



## COVERSHEET

<b>Minister</b>	Hon Simeon Brown	<b>Portfolio</b>	Energy
<b>Title of Cabinet paper</b>	Consultation on proposed amendments to the Electricity (Safety) Regulations to expand the permitted voltage range for electricity supply	<b>Date to be published</b>	22 January 2024

<b>List of documents that have been proactively released</b>		
<b>Date</b>	<b>Title</b>	<b>Author</b>
October 2024	Consultation on proposed amendments to the Electricity (Safety) Regulations to expand the permitted voltage range for electricity supply	Office of Minister for Energy
23 October 2024	Amending the Electricity (Safety) Regulations to Expand the Permitted Voltage Range for Electricity Supply: Approval to Consult ECO-24-MIN-0241 Minute	Cabinet Office

### **Information redacted**

**NO**

Any information redacted in this document is redacted in accordance with MBIE's policy on Proactive Release and is labelled with the reason for redaction. This may include information that would be redacted if this information was requested under Official Information Act 1982. Where this is the case, the reasons for withholding information are listed below. Where information has been withheld, no public interest has been identified that would outweigh the reasons for withholding it.

Office of the Minister for Energy

Cabinet Economic Policy Committee

## **Consultation on proposed amendments to the Electricity (Safety) Regulations to expand the permitted voltage range for electricity supply**

### **Proposal**

- 1 This paper seeks Cabinet's agreement to consult on a proposed amendment to the Electricity (Safety) Regulations 2010 to widen the permitted voltage range for electricity supply, on low voltage electricity networks.

### **Relation to government priorities**

- 2 The proposal in this paper will support the Government's objective of doubling renewable electricity generation to support our Net Zero 2050 target. It is also consistent with objectives to reduce unnecessary regulatory barriers and improve security and affordability of electricity supply.

### **Executive summary**

- 3 I propose to consult on a technical change to the Electricity (Safety) Regulations 2010 (regulations) governing the supply of electricity to homes and businesses at low voltage. The regulations require single phase mains electricity be supplied at a nominal voltage of 230 Volts, with a permitted range of not more than plus or minus ( $\pm$ ) 6 per cent.
- 4 The attached discussion document proposes increasing the upper limit from +6 per cent to +10 per cent. The proposed change would have the effect of aligning New Zealand's supply voltage range with Australia's current range.
- 5 An alternative, to align with the United Kingdom and Europe ( $\pm$ 10 per cent) is also described.
- 6 Importantly, appliances sold in New Zealand are already required to operate safely within a supply voltage range of  $\pm$ 10 per cent. This would mean consumers can be confident that electrical appliances bought or designed for use internationally can also be used in New Zealand, and vice versa.
- 7 While harmonisation of supply voltage is desirable in terms of closer economic relations with Australia, the proposal is also expected to reduce or defer expenditure by electricity distribution businesses (EDBs) and thereby reduce costs to electricity consumers over time.
- 8 The proposal will enable EDBs to defer network investment otherwise needed to accommodate high solar PV generation in the middle of a sunny day. Without the proposed change in regulated supply voltage, or sufficient expenditure on network upgrades, EDBs could need to restrict solar PV generation investment or operation. Any such restrictions would also represent a cost to consumers.

## Background

- 9 The electricity industry is facing significant change. Many homes and businesses are installing rooftop solar photovoltaic (solar PV) panels, and/or investing in electric vehicles (EVs) which are then charged at home. These trends are expected to accelerate in the years ahead, and the industry is already considering how to accommodate their impact on electricity networks – high levels of distributed solar generation in the middle of a sunny day, and higher household demand in the evening when EVs are plugged in to charge.
- 10 Other things being equal, electricity distribution businesses (EDBs) have signalled they will need to spend significant sums on network upgrades to enable expected higher uptake of solar PV in coming decades. This is because large amounts of solar PV, EVs and other distributed energy resources (DER) could raise voltage and could cause reverse power flows in networks that were designed for power flow and voltage patterns that catered to one-way power flow from generation through transmission and local lines to homes.
- 11 Electricity distribution companies and solar generation advocates have advocated for a review of the regulated voltage range. The rationale is that a larger permitted voltage range could avoid or defer significant expenditure on electricity networks. It could also avoid or defer restrictions that EDBs might otherwise place on the operation of solar generation to maintain compliance with the regulated supply voltage range.

## Proposal to increase permitted supply voltage range

- 12 Officials have investigated the merits and risks of increasing the permitted voltage range. The discussion paper notes that increasing the upper voltage limit from +6 to +10 per cent would:
  - 12.1 align New Zealand's supply voltage range closer with that in Australia, giving consumers confidence that appliances designed for one market will also operate effectively in the other.
  - 12.2 be consistent with existing regulated standards that require appliances sold in New Zealand (and other countries with a 230 Volt nominal supply voltage) to be able to operate safely and efficiently at voltages in the range -10 to +10 per cent.
  - 12.3 enable a significant increase in peak output from solar PV installed in homes and businesses, without needing additional network expenditure.
- 13 The discussion document does not propose lowering the lower voltage limit but invites further information on the potential costs and benefits if the lower voltage limit were to be reduced. Reducing the lower voltage limit from -6 to -10 per cent could potentially avoid or defer network expenditure if low voltage were to constrain charging EVs at peak times. However, expert advice is that transformer thermal limits, rather than low voltage, are expected to be the binding constraint on peak demand in most low voltage networks. This observation suggests there would be limited benefit (relative to the risks to appliances) if the regulated lower voltage limit were reduced from -6 to -10 per cent. This view will be reassessed in light of any submissions on it.

### **The risks of appliances failing following an expanded voltage range should be low**

- 14 New Zealand's appliance standards have been aligned with international standards for many years, including the wider voltage ranges permitted in Australia and Europe. It is therefore likely that newer appliances sold in New Zealand are designed for a greater voltage range of  $\pm 10\%$ .
- 15 It is also possible that older appliances can tolerate higher voltages, as they are likely to have been designed to accommodate the higher nominal voltage of 240 Volts that was historically used in parts of Australia.

### **Cost-of-living implications**

- 16 The proposal in this paper aims to mitigate upward pressures on electricity costs associated with uptake of rooftop solar PV generation. The costs of maintaining and developing transmission and distribution networks are already rising, without additional investment in infrastructure to manage the voltage impacts of solar PV. The Commerce Commission is currently reviewing the revenue required by regulated distribution networks and estimates that lines charges will increase \$15 a month on average for households from April 2025 to enable networks to perform their functions.

### **Financial Implications**

- 17 There are no financial implications associated with this paper.

### **Legislative Implications**

- 18 There are no legislative implications resulting from this paper. Following consultation, I will return to Cabinet with a final proposal to amend the regulated supply voltage range in the Electricity (Safety) Regulations 2010.

### **Impact Analysis**

- 19 The impact analysis requirements do not apply to this paper as it is not proposing regulatory changes. The Ministry of Business, Innovation and Employment's Regulatory Impact Assessment Review Panel has reviewed the discussion document and considers that it meets the quality assurance criteria for the purposes of public consultation.

### **Population Implications**

- 20 The proposal in the attached discussion paper is expected to enable greater investment in rooftop solar PV systems. The primary beneficiaries would be those households and smaller businesses investing in solar PV. Other electricity consumers would also benefit from the proposal to the extent that it reduces or defers the costs of network investment otherwise required to enable greater rooftop solar PV generation.

### **Human Rights**

- 21 There are no human rights implications arising from this paper.

### **Use of External Resources**

- 22 No external resources have contributed to this Cabinet paper. The discussion paper is supported by a technical report prepared by an independent consultant.

### Consultation

- 23 This paper was prepared by MBIE. The Treasury, Ministry for the Environment, and Ministry of Health were consulted. The Department of the Prime Minister and Cabinet was informed.
- 24 The attached discussion paper was prepared by MBIE with input from the Electricity Authority, Energy Efficiency and Conservation Authority, and WorkSafe New Zealand.

### Communications

- 25 The discussion paper will be published on MBIE's website along with an invitation for written submissions. MBIE will alert key stakeholders including: the Electricity Engineers Association, Electricity Networks Aotearoa, Sustainable Energy Association of New Zealand, New Zealand Electrical Inspector Association, Master Electricians, and Consumer NZ.

### Proactive Release

- 26 I intend to proactively release this paper, subject to necessary redactions, within 30 business days of decisions being confirmed by Cabinet.

### Recommendations

The Minister for Energy recommends that the Committee:

- 1 **Note** that amending the permitted voltage range could defer or reduce network investment and support solar PV uptake.
- 2 **Note** the proposed increase in upper voltage limit is considered low risk, would be consistent with existing standards for appliances, and would align closer with Australia.
- 3 **Note** the attached discussion paper proposes increasing the regulated upper supply voltage limit from +6 to +10 per cent above nominal voltage.
- 4 **Approve** release of the attached discussion paper for a consultation period of up to six weeks.
- 5 **Authorise** the Minister for Energy to approve minor technical and editorial changes to the discussion paper prior to publication.

Authorised for lodgement.

Hon Simeon Brown

Minister for Energy

**Annex One: Draft discussion document: Amendments to the Electricity Safety Regulations to expand the permitted voltage range for electricity supply**

*The discussion document is attached separately.*