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Mr Warwick Anderson
General Manager
Australian Energy Regulator

Dear Mr Anderson,

Re: AER Connection Charge Guideline Review - Issues Paper

Power and Water Corporation (**Power and Water**) welcomes the opportunity to provide a response to the Australian Energy Regulator's (**AER**) Connection Charge Guideline Review (the '**Guideline**').

The Northern Territory (**NT**) is experiencing an accelerated uptake of distributed energy resources (**DER**), with small-scale solar anticipated to double by 2030 under the Darwin-Katherine Electricity System Plan and the NT Government's objective of achieving 50 per cent renewables by 2030.

Power and Water is proactively seeking to enhance its planning and operation of its Darwin-Katherine, Alice Springs, and Tenant Creek systems to support customer's uptake of DER and better manage two-way flows on our networks to deliver benefits to all Territorians.

We consider that it is both timely and pertinent for the Connection Charge Guideline to be updated to provide greater clarity on how two-way flows should be addressed as part of distribution network service providers (**DNSPs**) connection policies and connection charges. However, we note that the Connection Charge Guideline is just one of many related AER reforms aimed at implementing the Australian Energy Market Commission's (**AEMC**) Distribution Pricing Access and Incentive Arrangements for DER Rule change. Consequently, in providing our feedback we have sought to be mindful of how these changes fit as part of the broader package of reforms requiring DNSPs to offer both consumption and export services to customers.

Power and Water is broadly supportive of the key positions outlined in the Energy Networks Australia's (**ENA**) submission. While we are supportive of the ENA's positions we note that there are some impacts and issues that differ from other DNSPs operating in the National Electricity Market (**NEM**). Consequently, in addition to providing responses to the AER's consultation questions, our attached response seeks to highlight:

- issues which are likely to be unique to the NT or Power and Water's operating circumstances
- our view on when circumstances when static zero limits may be necessary and what is required to avoid static zero limits

Power and Water looks forward to continuing to work closely with the AER in amending the Guideline and other related guidelines to reflect how DNSPs should invest to enable and offer export services to customers. If you have any queries or response to discuss our response further please do not hesitate to contact Felicity Walton, Manager of Regulation and Policy at [REDACTED]

[View our response to the AER's Connection Charge Guideline Review - Issues Paper](#)

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Yours sincerely,

Stephen Vlahovic

Executive General Manager – Power Services

16 September 2022

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Power and Water is pleased to provide feedback in response to the consultation questions outlined in the AER's Issues Paper, which are contained in Appendix A to this response.

The development of the AER's Connection Charging Guidelines (the '**Guidelines**') and other related initiatives will impact the development of Power and Water's network capability over both the short and long term.

Consequently, in addition to providing responses to the Issue Paper consultation questions we have sought to highlight issues which are either unique to the Northern Territory or Power and Water's operating circumstances. This is relevant as it provides context on Power and Water's views on the circumstances where static zero limits might be required and how they can be avoided in the future. Understanding this is important to ensure that any changes to the AER's Connection Charge Guideline are fit for purpose in the sense that they are:

- flexible enough to accommodate differences in DNSP operating circumstances
- appropriately targeted and not overly prescriptive or complex
- provides sufficient guidance to DNSPs in delivering export services and clarity to customers around their rights to access export services

Understanding Power and Water's context

Power and Water is currently consulting with customers and stakeholders in developing its Future Network Strategy. This strategy will define the strategic objectives and network capabilities for Power and Water's regulated networks over the next ten years in response to changes in our external environment as well as internal change factors, such as aging ICT infrastructure.

A key focus area of our Future Network Strategy is aimed at developing strategies and tools for efficiently integrating and orchestrating DER to maximise the benefits for all our customers. We are seeking to maximise two-way flows by managing and communicating network limitations and constraints – both to small customers and third-parties to facilitate competition in adjacent markets or industries.

While Power and Water is taking proactive steps to support customers' uptake of small-scale renewables and support the implementation of the Darwin Katherine Energy System Plan, we face a number of unique challenges arising from our three regulated networks being stand-alone rather than integrated, and our maturity with the national electricity framework having only recently adopted the National Electricity Rules relative to other networks.

It is also worth noting that our three regulated networks are service a significantly smaller yet more geographically dispersed customer base, with limited supply demand diversity relative to other networks operating in the National Electricity Market (**NEM**). Specific issues that arise as a result of these characteristics include:

- A relatively high-cost impact of distributed energy resource (**DER**) integration programs due to a smaller customer base to smear the recovery of costs across. This means that upfront capex and ongoing opex needs to be carefully balanced in our investment decisions.
- Technical limits are more challenging in a smaller system, with minimum demand being a major issue. Better facilitation and management of two ways flows is an essential focus for Power and Water, enabling both DER exports and demand management in parallel.
- Operating small networks means that implementation of new technology at scale will impact most customers. However, this also presents a unique opportunity where Power and Water is also in a position where it can be a leader in innovative trials at whole-of-grid scale, such as our Alice Springs Future Grid project.

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Circumstances where static zero limits may be necessary

Power and Water broadly agrees with the AER that static zero limits should only be required in limited circumstances. We consider that the need for static zero limits is a temporary issue, which will reduce over time as networks uplift their capabilities to flexibly operate and manage their electricity networks more dynamically.

A key challenge in moving away from static zero limits is having visibility over physical limitations and solar availability in the low voltage (LV) network with sufficient granularity. More DER exports can mean more voltage, system strength and thermal issues in the LV network. Unless the extent of these issues, and the potential impact of increased DER can be assessed, DNSPs may be unable to offer dynamic limits which would reduce the need for static zero limits or static limits more broadly.

Certain circumstances where static zero limits may be necessary and/or prudent, while networks develop the capability to enable dynamic limits include where:

- ***Physical network limitations exist and the network capacity for exports may be zero or unknown*** - In these circumstances DER export could risk voltage or thermal violations in certain areas of the grid, which would negatively impact Power and Water's ability to maintain reliable consumption services (which is a higher priority for our customers). These physical limitations could be rectified through network augmentation or flow management, or may be too costly to remediate given the level of solar to be unlocked. Network investment is likely to be required to understand and define what a feasible dynamic limit should be to promote the long-term interests of consumers and enable networks to offer a range of service options based on the overall benefit–cost analysis.
- ***At times of minimum demand, DER may need to be limited for system control*** - More DER export can exacerbate minimum demand issues. There will be a transition period over the next 10 – 20 years where limiting DER to zero in certain areas for periods of time is necessary to maintain system security. While this is not a preferable outcome and there will be solutions over the long-term, the AER must recognise that the end goal is not simply to maximise the capacity of the network for DER export, but to transition the whole energy system to one that is lower cost, cleaner and remains reliable.

In our view, the degree of network visibility will play defining factor in the degree of conservatism towards export limits. A degree of upfront investment in network-wide visibility will be a necessary first step in the gradual phasing out of static zero limits.

Power and Water believes the Guidelines should recognise that where static zero limits are a necessary, the issue is fundamentally one of technical grid capability and operation. Where efficient, investment in visibility and, if needed, network augmentation can alleviate technical barriers, however, this is likely to require a staged and prioritised assessment and investment process to ensure that static zero limits are alleviated in a manner to deliver the greatest benefit to customers.

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What is needed to avoid static zero limits

Power and Water is currently exploring a raft of investments and initiatives aimed at developing the necessary network capability to more efficiently integrate and manage two way electricity flows and improve our inherent level of hosting capacity. Key initiatives we are exploring as part of our upcoming regulatory proposal which we consider will assist in avoiding the need for zero static exports include:

- **Network Visibility:** Enhanced visibility of the LV network and analytical capability – including the capacity to model DER and its characteristics for forecasting and planning purposes in an optimised network. For example, our planned implementation of ‘dynamic operating envelopes’ (**DOEs**) – which is quickly becoming standard industry practice – will allow us to move away from conservative, static connection limits.
- **New tariff design:** DOE capability and new tariff designs will enable higher levels of energy exports from customers’ solar PV and behind-the-meter battery systems. We are currently considering how different tariff structures can provide customers with the choice to have higher export limits if their usage patterns and pricing reflect the network. Some customers may still choose a basic level of export service based on the intrinsic capacity of the network – depending on their DER investments and preferences.
- **Network Augmentation:** Power and Water will continue to identify opportunities to augment its networks where doing so provides net benefits to its customers.

The Guidelines should recognise order of precedence in network investment in visibility to uplift networks capability to minimise the need for static zero export limits. We consider this would likely take two regulatory periods before Power and Water would achieve the necessary level of network visibility of its LV network to avoid the need for imposing static limits. Visibility is fundamental in defining when a DER plant may be able to export and/or how a customer may undertake their own investment to remediate export issues.

Areas where further clarification is sought

In addition to the issues noted above, Power and Water seeks further clarity from the AER regarding the expected nature of dynamic limits. For example:

- What defines a static zero limit compared to a dynamic limit. E.g. Is a limit dynamic if it allows export for only 1 hour a year? Are there thresholds that define the minimum time or magnitude of an export limit such that it is not effectively a static zero limit?
- Does the AER envisage that a customer may be provided a dynamic limit only to be reverted to a static zero limit if network circumstances change in the future? E.g. A network issue occurs resulting in severely reduced DER capacity or increasing DER uptake in an area uses up all capacity and it is not possible or efficient to invest in further augmentation, resulting in dynamic limits being increasing reduced to zero.

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Appendix A: Power and Water’s Response to Issue Paper Questions

Connection Charge Guideline Connection Paper Questions	Power and Water’s response
<p>Question 1: Under what limited circumstances should distributors be able to impose static zero limits?</p>	<p>Static zero limits are necessary in parts of the network where voltage, thermal or other physical constraints in the network mean that exported DER at any time could result in network faults.</p> <p>From a purely technical sense, a static zero limit would only be necessary where these constraints are also static and bind 100% of the time. However, operationally, the extent of visibility the distributor has over the LV network to which DER is connected determines how these constraints are defined. Static Zero limits may be operationally necessary in low visibility areas of the grid only because the distributor cannot be certain about the real technical capacity of the network until investment in, and assessment of, the visibility of the network is undertaken.</p> <p>Static Zero limits may also be necessary for customer equipment which is unable to respond to dynamic signals and would be expected to be limited to zero output in some foreseeable operational circumstances.</p>
<p>Question 2: Under what circumstances should we take into account equity issues when considering the application of static zero limits?</p>	<p>We recognise the context of this question in the Issues Paper refers to equity between new and old DER customers. We do not believe there are material equity concerns relating to existing DER being impacted by new DER.</p> <p>In terms of equity in a broader sense, Power and Water’s customer base is represented by a very broad spectrum of customers in the NT, and customer equity and energy affordability are always front of mind in our network decisions.</p> <p>We recognise that, in general, the customers that own DER are not likely to be as financially vulnerable to energy costs as some other customers. It is therefore important that the guidelines do not require costly network augmentation or other investment to alleviate static zero limits where a disparate portion of the costs are borne by low income customers yet benefits are only experienced by DER owners. This is particularly pertinent for Power and Water, where magnitude of investment is not directly proportionate to the number of customers, due to its small customer base across three separate small networks. This means that the cost of network investment to enable DER will</p>

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Connection Charge Guideline Connection Paper Questions	Power and Water’s response
	<p>be higher per customer in the NT and subsequently have a greater impact on each bill. Power and Water also recognises that, over time, unlocking DER through efficient use of the existing network will result in lower costs for all customers.</p> <p>Power and Water will consult with customers to find the balance of investment, including our current consultation processes for our regulatory proposal and People’s Panel. We are also putting incentives in place to encourage the right behaviour to right size DER systems, maximise behind the meter solar use, maintain compliance, and transition onto DOEs. Power and Water prioritises choice for customers.</p> <p>Power and Water would support a guideline that does not require static zero limits to be alleviated where to do so would cause undue costs on vulnerable customers.</p>
<p>Question 3a: What are your views on networks using a ‘standard approach’ to decide on whether to impose a zero export constraint for each individual application?</p>	<p>Power and Water supports a standard approach that is specific to each network. We would support a standardised process for assessment rather than fixed metrics, such as a standard kVA of export per connection. This can provide customers with greater clarity as to what to expect while allowing the DNSP to manage local network issues where they bind, such as minimum demand issues.</p> <p>Effective application of a standard approach is reliant on improved compliance of connections to the standard and OEMs capability to support flexible connections. DNSPs will need the resources to manage compliance of DER with the standard approach.</p>
<p>Question 3b: If you consider a ‘standard approach’ to be inappropriate, what depth of analysis or study should networks be required to do in the limited circumstance where a static zero limit may need to be imposed? What would be the likely costs of this level of study? Should the costs of the study be charged on a requester or treated as a general network administration cost?</p>	<p>N/A</p>

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<p>Question 4a: What information should the distributor provide the connection applicant when a distributor proposes a static zero limit and how should that information be provided?</p>	<p>Power and Water believes that customers should be provided with sound reasoning as to why a static zero limit was implemented with reference to the Guideline. The customer should also be aware of the assessment approach taken and have access to a dispute resolution process.</p> <p>Power and Water recognises that there may be times where static zero limits are imposed due to lack of visibility over the relevant network area, resulting in conservative technical limits that may be lifted once visibility is improved.</p>
<p>Question 4b: What’s the best way to communicate the steps to inform customers’ investment decisions? For example:</p> <p>What type of information should customers be provided with, when should it be provided and by whom?</p> <p>Who is best placed to provide effective customer education before a customer makes an investment decision?</p>	<p>Power and Water is an advocate of direct, ongoing stakeholder engagement. As part of Power and Water's People's Panel we have received feedback that customers would like DNSPs to take on the role as an informed advisor to provide objective guidance to help inform what size unit makes sense based on their household characteristics, objectives for installing DER, and energy usage patterns.</p> <p>To facilitate this, DNSPs could provide publicly available network voltage maps, provide information on hosting challenges for the network and the benefits of storage or maximising behind the meter use of solar. It is also important for DNSPs to communicate the climate benefits of DER, particularly with the upcoming changes to the NEO.</p> <p>All of the above represent further initiatives that must be progressed alongside network investment for two ways flows.</p>
<p>Question 5: Are there exceptional circumstances where it would be appropriate for a distributor to impose a static zero limit where it has already been funded under revenue determinations to augment the network?</p>	<p>Yes, there is time required between funding and augmentation. Static zero limits are necessitated by physical limits and so can only be remediated after physical investment. As discussed in the body of this submission, the practical process of enabling dynamic limits is network funding to investment in visibility to investment in network capability to wider provision of non-zero export limits. Therefore there is naturally a lag between network funding allowances being approved and physical augmentation occurring.</p>

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	<p>Power and Water also notes that capacity is not unlimited, there must be a balanced approach to investing to enable dynamic limits and efficiently curtailing DER.</p>
<p>Question 6a: What conditions must be met in the limited circumstance that a static zero limit is applied? Do you consider the controls proposed in the Issues Paper to be adequate?</p>	<p>Power and Water considers both the technical and economic considerations to be sound in determining whether a static limit could be imposed.</p> <p>We clarify point 3 to also mean that a static zero limit may also need to be imposed where the customers system is not capable of responding to dynamic signals.</p> <p>Power and Water again notes that the capability to assess the technical consideration in particular requires upfront investment in network visibility, else technical assessments will necessarily be conservative and may lack the detail to define the dynamism of a limit even if it is known that there is non-zero capacity available.</p>
<p>Question 6b: In the limited circumstance that they are imposed, should static zero limits be subject to regular review? If so, what should the length of the period be?</p>	<p>Static zero limits should be reviewed when there is a material change in network circumstance. E.g. After network augmentation, material change in the local two way flows including penetration of DER and storage, or there is a change to a guideline.</p> <p>Power and Water warns against regular reviews without trigger, as this can be very onerous for the network and increase operational costs without benefit. There are likely areas of the network where static limits may be imposed for substantial periods of time until a remedy to local constraints is actioned.</p>
<p>Question 7: At locations where it is not prudent nor efficient to augment the local network to increase the rooftop solar hosting capacity, should customers bear the cost for network augmentation if they wish to avoid export limitation?</p>	<p>In theory, customer should be able to bear the cost for their own network augmentation. This being said, the AER must recognise that to define the augmentation required, Power and Water must have already invested in network visibility in the area and undertaken assessment of the DER plant.</p> <p>The AER should also consider the upstream and cross customer impacts of highest payer gets more capacity given Power and Water operates a shared network. The guidelines should provide flexibility for distributors to deny customer augmentation if it would affect their capabilities to carry</p>

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	<p>out their other work or if it would require substantial upfront investment in network visibility that would otherwise not be undertaken.</p> <p>Distributors require the funding to roll out the fundamental network visibility technology and its implementation to support two way flows and dynamic limits. Power and Water notes that its network context is markedly different from NEM networks currently investing in this space, such as SAPN, and that the necessary investment represents a proportionally large upfront cost, operational cost and deliverability burden for Power and Water than other networks. Power and Water is intent on being proactive in facilitating two way flows in its network for the benefit of its customers, yet our funding requirements and starting point should be recognised as unique from typical NEM networks.</p>
<p>Question 8: Do you consider that the following charging practice is reasonable?</p> <p>the net cost to the distributor between: (1) the actual cost to remove the static zero export constraint netted off by (2) the net present value (NPV) of the export charge revenue received from the connection applicants and the projected future additional PV connections over a 30-year period.</p> <p>That is, (1) minus (2)</p> <p>If not, what do you consider is a reasonable charging practice?</p>	<p>Power and Water considers this to be a reasonable charging practice but refers to our response to question 7 for further factors for the AER to consider.</p>