8 August 2013

Mr John Pierce
Chairman
Australian Energy Market Commission
PO Box A2449
Sydney South NSW 1235

Dear Mr Pierce,

RE: AEMC's Draft Rule Determination - *National Electricity Amendment (Connecting Embedded Generators) Rule 2013* (Reference ERC0147)

The NSW Distribution Network Service Providers, Ausgrid, Endeavour Energy and Essential Energy (the NSW DNSPs) are pleased to respond to the AEMC's draft rule determination on connecting embedded generators (EGs).

The NSW DNSPs in principle support the draft determination and consider the draft rule to be more preferable than the rule change request. However, we have a number of concerns regarding the AEMC's proposed connection process. In particular, that it will create inefficiencies, increase consumer costs and will result in suboptimal outcomes for the Connection Applicant. Our concerns regarding the proposed process largely relate to:

- **The potential overlap and duplication of obligations** –the National Energy Customer Framework (NECF) already has the capability to address the connection process issues raised by the proponent's rule change request. We are concerned that creating another framework under the rules will impose unnecessary burden on DNSPs, have cost impacts on customers and increases the risk of processing errors.
- **The lack of clarity regarding the process application** – both the determination and the drafting of the rule are unclear regarding which EGs are eligible to apply for connections under the proposed process. This ambiguity is problematic for DNSPs from an implementation perspective and also creates confusion to prospective Connection Applicants.
- **Timeframes which are not practical**– the timeframes are not appropriate in light of the broad range of EGs (10kW to 30MW) eligible to apply for connections under the framework. While the timeframes are generally appropriate for small/simple EG connections they are not appropriate for more complex or larger connections (5MW or greater).
- **The risk of unrealistic expectations and sub-optimal outcomes** – if maximum timeframes do not align with the time required to process large/complex connections, Connection Applicants may be unwilling to agree to an extension. This may result in suboptimal outcomes for the Connection Applicant, as DNSPs may have insufficient time to develop cost effective solutions to facilitate their connection or meet their connection objectives or requirements.
- **The process not reflecting the iterative nature of establishing EG connections** – it is unclear how the timeframes will operate in practice, in particular whether the time taken by an EG to provide a DNSP with additional information or to correct deficiencies is counted towards the time the DNSP has for responding.

In Attachment 1 we detail these concerns and provide feedback on how the workability of the draft rule could be improved to better meet the National Electricity Objective (NEO). In addition to this detailed response in Attachment 1, we provide a summary of key positions in Attachment 2, an outline of the technical issues that may trigger a need to extend timeframes in Attachment 3, and connection examples to demonstrate the need for appropriate timeframes in Attachment 4.

The NSW DNSPs would be happy to meet with the AEMC to discuss our concerns further. If you have any further queries or would like to arrange a meeting please contact Mike Martinson, Group Manager Regulation at Networks NSW on (02) 9853 4375 or michael.martinson@endeavourenergy.com.au

Yours sincerely,

Vince Graham
Chief Executive Officer
Ausgrid, Endeavour and Essential Energy

Attachments:

1. Response to Draft Rule
2. Summary of Key Positions
3. Potential Causes of Delay
4. Connection Examples

1. INTRODUCTION

Our submission is not aimed at providing detailed comments in relation to each aspect of the draft rule. Rather, it is focused on providing the AEMC with feedback on the workability of the draft rule. In particular, we have sought to highlight aspects of the proposed connection process which could be further refined or clarified to ensure that it operates effectively from a practical perspective.

The NSW DNSPs have also sought to highlight other issues not specifically raised by the rule change request, which are relevant in the context of facilitating efficient levels of embedded generation in the National Electricity Market (NEM) and meeting the National Electricity Objective (NEO).

Our response to the AEMC's draft determination is divided into the following sections:

- **General comments** - this section outlines our high level view of the draft rule;
- **Key concerns** – this section outlines key issues raised by the proposed connection process; and
- **Other issues** – this section outlines important issues related to the rule change request, that have not been considered or discussed but are important in the context of the NEO.

In preparing our submission, we have worked closely with the Energy Networks Association (ENA).

2. GENERAL COMMENTS

The NSW DNSPs are generally supportive of the AEMC's draft determination and support the intent of the draft rule. In particular, we support the AEMC's decision to:

- Not provide embedded generators with an automatic right to export; and
- Not to exempt embedded generators from paying deep augmentation costs.

In addition, we consider that the requirement for DNSPs to provide more information upfront in an 'information pack' and the corresponding requirements for Connection Applicants to provide DNSPs with more information, will improve existing processes by providing greater clarity and transparency. We share the AEMC's view, that such changes should facilitate more timely and efficient connections for embedded generators.

A current challenge faced by DNSPs in facilitating timely embedded generator connections is that Connection Applicants are typically uncertain or overly optimistic regarding what type of connection they are after (whether the connection is to allow export, grid support, or where the connection capacity may change over time) or do not have a firm view of the type of generating unit that they are seeking to have connected.

This uncertainty has subsequently resulted in an iterative and time consuming process at the enquiry stage. In our experience, we have often needed to work with the Connection Applicant to better define/refine their requirements so that we have been able to undertake the necessary analysis to facilitate the Connection Applicant's connection.

Consequently, the NSW DNSPs strongly support the new requirements for Connection Applicants to provide more information when lodging their enquiries. Providing this information will enable DNSPs to gain a better understanding of the Connection Applicant's connection requirements/objectives; and would assist in the early identification of technical issues which may necessitate further time or impact on the feasibility of the connection. Further, this should also reduce the level of iteration that occurs in the initial enquiry stage of connections, as DNSPs would have the necessary information to provide the Connection Applicant with a timely response.

Whilst the NSW DNSPs already provide guidance to Connection Applicants to help facilitate their connection,[1] we consider that the requirement to publish an 'information pack' would assist in:

- Providing further guidance to potential applicants;
- Helping the Connection Applicant in defining their connection requirements; and

[1] As an example, please refer to Ausgrid's website **(http://www.ausgrid.com.au/Common/Our-network/Connecting-to-the-network/How-do-I-connect-to-the-network/Embedded-generation.aspx)**.

- Would provide an indication of the possible costs for connections which would help the Connection Applicant to determine the feasibility of their proposed connection (prior to them lodging an enquiry), thus reducing the number of connection enquiries for DNSPs to process.

As the NSW DNSPs already provide some of the information that must included in the 'information pack', we do not anticipate that complying with these requirements by the 1 July 2014, will be overly onerous. Whilst some of the requirements under the information pack impose new obligations, which will subsequently increase DNSPs' costs, we share the AEMC's view that the likely benefits from this requirement will outweigh the associated costs.

For a summary of the NSW DNSPs views in relation to key aspects of the draft rule, refer to Attachment 2.

3. KEY CONCERNS

Whilst the NSW DNSPs are generally supportive of the draft determination, we have a number of concerns regarding the AEMC's proposed connection process. In particular, we are concerned that the proposed process is unlikely to be effective or efficient in practice due to:

- The potential overlap and duplication of obligations under the National Energy Customer Framework (NECF) and lack of clarity surrounding the application of the process;
- Timeframes under the proposed connection process and how they will operate in practice;
- Information requirements;
- The possible disconnect between policy intent and the draft rule; and
- The proposed technical dispute resolution process

These concerns are outlined in further detail in the following section.

3.1 Potential overlap and duplication of obligations under the NECF

The NSW DNSPs note the potential for overlap between the proposed connection process and the connection framework under Chapter 5A, following implementation of the NECF. Specifically we are concerned that the AEMC's proposed connection process may result in:

1) Duplication of work, given that the NECF provides the flexibility for DNSPs to provide a model standing offer for standard connection services; and
2) Ambiguity for Connection Applicants as to which framework is appropriate for progressing their connection application.

NECF commenced in NSW on 1 July 2013, which required us to review all connection systems and processes. The necessary changes to our processes and systems to achieve compliance have been substantial, costly and time consuming.

NSW DNSPs and DNSPs whose jurisdiction have implemented the NECF, are already required to follow a different connection process for connection applications made under Chapter 5 and Chapter 5A. The amendments to Chapter 5 that apply following our implementation of the NECF (particularly the removal of clause 5.3.1(c)) removed the scope for any person not required to register with the Australian Energy Market Operator (AEMO) to elect to follow the connection process under Chapter 5.[2] Consequently, adding another section of the rules with differing requirements:

- Will add an unnecessary administrative burden on DNSPs which will result in cost impacts to all customers;
- Create confusion for customers in an already complex area; and
- May create confusion for DNSPs and increase the risk of processing errors.

These issues are particularly relevant, given that Chapter 5A has the capability to address the connection process issues raised by the proponent's rule change request. Specifically we note that Chapter 5A already accommodates embedded generator connections which fall outside the basic standing model offer (without the need to create a separate framework) through the development of model offers for standard connection services or via a negotiated connection.

[2] The NSW DNSPs note that this clause is still operative in jurisdictions which have not yet adopted the NECF.

The NSW DNSPs note that the policy intent is for the proposed connection process to apply to embedded generators with a nameplate rating of 10kW to 30MW. However, we are concerned that this intended application may create a lack of certainty and cause confusion for DNSPs and Connection Applicants in jurisdictions that have implemented the NECF. This is because smaller embedded generators, which are compliant with AS 4777, fall within the scope of the proposed connection process and are also eligible to apply for a basic standing model offer under Chapter 5A.

The NSW DNSPs preference would be to connect all embedded generating units compliant with AS 4777 under Chapter 5A, as this provides a more streamlined connection process for the Connection Applicant. This is appropriate, as these types of connections are unlikely to cause adverse impacts on the DNSP's network. Further, addressing this ambiguity would assist DNSPs from an implementation and operational perspective, and would reduce the risk of processing errors.

The NSW DNSPs strongly suggest that the AEMC clarifies the application of its proposed connection process by amending the draft rule so that it excludes connections involving generating units compliant with AS 4777. Clarifying this would provide regulatory certainty to DNSPs and embedded generators regarding which process should be adopted in relation to their connection.

Therefore, if a new connection process is included in the rules, its application should be clear and distinguished from existing connection processes. Subsequently any amendment to the application of the draft rule should reflect:

- Embedded generators intending to register as Registered Participants must apply for connection under Chapter 5;
- Load, micro embedded generators and non-registered embedded generators compliant with AS 4777 are to apply for a connection under Chapter 5A; and
- Non-registered generators with a nameplate rating of 10kW to 30MW, outside the scope of AS 4777, are to apply for a connection under the AEMC's proposed connection process.[3]

3.2 Timeframes

The NSW DNSPs have a number of concerns regarding timeframes under the proposed connection process. Specifically, we are concerned that:

1) The proposed timeframes are inappropriate for large scale embedded generation connections, connections to the CBD or remote areas of the network and connections involving new technology that is unfamiliar to the DNSP;
2) The AEMC's proposed trigger for longer timeframes is too prescriptive and fails to take into account the broad range of issues that may require a DNSP to take longer than the prescribed timeframes to provide a response; an
3) Meeting the proposed timeframes are problematic from an operational perspective; and
4) Timeframes and how they are calculated.

3.2.1 Timeframes are inappropriate or unrealistic

The rule change request proposed by the proponent sought to provide a more streamlined process for connecting non-registered embedded generators with a nameplate rating between 10kW and 30MW. It appears that the policy intent is for this range to apply to the proposed connection process[4]; however, it is not clear from the drafting of the rules, nor the draft determination that this is the intended application.

Our concerns regarding information requirements and meeting timeframes largely arise because the requirements, whilst mostly appropriate for small/simple embedded generation connections, are not appropriate for large/complex connections. Therefore, if the scope of the proposed process excluded embedded generators that were 5MW or greater, it would to some extent address several of our concerns. In our view, Chapter 5 provides a more appropriate connection process for these types of

[3] The NSW DNSPs consider that embedded generators between 5MW and 30MW would be more appropriate to have their connection progressed under Chapter 5 given the size of the generator, its location on the network and the possible adverse affects that such a connection could have upon the network.

[4] AEMC 2013, Connecting Embedded Generators, Rule Determination, 27 June 2013, Sydney, p43.

embedded generators given their size, location on the network, complexity and possible impact to other customers. [5]

Consequently, if the proposed connection process is to be effective the AEMC must consider 1) amending the scope of the process to exclude connections greater than 5MW or 2) adjusting the timeframes so that align with the time required to process large/complex connections.

If the AEMC's proposed process is to apply to embedded generators between 10kW and 30MW, then the timeframes need to correspond with the time required to connect large/complex connections rather than small/simple installations. This is because the timeframes are termed as maximums, in which failure to comply is subject to civil penalty.

The NSW DNSPs consider that the proposed timeframes largely reflect the reasonable time required for processing small/simple connections and do not reflect the appropriate time required to connect:

- Larger scale embedded generators (such as 5MW or greater) – connecting these types of embedded generators generally involves connection to the DNSP's sub-transmission network to absorb the generator's fault contribution. Generally these types of connections are complex and require more detailed technical analysis,[6] as they have a higher potential of impacting other customers, subject to more stringent protection requirements and cost more.[7]
- Connections to the CBD or remote areas of the network - For any size generators, connection to the Ausgrid's CBD network is by default a complex connection due to the need to meet licence conditions and technical network constraints such as load balance, fault levels and protection interface requirements.
- Connections involving new technology – connections involving generator installations or components where the technology is new[8] require additional studies and testing to ensure that the equipment can be safely and reliably integrated with the DNSP's network. This is because the equipment could pose safety risks to the DNSP's staff and the general public; cause supply outages; or adversely impact power quality, resulting in damage to other customer appliances.

Whilst we note that the draft rule allows DNSPs to extend the timeframes to provide information by agreement (which is an aspect that we strongly support) we are concerned that the proposed timeframes may create unrealistic expectations regarding the time required to provide a response to larger or more complex connection enquiries.

Connection Applicants may therefore be unwilling to agree to a DNSP's request for an extension. Subsequently, there is a risk that any request to extend the relevant timeframes may be misconstrued by the Connection Applicant as the DNSP seeking to avoid complying with its obligation under the NER, or alternatively the DNSP behaving in an obstructive manner.

As noted above, there are a number of scenarios which give rise to the need for DNSPs to undertake more detailed analysis.[9] This is often necessary for the DNSP in order to ensure the safety and reliability of its network and to identify the most cost effective solution for facilitating the connection.

Consequently, as the proposed timeframes are not adequately commensurate with the scale or complexity of possible connections under the proposed process, there is also a risk of the proposed connection process resulting in suboptimal outcomes for Connection Applicants.

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[5] Embedded generator connections 5MW or greater will generally require connection to the 33kV or sub-transmission network. Any fault on a DNSPs sub-transmission network can have a significant impact on the DNSP's network performance, and consequently adversely impact a larger portion of DNSP customers than if the fault occurred on the 11kV or low voltage level. For example, the corresponding scale of a fault caused by an embedded generator connected to a DNSP's 33kV network affects thousands of customers (i.e. whole neighbourhoods), as compared to a hundred customers (i.e. a street) if the embedded generator were located on the low voltage network.

[6] Typically, the size, complexity and duration of system studies increases with increasing connection capacity and voltage.

[7] For example, protection and control systems at sub-transmission supply levels are more complex to ensure that they are fast acting and provide for a safe and reliable network. A fault or disruption at the sub-transmission level has the potential for disrupting a wider range of down stream connected customers and consequently requires greater engineering design expertise and design effort to specify and implement. This also requires more equipment and is more expensive. In addition, technical access standards for power quality are required to be specified at the enquiry/design information stage. The engineering design effort when modelling network performance is proportionally greater with the higher connecting voltage levels of the network, as more assets are taken into account which can influence performance outcomes.

[8] Technology that is not compliant with relevant Australian or international standards and is unfamiliar to the DNSP.

[9] Refer to Attachment 2, for further details on the complexities that may arise from proposed embedded generation connections and the key reasons why further analysis is often required to facilitate connections of this nature.

For instance, if the proposed connection gives rise to technical issues and the DNSP is unable to undertake the requisite level of analysis to resolve these issues, the DNSP is likely to adopt a conservative approach and impose more stringent requirements to ensure that the connection does not adversely impact upon the DNSP's licence and regulatory obligations. Whilst DNSPs will generally be able to resolve technical issues within the prescribed timeframes, the solution that can be developed within the time constraints may not necessarily be the most cost effective nor achieve all of their desired connection objectives and/or requirements.[10]

The NSW DNSPs strongly argue that better outcomes can be achieved (for both DNSPs and the Connection Applicant) if the timeframes under the proposed connection process adequately reflected appropriate timeframes for connecting large and complex connections. This is necessary 1) to appropriately manage Connection Applicants' expectations; and 2) to ensure that the best outcome can be achieved for the Connection Applicant.

Our preference would be to have longer time upfront in the planning/enquiry phase (particularly if the proposed connection is complex or large) to work with the Connection Applicant to elucidate their connection requirements and to develop cost effective solutions for facilitating their connection.

3.2.2 *Triggers for longer timeframes*

The NSW DNSPs are concerned by the AEMC's policy position regarding the trigger(s) for longer timeframes under the proposed connection process. The AEMC's commentary on the detailed enquiry stage appears to indicate that longer timeframes are only appropriate in circumstances where shared network augmentation is required.[11]

Consistent with our view outlined above, whether longer timeframes are required should be determined according to whether the proposed installation is small/simple or large/complex. It would be inappropriate to limit the circumstances for allowing longer timeframes given the broad range of embedded generators connections likely to be captured by this process.[12] We are concerned that limiting the ability for DNSPs to access longer timeframes in the rules:

- Adds unnecessary prescription to the proposed connection framework;
- Fails to take into account the evolving nature of operating a DNSP network;
- May constrain technological innovation in the embedded generation and protection area; and
- Reduces the effectiveness of the framework and is likely to lead to suboptimal outcomes.

Further, the policy intent to limit timeframes to shared network augmentation fails to consider network augmentation that is dedicated to the customer and the time required to negotiate easements.

In our view, the proposed connection process needs to be flexible rather than prescriptive if it is to operate effectively in practice to achieve the Connection Applicant's desired outcomes.

3.2.3 Specific concerns with timeframes

Timeframe for acknowledging receipt

The two day turnaround for acknowledging receipt of a preliminary enquiry or detailed enquiry is problematic from a practical perspective. DNSP's often do not have a dedicated area of their business for responding to embedded generation enquiries. Rather, embedded generation enquiries are processed by the same areas of the business which are responsible for customer load connections and are as far as possible, treated in a consistent manner.

The two day timeframe is also inappropriate from a customer perspective, as it prioritises embedded generation connection enquiries over load customer enquiries. Currently, under NECF there is no corresponding obligation for DNSPs to acknowledge receipt of a customer enquiry within two business days. Rather the business must respond to a preliminary enquiry within five business days if the required information is on the DNSP's website.[13] If the inquirer requires a written response or enquires about a specific situation, the response must be responded to as soon as *reasonably practicable*.

[10] Refer to Attachment 3, for practical examples of how strict adherence to the prescribed timeframes may result in suboptimal outcomes for the Connection Applicant.
[11] AEMC 2013, Connecting Embedded Generators, Rule Determination, 27 June 2013, Sydney, p37.
[12] Refer to Attachment 3.
[13] Refer to Chapter 5A, clause 5A.D.2 (a) and (c) of the National Electricity Rules (NER).

The NSW DNSPs consider that it would be preferable to align the process for acknowledging receipt of embedded generation enquiries, with the business' processes for acknowledging customer load connections enquiries. Aligning these two processes would address the risk of processing errors and would reduce the administrative burden on DNSPs from having to implement separate processes.

Whilst under the NECF there is no corresponding timeframe for acknowledging receipt of enquiries, the NSW DNSPs endeavour to send a letter of acknowledgement to customers within five business days. Therefore, we consider five business days to be a more appropriate timeframe for acknowledging receipt of embedded generation enquiries than the timeframe currently proposed.

Timeframes to provide a preliminary and detailed response

Processing embedded generator enquiries often requires DNSPs to adopt a multidiscipline approach.[14] Subsequently, facilitating these types of connections often requires assessment and/or involvement from a number of different areas within the business such as systems planning, protection, customer connection, sub-transmission planning and contestability.

The AEMC's proposed connection process requires DNSP's to provide more information earlier in the connection process and under more stringent timeframes. Meeting these requirements will be difficult for DNSPs, particularly if the proposed connection is complex or large, given the number of different areas which must be involved in the assessment process.[15] Further, stipulating maximum timeframes adds unnecessary prescription to the proposed connection process which is likely to undermine the process' effectiveness.

As noted earlier, the current timeframes do not appropriately reflect the scale or complexity of embedded generation connections that may arise under the proposed connection process. Consequently, the proposed framework is unlikely to provide sufficient time for DNSPs to undertake the necessary technical analysis and studies to facilitate these connections without having to impose stringent (and also costly) requirements upon the Connection Applicant.[16]

Whilst DNSPs could allocate more resources to processing and assessing embedded generation connections to meet the stringent timeframes this is not considered desirable or appropriate. Not only would this mean that DNSPs would have to prioritise embedded generation connections over customer load connections, the volume of embedded generation connections would also result in an inefficient allocation of resources for DNSPs.[17] We further recognise that adopting such an approach would unnecessarily increase compliance costs and place upward pressure on customer prices.

Consequently, unless timeframes are appropriately amended there is a risk that the proposed process will result in inefficient outcomes and will unlikely contribute to the NEO. The NSW DNSPs suggest amending the maximum timeframes to align with the time required to process large or technically complex connections. If the timeframes were better aligned:

- The workability of the proposed connection process would be significantly improved, allowing it to be applied flexibly without the DNSP needing to seek constant extensions; and
- Would likely facilitate better outcomes for the Connection Applicant, as DNSPs will have sufficient time to undertake the necessary analysis to develop cost effective solutions that enable the Connection Applicant to meet their connection objectives.

Aligning the maximum timeframes to better reflect the time required for processing large/complex connections does not mean that DNSPs will need to take the maximum time for *all* connections. The policy intent for extending the maximum timeframes is to allow the framework to be applied flexibly so

[14] This is because embedded generation connections can give rise to a number of technical complexities and have a higher risk of causing adverse impacts on the DNSP's network.

[15] For Ausgrid, assessment of embedded generator connection enquiries often requires collaboration across a number of sections of the business including: low voltage planning; high voltage planning; contestability; installation and data operations; protection; and transmission.

[16] Refer to Attachments 2 and 3.

[17] In June 2012, Ausgrid processed 68 larger (non PV) embedded generation connections and received a further 64 applications for connection compared to 12,000 customer load connections.

that it accommodates all connection types contemplated by the connection process.[18] Importantly, it would not act to inhibit DNSPs from processing small/simple connections in an expeditious manner.[19]

Determining appropriate maximum timeframes that accommodated larger/complex connections could be achieved by holding a workshop with stakeholders. This would allow stakeholders to discuss their views on what timeframes may be appropriate and would facilitate a satisfactory outcome.

Alternatively, we note a simple solution to this problem would be not to stipulate a set timeframe and instead require the DNSP to provide its response "as soon as practicable." This would align the AEMC's proposed process with the negotiated process under Chapter 5A and would allow the process to operate more flexibly to allow the parties to negotiate better outcomes.

3.2.4 Clarification of how time is calculated

The NSW DNSPs seek further clarification from the AEMC on how timeframes are to be calculated. The NSW DNSPs consider that in order for the connection framework to work effectively in practice, the draft rule should be amended to clarify that:

- Any time taken by the Connection Applicant to provide the DNSP with further information or clarify any aspect of their application is not counted towards the time taken by the DNSP to provide its response.
- If a DNSP requires expert advice on a technical issue relating to the proposed connection, any time taken to engage the consultant or time that elapses while the consultant undertakes its analysis is not counted towards the DNSPs timeframes for providing a response.[20]
- Any time taken by the Connection Applicant to correct a deficiency in their enquiry is not calculated in the DNSPs timeframes.
- Any time taken by another party to the connection process (such as under contestability arrangements in NSW) to provide the DNSP with information required to provide its response is not counted towards the DNSPs timeframes.[21]

This clarification is necessary, given the more stringent timeframes and information requirements under the proposed connection process. It is also necessary given that the DNSP's ability to respond to Connection Applicant enquiries is constrained by: 1) the quality of information provided by the Connection Applicant; and 2) the ability of the Connection Applicant to clearly articulate its connection requirements and objectives.

3.3 Information requirements

The NSW DNSPs have a number of concerns regarding the information requirements under the proposed connection process. Our key concerns relate to:

- Our ability to provide itemised cost estimates – due to contestability arrangements in NSW, the NSW DNSPs can only provide itemised cost estimates for monopoly services.[22] It is important that the proposed connection process recognises this limitation on NSW DNSPs.
- The provision of fault level information at the preliminary enquiry stage **-** providing this information at this stage of the connection process is inappropriate and fails to take into

[18] We note that the intention is for this to apply to embedded generators between 10kW and 30MW, but as noted in our submission, the draft rule does not make it clear that this process should only apply to non-mico embedded generation.

[19] Under Ausgrid's current connection process, embedded generators which are able to demonstrate compliance with AS 4777 are fast tracked and made an offer to connect without the need to go through a detailed enquiry process. Ausgrid considers that such an approach is appropriate for connections of this nature and intends on continuing to identify areas of its connection process which could be streamlined or standardised.

[20] For example NSW DNSPs would typically need to engage a consultant if a Connection Applicant's enquiry required dynamic studies. Due to the low number of connections that require this type of analysis and the significant costs involved in purchasing the software and ensuring staff have the necessary skills to do the modelling, it is more cost efficient for NSW DNSPs to outsource this analysis to consultants on a needs basis.

[21] Refer to Attachment 3, Example 2.

[22] It is not appropriate for NSW DNSPs to provide cost estimates for contestable network extensions or contestable network augmentation works, which are applicant funded contestable works and should be sourced from the contestable market through consultation with suitably qualified Accredited Service Providers (ASPs). Consequently, an applicant may only be able to achieve accurate network extension/augmentation costs once a certified design for contestable works is available.

account that information of this nature is not readily available.[23] It would be more appropriate for the DNSP to provide this as part of the detailed response. This aligns with current processes under Chapter 5 and is more practical from a timing perspective.

- The misalignment of information requirements **-** information requirements contained in the preliminary enquiry would be more appropriate to provide as part of the detailed response. Further we note that some of the information required during the two-stage enquiry process is information typically not provided until later in the connection process. If the expectation is that detailed information is required to be provided as part of the DNSP's preliminary enquiry, then the draft rule should be amended to allow DNSPs to charge a fee. Otherwise embedded generators will not receive cost reflective price signals and other load customers would effectively be cross subsidising the cost associated with processing their enquiries.
- The prescriptive nature of information requirements – The NSW DNSPs are concerned that the proposed framework does not sufficiently recognise the iterative nature of processing embedded generation connections. Whilst, the draft rule allows DNSPs to request the Connection Applicant to rectify any deficiency in its enquiry it is not clear from the drafting of the rule whether DNSPs are able to request further information from the Connection Applicant.[24] It is important that the connection process provides this discretion, as technical issues may not always be apparent during the initial enquiry; and further, information that becomes available during the design phase may change or negate previously agreed project parameters.

3.4 Disconnect between policy intent and drafting of the rules

Whilst the draft determination clearly indicates that the proposed connection is to apply to non-registered embedded generators with a name plate rating between 10kW and 30 MW, this intent is not adequately reflected in the draft rule. Under the current drafting, the application of the rule is to apply to *embedded generating units,* which is defined under Chapter 10 as:

"A *generating unit connected* within a *distribution network* and not having direct access to the *transmission network*."

In our view, the application of the draft rule should be further clarified so that it is clear to prospective embedded generators which framework they should be seeking to progress their connection under. As noted earlier, without this clarification there is a risk of Connection Applicants applying for a connection under the proposed connection which may be more appropriately processed under Chapter 5A. Clarifying this ambiguity would provide regulatory certainty and assist DNSPs from a practical perspective by reducing the risk of processing errors.

Consequently, we strongly suggest that the AEMC clarifies the application of their proposed framework so that it applies to embedded generating units which are non-compliant with (or outside the scope of) AS 4777.

We also note that there is a disconnect between the drafting of the rules and the policy intent regarding the detailed response and connection application stage. In its draft determination the AEMC's notes that DNSPs are to provide "*a detailed response within 30 business days for projects that do not require shared network augmentation; or for projects that are likely to require shared network augmentation, the DNSP provides the detailed enquiry response within the time agreed with the applicant but, in any case, within four months.*"[25]

It appears from the AEMC's commentary that the policy intent is to limit the use of longer timeframes to connections which involve shared network augmentation. However, we note that this limitation is not reflected in the draft rule which provides that timeframes can be extended by agreement or where the RIT-D is to be applied. The need for a shared network augmentation and the application of the RIT-D are not necessarily equivalent. Shared network augmentations may not be subject to the RIT-D for a number of reasons. Further, we note that whilst the policy intention in the draft determination

[23] Determining fault levels must be done on a case by case basis due to site specific factors. The information required for load flow analysis may not be readily available on certain areas of the network due to legacy issues. Where this is the case, DNSPs must send staff out to the area to investigate and record the load for that area which can take up to 10 business days.
[24] Refer to clauses 5.3A.5 and 5.3A.8.
[25] AEMC 2013, Connecting Embedded Generators, Rule Determination, 27 June 2013, Sydney, p37.

appears to indicate that the timeframes for providing a detailed response are to be capped at four months, this intent has not been reflected in the draft rule.[26]

The NSW DNSPs seek clarification from the AEMC that the proposed connection process will not place limitations on the circumstances in which DNSPs and Connection Applicants can agree to longer timeframes. As noted in section 3.2.2, there is a broad range of technical issues outside of network augmentation which may require a DNSP to seek an extension of the 30 business day timeframe. We consider that it would be inappropriate to place limitations on the circumstances for extending timeframes by agreement. In our view, placing such limitations adds unnecessary prescription and will inhibit the effectiveness of the connection framework.

The NSW DNSPs generally support the current drafting of clause 5.3A.8(c), aside from timeframe issues that have been raised in sections 3.2.1 and 3.2.3.

3.5 Technical disputes

The NSW DNSP's are doubtful that the proposed appointment of an independent expert appraisal provides an effective solution for resolving technical disputes. This is because there are more embedded generation "advocates" than there are experts. Experts need to have a full understanding of generator characteristics, connection issues, and electrical safety and network performance. In NSW, this skill set is possessed by a small number of individuals who may not be immediately available to perform the appraisal. We also note that this has the potential to create a significant delay in the connection process.

In relation to dispute resolution generally, the NSW DNSPs submit that the arrangements should parallel those in Chapter 5A, which provides for disputes regarding the terms and conditions of connection and connection charges to be treated as access disputes for the purposes of Part 10 of the National Electricity Law. In this way all disputes regarding the terms and connection of non-registered participants, either load or generation, would be dealt with under the same regime.

4. OTHER ISSUES

Whilst the rule change request is primarily focused on streamlining the connection process for embedded generators, it also gives rise to other issues that have not been examined or discussed, which impact on the feasibility and efficiency of embedded generation connections. These include:

- Allocating costs associated with providing standby capacity to embedded generators; and
- The impact of metering arrangements on commercial outcomes for Connection Applicants.

While these issues have not been explicitly raised by the rule change request, the NSW DNSPs consider that further examination of these issues is required in order to facilitate efficient levels of embedded generation in the NEM.

Grid support

We note that as part of the current rule change request, discussion has been limited to whether embedded generators should pay deep network augmentation costs and has not touched upon the issue of grid support and whether embedded generators should receive avoided distribution use of system (DUOS) and transmission use of system (TUOS).

Whilst it is true that greater levels of embedded generation connections can lead to network investment deferral, it is important to qualify that currently this is generally limited because:

- generators cannot, for technical reasons, be generally relied on for network support;
- have no contractual obligation to operate at the times they are needed; and
- upgrading of the shared network is often required to accommodate embedded generation (both to manage fault level requirements, and voltage regulation in order to accommodate the embedded generator's export[27], as well as additional capacity and connection points to convey the generated energy).

[26] Refer to clause 5.3A.8.

[27] Pragmatically, the higher the desired level of embedded generator export, the more network capacity is required to "absorb" the exported energy and transport it to a point within the network hierarchy where it can be distributed to a sufficiently large customer base.

In our experience, Connection Applicants who have connected embedded generators to supply their own load have generally sought to retain access to network supply for standby / backup to cover maintenance and failures of their generation systems. This means the network assets (and associated capacity availability) need to be maintained as though the customer was using them. Currently, due to a lack of cost reflectivity in current tariff structures, embedded generators are not paying for grid support/stand by capacity.

Consequently, as there is currently inefficient price signalling and Connection Applicants are not paying the true cost for supplying their connection (that is, they are not paying for the standby capacity that they receive) they are being cross subsidised by other load customers. This results in load customers paying higher prices than necessary, without any off setting benefit.[28]

Another consequence of this inefficient price signalling is that it has the potential to make significant portions of the network appear to be under utilised (as the capacity has been reserved by the embedded generator). Further, as penetration levels of embedded generators increases DNSPs will also encounter difficulties in how reserve capacity should be allocated.

This issue could be addressed by reforming tariffs so that they were more cost reflective, consisting of higher fixed charges and a move to more capacity based pricing. However, the ability of DNSPs to provide more cost reflective price signalling is limited to the availability of enabling technology. In the absence of enabling technology, a mechanism would need to be developed in the rules to correct the current cross subsidisation of grid support.

Once this issue is addressed, the NSW DNSPs envisage that over time, as more embedded generators connect and DNSPs become more familiar with how the technology impacts on their network, network support contracts may become more common place and workable. This would result in more efficient outcomes to consumers through network deferrals and better utilisation of existing electricity assets.

Commercial outcomes for load supplying generators.

Commercial outcomes for embedded generators can vary widely depending on the metering arrangements. This is particularly evident for a 'precinct' based system where a local embedded generator source supplies nearby customers but is also a potential issue for some single customer situations like rooftop photovoltaic generation (PV).

The easiest example for demonstrating this point is a commercial building with a cogeneration system. If the building is owner occupied and has a single metered entity, it can locate a cogeneration unit behind the meter, and avoid both retail and network charges fully.

If it is tenanted, with many individually metered customers, the cogeneration unit could be located behind the base services meter and fully offset costs for that account. However energy to the tenant accounts would at best, avoid the retail portion of the bill and full network charges would be paid by all tenants. This demonstrates that an identical physical arrangement can have very different commercial outcomes which should not be the case. This represents a cross-subsidy to those customers who locate their generators behind the metering, which is likely to drive sub-optimal investment.[29]

The above issues relate to the inequities and inefficiencies resulting from the poor price signals that DNSPs convey to customers in relation to their network usage decisions. This is a broader issue that results in a distortion of customer decisions regarding investment and operation of embedded generation units. For example shoulder and energy charges in network tariffs also distort network usage decisions by encouraging an inefficient level of energy conservation during periods when the network is not likely to be constrained.

The longer term solution to the above issues is to convey cost reflective network pricing solutions to these customers. It is only in this situation that (1) investment in embedded generation will be based on efficient incentives and (2) that efficient generation behaviour will occur once the investment has been made.

[28] DNSP must incur investment expenditure to provide capacity to enable customer and embedded generator connections. If the embedded generator is load supplying and drawing , the DNSP cannot recover use of system charges from the embedded generator despite them still relying on the DNSPs network for support. The DNSP still needs to recover the cost of its investment, however, it has a smaller customer base to recover these costs from which results in higher use of system charges.

[29] Examples can be provided on a confidential basis upon request.

However, cost reflective pricing can only be achieved where interval metering has been installed. Even where interval metering is present, it will take time to achieve a cost reflective pricing solution (i.e transition to proper capacity-based pricing regime, which ensures that the customer pays the full economic cost associated with their network capacity requirement).

5. CONCLUSION

The NSW DNSPs are generally supportive of the AEMC's draft determination. The concerns raised by our submission largely relate to the proposed connection process and are aimed at highlighting workability issues. In particular, our submission has sought to demonstrate:

- That timeframes need to be better aligned to reflect the time taken to process large/complex connections to ensure optimal outcomes for Connection Applicants;
- The need for further clarification of how timeframes are to be calculated;
- The possible disconnect between the policy intent and drafting of the rule; and
- Other issues raised by the rule change request, which are likely to impact on the feasibility and efficient up-take of embedded generation connections in the NEM.

The following section outlines the NSW DNSP's views on key aspects of the AEMC's draft rule:

- Information pack – the NSW DNSPs strongly support this requirement. We consider that providing this information to Connection Applicant should enable them to better define their requirements when making enquiries. This would streamline the current ad hoc iterative process for embedded generation connections. However, it is important to note that NSW DNSPs would only be able to provide example cost estimates for monopoly services, as per previous comments regarding contestability arrangements.
- Enquiry process: the NSW DNSPs are generally supportive of the AEMC's two stage enquiry process; however, we have some concerns regarding the proposed maximum timeframes for providing responses. Further, we consider that there are other triggers other than shared network augmentation or the RIT-D which may prevent DSNPs from providing a detailed response within 30 business days. The extended timeframe should be flexible enough to recognise these other triggers.
- Application Process – the NSW DNSPs are generally supportive of this process, however similar to above, we have concerns regarding the proposed timeframes.
- Technical information – Supports the AEMC decision to require DSNP's to publish a register of compliant embedded generating units, however, we note that the information will need to be heavily qualified as requirements which may have been appropriate previously may not be appropriate under the different circumstances due to site specific constraints[30] or changes in the network.
- Technical expert appraisal – The NSW DNSPs consider that there are more embedded generation "advocates" than there are experts and have serious doubts regarding the effectiveness of this solution for resolving technical disputes. Instead, we propose that dispute process is aligned with Chapter 5A, which provides for disputes regarding the terms and conditions of connection and connection charges to be treated as access disputes for the purposes of Part 10 of the National Electricity Law. In this way all disputes regarding the terms and connection of non-registered participants, either load or generation, would be dealt with under the same regime.
- Enquiry fee – the NSW DNSPs strongly support this clarification.
- Exporting to the grid – the NSW DNSPs support the AEMC's decision not to provide an automatic right for embedded generators to export and further supports the AEMC's reasoning for reaching its decision.
- Shared network augmentation costs – the NSW DNSPs support the AEMC's decision not to exempt embedded generators from paying deep augmentation costs and supports the AEMC's reasoning for reaching its decision.

[30] This may include but is not limited to: network configurations, capacity, impedance, fault level headroom, etc.

Outlined below is a list of technical issues that could arise in relation to embedded generation connections that may trigger the need for the DNSPs to extend the maximum timeframes.

- Connection to dense urban networks with high reliability and power requirements;
- Areas where "clusters" of independent embedded generators are present;
- Areas where multiple generator connections are being simultaneously processed;
- Proposals that are staged (i.e. generator's capacity may change over an extended period or future connections via the installation are being considered);
- Proposals that involve energy export;
- Proposals that include energy export and grid support;
- Proposal where connection to the high voltage network is required;
- Connections to long radial networks where reactive power flows and voltage regulation requires detailed analysis;
- "Novel" connection proposals involving technical solutions that have not been previously evaluated (and in some cases modelled and tested);
- Connections to the network where fault level constraints are present;
- Connections to the network where the DNSP does not have accurate and detailed records or requires load flow and fault studies;
- Any proposal that requires significant technical development on the part of the DNSP or the proponent to achieve specified performance requirements;
- Proposals where the DNSP is considering modifying the local network where the proposed connection is to be located; and
- Circumstances where the DNSP is developing a technology change for connection principles due to a discovered deficiency in a previous installation or performance improvement opportunity.

Each of the above scenarios may result in delays that exceed the 30 business day timeframe, as they are likely to result in issues with voltage regulation; reactive power flows; and fault levels, which will require interactions between the DNSP and the Connection Applicant to develop appropriate solutions.

Timeframes are also likely to be pushed out if the proposed connection requires a testing program to confirm modelling. For example, where generators are proposed for grid support, conventional anti-islanding protection cannot be used and a separate technical solution must be developed as well as negotiating commercial and operating agreements with the operator.

If DNSPs are not allowed sufficient time to undertake technical studies to develop engineering solutions to the complexities that can arise from embedded generator connections, the possible consequences to a DNSPs network include:

- a reduction of supply reliability and power quality to the applicant and other customers connected to the network;
- electrical safety risks such as damage to the DNSPs electricity network apparatus and customers' equipment; and
- repairs with long lead times involving lengthy customer outages, and failure of the DNSP to meet its license conditions.

Provided that the embedded generation enquiry contains sufficient detail, DNSPs should be able to identify from the outset whether longer timeframes are required. However, our concern is that Connection Applicants may be unwilling to agree to: 1) an extension; and 2) the requested time for the extension because maximum timeframes do not align with large/complex installations; and the AEMC's policy intent appears to limit the use of longer timeframes to connections requiring shared network augmentation.

The following section seeks to demonstrate the need for timeframes under the proposed connection process to appropriately reflect the complexities that can arise with embedded generator connections.

As noted in section 2 of our submission, if timeframes do not appropriately align with timeframes for processing large/complex connections proposals there is a risk that the Connection Applicant will be unwilling to agree to extension requests. If this occurs, it is likely to result in suboptimal outcomes for the Connection Applicant.

Example 1 – Connection of 5kW embedded generating unit

If a DNSP receives an application to connect a single phase 5kW embedded generating unit to a household which has a three phase connection, the DNSP may need to undertake further studies to facilitate the requested configuration in order to understand any power and voltage imbalances likely to arise from a connection of this nature.

If on the other hand, the Connection Applicant was seeking a 5kW three phase connection these additional studies would likely not be required as the proposed connection would have the necessary inverters to prevent a power and voltage imbalance from occurring. However, as inverters for three phase connections are often more expensive, Connection Applicants have increasingly opted to have their embedded generating unit connection on single phase, which gives rise to power and voltage imbalance issues.

Consequently, it is generally apparent from the outset whether a proposed connection is likely to give rise to any technical issues which may necessitate further studies. As information is not always readily available, completing these studies can take time and may require the DNSP to seek an extension for providing its response.

For instance, in order to facilitate connections that are likely to give rise to power imbalances, DNSPs will often need to physically log and measure the voltage levels at the proposed connection location. Undertaking this investigation generally takes around 20-25 business days, as staff must physically place instruments at the site to collect the relevant data, collate the information and then analyse it to determine the likely level of imbalance so that solutions can be developed to correct any system imbalance.

If a Connection Applicant did not agree to a DNSP's request to extend the timeframes so that it could undertake this network analysis, then it is unlikely that the DNSP would be able to make an offer to connect that reflected the capacity requested by the Connection Applicant.

If strict adherence to the maximum timeframes was required, the DNSP may only be confident from a network perspective, to offer a connection based on a diversified maximum demand that may be below the capacity applied for at the proposed location, i.e. a connection of 2kW may be offered instead of the requested 5kW.

Example 2 – Connections involving customer dedicated augmentation

A customer may need to establish a dedicated substation on their premises to facilitate the connection of the generator. The contestable process has its own time-frames and possibly a separate applicant. However, the two processes are dependent on one another and therefore closely linked. For example, the generator design will often influence the design of the substation. The AEMC's proposed process does not seem to account for this dependency, nor how the situation is to be treated where a delay in the contestable process holds up the other. A recent Ausgrid project that involved both dedicated connection works and generator works, Ausgrid had to deal with ten separate parties during the process.