EMBEDDED NETWORKS – DETAILED MARKET DESIGN

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1 Executive Summary

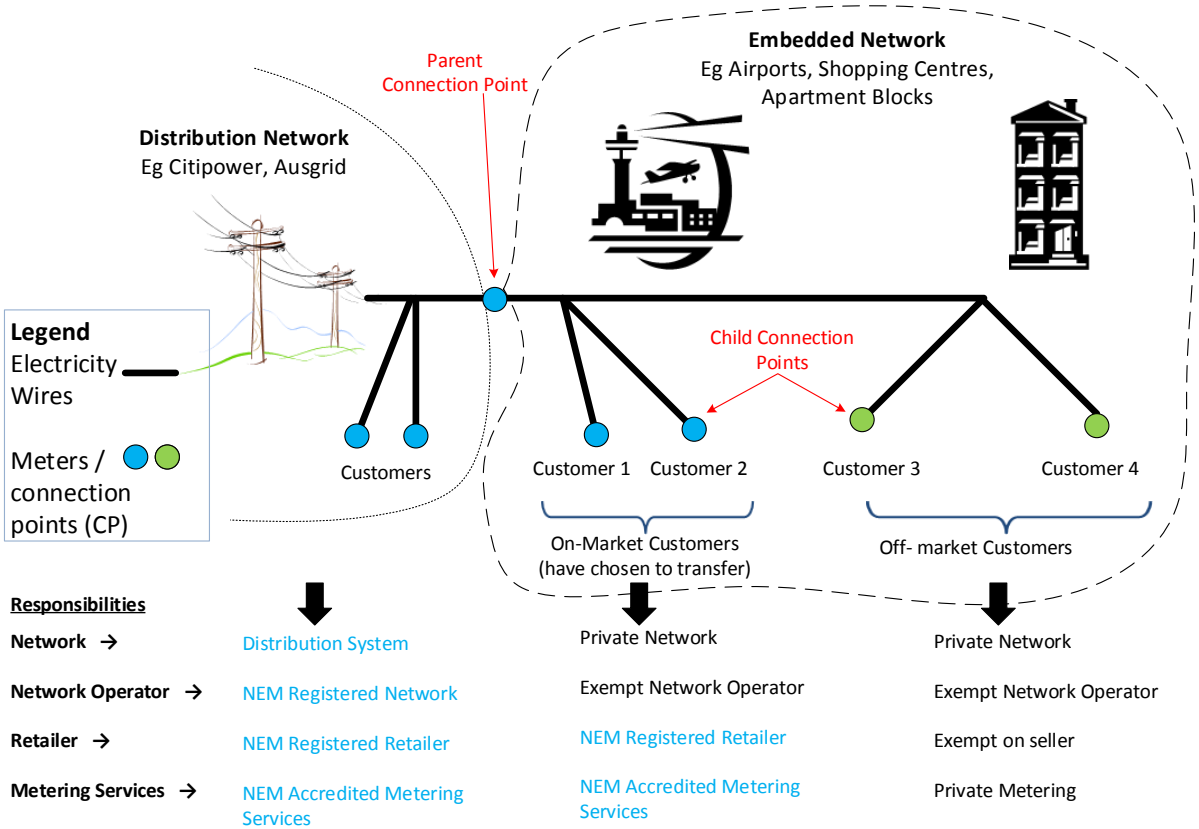
1.1 Introduction

This report presents the detailed market design for changes to embedded network arrangements proposed to be introduced in the National Electricity Market (NEM).

AEMO has been tasked by the Council of Australian Governments (COAG) Energy Council to develop a rule change to introduce new arrangements for embedded networks. AEMO has developed this detailed market design in consultation with industry to inform that rule change. This work is focused on lowering barriers for retail competition within embedded networks and addressing existing problems in the operational interfaces between embedded networks and the NEM.

1.2 Context

Under the National Electricity Law (NEL), network service providers and all re-sellers of electricity are either required to register in the National Electricity Market or to be exempted from registration by the Australian Energy Regulator (AER). Embedded networks relevant to this design are exempt private networks which serve multiple premises and are connected to a distribution system in the NEM. Examples of embedded networks include airports, shopping centres, retirement villages and apartment blocks.



The operator of the embedded network, or a party or parties acting on its behalf, provide network access and sell energy to customers within the network. This activity known as “off-market” activity is not visible to the NEM. Some NEM jurisdictions allow retail contestability within embedded networks. In such networks, some customers at former “off-market” child connection points have elected to choose a Retailer thus becoming NEM customers at “on market” child connection points. Meters within embedded networks must be registered in the Market Settlement and Transfer Solutions (MSATS) systems if the customer is at an on-market child connection point. However, the National Electricity Rules (NER) have not evolved to make clear who has the obligation to support NEM activities related to embedded networks.

In particular:

1. There is a lack of clarity as to who should set up and maintain the standing data for an embedded network.
2. The standard NEM processes for retail competition ensure efficient and timely exchange of all relevant standing data but potential retailers currently have very limited visibility of data pertaining to customers within embedded networks.
3. Processes for recording data related to life support for a customer within an embedded network may not always ensure that the local network service provider is aware of that life support requirement. Equally, information on who the local network service provider is may not be available to a retailer of an embedded network customer, e.g. to indicate the appropriate contact person if power is cut.
4. On-going maintenance requirements for meters in embedded networks can differ from NEM requirements, creating additional barriers to retail competition.
5. The level of consumer protection for customers at off-market child connection points in an embedded network is different from NEM customers. An embedded network may avoid some costs that exist in the broader NEM arrangements, though potentially not always to the advantage of their customers.
6. Embedded network customers may see bundled costs for network access and energy, making it difficult for them to assess a retailer's quote. A retailer's quote will only be for energy unless arrangements are in place for the retailer to charge for network access on behalf of the embedded network operator.

1.3 Key Changes

1. This design change requires that an Embedded Network Manager (ENM) be appointed for registrable or individually exempt networks supplied from the NEM.
2. An ENM is a new service provider role accredited by AEMO and appointed by an embedded network owner/operator or controller. An ENM must be appointed:
    a. For a new embedded network, from its commencement.
    b. For an existing embedded network, within 2 years of the commencement of the rules reflecting this design, though an ENM may be appointed earlier.
3. The roles and obligations of the ENM are:
    a. Undertake MSATS and Business to Business (B2B) obligations in regard to setting up and maintaining NMI standing data for on-market children. In MSATS this includes maintaining the embedded network code, assigning NMIs and maintaining distribution loss factors (DLFs). The B2B obligations include receiving service order requests.
    b. Fulfil roles within MSATS for embedded network child connection points which local network service providers (LNSP) would normally perform for distribution network connection points.
    c. Maintain an understanding of subtractive metering arrangements within the embedded network. This is important as the parent connection point is settled on a metered quantity net of consumption at on-market child connection points.
    d. Communicate with local retailers, market customers and distribution network service providers (DNSP) on behalf of the Embedded Network Operator (ENO) in relation to on-market and prospective on-market embedded network customers.
    e. If informed of life support equipment in the embedded network to inform the financially responsible market participant (FRMP) of the parent connection point. The FRMP of the parent connection point will then notify the DSNP.

4. The accreditation requirements for an ENM include:
    a. Maintaining an understanding of the NER and procedures relating to the function of an ENM, participant role relationships and subtractive metering arrangements.
    b. Maintaining interfaces (e.g. web browsers) to support the B2B Procedures and to support MSATS Procedures.
    c. To ensure there are ENMs available at the commencement of the arrangements, for the first 6 months any Market Customer or Network Service Provider who wishes to be an ENM will be deemed to be accredited.
5. AEMO will establish and maintain ENM service level requirements and will conduct periodic reviews to assess ENM compliance with these requirements. Timely performance of obligations will be a key compliance requirement. Non-compliance could result in suspension (or a reduction in scope of accreditation), loss of accreditation or civil penalties.
6. The AER Electricity Network Service Provider Registration Exemption Guideline will continue to govern the operation of embedded networks including network charging and setting of distribution loss factors. The guideline will need to be modified to create obligations on network owners/operators or controllers to appoint an ENM. It is proposed that additional changes be made to the exemption guidelines so as to:
    a. Standardise metering arrangements by requiring routine testing and inspection of off-market child meters.
    b. Ensure that customers in embedded networks have transparency with respect to their network and energy charges.
7. The NER will provide for the imposition of civil penalties on ENMs.
8. The design contemplates that:
    a. If an off-market child becomes an on-market child a National Metering Identifier (NMI) is allocated when this first happens.
    b. If an on-market child returns to being an off-market child its NMI will be retained but will be identified in MSATS as not active (with its data stream to be set inactive by the Meter Data Provider (MDP)).
    c. Where a NEM Customer connected to a DNSP network converts to an off-market connection child connection point in an embedded network the existing NMI will remain[1] (now at a child connection point), with NMIs allocated for new child connection points no later than such time at which the customer there becomes on-market.
9. NEM jurisdictions are encouraged to move towards maintaining compatible metering and settlement arrangements at the on-market child connection points as at the parent connection point.
10. AEMO will publish a guide to embedded networks in the NEM.
11. AEMO will maintain a list of accredited ENMs on its website.
12. AEMO will make a list of ENM contact details available via the Retail Operations Contact List (ROCL) while a separate report will identify the ENM associated with each EN Code. AEMO will also maintain internal reporting capability to allow it to assess the performance of ENMs in meeting timing obligations for their functions in MSATS.
13. No change is proposed to:
    a. Metering services
    b. Meter reading cycles

[1] Unless aspects of how the change is made require otherwise.

c. Calculation of distribution loss factors (DLF)
d. Network charging arrangements in embedded networks
e. Retailer of last resort processes
f. Obligation to supply provisions
g. Instrument transformer arrangements

2 Introduction

This report presents the detailed market design for changes to embedded network arrangements proposed to be introduced in the National Electricity Market (NEM).

AEMO has been tasked by the COAG Energy Council to develop a rule change to introduce new arrangements for embedded networks. AEMO has developed this detailed market design in consultation with industry to inform that rule change. This work is focused on lowering barriers for retail competition within embedded networks and addressing existing problems in the operational interfaces between embedded networks and the National Electricity Market (NEM).

Implementation of the proposed solution would require AEMO to make changes to existing procedures and systems to reflect the changed design and transitional matters. Amendments are expected to be applied to:[2]

- MSATS Procedures;
- Metrology Procedures;
- B2B Procedures;
- NMI procedure;
- NMI standing data document; and
- Service level procedures - Metering data provider services categories D and C for Metering Installation Types 1, 2, 3, 4, 5, 6 and 7.

With the proposed introduction of a new service provider to support the operation of embedded networks in the NEM, AEMO will need to develop service level requirements, accreditation checklists and guidelines for accreditation and for the removal of accreditation.

This report is structured as follows.

- Section 3 describes the structure of an embedded network.
- Section 4 introduces the Embedded Network Operator (ENO) and its roles and obligations.
- Section 5 introduces the Embedded Network Manager (ENM) and its roles and obligations.
- Section 6 describes the activities involved in the operation of an embedded network.
- Section 7 describes MSATS processes in relation to embedded networks.
- Section 8 describes metering arrangements in embedded network.
- Section 9 describes BSB processes in relation to embedded networks.
- Section 10 describes information about embedded networks to be reported.

A number of appendices provide summaries of obligations, and definitions.

[2] Transitional rules may be required so as to deem any consultation on procedure amendment undertaken prior to the rule commencement date to be an action under the Rules consultation procedures.

3 Embedded Networks

3.1 Structure of an Embedded Network

Figure 1 depicts the structure of an embedded network.

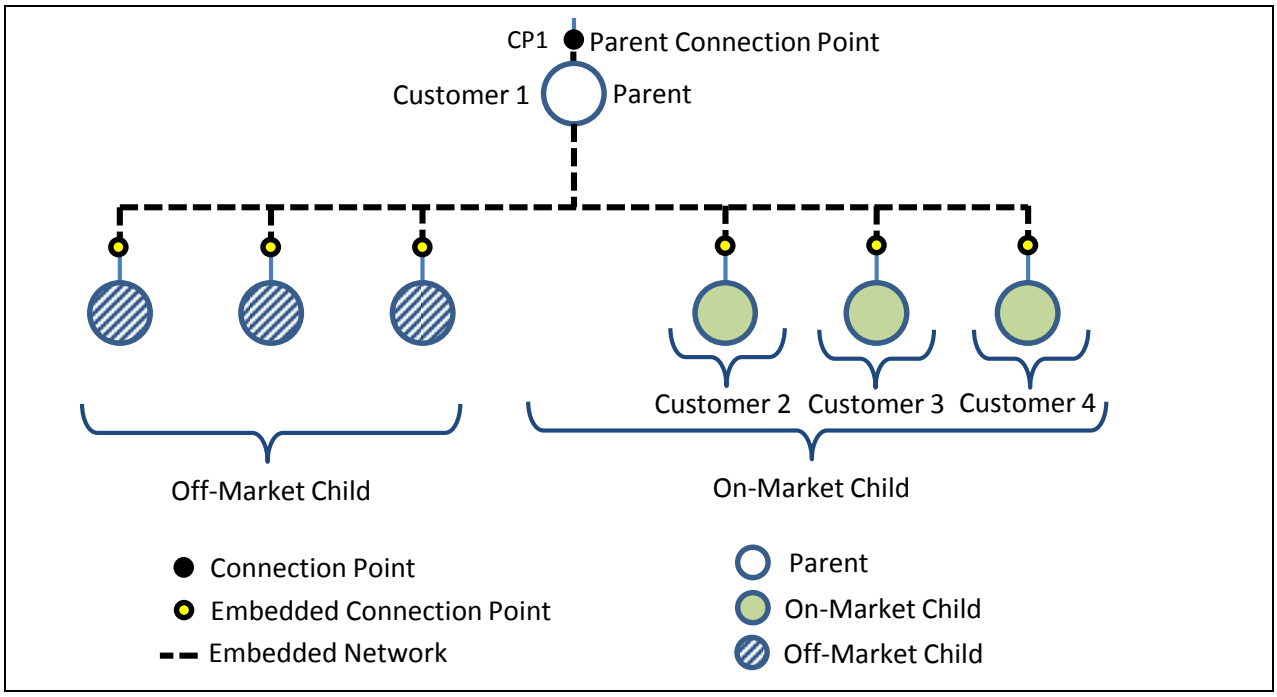


Figure 1 –Structure of an Embedded Network

The parent connection point has a physical connection to the distribution network. The embedded network takes supply from the parent connection point and child connection points are connected after this point. Child connection points within the embedded network have a physical connection to the embedded network and take supply from the embedded network. Customers at these child connections can be at off-market child connection points, supplied by the embedded network operator, or at on-market child connection points, purchasing from a retailer.[3] The terminology "embedded connection point" is introduced for the child connection points within an embedded network.

3.2 Current Issues with Embedded Networks

Under the NEL, network service providers and all re-sellers of electricity are either required to register in the National Electricity Market or to be exempt from registration by the AER. Embedded networks relevant to this design are exempt private networks which serve multiple premises and which are connected to a distribution system in the NEM. Examples of embedded networks include airports, shopping centres, retirement villages and apartment blocks.

Some NEM jurisdictions allow retail contestability within embedded networks. In such networks, some customers at former off-market child connection points have elected to choose a Retailer thus becoming NEM customers at on market child connection points. Meters within embedded networks must be registered in MSATS if the customer is at an on-market child connection point. However, the NER have not evolved to make clear who has the obligation to support NEM activities related to embedded networks. In particular:

1. There is a lack of clarity as to who should set up and maintain the standing data for an embedded network.

[3] A customer at an on-market child connection point may take advantage of other arrangements facilitated by the NEM, for example it may sell generation output via a small generator aggregator.

2. The standard NEM processes for retail competition ensure efficient and timely exchange of all relevant standing data but potential retailers currently have very limited visibility of data pertaining to customers within embedded networks.
3. Processes for recording data related to life support for a customer within an embedded network may not always ensure that the local network service provider is aware of that life support requirement. Equally, information on who the local network service provider is may not be available to a retailer of an embedded network customer, e.g. to indicate the appropriate contact person if power is cut.
4. On-going maintenance requirements for meters in embedded networks can differ from NEM requirements, creating additional barriers to retail competition.
5. The level of consumer protection for customers at off-market child connection points in an embedded network is different from NEM customers. An embedded network may avoid some costs that exist in the broader NEM arrangements, though potentially not always to the advantage of their customers.
6. Embedded network customers may see bundled costs for network access and energy, making it difficult for them to assess a retailer's quote. A retailer's quote will only be for energy unless arrangements are in place for the retailer to charge for network access on behalf of the embedded network operator.

4 Embedded Network Operators

4.1 Governance of ENOs

Exempt embedded network owners/operators or controllers will continue to be governed by the AER Electricity Network Service Provider Registration Exemption Guideline and embedded network owners/operators or controllers would not be required to be registered under the NER. The AER guidelines will require that an embedded network owner/operator or controller appoint an ENM. The NER will also provide for the application of civil penalties to ENMs.

Note – A proposal was put forward to have the NER specify conditions that the AER guidelines may set. This list has been removed from the detailed market design in response to legal advice. This advice suggests that the NER cannot direct the AER. While there may be other ways of addressing the proposal these are not material to the design presented in this document.

5 Embedded Network Managers

5.1 New Service Provider

An Embedded Network Manager (ENM) is a new class of service provider in the NEM. This new service provider would encompass all obligations in relation to the management of the embedded network in respect of on-market children supplied by the embedded network.

A service provider role is contemplated rather than a participant class as the ENM is providing a service to others rather than trading in the market. The service:

1. Ensures that embedded network customers have the opportunity to buy from retailers rather than buying from the ENO (or its agents).
2. Relieves the ENO (or its agents) from having to acquire and develop themselves the qualifications, skills and experience required to undertake those tasks.

The NER has no definition of a service provider but the framework by which an ENM is reflected in the NER could be similar to that for metering providers.

5.2 When is an ENM Required?

An ENM will not be required in all contexts. There will be a period of grace for existing embedded networks while an ENM will not be required for new embedded networks which satisfy the current requirements for a deemed exemption by the AER. Where an ENM has not been required due to a deemed exemption, but that situation is changing due to an off-market customer moving to being on-market then that customers prospective FRMP must inform the ENO to initiate the process of changing AER registration status and appointing an ENM. The requirements to appoint an ENM are summarised in Table 1.

Situation	Registrable/Individual Exemption	Deemed Exemption
A new embedded network. (I.e. exemption gained after commencement of this change).	ENM appointed from commencement of network operation.	No ENM required to be appointed. When a customer seeks to change retailer, such that the deemed exemption would cease, its prospective FRMP must contact the ENO so that the ENO can initiate the required actions.
An existing embedded network (I.e. exemption held at time of commencement of this change).	ENM must be appointed within two years of the commencement of the rules reflecting this design, though may be appointed earlier. Where no ENM is appointed the status quo remains.	

Table 1 – Context and Timing Requirements for ENM Appointment.

Existing embedded networks are given a set period in which to appoint an ENM, rather than requiring the appointment of an ENM upon a customer seeking to transfer, because the process of appointing an ENM could take a significant amount of time. The length of that period would need to be set by the AER in its exemption guidelines, though two years is proposed in this design.

5.3 Who can be an ENM

Only an accredited party can perform the function of an ENM. Parties with other roles in the NEM can also seek to be accredited as an ENM.

5.4 Functions and Obligations of an ENM

The key functions and obligations of an ENM under the NER are:

1. The MSATS registration of the parent NMI of the embedded network is performed by the Distribution Network Service Provider. However the ENM is to allocate an EN Code (which is a unique name for the embedded network) to the parent NMI at the embedded network and update that EN Code in MSATS. This is discussed further in section 6.1.
2. Allocate NMIs to child metering installations in MSATS when the embedded network connection point wishes to become an on-market child. See section 6.1.
3. Request NMIs from AEMO when they are required for allocation to child metering installations. See section 6.1.
4. Manage MSATS and B2B interfaces. See sections 7 and 9.
5. Maintain all standing data required in connection with embedded network child NMIs.
6. Where a customer at a child connection point has informed the ENM (or the ENO or child FRMP who in return informs the ENM) that electricity supply must be maintained for life support requirements the ENM is to notify the FRMP of the parent connection point of the requirement. The FRMP of the parent connection point will in turn notify the DSNP. See section 9.4.
7. Fulfil the LNSP role within MSATS for the embedded network child connection points.
8. Maintain an understanding of subtractive meeting arrangements within the embedded network that are relevant to market settlement.
9. Assign a DLF to the embedded network connection point of on-market children in MSATS. See section 6.3.
10. Communicate with local retailers, market customers and distribution network service providers on behalf of the ENO in relation to all on-market and prospective on-market embedded network customers, whether through the B2B processes or otherwise.

Implementing these obligations will require provisions to be made in the NER to specify the roles, responsibilities and obligations to be allocated to or imposed on ENMs in respect of MSATS, the B2B Procedures and the metrology procedure. These obligations should be similar in structure – though not function - to the provisions in respect of metering providers and metering data providers.

5.5 Accreditation and Governance of ENMs

5.5.1 Accreditation and service levels

An ENM must be accredited by AEMO. To ensure that ENMs are likely to be available at the start of the new arrangements, existing Market Customers and Network Service Providers who have notified AEMO within the first six months of the arrangements that they wish to be accredited and registered as ENMs will be deemed to be ENMs.

An ENM will be required to ensure that embedded network services are carried out in accordance with the NER, procedures and service level requirements. The AER Electricity Network Service Provider Registration Exemption Guideline may also be referenced in the NER.

The service level requirements would be established by AEMO.

Note - It is expected that the service level requirement would re-iterate the timing requirements for activities conducted in MSATS and that AEMO would develop a report tracking compliance against these requirements.

The capabilities required of an ENM will include:

1. A detailed understanding of the NER and procedures relating to the function of an ENM and the carrying out of embedded network services. Obligations under the AER Electricity Network Service Provider Registration Exemption Guideline may be referenced via the NER.
2. A detailed understanding of the participant role relationships and obligations that exist between the ENMs, FRMPs, DNSPs and AEMO.
3. A detailed understanding of subtractive metering arrangements as they relate to market settlements.
4. Maintaining interfaces (e.g. web browsers) to give capabilities to:
    a. Support B2B procedures; and
    b. Support MSATS Procedures for maintenance of NMI Standing Data.

Where an ENM engages a sub-contractor to perform any of its NER or procedure obligations the ENM must ensure that the sub-contractor complies with the NER and procedure obligations. The ENM will remain responsible and liable for all acts and omissions of such sub-contractors.

The role of ENM is contestable and to ensure a level playing field, any work as an ENM undertaken by a registered Network Service Provider should be ring fenced from the work it undertakes as a regulated business. This may require the AER to develop ring fencing guidelines as contemplated under clause 6.17 of the NER.

AEMO will undertake periodic reviews to assess the ENMs compliance. All scheduled reviews will be through a centralised review process established by AEMO and will be undertaken at the ENMs own costs. It is proposed that reviews should occur not more frequently than annually.

Note - It is likely that the accreditation process will primarily be in the form of a training / test process to verify understanding of the roles and obligations of the ENM and to demonstrate system access capability. As such the standard review will be as much about ensuring that understanding and capability have been maintained rather than an audit. To the extent that an ENM fails in the performance of its duties, this should be readily apparent if impacted parties who have experienced material cost raise the matter to the attention of AEMO or via monitoring of compliance with MSATS Procedure timing requirements.

Situations where AEMO may require an ENM to re-apply for accreditation include:

- In the event of Rule changes that require significant changes to the processes and capabilities of ENMs.
- Where the ENM is seeking to have a suspension of accreditation lifted.
- Organisational mergers and acquisitions.

AEMO must establish and maintain ENM service level requirements, accreditation checklists and guidelines for accreditation applicants and for the removal of accreditation.

Note - This might be similar in form to generation registration guidelines or a reduced version of the Metering Providers accredited checklist applicable to the scope of the ENM roles (which are significantly less than that of a Metering provider).

5.5.2 Dispute resolution

If a dispute arose between an ENM and a registered participant, then, even though the embedded network manager would not be a registered participant, it would be deemed to be one for the purposes of the dispute resolution procedures in the NER.

5.5.3 Compliance

The compliance requirements (through accreditation) on ENMs would include an obligation to comply with provisions of the NER, MSATS Procedure, and B2B Procedure imposing obligations upon them.

Where AEMO identifies non-compliance the ENM would be required to take corrective actions. Options available to AEMO in the event of breach or lack of adequate corrective actions would be:

1. Suspension of the ENM, or a reduction in the scope of its accreditation, until corrective actions are taken;
2. Loss of accreditation of the ENM; or
3. Imposition of civil penalties.

Where considered appropriate, obligations imposed on ENMs under particular provisions of the NER could be classified as civil penalty provisions, engaging the potential for liability to pay a civil penalty and other aspect of the civil liability regime.

5.6 Appointment of an ENM

The embedded network owner/operator or controller will be responsible for appointing the ENM. The ENM will be contracted by the embedded network owner/operator or controller to administer the embedded network – or at least to fulfil the obligations of the ENM in the NEM - and this would include ensuring that all relevant service provision is arranged. Under this contract the embedded network owner/operator or controller would be responsible for costs reasonably incurred on its behalf by the ENM

At the time of appointment the ENM will be registered in MSATS as the ENM for the embedded network against the NMI of the parent connection point.

5.7 Fees

Currently AEMO does not charge fees for accreditation and it is expected that this practise will continue in the near term. AEMO may review this at a future date to a cost reflective fee (in particular if there were a large volume of ENM applicants).

Note that all activities undertaken by the ENM to achieve and retain accreditation will be undertaken at the ENM's cost.

6 Embedded Network Operation

6.1 NMI Allocation

A National Metering Identifier (NMI) must be associated in MSATS with each connection point at which there is a customer in the NEM. For distribution connected customers AEMO provides lists of NMIs to DNSPs who then allocate these in registering connection points in MSATS. The processes for associating a NMI for a customer when becoming an on-market child in an embedded network is less standard and requires the FRMP of the parent connection, who may not be the FRMP for the new customer, to apply for a NMI from the DNSP of that parent connection.

So as to standardise processes and to align obligations to those with customer relationships the ENM will be required to request from AEMO a NMI or a set of NMIs to allow that ENM to register, within MSATS, new on-market connection points within the embedded network. The creation of a NMI in MSATS will only occur at the time that the connection point switches to being on-market. There will be no requirement to register off-market connection points in MSATS.

The following process would apply for registration of the parent connection point:

1. During the new connection process of the embedded network, the ENM must be assigned/identified by either the ENO or the FRMP of the embedded network and provided to the DNSP (by the FRMP) in order to be populated in the NSP2 (Network Service Provider 2) field[4] of the parent NMI in MSATS when the NMI for that connection point is created by the DNSP. Where the NMI for the parent connection point is *not* identified as an embedded network at the time of connection, and is identified post the new connection, the DNSP must perform this action at that time.
2. There will be flexibility to allow the ENM to nominate themselves as the ENM for a parent NMI by entering their participant identifier into the NSP2 field.[5]
3. The ENM must then allocate the EN Code in MSATS to the embedded network parent NMI;
4. The ENM uses new NMI's for the registration in MSATS of on-market customers. The ENM sources new NMI's by requesting them from AEMO.

Note – The precise workings of the NMI allocation process and the specific format of new data in MSATS (e.g. the EN Code) are implementation issues. The procedures would be updated as part of the implementation if required.

At the time a customer at an off-market child in an embedded network elects to take supply from a retailer, the following process would apply:

5. The prospective retailer of the customer undertakes NMI Discovery and determines that the NMI for that customer is not in MSATS. Using customer information it identifies that the customer is in an embedded network and identifies the parent NMI and the ENM for that embedded network.
6. The retailer requests that the ENM create a NMI for the child connection in MSATS with that retailer to apply as the FRMP from the actual start date.[6]
7. The ENM manager would then use an AEMO provided NMI to register that child connection in MSATS. The registration of the NMI must reflect the full suite of mandatory information required in MSATS including the appropriate EN Code, metering information and updated market roles.

[4] See Section 7.2 for information on the relevant MSATS fields.
[5] The details of which change request, associated objections and notifications for which scenarios will allow this will be determined during the implementation phase.
[6] This is the date of a NMI create/change in MSATS.

This process does not require a transfer of either the parent or child NMI as they are allocated with the appropriate FRMP at the time of NMI creation. The DNSP does not require visibility of child NMIs in MSATS.

The ENM role can be maintained and created in MSATS for embedded network parent NMIs in the role of NSP2 and embedded network child NMIs in the role of LNSP.

Ongoing standing data updates would be maintained by the ENM.

6.2 Network Charging

No changes are proposed to current network charging practices in embedded networks. However it is proposed that steps be taken to provide greater transparency of network and energy charging in embedded networks.

The LNSP at the parent connection point levies external network charges (NUOS) on the ENO based on the energy throughput and, where applicable, demand recorded by the metering installation at the parent connect point. This approach ensures the LNSP recovers the external network charges related to the total energy flow as opposed to the flow net of energy flows to child connection points. This will mean that the network charges will reflect total demand of the embedded network.

Regulation of network charging to child connection points is the domain of the AER and must be set in accordance with its Electricity Network Service Provider Registration Exemption Guideline. In order to recover appropriate costs the ENO may, in accordance with the AER guideline, apportion the external network charges applied to the parent connection point to off-market and on-market child connection points.

A difficulty for retailers when quoting to customers in embedded networks is that the customer may currently see a bundled charge for network access and energy. Retailer quotes will often only be for energy, though there are situations where retailers collected network charges on behalf of embedded network operators. If greater transparency in information were provided then embedded network customers would be better placed to compare its costs with a retailer's quote. It is recommended that the AER modify its exemption guidelines so as to ensure that embedded network customers can access information on the unbundled network and energy cost associated with their supply.

6.3 Distribution Loss Factors

No changes are proposed to current DLF practices in embedded networks.

Regulation of DLFs is the domain of the AER and must be set in accordance with the Electricity Network Service Provider Registration Exemption Guideline.

For an exempt network with a retail exemption the guideline generally requires that the DLF for an embedded connection point matches the DLF that would be imposed by the LNSP if the customer were directly connected to the distribution network.

The guideline includes a process for setting alternate DLFs but these processes are generally only relevant to embedded networks who used very large amounts of electricity.

The NER will be amended to clarify these roles.

6.4 Retailer of Last Resort (ROLR)

There is no change to the ROLR arrangements as a result of the proposed design changes.

A retailer of last resort is the default retailer for a customer if that customer's current retailer "fails", meaning it is no longer able to fulfil its responsibility as a result of having its licence to operate revoked or suspended or is suspended by AEMO. The failure of a retailer triggers a ROLR event.

The key goal in ROLR events is to ensure the integrity of NEM settlement by appointing a replacement retailer for each NMI associated with the failed retailer.

The framework for handling RoLR events is defined by the AER and any jurisdictional documentation as is reflected in NEM RoLR Processes documentation published by AEMO. From time to time the AER and/or jurisdictions update the retailers of last resort and the criteria for activating them. One or more retailers may be identified as the potential ROLR for a connection point with the actual retailer to be used only identified in a ROLR event. The standing instructions and/or instructions provided to AEMO at the time of a RoLR event govern the transfer of a NMI to its applicable Retailer of Last Resort.

1. Where the failed retailer is the retailer for parent connection point of an embedded network, the following actions will occur in MSATS:
    a. The FRMP of the Parent NMI will be changed to the applicable retailer of last resort; and
    b. AEMO will update the local retailer role of the Child NMIs to the new FRMP of the Parent NMI.
2. Where the failed retailer is the retailer for a child connection point of an embedded network, the following actions will occur in MSATS:
    a. The FRMP of the Parent NMI will remain unchanged (unless the parent and child share the same FRMP in which event the FRMP of the parent NMI will change as described above); and
    b. AEMO will update the FRMP of the child NMI to the applicable retailer of last resort.

There is a common misconception that the retailer of last resort for a Child NMI is the FRMP of the Parent NMI. This is not true, and the process described above applies.

6.5 Obligation to Supply

There is no change to the obligation to supply arrangements as a result of the proposed design changes.

“Condition 1 – Obligation to supply” as set out in rule 153 of the Retail Law allows for the sale of energy to exempt customers by exempt persons and require that:

- “An exempt person cannot refuse to sell energy to a customer who meets the criteria for this exemption class, except in accordance with relevant disconnection provisions.
- An exempt person cannot refuse to sell energy to a customer on the basis that the customer owes the exempt person outstanding amounts from a previous account. The exempt person can include in a new account any outstanding amounts owed on a previous account (except where the unpaid amounts are for other premises for which the customer has an ongoing contract with the exempt person).”

Not all of these conditions apply to all exemption classes. The specific obligations to supply will vary from class to class and will depend on whether the class relates to residential or commercial/retail customers. Refer to the table at Appendix A-3 of the ‘Exempt Selling (Retail) Guideline’ for the full list of conditions for their particular class in order to confirm their obligations.

6.6 Entitlement to metering data

To facilitate customer billing and support subtractive metering arrangements within an embedded network, the ENO and ENM must be entitled to access energy data or to receive metering data, NMI Standing Data, settlements ready data or data from the metering register for a metering installation. [Note: refer clause 7.7 of the NER]

7 MSATS Setup

7.1 Roles of MSATS

The Market, Settlements and Transfer Solution (MSATS) system is a system maintained by AEMO which stores for each NMI:

1. Standing data pertaining to that NMI.
2. Who is responsible for the various roles associated with a NMI, such as who is the financially responsible market participant (e.g. the retailer), who is responsible for metering, who is the distribution network operator, etc.
3. The metering data associated with the NMI.

The processes for transferring customers or changing roles are all implemented via MSATS. MSATS also compiles settlement ready data for the settlement system.

7.2 Embedded Networks and MSATS

Table 2 illustrates the structure of key data in MSATS pertaining to an embedded network.

	NMI	Parent EN	Child EN	LNSP	NSP2	LR	FRMP
Parent	A	EN Code[7]		Parent LNSP	ENM	LR	Parent FRMP
Child	B		EN Code	ENM	N/A	Parent FRMP	Child (B) FRMP
Child	C		EN Code	ENM	N/A	Parent FRMP	Child (C) FRMP

Table 2 – Embedded Network Data in MSATS

The Parent EN field identifies the name of the embedded network. This data is populated against child NMIs in the Child EN field. The LNSP field for the Parent Connection Point is the DNSP of the customer at the Parent Connection Point. The ENM is registered in the NSP2 field for the Parent but appears in the LNSP field for the Child Connection Points. The Parent FRMP needs to be identified in the LR field for each Child so as to support subtractive metering.

The DNSP for the embedded network will not have visibility of the Child data in MSATS.

Note – The timing obligations and CR initiation 'Roles & Responsibilities' would need to be defined for 'Create NMI' transactions as part of the implementation but is not critical for the detailed market design.

7.2.1 Reversion

Reversion occurs when an on-market child in an embedded network returns to being an off-market child. The AER guidelines require that written consent be gained in this situation. The ENM should not act without evidence of that consent. The exact manner of incorporating this requirement into the following process will be determined in the implementation phase.

As NMIs are only assigned to on-market children and it is undesirable to extinct the NMI since the customer could switch the child back to being on-market the following updates would be required and obligations imposed:

[7] This is the name of embedded network.

1. A new NMI Status Code, assumed in this document to be denoted by 'C' (for "Child")[8], would exist in MSATS which would indicate that the NMI is associated with an off-market child. This would flag that the data available for the site may not be current and current market obligations to maintain/provide data are removed.
2. The FRMP of the customer returning to being off-market must request the ENM update that NMI's data in MSATS so that:
    a. The status of the NMI is 'C'.
    b. If Life Support was applicable, the ENM must have already advised the FRMP so that this information can be recorded against the parent NMI.
3. There will be no requirement to update MSATS roles for these connection points. The FRMP, MDP, Metering Provider - Category B (MPB) and Responsible Person (RP) remain registered against the NMI.
4. The MDP must make the DataStream for the NMI 'I' Inactive to ensure settlement accuracy.
5. NMI Standing Data maintenance & obligations would not apply for that NMI while it has a status of 'C'.
6. Performance monitoring reporting will exclude 'C' connection points except in cases where the DataStream is active (status 'A').

Note - When developing procedure changes the following points must be taken into consideration. The transfer of a NMI with a status of 'C' NMI must allow existing roles to object. Transfer notifications will go to all relevant roles and will include the embedded network local retailer (ENLR) and ENM.

7.2.2 Switching an Off-Market Child Back to an On-Market Child

If an off-market child returns to being an on-market child then existing transfer processes will apply. In addition the NMI Status Code will automatically be changed to 'A' by MSATS as part of the transfer completion process and all obligations to maintain data on that NMI would be as for an on-market child.

Note – The timing obligations, CR notifications and objection would need to be defined for EN transfer transactions as part of the implementation but is not critical for the detailed market design.

7.2.3 Physical Rewiring to Join an Embedded Network

A NEM Customer connected to a DNSP network may convert to an off-market child connection point in an embedded network. This can happen, for example, where a new connection point is inserted between the NEM Customer's connection point and the DNSP network making the existing connection point a child connection point. In such situations the following updates and obligations would exist:

1. The existing NMI for the (original) DNSP network connection shall not be made extinct[9] and shall remain in MSATS[10].
2. The role of who is the LNSP role in MSATS will be changed via MSATS change request processes so that the LNSP role changes from the current distribution network service provider to the ENM.

[8] While 'C' is used in this document, the actual letter or method of identifying these NMIs will be determined in the final implementation phase.
[9] Unless aspects of how the change is made require otherwise.
[10] Though as it is no longer a connection point of the DNSP the DNSP's system may no longer track the NMI. Note also that the effective date of any such changes would need to allow for the final meter read.

3. A new NMI will be allocated for new connections within the embedded network by the ENM, which can either be done earlier on or at such time as the customer chooses to become a NEM Customer as an on-market child.

A one-time obligation on an ENM at the time of such a change would be to provide a list of all NMIs in the embedded network to the LNSP.

Note - Whether the list of NMIs is provided via B2B transactions or other methods will be determined in the implementation phase.

8 Metering and Safety in Embedded Networks

8.1 Introduction

This section describes the current metering and safety requirements pertaining to embedded networks. No change is proposed to the NER requirements. However it recommended that the NEM Jurisdictions harmonise their own requirements to facilitate more uniform arrangements in embedded networks. It is also recommended that the AER modify its exemption guidelines to facilitate routine testing and inspection of off-market child meters.

8.2 Metering Requirements

8.2.1 Summary of Current Arrangements

Table 3 provides a summary of the key metering requirements for different types of customers as they exist today.

Metering Requirement	Pattern Approved & Verified	Meter Accuracy	Routine Testing & Inspection
Parent Connection	National Metering Institute Requirements	NER, Clause 7.6, Schedule 7.2	NER, Clause 7.6, Schedule 7.3
On-Market Child	National Metering Institute Requirements	NER, Clause 7.6, Schedule 7.2	NER, Clause 7.6, Schedule 7.3
Off-Market Child	AER's Electricity Network Service Provider Registration Exemption Guideline (which reference National Metering Institute Requirements)	AER's Electricity Network Service Provider Registration Exemption Guideline (which reference NER, Schedule 7.2)	No requirement[11]

Table 3 – Summary of Current Key Metering Requirements

[11] It is recommended in Section 8.2.6 below that the AER take measures to standardise the routine testing and inspection arrangements for off-market children.

Table 4 presents a summary of existing metering requirements and how they change with the context of the embedded network children.

Date Embedded Network Established.	Situation	Metering of Off-Market Children	Metering of On-Market Children
Prior to January 2012[12]	All off-market	Existing grandfathered	N/A
	Some on-market	Existing grandfathered	Interval or Basic
	Off-market moving to on-market	Existing grandfathered	Interval or Basic
	On-market moving to off-market	Interval or Basic	Interval or Basic
From January 2012[13]	All off-market	Interval or Basic	N/A
	Some on-market	Interval or Basic	Interval or Basic
	Off-market moving to on-market	Interval or Basic	Interval or Basic
	On-market moving to off-market	Interval or Basic	Interval or Basic

Table 4 – Summary of Key Metering Data Requirements

8.2.2 Governing Arrangements for Meters in Embedded Networks

The key governing requirement for the metering for off-market children in embedded networks is the AER's Electricity Network Service Provider Registration Exemption Guideline which was published in June 2011. All metering requirements for on-market children are those in the NER. The guideline relates to embedded networks, and applies from January 2015.

The guideline includes the following requirements for metering in embedded networks.

General requirements

All meters used for the measurement of electrical energy whether delivered to, or exported by, a customer (whether buying from the ENO or a retailer) must comply with the requirements of the National Measurement Institute for electricity meters and sub-meters and with the requirements set out in schedule 7.2 of the NER.

- The National Measurement Institute requirements have applied since January 2013 and require that all electricity meters used for trade at connection points where the energy throughput is less than 750 MWh per annum have to be pattern approved and verified.
- Schedule 7.2 of the NER relates to the types and accuracy of meters. However, it does not cover testing of meters which is covered by clause 7.6 (which references schedule 7.3) of the NER.
- All customers (whether buying from the ENO or a retailer) must be individually metered except where the AER has determined an unmetered supply is permitted. This situation is

[12] Subject to jurisdictional metrology material in Metrology Procedures.
[13] Subject to jurisdictional metrology material in Metrology Procedures. It is recommended in Section 8.2.3 that the jurisdictions move towards harmonising the metering requirements at the parent and child connection points.

specific to unmetered loads in embedded networks and the NEM unmetered load arrangements in the NER and Metrology Procedure are not applicable in this case.

Safety requirements

All embedded or exempt networks must be installed, operated and maintained in accordance with all applicable requirements within the jurisdiction in which the network is located for the safety of persons and property, including where relevant an industry Code or Guideline otherwise applicable to a network service provider providing similar services. This includes, where applicable, an obligation to have current, and/or maintain, a safety management plan or similar, whether registered or unregistered with a competent safety authority or regulatory agency within that jurisdiction.

Metering accuracy

Meters used within embedded networks must be pattern approved, consistent with the requirements of the National Measurement Institute, in accordance with the equivalent requirements for NEM electricity meters and to accuracy classes as stipulated in schedule 7.2 of the NER, unless otherwise exempted by the National Measurement Institute.

NEM requirements

In jurisdictions where customers in embedded networks have the ability to go on market all metering arrangements must comply with all applicable AEMO requirements for: the installation and maintenance of a metering installation; the registration of meters; provision of metering data; and, where necessary, the transfer of the customer to another retailer. An exempt or embedded network operator may be required to appoint an accredited metering service provider or other registered NEM participant, as appropriate, to act as its agent for the provision, installation, registration and maintenance of the metering installation.

All operators of embedded or exempt networks must comply with the reasonable requests of a local DNSP for demand forecasting data, relevant details of the physical network infrastructure and assets and any other data relevant to the control, operation or maintenance of the network.

8.2.3 Meter Installation Types

Embedded networks serving contestable customers are serving small loads though the parent connection point which could have a much greater load. It follows that the energy consumption could require a parent connection to have a type 4 metering installation while the child connections will require type 4 or type 5 metering installations. Both type 4 and type 5 meters are interval meters.

The desirable arrangement going forward is that all metering in an embedded network for on-market children should be on an interval meter basis. This includes the parent and on-market and off-market children. This is because there is a limited subset of metering data providers that are accredited to process both type 4 and type 5 metering data. Allowing both types of meters to continue to be used could lead to practical problems, and may mean limited competition is available for metering data services.

This ideal does not align with current jurisdictional metrology material in the Metrology Procedure relating to embedded networks in which retail contestability is an option. Specifically:

- Victoria and South Australia require that if any child in an embedded network is an on-market child, the parent and all on-market children must have interval meters.
- New South Wales requires that an on-market child is settled on the same basis (interval or accumulated energy) as the parent. In the case of settlement on an interval basis the child must have a type 4 or type 5 meter, while for the accumulation basis it must have a type 6 (accumulation meter) or an interval meter.

It is proposed that the jurisdictions are encouraged to harmonise metering requirements for customers in embedded networks. The favoured approach would be to harmonise on the

requirement that if a parent has an interval (or accumulation) meter, the children should also have interval (or accumulation) meter. Any changes to jurisdictional material in the Metrology Procedure is required to go through the COAG Energy Council (NER 7.14.2).

8.2.4 Meter Reading Cycles

No change is proposed to meter reading cycles.

If parent and children are read on different cycles (e.g. daily vs monthly) there is an impact on retailer billing efficiency. Retail bills tend to be delayed to match the longest cycle (i.e. if parent has daily read and children monthly reads, billing is done on a monthly basis). However no change is proposed as this is not seen to be a significant issue, and can be managed.

8.2.5 Instrument Transformers

No change is proposed in respect of instrument transformer connected meters.

There are currently many embedded network customer's metering installations that use instrument transformers. These devices, which sample current and voltage, do create higher losses than direct connected meters.

There are no jurisdictional requirements for instrument transformer connected meters in an embedded network. It is proposed that their use should continue without restriction.

8.2.6 Meter Testing

As shown in Table 3 none of the above requirements impose maintenance requirements on the meters of off-market children when such requirements exist in the NEM. This raises the possibility that the metering installation is not compliant when an off-market child becomes an on-market child some years after the installation of the metering installation. If nothing changes it is anticipated, therefore, that meters will be replaced when an off-market child becomes an on-market child so as to ensure compliance.

Making no change to the testing requirements on off-market children maintains a potential barrier to competition.

It is recommended, therefore, that the AER modify its exemption guidelines so as to standardise the routine, testing and inspection requirements of off-market children to align with the requirements for on-market children. This change would ensure consistency and would reduce barriers to competition within embedded networks.

8.3 Metering Services

This section describes the metering service requirements imposed by the NER for on-market children within an embedded network. These requirements are not applicable to off-market children.

No change is proposed to metering services.

The RP for the parent, and all children with contestable customers, must be determined as per the NER. The MPB and MDP for each metering installation should be engaged by the RP. Each RP can engage a contestable MPB and MDP of their choice for each metering installation.

MSATS has the capability to perform settlement operations in an embedded network using differencing, as long as the parent and child relationships are correctly configured initially. While each metering point in the metering installation in the embedded network may be read by a different MDP, MSATS will perform the correct operations. Having a single MDP in an embedded network would reduce the chance of error, though there will be no requirement for this.

8.4 Responsible Person

The RP's role is to ensure that there is a suitable metering installation, to ensure NEM compliance of the metering installation, and to engage service providers.

A potential problem has been identified in cases where an on-market child requires a type 5 metering installation. For type 5 metering installations, the NER requires that the RP is always the LNSP. This is not suitable, as operational requirements dictate that the FRMP should be the party that is the RP for on-market children in an embedded network.

This issue should be resolved in the Metering Competition Rule change that has proposed the removal of RP exclusivity for type 5 and 6 metering installations. If this issue is not fully resolved for a jurisdiction, either because the rule change is not adopted or because the jurisdiction provisions take precedence over the rule change, it may be necessary to allow the RP to be the FRMP for all on-market children in embedded networks within that jurisdiction.

8.5 Other Jurisdictional Matters

Smart meter rollout

The Power of Choice Review (POCR) promotes the rollout of smart meters on a new and replacement basis. It is not a NEM wide mandate, and jurisdictions will have the option of opting in, either for the whole jurisdiction or for a partial area.

Meter functionality

The metering competition Rule change makes provision for the development of a minimum functionality specification for smart meters to be rolled out in the NEM.

AEMO is to be tasked with developing this specification in the form of a NEM Procedure, and while the starting point will be the National Stakeholder Steering Committee (NSSC) approved National Smart Meter Functionality specification, it is expected that the minimum functionality specification that will be developed will be a services based specification, where the functionality relates to the delivery of services to customers.

While an issue for each jurisdiction, it is recommended that the smart meter roll out apply to all children in embedded networks if commercially viable.

Reversion of metering types

The general requirement in the Metrology Procedure is that a responsible person must ensure that an interval metering installation is not replaced by an accumulation metering installation. There are jurisdictional difference provisions that allow reversion to occur in certain circumstances. These can be found in section 2.6 of the Metrology Procedure Part A.

The standard position is that reversion of metering types should not be allowed for NEM customers. However, it is proposed that reversion of metering type should be allowed where an on-market child reverts to being an off-market child. This will cease to be an issue if all meters in an embedded network are required to have the same metering arrangements.

9 B2B Processes

9.1 Introduction

The NEM provides a business-to-business (B2B) platform to facilitate the exchange of data between participants and service providers.

9.2 Service Orders

The B2B platform is used to initiate Service Orders between parties with responsibilities to carry out actions associated with a NMI.[14] The use of B2B processes within embedded networks will facilitate a smoother customer transfer process.

An ENM for an embedded network with one or more on-market children will be required to maintain a method to monitor and manage B2B Service Order messages (i.e. via a B2B Browser) and will be required to comply with all obligations set out in the B2B Procedures.

This will provide retailers with a single market process to manage all service order requests irrespective of whether the customer is connected to a distribution network or an embedded network. In the case of an embedded network it is expected that retailers would commence any new connection process and negotiation directly with the ENO or ENM. It is then proposed that the retailer would follow up with a B2B Service Order once details and timing were agreed. This approach imposes no additional cost on retailers.

Table 5 captures the party responsible for the execution of a NEM B2B Service Order in different situations. The B2B Procedures would be updated to reflect this.

Service Order Type	Connection Point Type					
	Parent		Off Market Child		On Market Child	
	Service	B2B Recipient	Service	B2B Recipient	Service	B2B Recipient
Allocate NMI	DNSP	DNSP	N/A	N/A	ENO	ENM
New Connection	DNSP	DNSP	N/A	N/A	ENO	ENM
Re-energisation	DNSP	DNSP	ENO[15]	N/A	ENO	ENM
De-energisation	DNSP	DNSP	ENO	N/A	ENO	ENM
Special Read	DNSP*	DNSP*	ENO	N/A	SP	SP
Adds and Alts	DNSP*	DNSP*	ENO	N/A	ENO**	ENM**
Meter Reconfiguration	DNSP*	DNSP*	ENO	N/A	SP	SP
Meter Investigation	DNSP*	DNSP*	ENO	N/A	SP	SP
Supply Abolishment	DNSP	DNSP	ENO	N/A	ENO	ENM
Miscellaneous	DNSP*	DNSP*	ENO	N/A	ENO**	ENM

[14] While the RP may be responsible for ensuring that actions are taken, the RP does not execute the action. Hence NEM B2B Service Orders do not go to RPs.
[15] ENO functions may be performed by an agent of the ENO, which could be the ENM.

Service Order Type	Connection Point Type		
	Parent	Off Market Child	On Market Child
* Where the FRMP of the NEM Customer connection point has installed metering and is therefore the RP, they may be responsible for undertaking the requested work and no B2B Service Order would be required.			
** The responsibility to undertake the requested action is dependent on the work being undertaken at the connection point. Where the service is a physical service unrelated to the meter, the ENO will undertake the work, therefore the Service Order should still be sent to the ENM. Where the work is related to the meter, the Service Order should be sent to the SP as noted below.			
SP It is expected that for all On Market Child NMI's that the Service Order should be sent to the appropriate Service Provider (SP) for the service – i.e. MDP or MPB. It is expected that all On Market Child NMI's will have NEM accredited SP's and as such the business as usual approach to Service Orders should be utilised.			

Table 5 – Parties Responsible for Execution of B2B Service Orders

Note – It is assumed that ENMs will charge for services performed. The NER convention is not to dictate how services are charged for and the AER guidelines will likely only refer to ENMs to indicate that embedded network owners/operators or controllers need to appoint them and have an obligation to compensate them for that service.

9.3 Meter Data

Meter data is also exchanged via B2B processes. There is no proposal to change these arrangements in the context of the embedded network changes. Where the connection point is being settled within the NEM a MDP must provide metering data to participants via B2B and to AEMO in line with current obligations. The Table 6 details where NEM B2B Meter Data Processes apply.

Process	Connection Point		
	Parent	Off Market Child	On Market Child
Meter Data Notification	B2B	N/A	B2B
Provide Meter Data	B2B	N/A	B2B
Verify Meter Data	B2B	N/A	B2B

Table 6 – Processes where NEM B2B Meter Data Processes Apply

9.4 Customer and Site Details Notification

Customer & Site Detail Notification refers to a process where the FRMP of a connection point provides the DNSP with customer details for outage communication and life support purposes. There are two key B2B transaction types:

1. Customer Details Notification comprising:
    a. Customer contact details for outage purposes, sensitive and where the site is vacant.
    b. Important details relating to life support for the connection point.

    Also linked to this transaction is the 'reconciliation' transaction which applies to life support customers only and the 'customer details request' transaction that a service provider can use where they do not have customer details.
2. Site Address Notification comprising

a. Information the FRMP acquires relating to a site address which is to be associated with that address (i.e. access & hazard information).

It is proposed that all National B2B obligations apply as per current business practices for the consumer at the parent connection point.[16] The exception to the current process, and a feature not proposed to be changed, would be that where a child connection point (on market or off market) has life support requirements. In this case:

1. The consumer at the child connection point notifies its FRMP (where applicable) or the ENO or the ENM of the life support requirement. If so informed the FRMP and ENO must inform the ENM.
2. The ENM must advise the FRMP of the parent connection point of this requirement.
3. The FRMP of the parent connection point records the life support requirement against the parent connection; and
4. The FRMP of the parent connection point must send a Customer Details Notification to the DNSP advising that the embedded network has a life support requirement via the existing obligations for B2B.

The FRMP would send Customer and Site Details Notification requests to the ENM via the B2B process and the ENM would be require to monitor and comply with all associated obligations of the B2B Procedure.

Outage management within an embedded network remains the responsibility of the ENO regardless of how it occurs.

9.5 One Way Notification

The B2B procedure includes a One Way Notification (OWN) which has the two notifications shown in Table 7 being provided by the DNSP to the FRMP of a connection point.

OWN Type	Connection Point		
	Parent	Off Market Child	On Market Child
Meter Exchange Notification	DNSP	N/A	N/A
Network Tariff Notification	DNSP	N/A	N/A

Table 7 – One Way Notifications Provided by the DNSP to the FRMP of a Connection Point.

The Meter Exchange Notification relates to the mass exchange of meters while the network tariff notification updates network tariffs on NMIs. Neither of these situations is likely in an embedded network and any action would tend to relate to child connection points which are maintained by the ENM.

9.6 Technical Delivery Specification & Technical Guidelines

As a registered participant, an ENM will be obliged to add their details to the Retail Operations Contacts List for use by other NEM Participants. The ENM will be required to comply with the B2B Technical Delivery Specification & B2B Technical Guidelines.

[16] There is no specific driver for Customer and Site Details Notification transactions for customers at off-market children. However given B2B processes are used for other transactions, there was support to have this process included.

10 Reporting

AEMO will maintain two reports allowing the identification of the ENM registered in MSATS for each embedded network. A list of ENM contact details will be available via the ROCL while a separate report will identify the ENM associated with each EN Code. AEMO will also maintain a list of accredited ENM's on its website so that the information is available to an embedded network owner/operator or controller seeking an ENM.

AEMO will also maintain internal reporting capability to allow it to assess the performance of ENM's in meeting timing obligations for their functions in MSATS.

Appendix A: Obligations Summary

No	Topic	Parties	Obligation
1	AER Exemptions	ENO	Comply with AER Exemption Guidelines.
2	ENM Accreditation	ENM	Must be accredited by AEMO.
3	ENM Accreditation	ENM	Must maintain an understanding of relevant NER and procedures.
4	ENM Accreditation	ENM	Must maintain B2B and MSATS interfaces (e.g. via browsers).
5	ENM Accreditation	AEMO	Run ENM accreditation process, including reviews of accreditation.
6	ENM Appointment	ENLR	Perform MSATS and B2B obligations in embedded networks for which no ENM is required to be appointed.
7	ENM Appointment	Embedded network owner/operator or controller	Must appoint an ENM when required to.
8	NMI Allocation	ENM	Allocate NMIs to on-market children.
9	NMI Requests	ENM	Request NMIs from AEMO.
10	NMI Requests	AEMO	Provided NMIs to ENMs on request for allocation.
11	MSATS Standing Data	ENM	Maintain MSATS standing data required in connection with embedded network child NMIs (performing the LNSP role in MSATS).
12	DLF	ENM	Assign DLFs to on-market children in embedded network.
13	Life Support	ENM	If informed of life support requirements within embedded network to inform FRMP of parent connection point (so FRMP can notify DNSP).
14	Electrical Arrangements / Wiring	ENM	Maintain information about electricity wiring and other infrastructure and equipment comprising the embedded network and to make that available to prospective retailers and their metering providers to the extent required to fulfil their obligations in the NEM
15	Electrical Monitoring	ENM	Maintain an understanding of subtractive meeting arrangements within the embedded network.

No	Topic	Parties	Obligation
16	Distribution network connected customers shifting to embedded network	ENM	A one-time obligation at the time of such a change would be to provide a list of all NMIs in the embedded network to the LNSP.
17	Reports	AEMO	Develop and maintain reports to facilitate identification of the ENM for an embedded network.
18	Reports	AEMO	Develop and maintain internal reports to allow performance monitoring of ENMs.
19	Reports	AEMO	Maintain a list of accredited ENMs on its website.
20	Procedures	AEMO	Develop and maintain procedures pertaining to embedded networks.

Appendix B: Glossary and Abbreviations

Glossary

The definitions included in this glossary are intended to provide sufficient clarity of the meaning of a term for the purpose of reading this document. The definitions do not necessarily include the level of detail of definitions in the NER or other documents.

Term	Definition
CATS Procedure	MSATS Procedures: Consumer Administration and Transfer Solution (CATS) Procedure.
Child Connection Point Children Connection Points	A Connection Point within an Embedded Network that is supplied via the Parent Connection Point.
connection point	The agreed point of supply established with a Network Service Provider.
customer	A consumer who has, or is proposing to have, a commercial relationship for supply by a retailer or network either of which may or may not be exempt.
Distribution Loss Factor (DLF)	An average loss factor calculated according to clause 3.6.3 of the NER.
Distribution Network Service Provider (DNSP)	A person who engages in the activity of owning, controlling, or operating a distribution system.
Distribution Use of System (DUOS) Charges	Charges to recover the costs of a distribution network. These charges include transmission use of system charges.
Embedded Connection Point	A child connection point within an Embedded Network.
Embedded Network	A group of connection points within a private network that is connected to a distribution network or transmission network[17] operated by an LNSP. The electrical wiring that links the parent connection point and downstream connection points in an Embedded Network are owned, operated and controlled by an Embedded Network Operator.
Embedded Network Code (EN Code)	The code used in MSATS to identify an embedded network
Embedded Network Operator	A person who has gained an exemption from the AER to register as a Network Service Provider for the purpose of operating an embedded network, and known as an Embedded Network Operator.
first-tier	The classification of a connection point and customer when their LR is their FRMP.

[17]There are only a very small number of Embedded Networks connected to Transmission Networks, these typically being mining sites in remote areas.

Term	Definition
Market Customer	An entity registered with AEMO as a Customer and as a Market Participant, and who classifies load as market loads to be settled by AEMO.
Market Participant	An entity registered with AEMO in any category of Market Participant, including Market Generator and Market Customer.
NEM Customer	A customer taking supply at a connection point within an Embedded Network who is supplied by a FRMP other than the FRMP for the parent connection point of the Embedded Network.
Parent Connection Point	The connection point between an LNSP's distribution network and an Embedded Network.
Pattern Approved	Having passed a testing process to ensure the design (i.e. pattern) of a meter is appropriate and suitable for conditions of use and accuracy is maintained under influences and disturbances such as temperature or electro-magnetic fields.
Responsible Person	Is accountable for the provision, installation and maintenance of a metering installation and the collection, processing and delivery of metering data for the metering installation.
Retail Market Procedures	Currently comprises: the B2B procedures; the Market Settlement and Transfer Solution (MSATS) Procedures; and the metrology procedures.
Retailer	An entity registered with AEMO as a Market Customer and is approved by the AER or a jurisdictional authority to retail electricity to consumers.
second-tier	The classification of a connection point and customer when their LR is not their FRMP.
subtractive metering arrangement	A metering arrangement where there is at least one meter that measures an energy flow that is also measured in at least one other meter. The metering is hierarchically arranged downstream from the connection point. A key feature is that energy flows at one meter needs to be calculated by deducting the energy flows measured in another meter.
Verified	Having passed testing performed by the manufacturer to verify the accuracy of a meter.

Abbreviations

Abbreviation	Meaning
AEMC	Australian Energy Market Commission
AEMO	Australian Energy Market Operator
AER	Australian Energy Regulator
B2B	Business-to-Business

Abbreviation	Meaning
CATS	Consumer Administration and Transfer Solution
CSD	Customer and Site Details
DNSP	Distribution Network Service Provider
EN	Embedded Network
ENM	Embedded Network Manager
ENO	Embedded Network Operator
FRMP	Financially Responsible Market Participant
LNSP	Local Network Service Provider
LR	Local Retailer
MDP	Meter Data Provider
MSATS	Market, Settlements and Transfer Solution
NECF	National Energy Customer Framework
NEL	National Electricity Law
NEM	National Electricity Market
NER	National Electricity Rules
NMI	National Metering Identifier
NSP	Network Service Provider
NSSC	National Stakeholder Steering Committee
NUOS	Network Use of System
ROCL	Retail Operations Contact List
ROLR	Retailer of Last Resort