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Ministry of Business, Innovation & Employment  
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## **Submission on Amendments to the Electricity Safety Regulations: To expand the permitted voltage range for electricity supply**

1. Thank you for giving Orion New Zealand Limited (“**Orion**”) the opportunity to make a submission on the Discussion Document “*Amendments to the Electricity Safety Regulations: To expand the permitted voltage range for electricity supply*”.
2. In general, we support the submission of Electricity Networks Aotearoa. We also set out our answers to the questions in the Discussion Document in the Appendix to this letter. But first we provide some information about Orion for your information.
3. Orion is the electricity distribution business (EDB) serving mid-Canterbury and we are owned by the Christchurch City Council (through its holding company Christchurch City Holdings Limited) and Selwyn District Council.
4. At Orion, our purpose is powering a cleaner and brighter future with our community. We want to drive prosperity for our region through balancing energy affordability, energy security and sustainability. We have five focus areas for achieving our purpose including
  - facilitating decarbonisation and hosting capacity at lowest cost while giving our customers choice on how they access our network, and
  - being a force for good in the community we serve, enabling the net zero transition.
5. We are experiencing a steady rise in residential solar connections. This is being driven by factors including decreasing installation costs, rising grid electricity prices, and an increased consumer appreciation for energy resilience.
6. With ongoing residential housing intensification in Christchurch, and electric vehicles and solar generation become more prevalent, the capability of our 400V LV network is becoming increasingly important.
7. To optimise our 400V LV network we are starting to use smart systems to assess information on power flows and quality down to LV feeder level. LV monitoring enables us to observe the use of power in near real time, at street level. This low voltage monitoring samples power flows and voltage at 10-minute intervals, generating a wealth of data that will allow us to see and respond to changes of activity on the network. Having visibility of how our network is being used at this

granular level will also help us to provide customers with a more flexible, dynamic range of choices for managing their energy needs.

8. Analysing the data from these monitors will also enable us to develop a better understanding of baseline LV demand and we will be able to see how it changes as adoption of EVs, solar PV, battery storage and energy sharing become more prevalent, and patterns in customer behaviour emerge. To increase the visibility and understanding of our LV networks, we are in the process of installing approximately 1,600 LV monitors by FY26.
9. In conjunction with the work that we are doing, we support the current proposal in this Discussion Document to expand the upper voltage limit from +6% to +10%. We do not support extending the lower voltage limit to -10%.
10. Please let us know if you have any questions about our submission. The contact person for this submission is Vivienne Wilson, Policy Lead, [vivienne.wilson@oriongroup.co.nz](mailto:vivienne.wilson@oriongroup.co.nz)

Yours sincerely

Vivienne Wilson

**Policy Lead**

## APPENDIX

- 1. Would expanding the upper voltage limit from +6% to +10% help networks host more distributed generation like solar PV? Do you think this is likely to be more, less, or similar in cost to other options, like reconfiguring networks or installing additional infrastructure?**

Yes, expanding the upper voltage limit from +6% to +10% will help networks host more distributed generation like solar PV. However, networks will need to be continually vigilant about the amount of distributed generation being hosted. Continual additional hosting of distributed generation may well lead to networks reaching the upper voltage limits and EDBs may need to install additional infrastructure and/or implement active energy orchestration in due course.

With respect to the second question, for the time being, expanding the upper voltage limit from +6% to +10% will be cheaper than reconfiguring networks or installing additional infrastructure. However, as mentioned above, as the amount of distributed generation increases, it may be just a question of time before EDBs need to install additional infrastructure and/or implement active energy orchestration.

- 2. Would expanding the lower voltage limit from -6% to -10% help networks host more distributed energy resources like electric vehicles? Do you think this likely to be more, less, or similar in cost to other options, like reconfiguring networks or installing additional infrastructure?**

We do not support changing the lower voltage limit to -10%.

- 3. Beyond costs, do you think expanding the voltage range will have any wider benefits to the security or sustainability of the electricity system?**

We have not identified any wider benefits at this point.

- 4. Are there any other benefits to expanding the voltage range that have not been mentioned?**

Assuming only the upper voltage limit is increased, it will be desirable to be consistent with the position in Australia (excluding Western Australia).

- 5. Do you have reason to believe that any appliances you manufacture, sell, or use would be at significant risk of failing if the maximum permitted voltage increased from 244 V to 253 V? If so, what appliance(s), why do you think it could be affected, and what would the impact be?**

We understand that in New Zealand there are many appliances and plug packs that are rated for 220 V. A higher upper voltage limit may cause issues for those appliances. We recommend that MBIE seeks the views of Fire and Emergency New Zealand and the Insurance Council in this regard.

**6. Do you have reason to believe that any appliances you manufacture, sell, or use would be significantly affected if the minimum voltage was allowed to fall from 216 V to 207 V? If so, what appliance(s), why do you think it could be affected, and what would the impact be?**

We suspect that allowing for a lower voltage limit of -10% could cause issues for certain types of asset owners such as pumping station owners. Pumping stations may not be able to operate at voltages of 207 V.

**7. Are there any specialised appliances that are at higher risk of failing from wider standard voltage ranges, or where the impacts of failures would be particularly serious?**

Please see our answers above at questions 5 and 6.

**8. Do you think an alternative approach should be taken to manage the demands of distributed energy resources on low voltage networks? If so, what approach and why would it be preferential to expanding voltage limits?**

MBIE may want to consider

- the use of dynamic operating envelopes or other forms of active energy orchestration, and the results of trials in Australia,
- the benefits of using non-traditional solutions in the form of pole top/kerb side batteries for real power absorption/release and/or reactive power support to mitigate voltage issues which periodically occur and have a duration of a few hours.

Distributors may also wish to build flexible export limits into their terms of supply with those customers exporting electricity onto a distribution network. These matters will need further investigation, but they should not restrict the change to the upper voltage limit as proposed in the Discussion Paper.

**9. If voltage limits were expanded, do you believe those changes should be phased in? If so, how? If not, why do you think a phased approach is undesirable?**

We do not support the phasing in of a change to the upper voltage limit. Our view is that the change should be made on a specified date. However, before that, MBIE must ensure that there is an appropriate education campaign about the change to the upper voltage limit and the increased risks to legacy equipment. Importers and sellers of these appliances will need to be well aware of the change. This risk cannot sit with EDBs. EDBs cannot be held liable for the use of appliances that are not well suited to changed voltage limits.

**10. If voltage limits were expanded, are there any specific safeguards you believe should be introduced for 'higher-risk' appliances, if any?**

Please see our comments above about an education campaign.

**11. What costs would be involved in expanding the regulated voltage range? Who would face those costs?**

EDBs may incur some costs in relation to protection settings and the like if the new upper limit for voltage proceeds. We envisage that these costs will largely be business as usual costs and not prohibitive for EDBs. Consumers may need to update their inverter settings. We are unsure of the costs in doing this.

**12. Are there other regulations or standards that would need updating if regulated voltage ranges were changed? Please be specific where possible.**

It is likely that AS/NZS 4777 will need to be updated.

**13. Is there anything which has not been covered by the previous questions that you believe we should consider?**

We have no other comments.