

Appendix A Format for submissions: Integrating hosting capacity into Part 6 on low voltage networks

Submitter	Aurora Energy Limited
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A.1 Please use the following table to provide your feedback on the questions included in this paper.

Question	Response
Q1. Have we adequately outlined the issues with increasing levels of SSDG, particularly inverter-connected solar PV systems?	<p>The Electricity Authority (Authority) has outlined the challenges well, including local effects on voltage, low voltage ride-through requirements and harmonic levels. These challenges may affect power quality to all consumers connected to the same low voltage network and may affect the reliability of small-scale distributed generation systems (for example, an inverter that cannot ride-through intermittent low voltage events may manifest as an unreliable inverter, possibly requiring callouts by technical personnel to reset it). The paper also addresses wider power system considerations such as system frequency, and the importance of inverters responding correctly to system frequency excursions.</p> <p>It is understood that, during the development of the Electricity Engineers' Association's (EEA) guide for the connection of small-scale inverter-based distributed generation (the EEA Guide), a number of submissions were made to Standards Australia to have the appropriate New Zealand system frequency, local voltage and harmonic parameters included in AS/NZS 4777.2:2015. These are reflected in the EEA Guide, which also includes additional requirements specific to New Zealand. The changes were based on substantial research, led by the University of Canterbury, and contributed to by the EEA, Transpower, numerous distributors, and inverter manufacturers.</p>

<p>Q2. What other factors are relevant to these technical network considerations?</p>	<p>Other relevant technical considerations are anti-islanding protection requirements contained within AS/NZS 4777.2 and the EEA Guide. These are relevant to ensure safety of consumers and of personnel working on low voltage networks during network outages.</p>
<p>Q3. Do you agree these options broadly represent the range of actions we could consider at this time? Are there other broad conceptual options we should consider that are not covered by these three approaches?</p>	<p>We do not believe there are other conceptual options that could be considered at this time.</p>
<p>Q4. Do you think the Authority should pursue the types of measures that Option B would require? If not, please outline your alternative preferred approach, including if possible the costs and benefits. If you consider there is a valid Option C-style alternative, please provide details, including your view on how your alternative would meet the Authority's statutory objective.</p>	<p>Aurora Energy supports Option B, being the amendments to Part 6 of the Electricity Industry Participant Code 2010 (Code) that the EEA has asked the Authority to consider.</p>
<p>Q5. Do you have any comments on the draft EEA guide's stated objectives?</p>	
<p>Q6. What advanced power quality capabilities do inverters sold into the New Zealand market possess?</p>	
<p>Q7. Is it reasonable to assume that the advanced power quality modes outlined are currently available in the marketplace at no additional cost? If not, what are the likely incremental costs involved to obtain these modes?</p>	
<p>Q8. Would a default requirement to provide volt-var and volt-watt modes for all future inverter installations that use the Part 1A connection process have any</p>	<p>Aurora Energy considers the consequences to be surmountable by providing a phase-in period in the Code. Moreover, this consultation itself signals a possible change to AS/NZS4777.2:2015 compliant</p>

<p>unintended adverse consequences (for example, leaving a stock of unsold inverters that are otherwise compliant with the superseded AS4777:2005 standard suite)? Are these adverse consequences surmountable?</p>	<p>inverters.</p>
<p>Q9. What comments do you have about the hosting capacity assessment process described in detail in the draft EEA guide?</p>	<p>The 'traffic light' system described in the EEA Guide provides a practical means of self-assessment of small-scale distributed generation installation requirements in terms of their inverter requirements and size. This could potentially be undertaken by the consumer wishing to install distributed generation, or the distributed generation installer, if the local distributor made hosting capacity available by address (such as via a lookup on its website).</p> <p>The traffic light system described in the EEA Guide does still allow for AS 4777.2:2005 compliant inverters to be installed that may not have power quality response modes available. Aurora Energy believes that:</p> <ul style="list-style-type: none"> • only AS/NZS 4777.2:2015 compliant inverters should be installed because only this standard has appropriate voltage and frequency settings for New Zealand (as per Q1 above); and • power quality response modes should always be enabled because this will maximise the capacity of each low voltage distribution network to host small-scale distributed generation and will provide the greatest protection against voltage quality issues.
<p>Q10. Do you support the Code amendment request discussed in the draft EEA guide? If not, please explain why and, if possible, suggest an alternative approach.</p>	<p>Aurora Energy supports the amendments to Part 6 of the Code that the EEA has asked the Authority to consider.</p>
<p>Q11. Do you think there is a problem or conflict with the '10 kW total' versus '5 kW per phase' thresholds respectively adopted in the Code and AS/NZS 4777.2:2015? If so, would you support aligning the</p>	<p>We do not support aligning the thresholds respectively adopted in the Code and AS/NZS 4777.2:2015.</p> <p>The thresholds each address separate issues and should therefore remain separate. The '5kW per phase' threshold is a technical rule to</p>

<p>Code threshold with the inverter standard?</p>	<p>help maintain phase balancing to avoid network power quality problems. In comparison the '10kW total' referred to in the Code relates to the overall size which determines what process to follow when connecting small scale distributed generation.</p> <p>It may be more worthwhile for the Authority to consider removing the 10kW process threshold from the Code altogether. The purpose of the 10kW threshold in the Code has been, in practice, superseded by the traffic light system contained in the EEA Guide guide. This system sees proposals being categorised and prioritised as a result of the category to which they are allocated. Green and orange light connection proposals are fast-tracked and red light proposals require a discussion, or bespoke terms to be agreed, between the distributor and the customer.</p>
<p>Q12. Do you think there are emerging problems with capacity or power quality from in-home electric vehicle chargers, or is it too early to tell? We are keen to hear industry views and experiences and from parties that supply electric vehicle charging equipment.</p>	<p>The impact of emerging technologies on the industry is still becoming apparent. We believe that distributors would benefit, at this stage, from a greater understanding of the impact on their networks and that this could be achieved, in the case of in-home electric vehicle chargers, by the adoption of a two-stage approach.</p> <p>The first stage could see consumers notifying distributors of the installation of in-home electric vehicle chargers at the time of commissioning (this could be encompassed within the Code of Compliance process). This would enable distributors to identify areas of emerging constraint, to identify and evaluate trends in electric vehicle charger size and to enable forecasting models to be developed based on current uptake and potential saturation levels.</p> <p>The second stage could encompass the Authority's suggested technical solution (an approval process for in-home electric vehicle chargers similar to the current small-scale distributed generation application process in Part 6 of the Code). Congested areas could also be identified and published by distributors.</p>

