Electricity (Voltage Limits) Amendment Regulation 2017

Explanatory notes for Subordinate Legislation 2017 No. 223 of 2017

made under the *Electricity Act 1994*

General Outline

Short title

This regulation may be cited as the *Electricity (Voltage Limits) Amendment Regulation 2017*

Authorising law

Section 263 of the *Electricity Act 1994* (the Act).

Policy objectives and the reasons for them

The *Electricity (Voltage Limits) Amendment Regulation 2017* (the amendment regulation) aims to allow more efficient management of network voltage rise caused by the high penetration of solar PV and support greater levels of renewable generation on Queensland electricity networks by adopting *Australian Standard (AS) 60038:2012 – Standard voltages* over one year and *AS 61000.3.100:2015 – Steady state voltage limits in public electricity systems* by 1 July 2020. These standards are considered Australian and international best practice and have been adopted in all other National Energy Market jurisdictions.

Two-way power flows from the high penetration of rooftop solar photovoltaic (PV) is causing network voltage to rise, which can affect the efficient operation of solar PV systems and reduce the shelf life, and efficiency of electrical appliances and equipment. High network voltage can also damage appliances and in extreme cases lead to safety (fire) risks in homes and businesses. The strong uptake of rooftop solar PV in Queensland is challenging electricity distributors' ability to maintain voltage levels within current statutory limits set out in the *Electricity Regulation 2006* (the electricity regulation) of 225 to 254 volts or 240 volts+/- 6 per cent.

To keep voltage within regulatory limits, distributors have increased capital expenditure on network upgrades with costs flowing through to customers via increased electricity prices. Distributors have also increased restrictions on solar connections and exports, making it more difficult and costly for customers to install solar PV.

Aligning Queensland's statutory voltage limits with Australian and international best practice will lead to more flexible solar PV connection processes, as well as improved appliance efficiency for customers and greater cost efficiency in the running of Queensland electricity networks. Similarly, it will increase the amount of renewable generation that can be connected to the grid by 960 megawatts, to support the Government's one million residential rooftops or 3,000 megawatts by 2020 solar target.

Achievement of policy objectives

Section 264 of the Act provides a head of power for regulations to provide for matters set out in Schedule 2 of the Act. Schedule 2 of the Act sets out the matters for which technical and operational requirements and standards (and their monitoring) can be prescribed in the electricity regulation. This includes power qualities such as frequency and voltage.

Section 11 of the electricity regulation sets the nominal frequency and standard voltage at which electricity must be supplied on low voltage networks. Specifically, general electricity supply on low voltage networks must be alternating current, having a frequency of 50 hertz (Hz). The nominal voltage for supply from a 3-phase system must be 240/415 volts and for a single-phase system 240/480 volts.

Section 13 of the electricity regulation sets the allowable margin at which supply of electricity by an electricity entity to a customer must be maintained on low and high voltage networks. For low voltage supply, the range is +/- 6 per cent of the standard voltage (i.e. 240 volts). This effectively sets the range for network supply voltage at 225 and 254 volts (between a phase conductor and the neutral conductor).

The amendment regulation sets the standard voltage and allowable voltage margin for electricity supply on low voltage networks to align with the values set out in AS 60038, with a one year transitional period. To clarify, the amendment regulation points to *AS 60038* to set the relevant values rather than prescribing them in regulation. *AS 60038* currently sets the standard voltage at 230/400 (three-phase) and 230/460 volts (single-phase) with an allowable margin of +10/-6 per cent (between 216 and 253).

From 1 July 2020, the amendment regulation will require electricity supply on low voltage networks to be maintained within the allowable voltage margins set out in *AS61000.3.100*. Again, the amendment regulation points to this standard rather than prescribing its requirements in regulation. The allowable margin in *AS 61000.3.100* is consistent with *AS 60038*, however it sets a preferred 8 per cent sub-range (between 225 and 244 volts).

In addition, the amendment regulation requires electricity entities to measure the voltage at a customer's consumers terminals in accordance with the methodology for the measurement of steady state voltages set out in AS 61000.3.100.

Adopting *AS 60038* and *AS 61000.3.100* in the electricity regulation achieves the policy objectives by lowering the standard voltage level, increasing the allowable voltage range and encouraging electricity entities to supply electricity at voltages closer to the standard level (230 volts). This allows electricity entities to manage voltage rise by adjusting networks settings rather than relying on costly network augmentation. Similarly, it increases renewable generation hosting capacity from 30 per cent to 45 per cent on

some sections of the network, allowing the relaxation of connection and export restrictions on solar PV systems, and encouraging solar uptake.

In addition, as most electrical appliances are manufactured to operate at a nominal 230 volts, household appliances will run more efficiently and safely, with reduced likelihood of failure or damage.

The transitional periods in the amendment regulation allow electricity entities to make the necessary network adjustments to comply with the new voltage requirements and align with the 2020 to 2025 distribution determination (undertaken by the Australian Energy Regulator) so that cost efficiencies flow into network pricing for that period.

Consistency with policy objectives of authorising law

The amendment regulation will enable more renewable generation to be connected to Queensland's low voltage networks at reduced cost to electricity entities and customers and enable appliances to run at more efficient levels. This is consistent with the first objective of the Act to set a framework for all electricity industry participants that promotes efficient, economical and environmentally sound electricity supply and use.

Inconsistency with policy objectives of other legislation

The amendment regulation is not inconsistent with any policy objectives of any other legislation.

Benefits and costs of implementation

A regulatory impact statement process – including a cost benefit analysis of three approaches to network supply voltage regulation in Queensland – found a net benefit of approximately $256 million (M) over ten years from implementing this regulatory amendment.

Benefits flow through to customers via improved energy efficiency and solar connection processes ($257M); distribution networks via reduced network augmentation expenditure ($52M); and the solar industry via increased solar uptake ($9M). Similarly, the amendments will enable an increase in residential solar hosting capacity of 960 megawatts, supporting Queensland Government renewable energy policy and targets.

These benefits outweigh the cost impacts on electricity retailers and generators ($62M) whose revenue from electricity sales is expected to reduce marginally as a result of the amendment. It should be noted that the benefit to distributors incorporates $7M in implementation costs to comply with the new requirements within the transitional timeframes.

Consistency with fundamental legislative principles

The Amendment Regulation has been drafted having regard to the Fundamental Legislative Principles (FLPs) outlined in the *Legislative Standards Act 1992*. The following FLP matters have been considered:

Whether legislation has sufficient regard to individual rights and liberties—Legislative Standards Act (LSA), s 4(3).

The amendments when enacted will incorporate into regulation external documents (i.e. Australian standards) that are not reasonably accessible by the public as there is a cost to purchase these documents from the publisher.

The amendments apply only to persons who design, build, maintain or operate an electric line or works. Persons that operate an electricity distribution network are aware there is a cost involved in purchasing these documents. It is therefore, reasonable to expect these persons to obtain access to the relevant standards to ensure they are aware of their regulatory obligations.

Whether legislation has sufficient regard to the institution of Parliament—LSA, s 4(4)

The amendments when enacted will incorporate into regulation documents made by an entity outside the framework of government (i.e. Standards Australia). This raises concern about whether this approach adversely affects the institution of Parliament by delegating law-making power to an outside body.

Given the highly technical nature of these documents, it is preferable for the amendment to point to *AS60038* and *AS61000.3.100* rather than setting out their requirements in regulation. Government agencies often contribute to the development and review of Australian standards by participating in the committee process or in mandatory public consultation processes. As such, the Government will have the opportunity to contribute to future reviews of these standards.

In addition, *AS60038* and *AS61000.3.100* are widely considered Australian and international best practice and their incorporation into regulation is made in the interests of ensuring Queensland remains in line with best practice network voltage standards into the future.

Consultation

Consultation about the regulation has been undertaken with Energy Queensland Limited (EQL) which is supportive of the amendments. EQL advised the Energex and Ergon Energy networks can implement the proposal via a dedicated process run in conjunction with their standard operation and maintenance schedules.

The Office of Best Practice Regulation (OBPR) was consulted throughout the RIS process and provided a letter of advice supporting the regulatory proposal.