Submission No 18

EMBEDDED NETWORKS IN NEW SOUTH WALES

Organisation: Ausgrid, Endeavour Energy, Essential Energy

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Mr Ray Williams MP

Committee Chair

Parliament of New South Wales

cc: lawsafety@parliament.nsw.gov.au

NSW DNSPs response to the Legislative Assembly Committee on Law and Safety Inquiry on embedded networks in New South Wales

Dear Mr Williams MP,

Ausgrid, Endeavour Energy and Essential Energy (NSW distribution network service providers (**DNSPS**)) thank the Legislative Assembly Committee (the **Committee**) for the opportunity to provide a submission on the Law and Safety Inquiry into embedded networks in New South Wales (the **Inquiry**).

DNSPs consider that the regulatory framework that applies to embedded networks in NSW is no longer fit for purpose. Several recent independent reviews of embedded networks both in Victoria and nationally, have identified numerous gaps in the regulatory framework for embedded networks ranging widely from technical, billing and even safety issues. Broadly speaking, these reviews determined that the existing regulatory regime for embedded networks required reform.

The existing regulatory framework was established at a time when there were relatively few embedded networks in NSW, and these were mostly, what are now considered, micro embedded networks for small-scale retirement villages or caravan parks. At the time, the embedded network regulatory framework was broadly considered fit for purpose in addressing a specific defined need.

However, more recently the historically 'typical' embedded network types have moved away from being a limited number of small scale retirement villages or caravan parks arrangement. Embedded networks are now proliferating in number and size, and are dominated by strata residential buildings, shopping centres and other large 'mixed use' developments, which are often large precincts comprising potentially hundreds or thousands of individual customers. This dramatic growth in the number and scale of embedded networks in NSW from the original intent of the framework designed for caravan parks and small retirement villages has meant that identified gaps (and corresponding harms) in the regulatory framework are being amplified over time, a trend which will continue if not addressed.

This regulatory framework scope-creep continues as embedded network developers are starting to request NSW network business to provide high voltage connections over low voltage connections as their embedded network developments increase in scale.

Please see **Attachment A** for our joint submission. It outlines key deficiencies in the existing regulatory framework for embedded networks in NSW and provides our recommendations for the Committee for consideration, including to:

1 Consider NSW-specific measures that may be required to address gaps in the consumer protection framework for customers served by embedded networks.

2 Clarify the circumstances and thresholds under which an embedded network (be it an 'electrical installation' or other category of network infrastructure) requires additional regulation and licensing in the form of conditions for consumer protections, reliability, guaranteed service

levels, reporting and monitoring, technical, safety and/or price regulation, for example as occurs in South Australia or with water embedded networks in NSW (also known as private water networks).

3 Clarify that under the *Electricity Supply Act 1995* (NSW) (**ESA**), the mode of connection for an embedded network (i.e. whether it will be high voltage or low voltage) will be determined by the DNSP, having regard to network safety considerations. The former typically being used for industrial sites where work, health and safety provision apply.

4 Consider policy options identified in the AEMC and Victorian Government reviews and apply a cost-benefit assessment of each.

5 Consider measures to improve the visibility of resources within embedded networks. This information could be reported directly to the Australian Energy Market Operator (**AEMO**) by embedded network operators and accessible to all market participants.

6 Clarify what constitutes a 'distribution system' and what constitutes an 'electrical installation' for regulatory purposes.

A potential regulatory and policy pathway forward for the Inquiry to consider could be to:

1 Retain the existing regulatory settings for traditional embedded networks such as small networks servicing caravan parks or retirement villages with fewer than 30 residential or small business customers.

2 Implement stronger regulation of larger embedded network operators through licensing. The AEMC and AER have recommended greater alignment of consumer protections for embedded network customers with those of standard supply customers. For NSW it may also include closely aligning safety and reliability obligations for large embedded networks with those applying to DNSPs and use the SA licensing approach and NSW approach for private water networks under the Water Industry Competition Act as a model.

3 Restriction or bans on certain types of embedded networks where they are not appropriate due to scale. For example, the Victorian Government has decided to ban new embedded networks. Instead NSW could determine that certain types of new embedded networks of a certain size or type should be restricted or banned. This could include banning residential or mixed use HV networks and limiting HV embedded networks to industrial sites only.

We welcome the opportunity to discuss any aspect of this submission with the Committee.

Please contact the following with any questions:

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Yours sincerely,

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Attachment A: NSW distribution businesses

Submission to the Legislative Assembly Committee on Law and Safety Inquiry on embedded networks in New South Wales

24 June 2022

Contents

1 Executive Summary

Ausgrid, Endeavour Energy and Essential Energy (NSW distribution network service providers (**DNSPS**)) welcome this opportunity to provide a joint submission to the Legislative Assembly Committee on Law and Safety (the **Committee**) Inquiry into embedded networks in New South Wales (the **Inquiry**).

The Inquiry is timely given the proliferation of embedded networks in NSW over the past decade and the rapid pace of the energy market's transition.

The regulatory framework for embedded networks in NSW no longer serves or protects energy consumers within embedded networks. Several recent independent reviews of embedded networks both in Victoria and nationally, identified regulatory framework gaps ranging widely from technical, billing and even safety issues and determined that the existing regulatory regime for embedded networks required reform.

The existing regulatory framework was established when there were relatively few embedded networks in NSW – they were mostly micro-embedded networks for small-scale retirement villages or caravan parks. When limited to just micro-embedded networks for small-scale retirement villages only, then the embedded network regulatory framework is broadly considered to be fit for purpose.

However, more recently the 'typical' embedded network is now large-scale retirement villages, strata residential buildings, shopping centres and other large 'mixed use' developments, which are often large precincts comprising potentially hundreds or thousands of individual customers. For example, since 2015, the number of embedded networks in Ausgrid's distribution area has grown 8-fold from around 100 for many years, to around 800.

This dramatic growth in the number and scale of embedded networks in NSW represents a departure from the original intent of a framework designed for caravan parks and small retirement villages. It also means that identified gaps (and corresponding harms) in the regulatory framework are being amplified over time. This trend is continuing and is now progressing to expand to high voltage (**HV**) mega embedded networks – a trend which will continue if not addressed by this review.

The key deficiencies in the regulatory framework include:

1 **Gaps in the customer protection framework**. Many of protections that apply to distribution-connected customers do not apply or do not apply in the same way to embedded network customers. In its 2017 and 2019 reviews of the national regulatory framework for embedded networks, the Australian Energy Market Commission (**AEMC**) identified numerous gaps in the customer protection framework for embedded network customers – including: reliability standards, connection standards, billing information, outage notifications, guaranteed service levels and protections for life support customers.[1] However, the AEMC's recommendations for greater alignment of embedded network customer protections with those applying to distribution-connected customers are on hold with Energy Ministers and there are no known plans to implement them.

2 **Lack of clarity around classification and regulatory treatment of embedded networks**. The *Electricity Supply Act 1995* (NSW) (**ESA**) and Service & Installation Rules currently distinguish between 'distribution systems' and 'electrical installations'. This distinction is critical because the ESA confers substantial powers and imposes significant obligations on 'network operators' (including operators of distribution systems i.e. DNSPs) and exempts them from various burdens when installing, operating and carrying out works. This is particularly relevant

[1] See: AEMC, Review of regulatory arrangements for embedded networks, Final Report, 28 November 2017, Sydney (**AEMC 2017 Final Report**); AEMC, Updating the regulatory frameworks for embedded networks, Final Report, 20 June 2019 (**AEMC 2019 Final Report**).

for safety regulations, public road consents, property rights, access rights and obtaining planning approvals. However, the ESA and Service & Installation Rules are currently unclear on this distinction between 'distribution systems' and 'electrical installations', and on the circumstances in which an 'electrical installation' requires additional regulation given its size and scope. This has direct and important implications for consumer protections, reliability and guaranteed service levels as well as reporting and monitoring conditions. Additionally, there is no requirement in NSW to licensee embedded networks to provide comparable protections to customers like there is in South Australia, or set parameters for when they are or are not allowed like in Victoria. The NSW DNSPs consider that greater clarity is now required given the growth in embedded networks in NSW over the past decade like it has done for water embedded networks (also known as private water networks) via the *Water Industry Competition Act 2006* (**WIC Act**). This Act imposes obligations on water embedded networks to ensure that the operators are licensed and must provide an array of customer protections including splitting out the retail function from the network function. However, does not confer the same powers given to the public water utility for matters such as land acquisition and compliance.

3 **Safety risks for embedded network customers and the general public.** The AEMC reviews have also noted that safety regulations often apply inconsistently to embedded networks and distribution systems. In NSW, where an embedded network is classified as an 'electrical installation' under the ESA, the operator will not be subject to the same safety obligations as a distribution system operator. This creates safety risks for customers and the general public, particularly in the case of larger embedded networks (e.g. those in 'mixed use' developments). Of particular concern are HV embedded network installations, since these carry a higher likelihood of catastrophic consequences to both life and property from close contact. For example, the only HV mixed use with residential embedded network in South Australia had a major safety incident in 2019 resulting in two contractors being hospitalised with severe burns.[2]

4 **Limited visibility of embedded network operations**. In order to support efficient dimensioning and maintenance of distribution systems, it is important for DNSPs to have visibility of load, generation and storage resources connected to their networks. This is important both to maximise the efficiency of distributed resources and to support the safety and reliability of the distribution system. While important steps have been taken to improve visibility of distribution-connected resources, DNSPs continue to have limited visibility of operations and energy resources within embedded networks. With growing levels of behind the meter distributed energy resources such as rooftop solar, this could have implications for how NSW DNSPs manage their network during times of system constraint.

5 **Potential for uneven sharing of network costs.** Where there are a large number of customers connected to an embedded network, those customers currently pay a much smaller share of fixed network costs compared to distribution-connected customers (assuming the embedded network operator passes through that lower amount, which it may not). As such, the costs of running the distribution network are not shared equitably between customers within embedded networks and those outside embedded networks. Ausgrid is currently working to address this inefficiency and will consult on a new tariff assignment policy that seeks to address this cross subsidy between network users. This results in other customers paying a higher than otherwise proportion of the fixed-shared costs of the network, to the benefit of the embedded network customers (or often the embedded network owner). As a shared community asset, this is often viewed as unfair by our customers.

[2] 'Two suffer burns in accident at Tonsley precinct', *The Advertiser*, 7 February 2019.

6 **Customers are not receiving access to retail choice or comparable regulated outcome.** The AEMC and AER have identified 'significant practical barriers' to customers in embedded networks accessing retail choice or comparable regulated outcomes. Whilst access to retailer choice in and of itself does not guarantee improved customer outcomes (given the range of regulated solutions also available to policy makers), we would nonetheless encourage close consideration from regulatory bodies to ensure customers connected to an embedded network are 'no worse off' relative to normal distribution-connected customers. Where embedded network customers are not receiving adequate service levels, options could be explored which include regulated pricing, similar to a regulated default market offer type construct.

The NSW DNSPs consider that all regulatory reform options should be considered as part of this Inquiry – including those arising out of the AEMC and Victorian Government reviews,[3] and the approach taken for water embedded networks in NSW. The expected costs and benefits of each option should be assessed by the Committee, having regard to the potential role of electricity embedded networks in the future energy system and the need to maintain appropriate regulatory safeguards.

At a minimum, the Committee should consider:

- Providing greater clarity around the regulatory treatment of embedded networks in NSW – including the circumstances in which an 'electrical installation' will require additional regulation and licensing given its size and scope, for example to align with the approach taken in NSW for private water networks (water embedded networks);
- Improving protections for customers connected to embedded networks, and potentially aligning these with protections available to distribution-connected customers;
- Enhancing safety regulations for embedded networks; and
- Improving visibility of operations and energy resources within embedded networks.

The NSW DNSPs' key recommendations are:

1 Consider NSW-specific measures that may be required to address gaps in the consumer protection framework for customers served by embedded networks.

2 Clarify the circumstances and thresholds under which an embedded network (be it an 'electrical installation' or other category of network infrastructure) requires additional regulation and licensing in the form of conditions for consumer protections, reliability, guaranteed service levels, reporting and monitoring, technical, safety and/or price regulation, for example as occurs in South Australia.

3 Clarify that under the ESA, the mode of connection for an embedded network will be determined by the DNSP, having regard to network safety considerations.

4 Consider policy options identified in the AEMC and Victorian Government reviews, and apply a cost-benefit assessment of each one.

5 Consider measures to improve the visibility of resources within embedded networks. This information could be reported directly to the Australian Energy Market Operator (**AEMO**) by embedded network operators and accessible to all market participants.

6 Clarify what constitutes a 'distribution system' and what constitutes an 'electrical installation' for regulatory purposes.

[3] The State of Victoria Department of Environment, Land, Water and Planning, Embedded Networks Review, Final Recommendations Report, January 2022.

A potential regulatory and policy pathway forward for the Inquiry to consider could be to:

1 Retain the existing regulatory settings for traditional embedded networks such as small networks servicing caravan parks or retirement villages with fewer than 30 residential or small business customers.

2 Implement stronger regulation of larger embedded network operators through licensing. The AEMC and AER have recommended greater alignment of consumer protections for embedded network customers with those of standard supply customers. For NSW it may also include closely aligning safety and reliability obligations for large embedded networks with those applying to DNSPs and use the SA licensing approach and NSW approach for private water networks under the WatIC Act as a model.

3 Restriction or bans on certain types of embedded networks. For example, the Victorian Government has decided to ban new embedded networks. Instead NSW could determine that certain types of new embedded networks of a certain size or type should be restricted or banned. This could include banning residential or mixed use HV networks and limiting HV embedded networks to industrial sites only.

For embedded networks that fall within category 2 or 3 above we recommend that IPART license and regulate these categories of embedded network like wat they do for the embedded water network industry. Safety, technical and performance requirements for these categories of embedded networks should mirror the obligations imposed on DNSPs. This will help ensure that customers receive standardised protections, safety, technical and performance standards regardless of whether they are connected to an DNSP or an embedded network.

We would be happy to discuss any aspect of this submission with the Committee.

2 Introduction

The Committee has been asked to inquire into and report on embedded networks in NSW, with particular reference to:

- The current legal framework regulating embedded networks;
- Changes to the legal framework proposed by the AEMC in its 2019 review on updating the regulatory frameworks for embedded networks;
- The effect of embedded networks on NSW residents and businesses, including any health or safety concerns;
- Policy and legal solutions to address the effect of and concerns about embedded networks, including to address any gaps in the regulatory framework or safety concerns raised by NSW residents and businesses; and
- Any other related matters.

As the DNSPs for NSW, we are uniquely positioned to comment on these issues given our central role in the supply chain and interface with embedded networks.

Embedded networks play a complimentary role to distribution networks and are our customers as well. As such, our interest is to ensure that there is sufficient clarity in the regulatory treatment of embedded networks and appropriate protections for embedded network customers. This is particularly important at a time of transition in the energy market.

This review is timely, for two reasons:

1 The 'typical' embedded network use case has moved away from small scale retirement village or caravan park arrangements (micro embedded networks of fewer than 30 customers) and is now dominated by strata residential buildings, shopping centres and other large 'mixed use' developments, which are often large precincts comprising potentially hundreds or thousands of individual customers. The rapid growth in the scale of embedded networks far exceeds what was contemplated when current NSW legal frameworks were established. It continues to exceed those bounds with NSW DNSPs beginning to see new embedded network connection applications comprising HV connections, multiple buildings and thousands of customers.

2 The energy market transition is now gathering pace, with implications for the role of networks including licensed networks and embedded networks.

Each of these points is discussed briefly below.

2.1 Expansion in embedded network types combined with rapid growth in the number and scale of embedded networks

The regulatory frameworks governing embedded networks – including frameworks for exemption from registration and other regulatory obligations – were established at a time when embedded networks were mostly limited to caravan parks, residential parks and retirement villages of 30 customers of less. At the time, the embedded network regulatory framework was broadly considered fit for purpose in addressing a specific defined need for the relatively few embedded networks operating in NSW at that time.

The embedded network types later grew to include some strata apartment buildings as embedded networks became an increasingly common method for developers to build medium- to high-density dwellings.

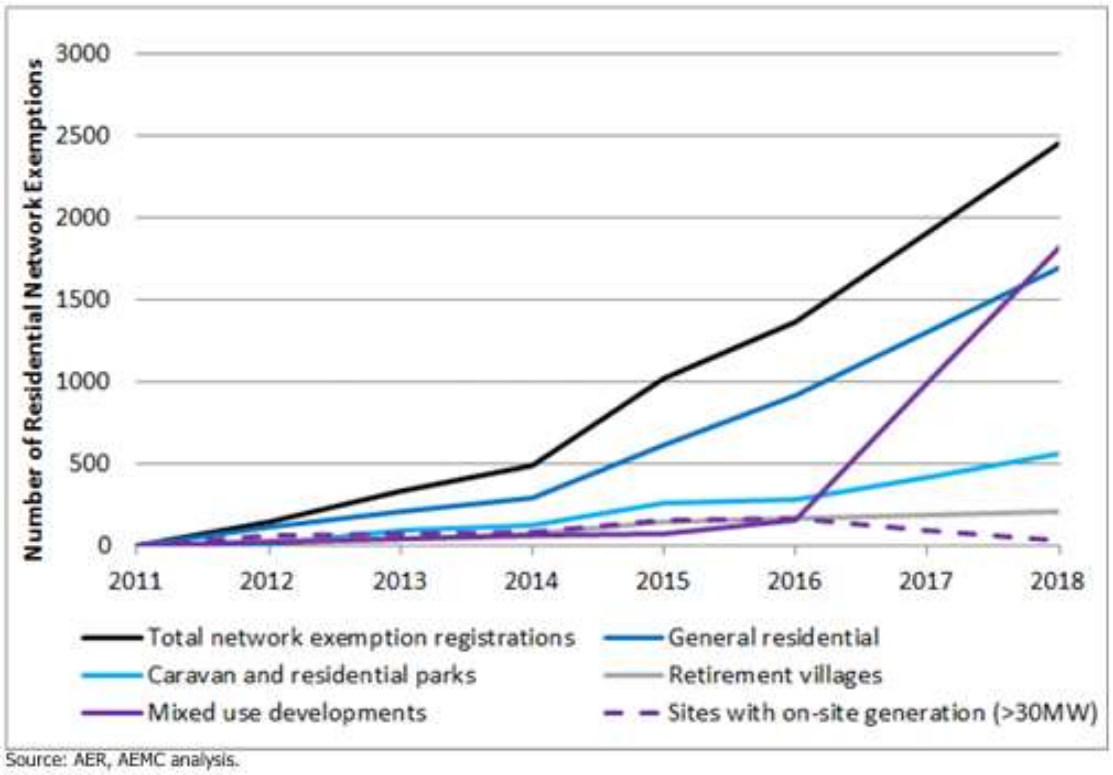
Over the past decade, there has been a rapid increase in the number of embedded networks. Between 2014 and 2018, the number of residential network exemptions recorded by the AER more than quadrupled – from around 500 to around 2,500 – across the NEM (**see Figure 1 below**).[4]

This growth was initially driven by general residential developments, such as new apartment buildings. However, over the past five years there has been dramatic growth in the number of network exemptions for 'mixed use developments'. These 'mixed use' developments are often large precincts combining residential, shopping centres, commercial and community usage, in some cases with significant generation and storage behind the parent meter. Prior to 2016, there were very few of these 'mixed use' developments holding network exemptions. However, 'mixed use developments' were the largest category of network exemptions by 2018, overtaking general residential developments and far outstripping the traditional small-scale caravan park, residential park and retirement village embedded network types.

Of note, pre-2016 the mixed use developments were typically for commercial use only (i.e. shopping centre and small business sites or mixed use industrial sites) that did not include residential customers. These types of customers typically have greater agency to engage with embedded networks than a residential customer and can advocate for more beneficial outcomes.

For example, a large supermarket chain could have sufficient economies of scale to justify investing in the metering infrastructure required to leave an embedded network. Whereas an equivalent cost on a residential customer would be prohibitive.

Figure 1: Residential network exemptions

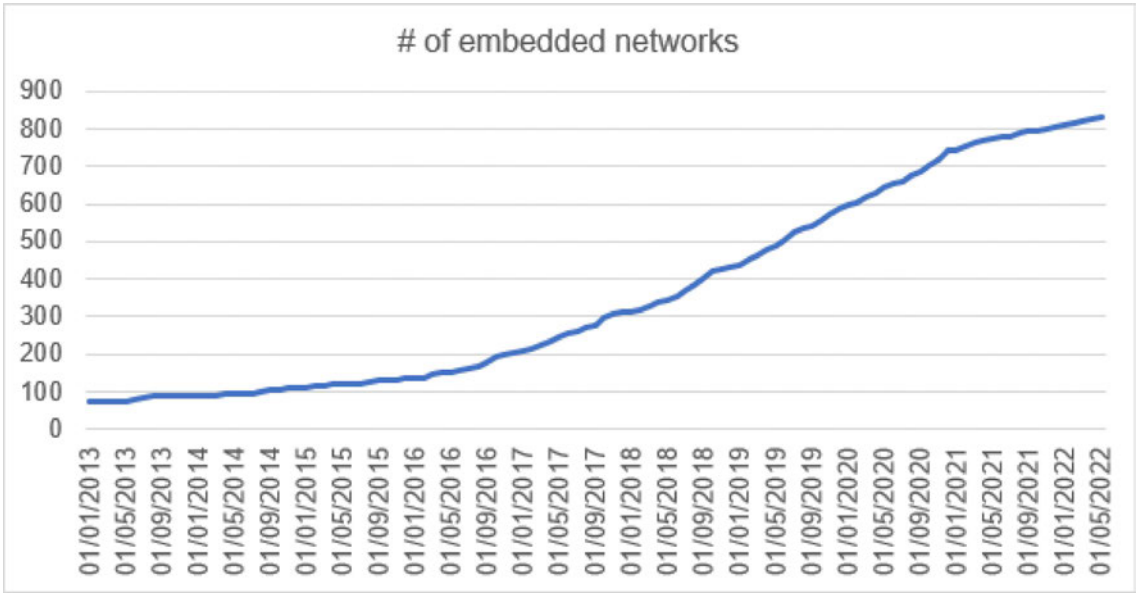


Source: AER, AEMC analysis.

[4] AEMC 2019 Final Report, ii.

The NSW DNSPs have a similar growth trajectory within their distribution areas. For example, Ausgrid has seen the number of embedded networks in its distribution area grow 8-fold from around 100 in 2015 to around 800 today (**see Figure 2 below**).

Figure 2: Number of embedded networks in Ausgrid distribution area showing a stable number of embedded networks that increase 8-fold in under 5 years



In the same time period, the number of embedded networks on the Essential Energy network service area has rapidly grown at an annualised rate of approximately 14% and as at June 2022 numbers 72 embedded networks.

Due to limited visibility of embedded network operations in NSW as there is no NSW registration or licensing requirement for them, NSW DNSPs are unable to identify the specific types of embedded networks that have been driving this growth.

2.2 The energy market transition

The energy market transition is rapidly gathering pace. Various factors are reshaping the energy supply chain, including developments in technology, shifting community sentiment around climate action and ageing of legacy infrastructure.

Of particular importance to this review is the growth of distributed energy resources (**DER**) and the changing role of networks. DER include solar PV installations, small-scale battery storage, electric vehicles and smart devices offering demand response capability. DER growth means that our role as DNSPs is changing. DNSPs will increasingly be used as platforms to connect these distributed resources, rather than just a conduit for delivery of centralised generation.

From a DNSP perspective, the market transition creates a need to more closely monitor the network and its capacity to accommodate distributed resources in our role as distribution system operators. With greater visibility of distributed energy resources, DNSPs can proactively plan investment needed to support the additional DER on the network and capacity needed to support them.

From a customer perspective, the transition potentially creates many more opportunities for participation in the energy market – including opportunities to produce, store and consume energy and to participate in demand response. However, a customer's ability to actively engage with new energy services depends on having access to information and markets for these services. There is also a need to ensure that customer protection frameworks keep pace with the expansion of markets for new energy services.

3 Gaps in the current legal framework for embedded networks

In the AEMC's 2017 Final Report, the AEMC found that the regulatory framework for embedded networks was no longer fit for purpose in the face of the change in embedded network use case, combined with the growth in the number of embedded networks.[5] The AER has subsequently agreed with this finding noting that 'embedded networks pose potential harms to consumers given the way they are set up' and 'are likely to be exacerbated in a post-2025 market, whereby consumers in embedded networks are unlikely to have access to or control over how they access new technologies and service models.[6]

NSW DNSPs agree with these observations. At a national level, the rules relating to consumer protection, network price regulation and retail contestability have failed to keep pace with the change in embedded network types and scale, combined with the rapid growth in the number of embedded networks. At the state level, there is a lack of clarity around the regulatory treatment of large-scale embedded networks in particular, and significant gaps in the application of safety regulations.

3.1 Gaps in the consumer protection framework for customers served by embedded networks

A number of protections apply to customers that are directly connected to a distribution system by a DNSP. These include protections around reliability and safety under the ESA and DNSP licences, as well as protections that must be afforded by DNSPs to their customers under the National Energy Customer Framework.

Some of the key protections for distribution-connected customers include:

- Network reliability standards and customer service standards imposed under DNSP licences;[7]
- Payments to customers when a DNSP fails to comply with reliability or service standards under guaranteed service level schemes;[8]
- Regulatory oversight of network performance – including requirements to report regularly to IPART on performance against reliability standards;[9]
- Obligations to provide connection services;[10]
- Deemed standard connection contracts governing the relationship between DNSPs and customers;[11]
- Requirements to publish certain information relating to connection services and the customer's rights and obligations;[12]
- Restrictions around interruption of supply, and requirements to notify customers in advance of any planned interruption;
- Strict rules around disconnection of supply;
- Additional protections for customers relying on life support equipment; and
- Retailer of last resort (**RoLR**) arrangements.

[5] See, e.g. AEMC 2017 Final Report, i and iv.

[6] AER, Retailer authorisation and exemption review: Issues Paper, April 2022, 31.

[7] For example: Ausgrid distributor licence issued under the ESA, cls 4, 5 and 6.

[8] For example: Ausgrid distributor licence issued under the ESA, cl 6.

[9] For example: Ausgrid distributor licence issued under the ESA, cl 7.

[10] NERR, s 79(4); NERL, s 66.

[11] NERR, s 81; NERL s 71(1).

[12] NERR, r 80.

Most of these protections do not apply to customers within embedded networks. In particular, these customers do not have any assurance around the reliability or performance of the embedded network, nor is there any regulatory scheme for compensation in the event or poor network performance.

Further, rules relating to service interruptions, including requirements to notify customers of a planned interruption do not apply to embedded network operators. Indeed, many embedded network customers are not even aware that they are an embedded network customer. This means that they are not able to make informed choices about their energy usage or advocate for their choices.

A number of these gaps in the customer protection framework were identified in the AEMC 2019 Final Report. The AEMC observed:[13]

> *While embedded network customers do benefit from some consumer protections imposed by the AER as conditions of exempting embedded network operators from registering as a network service provider and being authorised as a retailer, these consumer protections are more limited than those applicable for standard supply arrangement customers. Consumer protection gaps exist in areas such as de-energisation and re-energisation obligations, obligations to provide connection services, life support arrangements, information provision and retailer of last resort arrangements. There are no reliability standards or guaranteed service level payments for outages that apply to customers in embedded networks, as well as gaps in safety obligations in some jurisdictions. It is also more difficult for embedded network customers in some jurisdictions to access concessions and ombudsmen schemes.*

The AEMC also noted that the application of safety rules to embedded networks in some jurisdictions was unclear.[14] The issue of safety regulations is discussed further below.

The AEMC recommended changes to the National Energy Retail Law (**NERL**) and National Energy Retail Rules (**NERR**) to address some of these gaps. The AEMC's recommendations included changes to the NERL and NERR that would align the consumer protections for embedded network customers with those of standard supply customers. This reflects the position of the AEMC that embedded networks should be included in the national framework and that the existing protections could be applied without alteration. This position was adopted by the AEMC in the AEMC 2017 Final Report, and further reinforced in the final recommendations provided in the AEMC 2019 Final Report.[15] However the recommendations have not yet been enacted in legislation by Energy Ministers and we understand that there are no current plans to do so.

NSW DNSPs generally support changes to the NERL and NERR to better align protections for embedded network customers with those of standard supply customers. However, we note that the gaps in the customer protection framework are unlikely to be fully addressed through amendments to the NERL and NERR, as recommended by the AEMC given that a number of the key protection mechanisms for consumers exist in state legislation and/or instruments issued under state legislation (e.g. service standards applicable under DNSP licences).

The Energy & Water Ombudsman NSW (**EWON**) reports that it has received numerous complaints from embedded network customers in recent years, highlighting gaps in the customer protection framework.[16] EWON points to confusion among small business and residential customers regarding the regulatory framework, as well as inconsistencies in protections available. EWON considers that the growth of the embedded network industry has caused the regulatory system to 'become unwieldly'. For example, EWON notes that the ESA gives all residential and small business customers the right to complain to EWON, but because operators are not required to be EWON members, EWON's dispute

[13] AEMC 2019 Final Report, iii at [18].

[14] AEMC 2019 Final Report, v.

[15] see AEMC 2019 Final Report, chapter 4.

[16] See: https://www.ewon.com.au/page/publications-and-submissions/reports/spotlight-on/embedded-networks.

resolution powers are limited to, at best, negotiating an outcome if the operator is open to engaging with EWON.

We would encourage the Committee to consider additional NSW-specific measures that may be required to supplement any changes to the NERL and NERR. Possible NSW-specific measures to address gaps in the customer protection framework are discussed in section 4 below.

3.2 Lack of clarity around classification of embedded networks for regulatory purposes

The ESA and Service & Installation Rules currently distinguish between 'distribution systems' and 'electrical installations'. The Service & Installation Rules also refer to the concept of a 'customer installation' which has the same meaning as an 'electrical installation'.

The distinction between a 'distribution system' and an 'electrical installation' is critical because the ESA confers substantial powers and imposes significant obligations on 'network operators' (including operators of distribution systems (DNSPs)) and exempts them from various burdens when installing, operating and carrying out works. This is particularly relevant for safety regulations, public road consents, property rights, access rights and obtaining planning approvals. The same rights and obligations do not apply to owners and operators of electrical installations.

Under the ESA, a key point of delineation between a 'distribution system' and an 'electrical installation' is a 'connection point'. The ESA defines a 'distribution system' as the electricity power lines, structures and associated equipment used to convey and control the conveyance of electricity up to the connection point for the premises of a wholesale or retail customer.[17] An 'electrical installation' is defined as the wiring and electrical equipment used to convey and control the conveyance of electricity 'within premises to which electricity is supplied from a distribution system' – in other words, the equipment beyond the connection point.

NSW DNSPs understand that, under these definitions, a traditional embedded network (e.g. a caravan park or retirement village network) would not be a 'distribution system' and would likely be classified as an 'electrical installation'. This means that an operator of a small scale embedded network of say 30 residential customers or less in a caravan park or retirement village would not be subject to the same regulatory obligations as a distribution system operator. Among other things, the operator of such a network would not require a distribution licence under the ESA.

However, the position with respect to larger embedded networks is less clear. In particular, it is unclear to what extent an 'electrical installation' may extend beyond a customer's premises and traverse public lands. To the extent that an embedded network does traverse public lands (including public roads), it is unclear whether it would meet the definition of an 'electrical installation'. In such cases, the embedded network would appear to be in a regulatory 'no man's land'.

One example of this lack of clarity is in the definition of a 'connection point'. The ESA definition of a 'distribution system' suggests that a connection point need not be on the customer's premises – the 'distribution system' is defined as extending up to the connection point for the premises, *whether or not the connection point is on the building or land comprising the premises*.[18] However, under the ESA definition of 'connection point', this point is to be determined by reference to the Service & Installation Rules. The Service & Installation Rules state that, except for HV connections, a connection point must be on 'relevant land', meaning 'land to which the customer concerned or the electrical installation owner has a legal right of access for the purpose of constructing or maintaining the electrical installation'.[19] Thus, the ESA appears to contemplate a connection point being outside

[17] *Electricity Supply Act 1995* (NSW), s 12A.

[18] *Electricity Supply Act 1995* (NSW), s 12A.

[19] Service and Installation Rules of New South Wales (October 2019), r 1.9.

the land comprising the customer's premises whereas the Service & Installation Rules suggest a 'customer installation' is in a particular place.

This is one example of where the regulatory framework is unclear on the classification and treatment of embedded networks. On one view of the ESA and Service & Installation Rules, a large embedded network traversing public land could be an 'electrical installation'. However, on another reading of the regulatory framework, some large embedded networks would sit in regulatory 'no man's land' – neither a 'distribution system' nor an 'electrical installation'.

There is also no distinction under the regulatory framework between traditional embedded networks which clearly satisfy the definition of an 'electrical installation' (e.g. a caravan park or retirement village network) and much larger embedded networks (e.g. multi-building residential strata developments). These larger embedded networks can have very different characteristics to traditional embedded networks – including their size, load / generation profiles, connection type and the extent to which they traverse public land.

To address these issues, the ESA is likely to require amendment to clarify what constitutes a 'distribution system' and what constitutes an 'electrical installation'. At a minimum, this is likely to mean adopting more consistent definitions of a 'connection point', 'distribution system', 'electrical installation' and 'customer installation'. To the extent that some embedded networks do not meet these amended definitions, a new category of network installation may need to be created to fill this regulatory gap.

The ESA should also clarify the circumstances and thresholds under which an embedded network (be it an 'electrical installation' or other category of network infrastructure) requires additional regulation and licensing in the form of conditions for consumer protections, reliability, guaranteed service levels, reporting and monitoring, technical, safety and/or price regulation. This may be, for example, where an embedded network reaches a particular size or extends beyond a customer's premises.

NSW DNSPs understand that in some other jurisdictions, additional regulation and/or licencing obligations apply to certain types of embedded network operators. For example, in South Australia, certain HV embedded networks will be classified as 'distribution networks' and therefore require a licence under Part 3 of the *Electricity Act 1996* (SA). As part of issuing a licence to a HV embedded network operator, the South Australian energy regulator (**ESCOSA**) may impose conditions including in relation to safety, connection policies and customer protection mechanisms. There is currently one licenced HV embedded network operator in South Australia – for the Tonsley Innovation District.

Similar issues have been addressed in the water sector in NSW through the imposition of licence requirements for embedded network operators. Under the WIC Act, water embedded network operators are now required to hold a licence, which may be subject to conditions. This may include conditions to ensure that the licensee has, and continues to have, the capacity (including technical, financial and organisational capacity) to carry out the activities authorised by the licence. IPART is responsible for monitoring compliance with these licence conditions.

The WIC Act separates out water embedded networks by scale and type. For example water embedded networks with fewer than 30 residential or small business customers connected to the network do not require a license from IPART. Water embedded networks with 30 or more residential or small business customers must have a licensed operator and a licensed retailer. This means the licensed operator is responsible for compliance with the license conditions for operating and maintaining the network allowing for more direct understanding of roles and responsibility for customer protections. It also allows a community to retain their embedded network licensed operator but change their licensed retailer.

This could work in NSW for electricity embedded networks by requiring the electricity embedded network operator arm to hold a license from IPART and the licensed retailer arm to hold a retailer authorisation from the AER. This promotes competition in the embedded network market, as

customers within embedded networks could seek another authorised retailer to provide them with services as a collective or individually.

The WIC Act provisions also include obligations on water embedded networks to seek approval from IPART before it can be built from a design perspective and 'last resort' provisions in the event that a licensed operator fails. The operator licenses are not tied to specific infrastructure but instead the same licensee can be registered to multiple sites subject to IPART's approval.

We would encourage the Committee to consider options for clarifying the regulatory obligations that apply to embedded network operators under the ESA. This may include expanding licensing obligations to cover embedded network operators – similar to the approach adopted for HV embedded networks in South Australia and for water infrastructure in NSW under the WIC Act. This Act imposes obligations on water embedded networks to ensure that the operators are licensed and must provide an array of customer protections including splitting out the retail function from the network function. However, does not confer the same powers given to the public water utility for matters such as land acquisition and compliance. We support the Inquiry and IPART taking a similar approach for electrical embedded networks in NSW.

3.3 Application of safety regulations

As the number and scale of embedded networks grows, it is critical that the application of safety regulations is appropriately updated. DNSPs are subject to strict regulations to protect the safety of our workers and customers. NSW DNSPs recognise that safety regulations need not apply in the same way to small-scale embedded networks (e.g. traditional caravan park or retirement village models). However, certain larger embedded networks – including those that traverse public lands – may need to be subject to a stricter safety regime. A similar approach is used for water embedded networks in NSW as outlined in section 3.2.

Embedded networks are typically only subject to general workplace health and safety laws, which operate in limited contexts. These laws are not designed to comprehensively address the risks to members of the public created by electricity networks when operated in areas more accessible to the general public.

Of particular concern are HV embedded network installations. Recently, NSW DNSPs have seen developers start to apply for HV embedded network connections. This reflects how the scope of embedded networks have changed from caravan parks and retirement villages of fewer than 30 customers to increasingly larger embedded networks for 'mixed use' developments. HV installations carry a higher likelihood of catastrophic consequences from close contact when compared to low voltage (**LV**) installations. The risk to the general public increases when HV installations are situated in close proximity to residential developments.

Regrettably, some safety incidents have occurred at HV embedded network sites in other jurisdictions. For example, in South Australia, the only HV mixed use residential embedded network has a safety incident in 2019 resulting in two employees of the embedded network being hospitalised for severe electrical burns, and one being placed in an induced coma due to the extent of their burns.[20]

In section 4 we discuss policy options to address the safety risks posed by larger embedded networks. These include applying stricter safety regulation to these larger embedded networks and/or restricting the size and scope of embedded networks that can be operated without meeting higher safety standards.

[20] 'Two suffer burns in accident at Tonsley precinct', *The Advertiser*, 7 February 2019.

3.4 Determining the appropriate mode of connection to the distribution system

A related issue arises in relation to the mode of connection to the distribution system. Historically, smaller scale embedded networks (e.g. traditional caravan park or retirement village models) have been accommodated through LV connections to the distribution system. However, as noted above, NSW DNSPs have started to see developers request HV embedded network connections, which NSW DNSPs reject and request one or more LV connections unless there are extenuating circumstances.

In some cases there will be a choice to be made between a single HV connection or multiple LV connections for a large development. The choice between these options will have implications for network safety.

NSW DNSPs consider that, in such cases, the DNSP (i.e. distributor) should have discretion to decide on the appropriate mode of connection, having regard to safety considerations.

We consider this is currently reasonably clear on the face of the ESA and Service & Installation Rules. In particular, the following sections of the ESA provide a broad discretion to determine suitability of an electricity connection:

- Section 26(2) states that the type, construction and route of a service line and its point of connection are to be determined by the distributor;
- Section 26(3) states that a distributor may require premises to be provided with more than one point of connection if the distributor considers it necessary to avoid interference with the supply of electricity to or from any other premises; and
- Section 24(2) states that a distributor may refuse to provide a customer connection service to a person who fails to comply with a requirement under Division 4 of the ESA (which includes section 26 of the ESA).

Moreover, rule 7.4.3 of the Service & Installation Rules expressly provides that a distributor will nominate the supply voltage:

> *The electricity distributor will nominate the supply voltage during negotiations. Consult with the electricity distributor for its likely range of voltage conditions and install suitable equipment accordingly.*

Although we consider this to be reasonably clear under the current ESA and Service & Installation Rules, there appears to be some uncertainty among embedded network operators regarding their ability to request an HV connection. We would therefore recommend clarifying that under the ESA, the mode of connection for an embedded network will be determined by the licensed DNSP having regard to network safety considerations.

3.5 Limited visibility

In order to support efficient dimensioning and maintenance of distribution systems, it is important for DNSPs to have visibility of load, generation and storage resources connected to their networks. This is important both to maximise the efficiency of DER on their networks and to support the safety, security and reliability of their distribution system.

There has been growing recognition of the need for visibility of DER in recent years, as more generation and storage moves behind the meter. For example, in 2018 the AEMC (at the request of the COAG Energy Council) made a rule for AEMO to establish a register of distributed energy resources in the national electricity market, including small scale battery storage systems and rooftop

solar.[21] The register is intended to give DNSPs and AEMO visibility over where distributed energy resources are connected to assist in planning and operating the power system as it transforms.

While important steps have been taken to improve visibility of DER, DNSPs continue to have limited visibility of operations and energy resources within embedded networks. Again, this is of greater concern in relation to larger embedded networks that are likely to have larger amounts of generation and storage resources connected.

As one example of this lack of visibility, EWON notes that there continues to be limited information available on the number of customers connected to embedded networks. EWON recommends that the AER be more proactive in collecting data regarding the number of customers covered by network and retail exemptions and ensure these numbers are reported publicly on a regular basis – or change the public register so that customer numbers are included in the details on a registered exemption.[22]

NSW DNSPs would support improving the visibility of both customer numbers and distributed energy resources within embedded networks. This information could be reported directly to AEMO by embedded network operators and accessible to all market participants.

3.6 Unfair sharing of fixed network costs

The rules that apply to the determination of network tariffs can restrict the ability of DNSPs to fairly apportion fixed network costs between embedded network customers and standard supply customers. This issue has not been particularly significant with relatively small embedded networks, but it becomes more significant as more customers are connected to an embedded network.

The regulatory framework for determining network tariffs is fundamentally designed to support 'postage stamp' or 'uniform' pricing. Under 'postage stamp' pricing all customers of a certain type (e.g. residential) pay the same share of fixed network costs regardless of the network assets used to supply the individual. Specifically, the National Electricity Rules (**NER**) require that tariff classes be constituted with regard to the need to group customers together on an economically efficient basis and to avoid unnecessary transaction costs. Customers with similar connection and usage profiles must also be treated on an equal basis.[23]

Typically, a DNSP's fixed costs will be shared equally among all customer connection points within a tariff class. For an embedded network with a single parent connection point and multiple customers behind the parent connection point, the total amount of fixed costs apportioned to that connection point will be the same as for a connection point serving a single customer. This means that for an embedded network with multiple customers, the contribution of each customer to fixed network costs will be much smaller than the contribution of a single standard supply customer. In effect, standard supply customers will cross-subsidise those customers connected to embedded networks.

The scale of the cross-subsidy increases significantly as the size of an embedded network grows.

This gives rise to both equity and efficiency concerns. From an equity perspective, standard supply customers will be paying more in fixed network costs simply because they are not connected to an embedded network. This results in other customers paying a higher than otherwise proportion of the fixed-shared costs of the network, to the benefit of the embedded network customers (or often the embedded network owner). As a shared community asset, this is often viewed as unfair by our customers.

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[21] *National Electricity Amendment (Register of Distributed Energy Resources) Rule 2018*. See: https://www.aemc.gov.au/rule-changes/register-of-distributed-energy-resources#:~:text=as%20it%20transforms.-,On%2013%20September%202018%20the%20AEMC%20made%20a%20final%20rule,storage%20systems%20and%20rooftop%20solar.

[22] See: https://www.ewon.com.au/page/publications-and-submissions/reports/spotlight-on/embedded-networks.

[23] See NER, rr 6.18.3(d) and 6.18.4(a)(2).

From an efficiency perspective, the cross-subsidy could lead to development of embedded networks purely on the basis of an artificial cost advantage – and in circumstances where it would not otherwise be efficient. An embedded network should be utilised where it is the most practicable model (e.g. caravan parks) and offers a cost-service quality mix that is more attractive to customers, rather than implemented to exploit pricing inefficiencies or inconsistent regulations and regulatory gaps.

NSW DNSPs acknowledge that tariff structure issues are likely to be best addressed through the NER and AER approval of tariff structure statements.

However, this again illustrates the strain on regulatory arrangements posed by rapid growth in the number and size of embedded networks.

3.7 Embedded network customers not receiving access to retailer choice or a comparable regulated alternative

The AEMC reviews and the Victorian Government review each raised concerns that embedded network customers may not have access to retailer choice.[24] This is at least partly due to inadequate regulation of embedded network operators, and retailers needing to accommodate unregulated bespoke arrangements for individual embedded networks.

Currently, bespoke embedded network tariffs and embedded network arrangements require retailers to operate manual processes to manage transactions with large numbers of exempt network service providers. These network tariff structures and billing arrangements make it costly for NEM retailers to serve embedded network customers because they must adapt product offerings and implement manual processes to manage transactions with large numbers of exempt network service providers. In the AEMC 2017 Final Report, the AEMC found that the costs and risks related to network billing act to deter NEM retailers from serving embedded customers.

Whilst access to retailer choice in and of itself does not guarantee improved customer outcomes given the range of regulated solutions that are also available to policy makers, we would nonetheless encourage close consideration from regulatory bodies as to ensure customers are 'no worse off' relative to a normal distribution connected customers. Where embedded network customers are not receiving adequate service levels, options could be explored which include regulated pricing, similar to a regulated default market offer type construct.

In its recent review of retailer authorisation and exemption arrangements the AER similarly observes that, in practice, consumers in an embedded network often have limited retailer choice.[25] This is due to the way the network may have been wired or metered, or because energy retailers may not want to sell to a consumer inside an embedded network. The AER notes that conversions into embedded networks can lead to customer harm if occupants are not properly informed of the limitations imposed on their access to retail competition and alternative supply options. The AER identifies this as a key challenge for the energy sector transformation, as it means that customers within embedded networks may face barriers to engaging with new energy services. This challenge will become more acute if embedded networks are allowed to become larger and more numerous.

[24] AEMC 2017 Final Report, 25; AEMC 2019 Final Report, i-v; The State of Victoria Department of Environment, Land, Water and Planning, Embedded Networks Review, Final Recommendations Report, January 2022, 42-46, 75-76.

[25] AER, Retailer authorisation and exemption review: Issues Paper, April 2022, 31.

4 Policy solutions

The AEMC and Victorian Government reviews identified various policy solutions to address the regulatory challenges raised by the rapid growth of embedded networks.

Broadly, these policy solutions fall into three categories:

1 **Status quo**. It is recognised that current regulatory settings may be appropriate in some cases. For example, existing regulatory settings may be largely appropriate for traditional embedded networks such as small networks servicing caravan parks or retirement villages with fewer than 30 residential or small business customers.

2 **Stronger regulation of embedded network operators – particularly for large embedded networks and those traversing public land**. In particular, the AEMC and AER have recommended greater alignment of consumer protections for embedded network customers with those of standard supply customers. It may also be appropriate to more closely align safety and reliability obligations for large embedded networks with those applying to DNSPs and use the SA licensing approach and NSW approach for private water networks under the WIC Act as a model.

3 **Restriction or bans on certain types of embedded networks**. In some cases, it may be necessary to impose restrictions or bans on certain types of embedded networks. Notably, the Victorian Government has decided to ban new embedded networks. Alternatively, certain types of new embedded networks such as those of a certain size or type may be restricted or banned. This could include banning residential or mixed use HV networks and limiting HV embedded networks to industrial sites only.

For embedded networks that fall within category 2 or 3 above we recommend that IPART license and regulate these categories of embedded network like wat they do for the embedded water network industry. Safety, technical and performance requirements for these categories of embedded networks should mirror the obligations imposed on DNSPs. This will help ensure that customers receive standardised protections, safety, technical and performance standards regardless of whether they are connected to an DNSP or an embedded network.

Some brief commentary on the policy options coming out of the AEMC and Victorian reviews is set out in **Appendix A**.

We would encourage the Committee to consider all policy options and apply a cost-benefit analysis to each option for consultation. This assessment should have regard to both the potential role of embedded networks in the future energy system and the need to maintain appropriate regulatory safeguards and customer protections.

Appendix A: Recommendations from AEMC and Victorian Government reviews

AEMC recommendations

(a) Registration and exemption

The AEMC has recommended that, rather than requiring exemptions from normal registration requirements, additional categories of registration be created for embedded network operators and retailers.

The AEMC proposed that two new roles be created:

1 Embedded Network Service Providers (**ENSPs**), which will be required to **register with AEMO** and will be subject to many of the existing regulatory requirements placed on DNSPs; and

2 Off-market retailers, which will be required to obtain an **authorisation from the AER** and will be subject to most requirements that existing authorised retailers are subject to, including being subject to the NERL compliance framework applicable to NEM retailers.

(b) Consumer protections in the NERL and NERR

Under the AEMC recommendations, customers in new embedded networks will be retail customers, supplied by either an authorised on-market NEM retailer or an authorised off-market retailer. Where customers are supplied by an authorised off-market retailer, almost all the existing consumer protections under the NERL and NERR should apply.

New Retailer of Last Resort (**RoLR**) arrangements would also apply in embedded networks where the retailer at the parent connection point would become the RoLR in the event of the failure of an off-market retailer.

(c) Market and system integration

The AEMC has recommended extending the application of the NER metering framework, noting that this is key to providing customers in embedded networks improved access to retail choice and important consumer protections relating to metering data.

The AEMC's specific recommendations in this respect include:

- Metering framework: apply the metering framework set out in Chapter 7 of the NER to embedded networks by requiring the off-market retailer to appoint a metering coordinator (**MC**), other than where a large customer at an off-market child connection point has appointed their own metering coordinator. In turn, as required under Chapter 7 of the NER, the metering coordinator will be required to appoint a metering provider (**MP**) and a metering data provider (**MDP**) who will have the same responsibilities at an off-market child connection point as they would have in relation to a standard supply customer's connection point or an on-market child connection point.
- Market interface: require ENSPs to apply to AEMO for national metering identifiers (**NMIs**) for all child connection points; register the NMI for connection points with AEMO through Market Settlement and Transfer Solutions (**MSATS**); and maintain information in the metering register. This will allow off-market child connection points to be 'discoverable'.
- B2B: ENSPs and off-market retailers should become B2B parties and be permitted to use B2B communications if they acquire accreditation with AEMO.

(d) Network billing

The AEMC recommended that, for 'on market' customers of ENPSs, ENSPs:

- Be required to set network charges at a level no greater than the amount that the customer would have paid had it been directly connected to the LNSP's distribution network to which the embedded network is connected (the 'shadow price');
- Be required to use standardised processes and data formats to bill retailers these charges for on-market customers; and
- Will not be permitted to charge residential customers for any infrastructure costs associated with their internal embedded network. If mutually agreed, an ENSP may levy charges from large customers and/or large corporate entities for the internal network.

(e) Connection of retail customers

Obligations would be imposed on ENSPs to provide customer connection services under the NERL and Chapter 5A of the NER in a similar manner to DNSPs. However, unlike for DNSPs, it is proposed that a single connection policy covering all ENSPs will be established by the AER. There will be obligations in place that require connection charges levied by ENSP to be reasonable and provisions that allow any disputes raised in this regard to be resolved by the AER.

(f) Connection of registered participants

While the ENSP will be required to meet certain obligations in establishing a connection agreement, the ENSP is not under any obligation to agree to connect a registered participant. The Commission considers there may be valid reasons why an ENSP may not wish to connect a registered participant, such as lack of network capacity or site characteristics.

Embedded networks that connect a registered embedded generator will not be eligible for a network exemption. ENSPs will be required to negotiate performance standards as part of establishing a connection agreement with a registered participant. AEMO will have an advisory role on the acceptability of some negotiated access standards. The ENSP will also have an obligation under Chapter 5 of the NER to consult the relevant DNSP prior to entering into or modifying a connection agreement with a registered participant. The ENSP and relevant DNSP will both be included in the information flow under the compliance framework for performance standards under Chapter 4 of the NER.

(g) Jurisdictional regulations

The AEMC also observes that to provide a complete set of consumer protection and safety regulations to consumers in embedded networks, there are state and territory functions that need to be considered.

Relevant state and territory regulations include:

- Network reliability protections including guaranteed service level schemes (as noted above, these apply as conditions of DNSP licences in NSW);
- Safety requirements and monitoring regimes; and
- Technical regulation, such as equipment and performance standards.

Given the importance of network reliability in particular, the AEMC has given consideration as to how jurisdictional frameworks might be amended to extend protections for existing DNSP customers to those of ENSPs. This could involve amending existing jurisdictional regulations for DNSPs in order to capture customers at child connection points, as opposed to treating parent connection points as only being single customers, and extending guaranteed service level schemes to cover ENSPs.

Recommendations of the Victorian Government review

On 14 January 2022, the final report in the Victorian Government's Embedded Networks Review was published. This report followed on from the Government's decision to ban new embedded networks, and included a series of recommendations relating to the implementation of the ban. Some of the key recommendations from this review are set out below.

Number	Recommendation	Rationale for recommendation
1	Implementation of ban on new embedded networks	• The Victorian Government's commitment to ban embedded networks in new apartment buildings (allowing limited exemptions) should be implemented via amendments to the General Exemption Order (**GEO**). • Changes to the GEO should include a new renewable energy condition requiring at least 50% of electricity at the site to be met from on-site renewable sources.
2	Additional conditions for legacy (existing) local energy networks	• Stakeholders broadly supported this recommendation to ensure that operators selling electricity in local networks are adequately equipped to provide this essential service.
3	Introducing licensing framework for new local energy networks	• Stakeholders noted that the introduction of licensing would support the long term effect of the embedded networks ban and eliminate disparities between conditions and regulatory obligations placed on licensed energy retailers and exempt sellers.
4	Applying the Local Energy Service (**LES**) licensing framework to legacy (existing) local energy networks	• Stakeholders were generally pleased at this recommendation ensuring all sites being brought under the new framework to ensure equity and fairness for all Victorian energy consumers.
5	Reviewing the broader licensing and exemptions framework	• Any review should also consider whether it is appropriate to extend these reforms to small business customers and the feasibility of extending the LES licensing regime to other exempt entities, such as commercial sites, industrial sites and business parks.
6	Enhancing consumer protections	• All local energy network customers (e.g. social housing, retirement villages and residential parks) should have access to customer protections which are equal or equivalent to those provided to on-market customers. • Aligning consumer access to rebates and concessions for both embedded network customers and on-market customers.
7	Enhancing the Essential Services	• Strengthen compliance, monitoring and enforcement of the state energy regulator to enforce an exempt person's compliance with

Number	Recommendation	Rationale for recommendation
	Commission's (**ESC**) enforcement powers and information about local energy network	exemption conditions. • Strengthen information gathering powers.
8 and 9	Access to competitive retail offers	• Embedded network customers noted that access to competitive retail offers and being able to exercise their choice of retailer is a consumer right. • Greater sense of control for embedded network customers to improve ongoing relationship with provider. • Customers should not be required to pay for the infrastructure upgrade and it should fall to embedded network operators. • Address lack of business-to-business arrangements and a dearth of suitable energy-only plans offered by on-market retailers for embedded network sites.
10	Improved information disclosure	• Commercial agreements and decisions around the ownership of an embedded network's infrastructure and assets are made long before new lot owners and tenants take possession or occupy the site. As a result, prospective customers have very little, if any, influence over the design (including technology offerings) and operation of the embedded network. • A lot owner and occupant's understanding of the commercial contracts and ownership arrangements associated with the embedded network infrastructure and assets is also often quite limited, making it difficult for them to negotiate a better deal. • In relation to information disclosure, prospective purchasers are at an even greater disadvantage than tenants, because there is no obligation to disclose information relating to an embedded network to a prospective purchaser.
11 and 12	Planning and building requirements (amendments to Victorian building and planning legislation)	• Panel uncovered a range of issues that are having a detrimental effect on owners and occupants in apartment buildings, some of which lie outside of the Panel's remit. One of the most significant issues is that embedded networks are often established in new residential sites with very little regard for the likely impact for consumers.
13	Bundled services and other fees and charges	• Some services that are common in apartment buildings, such as bulk hot-water, bulk heating/cooling, unmetered gas cooktops and solar PV, are often bundled together with electricity embedded networks and are provided by the same third-party service provider. As a result, customers may be unable to decipher how much they are paying for each service.

Number	Recommendation	Rationale for recommendation
14	Mitigating disruption of supply due to failure of a local energy network	• As an essential service, disruption to electricity and other bundled service supply should be minimised to the fullest extent possible, regardless of where people live.
15	Giving voice to energy consumers in local energy networks	• Reflects the ESC's approach in its published vulnerability strategy, *Getting to Fair: Breaking Down Barriers to Essential Services.* • The purpose of the strategy is to ensure the ESC is supporting consumers who are at risk or experiencing vulnerability to access essential services, noting that legislation requires the Commission to consider vulnerable and low-income consumers in its decision-making.
16	Transitional arrangements	• It is vital that affected stakeholders have a clear understanding of the key changes, including their rights and obligations as well as the sequencing and timelines for the reforms coming into effect.