediation schemes* and where applicable, in determining the *system strength locational factor* and the *system strength quantity*; and

(vii) a list of services, if any, relevant to the *connection* that are *contestable* in the relevant *participating jurisdiction*;

(2) single line diagrams of the *Distribution Network Service Provider's* preferred *connection* arrangements, and a range of other possible *connection* arrangements for integration of an *embedded generating*

unit, showing the *connection point*, the point of common coupling, the *embedded generating unit(s)*, *load(s)*, *meter(s)*, circuit breaker(s) and isolator(s);

(3) a sample schematic diagram of the *protection system* and *control system* relevant to the *connection* of an *embedded generating unit* to the *distribution network*, showing the *protection system* and *control system*, including all relevant current circuits, relay potential circuits, alarm and monitoring circuits, back-up systems and parameters of protection and *control system* elements;

(4) worked examples of *connection service* charges, enquiry and application fees for the *connection* of *embedded generating units*, based on the preferred and possible *connection* arrangements set out in paragraph (b)(2);

(5) details of any *minimum access standards* or *plant standards* the *Distribution Network Service Provider* considers are applicable to *embedded generating units* and *generating plant*;

(6) technical requirements relevant to the processing of a *connection* enquiry or an *application to connect*, including information of the type, but not limited to:

(i) *protection systems* and protection schemes;

(ii) fault level management principles;

(iii) *reactive power capability* and *power factor* correction;

(iv) power quality and how limits are allocated;

(v) responses to *frequency* and *voltage* disturbances;

(vi) *voltage* control and regulation;

(vii) *remote monitoring equipment*, control and communication requirements;

(viii) earthing requirements and other relevant safety requirements;

(ix) circumstances in which *augmentation* may be required to facilitate integration of an *embedded generating unit* into the *network*;

(x) commissioning and testing requirements; and

(xi) circumstances in which a *system strength remediation scheme* or *system strength connection works* will be required as a condition of *connection*; and

(7) model *connection agreements* used by that *Distribution Network Service Provider*.

...

5.3A.9 Application for connection

(a) Following receipt of a *detailed response* under clause 5.3A.8, a *Connection Applicant* may make an *application to connect* in accordance with this clause 5.3A.9, clause 5.3.4A and clause 5.3.4B.

(b) To be eligible for *connection*, the *Connection Applicant* must submit an *application to connect* containing the information specified in the *detailed response* provided under clause 5.3A.8(c) and the application fee specified under clause S5.4B(m) to the *Distribution Network Service Provider* and (except where, under clause 5.3.4B(a3), the *Network Service Provider* is not required to calculate the *system strength locational factor* and the *system strength quantity*) the *Connection Applicant's* election under clause 5.3.4B(b1).

(c) The *Connection Applicant* may submit an *application to connect* to more than one *Distribution Network Service Provider* in order to receive additional offers to *connect* in respect of *facilities* to be provided that are *contestable*.

(d) If the *application to connect* is incomplete in a material respect the *Distribution Network Service Provider* must, within 10 *business days* after receipt of it, advise the *Connection Applicant* of the deficiency, and the steps required to address it.

(e) To the extent that an application fee includes amounts to meet the reasonable costs anticipated to be incurred by any other *Network Service Providers* or *AEMO* in the assessment of the *application to connect*, a *Distribution Network Service Provider* who receives the *application to connect* and associated fee must pay such amounts to the other *Network Service Providers* or *AEMO*, as appropriate.

(f) For each technical requirement where the proposed arrangement will not meet the *automatic access standards* nominated by the *Distribution Network Service Provider* pursuant to clause S5.4B(b), the *Connection Applicant* must submit with the *application to connect* a proposal for a *negotiated access standard* for each such requirement to be determined in accordance with clause 5.3.4A.

(g) The *Connection Applicant* may:

(1) lodge separate *applications to connect* and separately liaise with the other *Network Service Providers* identified in clause 5.3A.5(e) who may require a form of agreement; or

(2) lodge one *application to connect* with the *Distribution Network Service Provider* who processed the *connection* enquiry and require it to liaise with those other *Network Service Providers* and obtain and present all necessary draft agreements to the *Connection Applicant*.

(h) A *Connection Applicant* who proposes a *system strength remediation scheme* under clause 5.3.4B must submit its proposal with the *application to connect*.

5.3A.10 Preparation of offer to connect

(a) The *Distribution Network Service Provider* to whom the *application to connect* is submitted under clause 5.3A.9(a):

(1) at the *automatic access standard*; or

(2) at a *negotiated access standard* that the provider has accepted under clause 5.3.4A(e),

must proceed to prepare an offer to *connect* in response.

(b) So as to maintain levels of service and quality of *supply* to existing *Registered Participants* in accordance with the *Rules*, the *Distribution Network Service Provider* in preparing the offer to *connect* must consult with *AEMO* and other *Registered Participants* with whom it has *connection agreements*, if the *Distribution Network Service Provider* believes in its reasonable opinion, that compliance with the terms and conditions of those *connection agreements* will be affected, in order to assess the *application to connect* and determine:

(1) the technical requirements for the equipment to be *connected*;

(2) the extent and cost of *augmentations* and changes to all affected *networks*;

(3) any consequent change in *network service* charges; and

(4) any possible material effect of this new *connection* on the *network power transfer capability* including that of other *networks*.

(c) If the *application to connect* involves the *connection* of *embedded generating units* having a nameplate rating of 10 MW or greater, the *Distribution Network Service Provider* must consult the relevant *Transmission Network Service Provider* regarding the impact of the *connection* contemplated by the *application to connect* on fault levels, line reclosure protocols, and stability aspects.

(d) The *Transmission Network Service Provider* consulted under paragraph (c) must determine the reasonable costs of addressing those matters for inclusion in the offer to *connect* and the *Distribution Network Service Provider* must make it a condition of the offer to *connect* that the *Connection Applicant* pay these costs.

(e) The *Distribution Network Service Provider* preparing the offer to *connect* must include provision for payment of the reasonable costs associated with *remote control equipment* and *remote monitoring equipment* as required by *AEMO* and it may be a condition of the offer to *connect* that the *Connection Applicant* pay these costs.

Note

This paragraph is classified as a tier 3 civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

(f) The *Distribution Network Service Provider* preparing the offer to *connect* must specify in reasonable detail any *system strength connection works* to be undertaken by the *Distribution Network Service Provider*.

…

5.12.2 Transmission Annual Planning Report

(a) Subject to paragraph (b), by 31 October each year all *Transmission Network Service Providers* must *publish* a *Transmission Annual Planning Report* setting out the results of the annual planning review conducted in accordance with clause 5.12.1.

(b) If a *Network Service Provider* is a *Transmission Network Service Provider* only because it owns, operates or controls *dual function assets* then it may *publish* its *Transmission Annual Planning Report* in the same document and at the same time as its *Distribution Annual Planning Report*.

(c) The *Transmission Annual Planning Report* must be consistent with the *TAPR Guidelines* and set out:

(1) the forecast *loads* submitted by a *Distribution Network Service Provider* in accordance with clause 5.11.1 or as modified in accordance with clause 5.11.1(d), including at least:

(i) a description of the forecasting methodology, sources of input information, and the assumptions applied in respect of the forecast *loads*;

(ii) a description of high, most likely and low growth scenarios in respect of the forecast *loads*;

(iii) an analysis and explanation of any aspects of forecast *loads* provided in the *Transmission Annual Planning Report* that have changed significantly from forecasts provided in the *Transmission Annual Planning Report* from the previous year; and

(iv) an analysis and explanation of any aspects of forecast *loads* provided in the *Transmission Annual Planning Report* from the previous year which are significantly different from the actual outcome;

(1A) for all *network* asset retirements, and for all *network* asset de-ratings that would result in a *network constraint*, that are planned over the minimum planning period specified in clause 5.12.1(c), the following information in sufficient detail relative to the size or significance of the asset:

(i) a description of the *network* asset, including location;

(ii) the reasons, including methodologies and assumptions used by the *Transmission Network Service Provider* for deciding that it is necessary or prudent for the *network* asset to be retired or *de-rated*, taking into account factors such as the condition of the *network* asset;

(iii) the date from which the *Transmission Network Service Provider* proposes that the *network* asset will be retired or *de-rated*; and

(iv) if the date to retire or *de-rate* the *network* asset has changed since the previous *Transmission Annual Planning Report*, an explanation of why this has occurred;

(1B) for the purposes of subparagraph (1A), where two or more *network* assets are:

(i) of the same type;

(ii) to be retired or *de-rated* across more than one location;

(iii) to be retired or *de-rated* in the same calendar year; and

(iv) each expected to have a replacement cost less than $200,000 (as varied by a *cost threshold determination*),

those assets can be reported together by setting out in the *Transmission Annual Planning Report*:

(v) a description of the *network* assets, including a summarised description of their locations;

(vi) the reasons, including methodologies and assumptions used by the *Transmission Network Service Provider*, for deciding that it is necessary or prudent for the *network* assets to be retired or *de-rated*, taking into account factors such as the condition of the *network* assets;

(vii) the date from which the *Transmission Network Service Provider* proposes that the *network* assets will be retired or *de-rated*; and

(viii) if the calendar year to retire or *de-rate* the *network* assets has changed since the previous *Transmission Annual Planning Report*, an explanation of why this has occurred;

(2) planning proposals for future *connection points*;

(3) a forecast of *constraints* and inability to meet the *network* performance requirements set out in schedule 5.1 or relevant legislation or regulations of a *participating jurisdiction* over 1, 3 and 5 years, including at least:

(i) a description of the *constraints* and their causes;

(ii) the timing and likelihood of the *constraints*;

(iii) a brief discussion of the types of planned future projects that may address the *constraints* over the next 5 years, if such projects are required; and

(iv) sufficient information to enable an understanding of the *constraints* and how such forecasts were developed;

(4) in respect of information required by subparagraph (3), where an estimated reduction in forecast *load* would defer a forecast *constraint* for a period of 12 months, include:

(i) the year and months in which a *constraint* is forecast to occur;

(ii) the relevant *connection points* at which the estimated reduction in forecast *load* may occur;

(iii) the estimated reduction in forecast *load* in MW needed; and

(iv) a statement of whether the *Transmission Network Service Provider* plans to issue a request for proposals for *augmentation*, replacement of *network* assets, or a *non-network option* identified by the annual planning review conducted under clause 5.12.1(b) and if so, the expected date the request will be issued;

(5) for all proposed *augmentations* to the *network* and proposed replacements of *network* assets the following information, in sufficient detail relative to the size or significance of the project and the proposed operational date of the project:

(i) project/asset name and the month and year in which it is proposed that the asset will become operational;

(ii) the reason for the actual or potential *constraint*, if any, or inability, if any, to meet the *network* performance requirements set out in schedule 5.1 or relevant legislation or regulations of a *participating jurisdiction,* including *load* forecasts and all assumptions used;

(iii) the proposed solution to the *constraint* or inability to meet the *network* performance requirements identified in subparagraph (ii), if any;

(iv) total cost of the proposed solution;

(v) whether the proposed solution will have a *material inter-network impact.* In assessing whether an *augmentation* to the *network* will have a *material inter-network impact* a *Transmission Network Service Provider* must have regard to the objective set of criteria *published* by *AEMO* in accordance with clause 5.21 (if any such criteria have been *published* by *AEMO*); and

(vi) other reasonable *network options* and *non-network options* considered to address the actual or potential *constraint* or inability to meet the *network* performance requirements identified in subparagraph (ii), if any. Other reasonable *network* and *non-network options* include, but are not limited to, *interconnectors*, *generation* options, demand side options, *market network service* options and options involving other *transmission* and *distribution networks*;

(6) the manner in which the proposed *augmentations* and proposed replacements of *network* assets relate to the most recent *Integrated System Plan*;

(6A) for proposed new or modified *emergency frequency control schemes*, the manner in which the project relates to the most recent *general power system risk review*;

(6B) information about which parts of its *transmission network* are *designated network assets* and the identities of the owners of those *designated network assets*;

(7) information on the *Transmission Network Service Provider's asset management* approach, including:

(i) a summary of any *asset management* strategy employed by the *Transmission Network Service Provider*;

(ii) a summary of any issues that may impact on the system *constraints* identified in the *Transmission Annual Planning Report* that has been identified through carrying out *asset management*; and

(iii) information about where further information on the *asset management* strategy and methodology adopted by the *Transmission Network Service Provider* may be obtained.

(8) any information required to be included in a *Transmission Annual Planning Report* under:

(i) clauses 5.16.3(c) and 5.16A.3 in relation to a *network* investment which is determined to be required to address an urgent and unforeseen *network* issue; or

(ii) clauses 5.20B.4(h) and (i) and clauses 5.20C.3(f) and (g) in relation to *network* investment and other activities to:

(A) provide *inertia network services* or *inertia support activities*; or

(B) meet the standard in clause S5.1.14 in relation to a *system strength node*;

(9) emergency controls in place under clause S5.1.8, including the *Network Service Provider's* assessment of the need for new or altered emergency controls under that clause;

(9A) the analysis of the operation of, and any known or potential interactions between:

(i) any *emergency frequency control schemes*, or emergency controls place under clause S5.1.8, on its *network*; and

(ii) *protection systems* or *control systems* of *plant connected* to its *network* (including consideration of whether the settings of those systems are fit for purpose for the future operation of its *network*),

undertaken under clause 5.12.1(b)(7), including a description of proposed actions to be undertaken to revise those schemes, controls or systems, or to address any adverse interactions;

(10) *facilities* in place under clause S5.1.10;

(11) an analysis and explanation of any other aspects of the *Transmission Annual Planning Report* that have changed significantly from the preceding year's *Transmission Annual Planning Report*, including the reasons why the changes have occurred;

(12) the results of joint planning (if any) undertaken with a *Transmission Network Service Provider* under clause 5.14.3 in the preceding year,

including a summary of the process and methodology used by the *Transmission Network Service Providers* to undertake joint planning and the outcomes of that joint planning; and

(13) the *system strength locational factor* for each *system strength connection point* for which it is the *Network Service Provider* and the corresponding *system strength node*.

(d) A *declared transmission system operator* for all or part of the *declared shared network* must provide to *AEMO* within a reasonable period of receiving a request, such information as reasonably requested by *AEMO* to enable it to comply with:

(1) clause 5.12.1(b)(5);

(2) clause 5.12.1(b)(6);

(3) clause 5.12.2(c)(1A);

(4) clauses 5.12.2(c)(4), (5) and (6) as they relate to the proposed replacement of *network* assets; and

(5) clause 5.12.2(c)(7).

…

5.13.2 Distribution Annual Planning Report

(a) For the purposes of this clause 5.13.2:

DAPR date means for a *Distribution Network Service Provider*:

(1) the date by which it is required to *publish* a *Distribution Annual Planning Report* under *jurisdictional electricity legislation*; or

(2) if no such date is specified in *jurisdictional electricity legislation*, 31 December.

(b) By the *DAPR date* each year, a *Distribution Network Service Provider* must *publish* the *Distribution Annual Planning Report* setting out the results of the *distribution* annual planning review for the *forward planning period*.

Note

Under clause 5.12.2(b), if a person is a *Transmission Network Service Provider* only because it owns, operates or controls *dual function assets* then it may *publish* its *Transmission Annual Planning Report* in the same document and at the same time as its *Distribution Annual Planning Report* under this clause 5.13.2.

(c) A *Distribution Network Service Provider* must include the information specified in schedule 5.8 in its *Distribution Annual Planning Report*.

(d) Despite paragraph (c), a *Distribution Network Service Provider* is not required to include in its *Distribution Annual Planning Report* information required in relation to *transmission-distribution connection points* if it is required to do so under *jurisdictional electricity legislation*.

(e) As soon as practicable after it *publishes* a *Distribution Annual Planning Report* under paragraph (b), a *Distribution Network Service Provider* must *publish* on its website the contact details for a suitably qualified staff

member of the *Distribution Network Service Provider* to whom queries on the report may be directed.

…

Schedule 5.4 Information to be Provided with Preliminary Enquiry

The following items of information are required to be submitted with a preliminary enquiry for *connection* or modification of an existing *connection*:

(a) Type of *plant* – (eg. gas turbine *generating unit*; rolling mill, etc.).

(b) Preferred site location – (listing any alternatives in order of preference as well).

(c) Maximum power *generation* or demand of whole *plant* – (maximum MW and/or MVA, or average over 15 minutes or similar).

(d) Expected *energy* production or consumption (MWh per month).

(e) *Plant* type and configuration – (eg. number and type of *generating units* or number of separate production lines).

(f) Nature of any disturbing *load* (size of disturbing component MW/MVAr, duty cycle, nature of power electronic *plant* which may produce harmonic distortion).

(g) Technology of proposed *generating unit* (e.g. *synchronous generating unit*, induction generator, photovoltaic array, etc).

(h) When *plant* is to be in service – (eg. estimated date for each *generating unit*).

(i) Name, ABN, ACN and address of enquirer, and, if relevant, of the party for whom the enquirer is acting.

(j) Other information may be requested by the *Network Service Provider*, such as amount and timing of power required during construction or any auxiliary power requirements.

Schedule 5.4A Preliminary Response

For the purposes of clause 5.3A.7(a), the following information must be included in the preliminary response:

(a) relevant technical information about the *Distribution Network Service Provider's distribution network*, including guidance on how the *Connection Applicant* may meet the following requirements if it were to proceed to prepare an *application to connect*:

  (1) primary protection and backup protection;

  (2) other protection and control requirements applicable to *embedded generating units* and associated *plant*;

  (3) *remote monitoring equipment* and control communications *facilities*;

  (4) insulation co-ordination and lightning protection;

(5) existing maximum and minimum fault levels and *fault clearance times* of relevant local *zone substations*";

(6) switching and *isolation* facilities;

(7) interlocking and *synchronising* arrangements;

(8) *metering installations*; and

(9) remedy or avoid a *general system strength impact* caused by the *connection*;

(b) if not otherwise provided in accordance with paragraph (a), to the extent the *Distribution Network Service Provider* holds technical information necessary to prepare an *application to connect*, that information;

(c) information relevant to each technical requirement of the proposed *plant* as relevant to:

(1) the *automatic access standards*;

(2) any relevant *minimum access standards*;

(3) any applicable *plant standards*; and

(4) the *normal voltage* level, if it is expected to change from the *nominal voltage* level;

(d) the identity of other parties that the *Distribution Network Service Provider* considers:

(1) will need to be involved in planning to make the *connection* or must be involved under clause 5.3A.10(c); and

(2) must be paid for *transmission services* or *distribution services*;

(e) whether it will be necessary for any of the parties identified in subparagraph (d) to enter into an agreement with the *Connection Applicant* in respect of the provision of *connection services* or other *transmission services* or *distribution services* or both, to the *Connection Applicant*;

(f) where relevant the *Distribution Network Service Provider* is to identify whether any service required to *establish a connection* is *contestable* in the relevant *participating jurisdiction*;

(g) worked examples of *connection service* charges relevant to the enquiry and an explanation of the factors on which the charges depend;

(h) information regarding the *Distribution Network Service Provider* and its *network*, system limitations for *sub-transmission lines* and *zone substations* and other information relevant to constraints on the *network* as such information is relevant to the *application to connect*;

(i) an indication of whether *network augmentation* may be required and if required, what work the *network augmentation* may involve;

(i1) an indication of whether the new *connection* is expected in the reasonable opinion of a *Network Service Provider* to have a *general system strength impact* and whether a *system strength locational factor* and the *system strength quantity* can be calculated in relation to the new *connection*;

(j) a hyperlink to the *Distribution Network Service Provider's information pack*;

(k) the contact details for the relevant point of contact within the *Distribution Network Service Provider* managing the *connection* enquiry;

(l) the *Distribution Network Service Provider's* response to the objectives of the *connection* sought as included by the *Connection Applicant* in its enquiry under clause 5.3A.5(c)(1);

(m) a description of the process for the provision of the *detailed response*, including the further information to be provided by the *Connection Applicant* and analysis to be undertaken by the *Distribution Network Service Provider* as part of the preparation of the *detailed response*;

(n) an overview of any available options for *connection* to the *Distribution Network Service Provider's network*, as relevant to an enquiry lodged, at more than one *connection point* in a *network*, including:

(1) example single line diagram and relevant *protection systems* and *control systems* used by existing *connection* arrangements;

(2) a description of the characteristics of supply; and

(3) an indication of the likely impact on terms and conditions of *connection*,

as relevant to each optional differing *connection point*;

(o) a statement of further information required from the *Connection Applicant* for the preparation of the *detailed response*, including:

(1) details of the *Connection Applicant's connection* requirements, and the *Connection Applicant's* specifications of the *facility* to be *connected*, consistent with the requirements advised in accordance with paragraphs (a) to (c); and

(2) details of the *Connection Applicant's* reasonable expectations of the level and standard of service of *power transfer capability* that the *network* should provide;

(3) the *Connection Applicant's* proposal for any *system strength remediation scheme*;

(p) an estimate of the enquiry fee payable by the *Connection Applicant* for the *detailed response*, including details of how components of the fee were calculated;

(q) the component of the estimate of the enquiry fee payable by the *Connection Applicant* to request the *detailed response*;

(r) an estimate of the application fee which is payable on submitting an *application to connect*; and

(s) any additional information relevant to the enquiry.

Schedule 5.4B Detailed Response to Enquiry

For the purposes of clause 5.3A.8(g), the following information must be included in the *detailed response*:

(a) the contact details for the relevant point of contact within the *Distribution Network Service Provider* who will manage the *application to connect*;

(b) written details of each technical requirement relevant to the proposed *plant* as relevant to the:

(1) *automatic access standards*;

(2) *minimum access standards*;

(3) any applicable *plant standards*; and

(4) *normal voltage* level, if that is to change from the *nominal voltage* level;

(c) details of the *connection* requirements based on the *Connection Applicant's* specifications of the *facility* to be *connected*;

(d) details of the level and standard of service of *power transfer capability* that the *Distribution Network Service Provider*, with reasonable endeavours, considers the *network* provides at the location of the *connection point* or *connection points*, if options have been made available under clause S5.4A(n);

(e) *negotiated access standards* that will require *AEMO's* involvement in accordance with clause 5.3.4A(c);

(e1) written details of:

(1) the minimum *three phase fault level* at the *connection point*;

(2) the results of the *Network Service Provider's* preliminary assessment of the impact of the new *connection* undertaken in accordance with the *system strength impact assessment guidelines* and clause 5.3.4B; and

(3) except where, under clause 5.3.4B(a3), the *Network Service Provider* is not required to calculate the *system strength locational factor* and the *system strength quantity*:

(i) the indicative *system strength quantity* for the *connection point*;

(ii) the *system strength locational factor* for the *connection point*; and

(iii) the relevant *system strength node* and the indicative *system strength charge* for the *connection point* using the then applicable *system strength unit price*.

(f) a list of the technical data to be included with the *application to connect*, which may vary depending on the *connection* requirements and the type, rating and location of the *facility* to be *connected*. The list provided under this paragraph (f) will generally be in the nature of the information set out in schedule 5.5 but may be varied by the *Distribution Network Service Provider* as appropriate to suit the size and complexity of the proposed *facility* to be *connected*;

(g) commercial information to be supplied by the *Connection Applicant* to allow a *Network Service Provider* (as is relevant) to make an assessment of

the ability of the *Connection Applicant* to satisfy the prudential requirements set out in rules 6.21 and 6A.28;

(h) so far as is relevant, and in relation to services that the *Distribution Network Service Provider* intends to provide, an itemised estimate of *connection* costs including:

(1) *connection services* charges;

(2) costs associated with the proposed metering requirements for the *connection*;

(3) costs of any *network extension*;

(4) details of *augmentation* required to provide the *connection* and associated costs;

(5) details of the interface equipment required to provide the *connection* and associated costs;

(6) details of any ongoing operation and maintenance costs and charges to be undertaken by the *Distribution Network Service Provider*; and

(7) other incidental costs and their basis of calculation;

(i) an explanation of the factors affecting each component of the itemised estimate of *connection* costs and the further information that will be taken into account by the *Distribution Network Service Provider* in preparing the final itemised statement of *connection* costs to be provided under clause 5.3.6(b2)(1);

(j) using reasonable endeavours, all risks and obligations in respect of the proposed *connection* associated with planning and environmental laws not contained in the *Rules*;

(k) a draft *connection agreement* that contains the proposed terms and conditions for *connection* to the *network* including those of the kind set out in schedule 5.6 and:

(1) an explanation of the terms and conditions in the *connection agreement* that need to be finalised; and

(2) if relevant, further information necessary from the *Connection Applicant* to finalise the *connection agreement*;

(l) a description of the process for lodging the *application to connect*, including:

(1) the options open to the *Connection Applicant* in submitting an *application to connect* in accordance with clause 5.3A.9;

(2) the further analysis to be undertaken by the *Distribution Network Service Provider* as part of the *Distribution Network Service Provider's* assessment of the *application to connect*;

(3) further information required from the *Connection Applicant* for the *Distribution Network Service Provider* to assess the *application to connect*; and

(4) an outline of proposed milestones (and their timeframes) for *connection* and access activities which may be modified from time to time by agreement of the parties, where such agreement must not be unreasonably withheld;

(m) the application fee payable when submitting an *application to connect*;

(n) whether the *Distribution Network Service Provider* agrees to the *detailed response* remaining valid for a specified period of time to allow the *Connection Applicant* to lodge an *application to connect* within that time; and

(o) any additional information relevant to the *application to connect*.

…

Schedule 5.8 Distribution Annual Planning Report

For the purposes of clause 5.13.2(c), the following information must be included in a *Distribution Annual Planning Report*:

(a) information regarding the *Distribution Network Service Provider* and its *network*, including:

(1) a description of its *network*;

(2) a description of its operating environment;

(3) the number and types of its *distribution assets*;

(4) methodologies used in preparing the *Distribution Annual Planning Report*, including methodologies used to identify *system limitations* and any assumptions applied; and

(5) analysis and explanation of any aspects of forecasts and information provided in the *Distribution Annual Planning Report* that have changed significantly from previous forecasts and information provided in the preceding year;

(b) forecasts for the *forward planning period*, including at least:

(1) a description of the forecasting methodology used, sources of input information, and the assumptions applied;

(2) *load* forecasts:

(i) at the *transmission-distribution connection points*;

(ii) for *sub-transmission lines*; and

(iii) for *zone substations*,

including, where applicable, for each item specified above:

(iv) *total capacity*;

(v) *firm delivery capacity* for summer periods and winter periods;

(vi) *peak load* (summer or winter and an estimate of the number of hours per year that 95% of *peak load* is expected to be reached);

(vii) *power factor* at time of *peak load*;

(viii) load transfer capacities; and

(ix) generation capacity of known *embedded generating units*;

(2A) forecast use of *distribution services* by *embedded generating units*:

(i) at the *transmission-distribution connection points*;

(ii) for *sub-transmission lines*; and

(iii) for *zone substations*,

including, where applicable, for each item specified above:

(iv) *total capacity* to accept *supply* from *embedded generating units*;

(v) *firm delivery capacity* for each period during the year;

(vi) peak *supply* into the *distribution network* from *embedded generating units* (at any time during the year) and an estimate of the number of hours per year that 95% of the peak is expected to be reached; and

(vii) *power factor* at time of peak *supply* into the *distribution network*;

(3) forecasts of future *transmission-distribution connection points* (and any associated *connection assets*), *sub-transmission lines* and *zone substations*, including for each future *transmission-distribution connection point* and *zone substation*:

(i) location;

(ii) future *loading level*; and

(iii) proposed commissioning time (estimate of month and year);

(4) forecasts of the *Distribution Network Service Provider's* performance against any applicable performance targets in a *service target performance incentive scheme*; and

(5) a description of any factors that may have a material impact on its *network*, including factors affecting;

(i) fault levels;

(ii) *voltage* levels;

(iii) other *power system security* requirements;

(iv) the quality of *supply* to other *Network Users* (where relevant); and

(v) ageing and potentially unreliable assets;

(b1) for all *network* asset retirements, and for all *network* asset de-ratings that would result in a system limitation, that are planned over the *forward planning period*, the following information in sufficient detail relative to the size or significance of the asset:

(1) a description of the *network* asset, including location;

(2) the reasons, including methodologies and assumptions used by the *Distribution Network Service Provider*, for deciding that it is necessary or prudent for the *network* asset to be retired or *de-rated*, taking into account factors such as the condition of the *network* asset;

(3) the date from which the *Distribution Network Service Provider* proposes that the *network* asset will be retired or *de-rated*; and

(4) if the date to retire or *de-rate* the *network* asset has changed since the previous *Distribution Annual Planning Report*, an explanation of why this has occurred;

(b2) for the purposes of subparagraph (b1), where two or more *network* assets are:

(1) of the same type;

(2) to be retired or *de-rated* across more than one location;

(3) to be retired or *de-rated* in the same calendar year; and

(4) each expected to have a replacement cost less than $200,000 (as varied by a *cost threshold determination*),

those assets can be reported together by setting out in the *Distribution Annual Planning Report*:

(5) a description of the *network* assets, including a summarised description of their locations;

(6) the reasons, including methodologies and assumptions used by the *Distribution Network Service Provider*, for deciding that it is necessary or prudent for the *network* assets to be retired or *de-rated*, taking into account factors such as the condition of the *network* assets;

(7) the date from which the *Distribution Network Service Provider* proposes that the *network* assets will be retired or *de-rated*; and

(8) if the calendar year to retire or *de-rate* the *network* assets has changed since the previous *Distribution Annual Planning Report*, an explanation of why this has occurred;

(c) information on *system limitations* for *sub-transmission lines* and *zone substations*, including at least:

(1) estimates of the location and timing (month(s) and year) of the system limitation;

(2) analysis of any potential for *load transfer capacity* between *supply* points that may decrease the impact of the *system limitation* or defer the requirement for investment;

(3) impact of the *system limitation*, if any, on the capacity at *transmission-distribution connection points*;

(4) a brief discussion of the types of potential solutions that may address the *system limitation* in the *forward planning period*, if a solution is required; and

(5) where an estimated change in forecast *load* or forecast *generation* from *embedded generating units* would defer a forecast *system limitation* for a period of at least 12 months, include:

(i) an estimate of the month and year in which a *system limitation* is forecast to occur as required under subparagraph (1);

(ii) the relevant *connection points* at which the estimated change in forecast *load* or forecast *generation* may occur; and

(iii) the estimated change in forecast *load* or forecast *generation* in MW or improvements in *power factor* needed to defer the forecast *system limitation*;

(d) for any *primary distribution feeders* for which a *Distribution Network Service Provider* has prepared forecasts of *maximum demands* under clause 5.13.1(d)(1)(iii) and which are currently experiencing an overload, or are forecast to experience an overload in the next two years the *Distribution Network Service Provider* must set out:

(1) the location of the *primary distribution feeder*;

(2) the extent to which load exceeds, or is forecast to exceed, 100% (or lower utilisation factor, as appropriate) of the *normal cyclic rating* under normal conditions (in summer periods or winter periods);

(3) the types of potential solutions that may address the overload or forecast overload; and

(4) where an estimated reduction in forecast *load* would defer a forecast overload for a period of 12 months, include:

(i) estimate of the month and year in which the overload is forecast to occur;

(ii) a summary of the location of relevant *connection points* at which the estimated reduction in forecast *load* would defer the overload;

(iii) the estimated reduction in forecast *load* in MW needed to defer the forecast *system limitation*;

(d1) for any *primary distribution feeders* for which a *Distribution Network Service Provider* has prepared forecasts of demand for *distribution services* by *embedded generating units* under clause 5.13.1(d1)(3) and which are currently experiencing a *system limitation*, or are forecast to experience a *system limitation* in the next two years, the *Distribution Network Service Provider* must set out:

(1) the location of the *primary distribution feeder*;

(2) the extent to which demand for *distribution services* by *embedded generating units* exceeds, or is forecast to exceed, 100% (or lower utilisation factor, as appropriate) of the normal capacity to provide those *distribution services* under normal conditions;

(3) the types of potential solutions that may address the *system limitation* or forecast *system limitation*;

(4) where an estimated reduction in demand for *distribution services* by *embedded generating units* would defer a forecast *system limitation* for a period of 12 months, include:

(i) an estimate of the month and year in which the *system limitation* is forecast to occur;

(ii) a summary of the location of relevant *connection points* at which the estimated reduction in demand for *distribution services* by *embedded generating units* would defer the *system limitation*; and

(iii) the estimated reduction in demand for *distribution services* by *embedded generating units* in MW needed to defer the forecast *system limitation*;

(d2) for a *SAPS enabled network*, information on *system limitations* in the *forward planning period* for which a potential solution is a *regulated SAPS*, including at least:

(1) estimates of the location and timing (month(s) and year) of the *system limitation*; and

(2) a brief discussion of the types of potential *stand-alone power systems* that may address the *system limitation*;

(e) a high-level summary of each *RIT-D project* for which the *regulatory investment test for distribution* has been completed in the preceding year or is in progress, including:

(1) if the *regulatory investment test for distribution* is in progress, the current stage in the process;

(2) a brief description of the *identified need*;

(3) a list of the *credible options* assessed or being assessed (to the extent reasonably practicable);

(4) if the *regulatory investment test for distribution* has been completed a brief description of the conclusion, including:

(i) the net economic benefit of each *credible option*;

(ii) the estimated capital cost of the *preferred option*; and

(iii) the estimated construction timetable and commissioning date (where relevant) of the *preferred option*; and

(5) any impacts on *Network Users*, including any potential material impacts on *connection* charges and *distribution use of system* charges that have been estimated;

(f) for each identified *system limitation* which a *Distribution Network Service Provider* has determined will require a *regulatory investment test for distribution*, provide an estimate of the month and year when the test is expected to commence;

(g) a summary of all committed investments to be carried out within the *forward planning period* with an estimated capital cost of $2 million or more (as varied by a *cost threshold determination*) that are to address an

urgent and unforeseen *network* issue as described in clause 5.17.3(a)(1), including:

(1) a brief description of the investment, including its purpose, its location, the estimated capital cost of the investment and an estimate of the date (month and year) the investment is expected to become operational;

(2) a brief description of the alternative options considered by the *Distribution Network Service Provider* in deciding on the preferred investment, including an explanation of the ranking of these options to the committed project. Alternative options could include, but are not limited to, *generation* options, demand side options, and options involving other *distribution* or *transmission networks*;

(h) the results of any joint planning undertaken with a *Transmission Network Service Provider* in the preceding year, including:

(1) a summary of the process and methodology used by the *Distribution Network Service Provider* and relevant *Transmission Network Service Providers* to undertake joint planning;

(2) a brief description of any investments that have been planned through this process, including the estimated capital costs of the investment and an estimate of the timing (month and year) of the investment; and

(3) where additional information on the investments may be obtained;

(i) the results of any joint planning undertaken with other *Distribution Network Service Providers* in the preceding year, including:

(1) a summary of the process and methodology used by the *Distribution Network Service Providers* to undertake joint planning;

(2) a brief description of any investments that have been planned through this process, including the estimated capital cost of the investment and an estimate of the timing (month and year) of the investment; and

(3) where additional information on the investments may be obtained;

(j) information on the performance of the *Distribution Network Service Provider's network*, including:

(1) a summary description of reliability measures and standards in *applicable regulatory instruments*;

(2) a summary description of the quality of *supply* standards that apply, including the relevant codes, standards and guidelines;

(3) a summary description of the performance of the *distribution network* against the measures and standards described under subparagraphs (1) and (2) for the preceding year;

(4) where the measures and standards described under subparagraphs (1) and (2) were not met in the preceding year, information on the corrective action taken or planned;

(5) a summary description of the *Distribution Network Service Provider's* processes to ensure compliance with the measures and standards described under subparagraphs (1) and (2); and

(6) an outline of the information contained in the *Distribution Network Service Provider's* most recent submission to the *AER* under the *service target performance incentive scheme*;

(k) information on the *Distribution Network Service Provider's asset management* approach, including:

(1) a summary of any *asset management* strategy employed by the *Distribution Network Service Provider*;

(1A) an explanation of how the *Distribution Network Service Provider* takes into account the cost of *distribution losses* when developing and implementing its *asset management* and investment strategy;

(2) a summary of any issues that may impact on the *system limitations* identified in the *Distribution Annual Planning Report* that has been identified through carrying out *asset management*; and

(3) information about where further information on the *asset management* strategy and methodology adopted by the *Distribution Network Service Provider* may be obtained;

(l) information on the *Distribution Network Service Provider's* demand management activities and activities relating to *embedded generating units*, including:

(1) a qualitative summary of:

(i) *non-network options* that have been considered in the past year, including *generation* from *embedded generating units*;

(ii) key issues arising from *applications to connect embedded generating units* received in the past year;

(iii) actions taken to promote non-*network* proposals or (for a *SAPS enabled network*) SAPS proposals in the preceding year, including *generation* from *embedded generating units*; and

(iv) the *Distribution Network Service Provider's* plans for demand management and *generation* from *embedded generating units* over the *forward planning period*;

(2) a quantitative summary of:

(i) *connection* enquiries received under clause 5.3A.5 and of the total, the number for *non-registered embedded generators*;

(ii) *applications to connect* received under clause 5.3A.9 and of the total, the number for *non-registered embedded generators*; and

(iii) the average time taken to complete *applications to connect*; and

(3) a quantitative summary of:

(i) *enquiries* under clause 5A.D.2 in relation to the *connection* of *micro embedded generators* or *non-registered embedded generators*; and

(ii) applications for a *connection service* under clause 5A.D.3 in relation to the *connection* of *micro embedded generators* or *non-registered embedded generators*;

(m) information on the *Distribution Network Service Provider's* investments in information technology and communication systems which occurred in the preceding year, and planned investments in information technology and communication systems related to management of *network* assets in the *forward planning period*; and

(n) a regional development plan consisting of a map of the *Distribution Network Service Provider's network* as a whole, or maps by regions, in accordance with the *Distribution Network Service Provider's* planning methodology or as required under any *regulatory obligation or requirement*, identifying:

(1) *sub-transmission lines*, *zone substations* and *transmission-distribution connection points*; and

(2) any system limitations that have been forecast to occur in the *forward planning period*, including, where they have been identified, overloaded *primary distribution feeders*;

(o) the analysis of the known and potential interactions between:

(1) any *emergency frequency control schemes,* or emergency controls in place under clause S5.1.8, on its *network*; and

(2) *protection systems* or *control systems* of *plant connected* to its *network* (including consideration of whether the settings of those systems are fit for purpose for the future operation of its *network*),

undertaken under clause 5.13.1(d)(6), including a description of proposed actions to be undertaken to address any adverse interactions; and

(p) for a *SAPS enabled network*, information on the *Distribution Network Service Provider's* activities in relation to *DNSP-led SAPS projects* including:

(1) opportunities to develop *DNSP-led SAPS projects* that have been considered in the past year;

(2) committed projects to implement a *regulated SAPS* over the *forward planning period*; and

(3) a quantitative summary of:

(i) the total number of *regulated SAPS* in the *network*; and

(ii) the total number of premises of *retail customers* supplied by means of those *regulated SAPS.*

(q) the *system strength locational factor* for each *system strength connection point* for which it is the *Network Service Provider* and the corresponding *system strength node*.

CHAPTER 6A

6A. Economic Regulation of Transmission Services

…

6A.23.5 System strength charge

(a) This clause applies to a *Transmission Network Service Provider* who is a *System Strength Service Provider*.

(b) In this clause:

system strength charging period means, for a *System Strength Service Provider*, each period running from the start of the second *regulatory year* in a *regulatory control period* of the *System Strength Service Provider* to the end of the first *regulatory year* in its next *regulatory control period.*

(c) The *pricing methodology* of a *Transmission Network Service Provider* who is a *System Strength Service Provider* must provide for the *System Strength Transmission Service User* for a *system strength connection point* to pay an *annual system strength charge* for the *system strength connection point* determined in accordance with this rule, in equal monthly instalments from the time determined in accordance with the *pricing methodology guidelines*.

(d) If the obligation to pay the *system strength charge* in relation to a *system strength connection point* commences part way through a *regulatory year*, the *System Strength Service Provider* must calculate the monthly instalments of the *annual system strength charge* for the remaining months of the *regulatory year* on a pro rata basis.

(e) The *annual system strength charge* for a *system strength connection point* for a *regulatory year* must be calculated in accordance with the following formula:

SSC = SSUP SSL SSQ

where:

SSC	is the *annual system strength charge* for the *regulatory year* (in $);
SSUP	is the *system strength unit price* of the *System Strength Service Provider* for the *system strength charging period* in which the *regulatory year* falls (in $/MVA) and for the *system strength node* used to determine the *system strength locational factor* for the *system strength connection point*;
SSL	is the *system strength locational factor* applicable to the *system strength connection point* for the *system strength charging period* in which the *regulatory year* falls, determined in accordance with paragraph (h); and
SSQ	is the *system strength quantity* for the *system strength connection point*, determined in accordance with

paragraph (~~j~~h) (in MVA).

(f) The *system strength unit price* of a *System Strength Service Provider* for a *system strength node* must be the same for each *regulatory year* in a *system strength charging period* except to the extent the *pricing methodology guidelines* permit indexation.

(g) A *System Strength Service Provider* must determine the *system strength node* used to determine the *system strength locational factor* for a *system strength connection point* in accordance with the *system strength impact assessment guidelines*.

(h) The *system strength locational factor* and the *system strength quantity* applicable to a *system strength connection point* ~~is~~ are determined by the *Network Service Provider* for the *system strength connection point*. Where:

(1) the *System Strength Service Provider* is also the *Network Service Provider* for the *system strength connection point*, the *System Strength Service Provider* must calculate the *system strength locational factor* and the *system strength quantity* applicable to each *system strength connection point* for which it is the *Network Service Provider* for each year of a *system strength charging period* in accordance with the *system strength impact assessment guidelines*; and

(2) the *System Strength Service Provider* is not the *Network Service Provider* for the *system strength connection point*, the *System Strength Service Provider* must request the relevant *Network Service Provider* under clause 5.3.4C(c) to calculate and notify to the *System Strength Service Provider* the *system strength locational factor* and the *system strength quantity*.

(i) A *System Strength Service Provider* must not change the *system strength locational factor* used to calculate the *system strength charge* for a *system strength connection point* during a *system strength charging period*.

(j) **[Deleted]**~~Subject to paragraph (k), the *system strength quantity* for a *system strength connection point* is the product of:~~

~~(1) the *short circuit ratio*; and~~

~~(2) the *rated active power*, rated *power transfer capability* or *maximum demand* for the *system strength connection point*,~~

~~each as agreed in accordance with clause S5.2.5.15, clause S5.3.11 or clause S5.3a.7 (as applicable) and recorded in the relevant *performance standards* for the *plant connected* at the *system strength connection point*.~~

(k) If a change to the *system strength quantity* for a *system strength connection point* comes into effect part way through a *regulatory year*, the *System Strength Service Provider* must calculate the monthly instalments of the *annual system strength charge* for the remaining months of the *regulatory year* using the new *system strength quantity*.

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6A.23.6 System strength pass through charge

(a) This clause applies to a *Transmission Network Service Provider* who is not a *System Strength Service Provider*.

(b) The *pricing methodology* of a *Transmission Network Service Provider* who is not a *System Strength Service Provider* must provide for a charge applicable to each *system strength connection point* on its *network* to recover from the relevant *Transmission Network User*, on a pass through basis as described in paragraph (c), the *annual system strength charge* for the *system strength connection point* determined by the relevant *System Strength Service Provider*.

(c) The amount, structure and timing of the amount billed by the *Transmission Network Service Provider* to the *Transmission Network User* must replicate as far as is reasonably practical the amount, structure and timing of the corresponding *system strength charge* billed to the *Transmission Network Service Provider*.