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Mr. John Pierce
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By online submission

Dear Mr Pierce

Submission to Australian Energy Market Commission's (AEMC) draft report, *Updating the regulatory framework for embedded networks*

The Australian Energy Market Operator (AEMO) welcomes the opportunity to provide input to the Commission's draft report on updating the regulatory framework for embedded networks.

AEMO is the independent National Electricity Market (NEM) and Western Australian Wholesale Electricity Market (WEM) market and systems operator, and the NEM National Electricity Transmission Planner. We undertake these roles within the relevant legislated policy and market frameworks, and in adherence to the National Gas and Electricity Objectives and Rules.

AEMO's attached submission provides views on the arrangements for network charging, the role of the Off-Market Retailer and options for the transition of existing embedded networks to the proposed framework. The submission also raises matters for the AEMC's consideration regarding the application of relevant technical requirements to market generators within embedded networks, as well as some drafting suggestions.

For further information on the AEMO submission, please do not hesitate to contact myself or Lee Brown, Specialist Market Design on (03) 9609 8528.

Yours sincerely



Peter Geers
Chief Strategy and Markets Officer

ATTACHMENT – AEMO SUBMISSION ON DRAFT REPORT - UPDATING THE REGULATORY FRAMEWORK FOR EMBEDDED NETWORKS

1. Network charging

The draft report considers two alternatives for the management of network charging in embedded networks for customers who move to an on-market retailer. The first model presented requires the Embedded Network Service Provider (ENSP) to be responsible for network billing in embedded networks. The draft report considers this to be the preferred model and proposes that AEMO establish procedures in order that there is a NEM-wide format for the creation of a network bill.

The second model considered is that an intermediary facilitate network changing within embedded networks. AEMO and Distribution Network Service Providers (DNSPs) are identified as parties who could undertake such a role.

In either case, it is proposed that customers within an embedded network who move on-market, should be charged a 'shadow' price – matching the network charge that would apply if they were connected directly to the local distribution network.

AEMO considers that the model preferred in the draft report requiring the ENSP to be responsible for network billing is problematic, primarily due to cost, practicality and proportionality.

To calculate and apply the correct 'shadow' network charge, ENSPs would have to replicate the functionality of distribution billing systems, but with the added complexity that the system would need to accommodate calculation, publication and invoicing for all the distribution networks that they operate within.

To do this they would need to be capable of accepting, holding and maintaining a register of distribution network tariffs and associated charging rates, at least for small customer tariffs, as updated from time to time. ENSPs would need to perform calculations using these data inputs and analyzing additional inputs of energy used over time. As distribution tariffs become more complex, with increased focus on cost reflective pricing, ENSPs would need to obtain more information and perform more complex charging, including maximum demand charges.

The cost to establish such complex systems and receive and store the data needed to perform the required calculations and produce invoices is likely to be substantial and will be required of each ENSP.

AEMO considers that the implications of pursuing such a model would be detrimental to:

- **Competition and cost of service**

Whilst an accredited provider may be able to determine the nature of service they wish to offer and scale their operation and scope of accreditation accordingly, a registered participant is tested on the basis that they can either meet the requirements of the role they are applying for, or they cannot. Imposing high establishment costs and complexity on the ENSP role is likely to limit competition, risking the establishment of an oligopoly for ENSP provision as a result. Organizations that already have the capability to perform NEM network billing and invoicing would have a clear advantage and opportunity to dominate the market. Where such an organization also provides metering services, they would be able to use their position to limit competition in that area also.

- **Compliance and traceability**

The management of distribution network billing has a number of checks and measures, which are transparent and auditable. The proposed arrangement in embedded networks does not provide the same level of comfort. An error by a DNSP in application of customers' network

charging is likely to a systematic error, which if not identified by the DNSP itself, is likely to be identified by one of the retailers who are in receipt of that DNSP's bill. If the Australian Energy Regulator (AER) determined to perform an audit of the DNSPs' network billing, all of the data flows and standing data is traceable and auditable.

The calculation of network charges by the ENSP will be largely determined in their own systems based on inputs from a number of other parties. Billing processes and may relate to only a handful of customers per network tariff with any one market retailer. AEMO considers that it will be impractical for the AER to ensure that all ENSPs are audited and that in any case, access to each ENSPs systems would be required to facilitate such an audit. As a result, it is unlikely that there will be any practical validation to ensure that network charges are being applied accurately by ENSPs.

For example:

- For a small customer connection on a distribution network, the Metering Provider (MP) will input the network tariff code (NTC) into AEMO's MSATS system. The DNSP validates this NTC and has the power to correct it if wrongly applied. The DNSP uses the NTC in its own systems to generate the network bill, considering time, energy consumption and other metering data as required to support the complexities of the network charges at the connection point. Billing to retailers is based on the MSATS register of financially responsible market participant (FRMP) for each connection point, which of course may alter over any given billing period.
- For a connection within an embedded network, it is unclear who would be responsible for verifying that the MP has correctly applied the DNSP NTC. AEMO considers that it is unlikely that the DNSP would either wish to or be capable of performing the validation. AEMO considers that the ENSP will be in no better a position than the MP to perform validation, so this check is likely to be missed for embedded network connection points or be otherwise ineffectual.

When calculating each connection point bill, each ENSP will be required to interpret DNSP requirements for network charging and then generate the bill accordingly. They will also have to use the MSATS register to correctly invoice each FRMP for on-market connection points, accommodating changes to that role at connection points over that billing period. If the DNSP charging requirements are applied incorrectly, and assuming the NTC is correct, the last points of validation are with the retailer and then the customer to dispute their respective bills once they arrive. If the NTC has been incorrectly applied, even if DNSP charging requirements are determined and calculated correctly by the ENSP, the network bill will be incorrect until the metering is replaced by an MP at some point in the future.

● **Proportionality**

More generally, the requirements for network charging appear out of proportion with the nature of many embedded networks. It may be reasonable for operators who manage large embedded networks, in particular those that include large numbers of commercial and industrial customers, to appoint an ENSP with the capability to provide this network billing service, as the costs of doing so are likely to be commensurate with the costs of providing embedded network services more generally. It is also reasonable to consider that such an ENSP would also have the capability to invoice and manage its debtors (in this case retailers).

However, embedded networks are diverse in nature and the draft report seeks to expand the scope of what would be considered as an embedded network further. AEMO does not believe that the proposed model could be reasonably applied in the case of a smaller embedded

network, such as a small retirement village or single apartment block with, for example, no more than 50 connection points. A smaller ENSP servicing these embedded networks, or the embedded network operator for whom they are working, is likely to become a creditor to retailers. Whilst obligations may be established in market rules that require retailers to pay bills, the onus to ensure network charges are paid will be on the party invoicing the retailer. For the embedded network operator and their ENSP, this could mean chasing multiple retailers for relatively small amounts of money, with any dispute requiring records of invoice delivery, receipt, follow up and response. Potential disputes of this nature appear potentially burdensome on the AER.

AEMO considers that the second model (intermediary facilitating network billing) has advantages over the first and is generally well suited to supporting the framework for embedded networks.

An intermediary, established to coordinate multiple transactions among multiple parties and acting as a trusted data manager, has the potential to reduce the operational and settlement risk for ENSPs and reduce the costs of establishment and registration. This in turn will lower the barriers to entry and establish a framework where a variety of ENSPs can offer services to the market, lowering the overall costs to the customer.

The basic models are presented effectively in Figure 5.2 of the draft report, which highlights one of the benefits – the production of a single invoice to each retailer. The intermediary could perform a full financial clearing function, removing all financial risk from the ENSP, however a simplified intermediary model could retain the production and delivery of a single invoice per retailer and a ledger report per ENSP, which could track and report on cleared and uncleared invoices. This could be supported by new obligations to pay invoices in market rules, as has been proposed under the first model in the draft report. This would reduce ENSPs financial risk and provide transparent reporting on retailer compliance regarding the payment of embedded network charges.

Problems created by the ENSP charging model are resolved under the intermediary model, for example:

- High establishment costs and complexities in system build and design for ENSPs would be largely eliminated, save for one-off registration fees, encouraging a diversity of applicants to support a diverse embedded network market.
- Current Embedded Network Managers (ENMs) could establish a pathway to registration, as ENSP market interface requirements would largely replicate the current ENM model requirements.
- All transactions and invoices would be managed and calculated based on the central market register, with a single 'source of truth'. Options could be explored which enable the intermediary to validate the application of NTC and invoices would be based on charging data uploaded by distributors (i.e. network charging would be transparent and auditable).

AEMO considers that it is well placed to perform an intermediary role and sees this as a natural extension of AEMO's current functions (e.g. wholesale electricity settlement and clearing, standing data and role transfer processes, provider of the B2B platform). AEMO holds much of the data required to perform the function today and this will be expanded following the implementation of the global and 5-minute settlement rules over the next two to three years. For example, the register of NMI Standing Data holds configuration information against each connection point, including the NTC, whether the connection point is within or external to the NEM and which retailer is financially responsible over time. AEMO also considers that a move to an intermediary model for embedded networks may pre-empt the need for such a service to support emerging and future non-traditional trading arrangements in the NEM, and that a move to this model may be inevitable over time.

Over the period 2019-21, AEMO is adapting systems and interfaces to deliver requirements for initiatives, such as the recent rule changes regarding energy settlement. Costs of implementing an AEMO intermediary service for embedded networks are likely to be incremental to these broader NEM framework changes if adopted over this period or shortly thereafter.

2. Role of the Off-Market Retailer

The draft report proposes the creation of a new registered participant, in the form of an Off-Market Retailer (OMR). It is proposed that OMR be made visible in MSATS, and that a number of tasks undertaken by on-market retailers, such as the appointment of MC and the provision of data upon request by a customer or their authorised agent, are undertaken by the OMR for off-market connection points in embedded networks.

AEMO notes that there are a very limited set of NER requirements for which OMRs would be 'registered participants' and considers that there is little benefit in having OMRs registered in Chapter 2 of the NER.

The more substantial ENSP role, which like the OMR concept is a party appointed by the embedded network operator, appears better placed to perform the tasks and obligations currently proposed to be assigned to the OMR.

Given that OMRs will be authorised by the AER and presumably listed on an AER public register, the purpose of AEMO separately registering them is unclear, other than potentially to collect appropriate fees if warranted.

AEMO notes that there are now many roles that are accredited (also referred to as registered or listed) by AEMO outside Chapter 2 as their roles are limited to metering or B2B interactions. However, it is becoming more difficult to establish clear principles for differentiation, and the key attributes of a registered participant as opposed to other roles. Should the AEMC determine to maintain the OMR role as proposed in the draft report, AEMO would welcome the development of a consistent set of principles that could provide a basis for participation as a registered participant, or in some other role.

3. Transition

Once established, the new framework for embedded networks presents an opportunity to consider how to transition current embedded network connection points, in order that the many thousands of customers already connected within embedded networks are provided with equal access to retail competition and other benefits considered in the draft report.

It is important to recognise that current connections should have been provided to customers based on the legislative requirements prevalent at the time of the connection, and in good faith. As a result, embedded network operators will have installed a variety of metering technologies over time. Changes to this equipment ahead of a reasonable period for the embedded network operator to recover its investment is likely to impose additional costs on customers. This financial concern needs to be balanced against the reasonable expectations by any customer that they are being billed accurately, and the benefits of inclusion in the new framework.

For energy, accuracy is as determined by the National Measurement Institute, and for the NEM and the new embedded network framework, compliance with NER accuracy and maintenance programs. Changes to requirements for metering in embedded networks over the last 6 years provide confidence that over that time, metering equipment installed in embedded networks is consistent with the standards for metering installed in the NEM. This means that the installed devices should have been tested for accuracy prior to installation. Accordingly, AEMO considers it reasonable for NEM standard

testing and calibration timeframes to be used as a guide to determine a reasonable replacement cycle (e.g. 10-15 years from installation). It may be the case that the installed equipment is fully NEM compliant and that an MP can test and inspect the equipment and certify its compliance with the NER, removing the necessity for device replacement.

AEMO considers it likely that embedded connection points established in 2012 or earlier are unlikely to have metering which is capable of being NEM compliant and in many cases will be installed mounted on DIN-rails (a metal rail of a standard type used for mounting circuit breakers and industrial control equipment inside equipment racks), which is not conducive to simple replacement with current standard NEM compliant metering equipment. Whilst these devices are technically more challenging to replace, AEMO considers that they are less likely to be accurate and that as costs to install would have been relatively low, there is less concern regarding sunk costs.

AEMO has been in regular discussion with technology providers who, in time, are likely to have the capability to provide NEM standard metering devices that may be able to be retrofitted to DIN-rail arrangements. AEMO's initial interest in assessing these technologies was in relation to providing metering solutions for connections in the NEM that are currently unmetered, as identified and considered in the recent rule change for Global Settlements. AEMO considers that it is only a matter of time before these technologies are available to the market and that any rule-based imperative to bring legacy embedded network connections to NEM standards, will encourage this further.

AEMO recommends that the AEMC consider the introduction of a transition period in the NER, within which all embedded network connections are required to transition to the new framework. Such a transition period should be no longer than 15 years, however it should also provide sufficient time for technologies to become available for DIN-rail connected customers to reasonably transition. A transition period of between 5 to 10 years post the effective date of the rule establishing the new framework appears reasonable and would ensure that there is a pathway for all customers to receive the benefits of the framework changes.

4. Generation within embedded networks

AEMO supports the AEMC's proposal to require embedded network operators to register as ENSPs where they connect individual generators that are required to register with AEMO or provide network support. AEMO also suggests that the requirement to register as an ENSP should extend to embedded networks where the aggregate amount of connected generation exceeds a specified threshold, proposed at 5 MW. Aggregations of small generation that together represent the equivalent of a significant power plant concentrated in a local area are increasingly prevalent. The challenges of non-visibility and non-controllability of this generation have been discussed in other forums and initiatives are under way to tackle them. However, these issues may be exacerbated where these volumes of smaller generation are connected within exempt networks where the operator has no direct regulatory obligations relating to power system security.

As the AEMC notes in section 6.6 of its draft report, further consideration is needed of the way in which the NER should apply to the connection and ongoing operation of significant generation within embedded networks. Similar issues also arise in relation to exempt transmission systems, which will also need to be addressed.

In particular, as indicated in the draft report, registered generators must comply with technical performance requirements designed to ensure that their plant does not adversely impact on quality of supply to other network users or, importantly from AEMO's perspective, on the security of the power system. They may also be required to fund, or establish and maintain, system strength remediation measures where their connection results in system strength falling below acceptable limits.

These are key tools for AEMO to manage power system security as generator connections increase at a rapid pace, frequently asynchronous generation in weaker parts of the grid. From a power system security perspective, it makes no difference whether those generators are connected to an embedded network or within a regulated distribution network. From a regulatory perspective, however, the technical requirements for each plant are established between AEMO, the connecting network service provider and the connection applicant as part of the connection process set out in Part A of Chapter 5 of the NER. Since that process does not currently apply to exempt transmission or distribution system operators, there is a regulatory gap with no clear path to establish enforceable performance obligations.

For the proposed new category of registered ENSPs, it will be critical to carefully consider how to apply connection requirements that incorporate the Chapter 5 processes for determining performance standards and undertaking appropriate system strength assessments.

AEMO will continue to work closely with the AEMC to develop an appropriate framework under which these requirements will be established for registered generators within embedded networks and other exempt systems.

5. Drafting suggestions

AEMO has identified a number of areas of the proposed legal drafting changes that may require correction or clarification. These are set out in the table below for the AEMC's consideration.

National Electricity Law	
Section	Comment
2(1) (Table 1a)	Consider renaming the proposed new definition 'exempt network operator' an 'exempt system operator' to be consistent with all transmission and distribution asset exemption possibilities contemplated by the NER. In particular this change would adequately capture dedicated connection assets which, although they are defined in the NER not to be 'networks', are able to apply for AER exemption from the requirement to register.
2(1) (Table 1a)	The second limb of the new definition of 'distribution system operator' should refer to 'an exempt network (system) operator <u>in respect of a distribution system</u> '.
13(4) (Table 1c)	The proposed replacement section will need to apply in respect of exempt transmission systems as well as distribution systems.
National Electricity Rules	
Clause	Comment
Ch 2 Heading	Consider amending the revised heading to 'Registration and Exemptions', since the chapter also covers generator as well as network exemptions.
2.3.4(i)	Clause 2.3.4(i) requires the OMR to classify the parent connection point as a market load. However, the OMR is only related to child connections within an embedded network according to the Chapter 10 definition. As a result, the clause as it stands is not correct; the OMR does not have a market role at the parent connection point and only a Market Customer is eligible to classify market loads. We suggest the intent could be addressed by instead making appropriate amendments to clause 2.3.4(a), for example: (a) If electricity, <i>supplied</i> through the <i>national grid</i> to any person <i>connected</i> at a <i>connection point other than an off-market connection point</i> , is purchased other than from the <i>Local Retailer</i> the <i>that load</i> at that <i>connection point</i> may <i>must</i> be classified by that person or, with the consent of that person, by some other person as a <i>market load</i> .
2.5.1(d)	It no longer seems necessary or appropriate to contemplate exemptions for an otherwise registered transmission or distribution system operator from Chapter 5, or at least not <u>only</u> Chapter 5 and not necessarily all of Chapter 5. AEMO suggests a preferable approach would be to remove the power for the AER to exempt a participant from compliance with any particular part of the rules, leaving the alternatives of: <ul style="list-style-type: none"> • registration with full compliance subject to any participant derogations under chapter 8A; or

National Electricity Law	
Section	Comment
	<ul style="list-style-type: none"> exemption subject to any rules expressed to apply to exempt network (system) operators, as well as any additional exemption conditions imposed by the AER requiring compliance with other specified provisions.
2.5.4(a)	As classification cannot have occurred unless AEMO has first approved it, the words 'and whose classification has been accepted by AEMO' can be removed.
2.5.4(d)	The inclusion of requirements in the registration chapter to continue to meet certain conditions of classification raises enforcement questions about AEMO's role in relation to the registration of participants who cease to meet those conditions, compared with obligations for which compliance is monitored and enforced by the AER. AEMO considers these questions need to be clarified.
2.5.4(f)	Paragraph (f) seems unnecessary – even for the avoidance of doubt – as there is no particular reason to state the fact that participant derogations are available for this requirement as distinct from any other. If it is retained, paragraph (c) should be subject to paragraph (f).
2.5.4(h), (i)	We suggest sub-paragraphs (h)(3) and (4) and paragraph (i) be removed. Information collected at registration is to assess a person's eligibility to enter the market, and ongoing changes can be recorded under ongoing obligations elsewhere in the rules. For example, clause 5A.D.1(a)(8) provides for relevant obligations on the ENSP.
2.13.3	<p>We suggest that (a)(2) and (3) clarify that they apply in relation to exemptions under clause 2.14.2 (distinct from 2.14.1).</p> <p>Consider specifying in paragraph (b) that a description/location of the exempt network(s) is to be included as a minimum requirement – possibly also the local embedded retailer.</p>
2.14.1(d), 2.14.2(f), 2.15.1	The AER should also consult with AEMO in relation to a proposed transmission system exemption and any conditions on that exemption, as well as the exemption classes for exempt distribution systems.
10 – exempt embedded network	As this definition is only used once (in the definition of an 'embedded network'), consider deleting and replacing the second part of the 'embedded network' definition so it refers to a distribution system owned, controlled or operated by an Exempt Embedded Network Service Provider.