



14 December 2016

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Dear Peter

Electricity (Safety) Regulations 2010 – Use of inverters conforming to AS/NZS 4777.2:2015 in domestic installations

EnergySafety recently, in its November Business Updates, called attention to the fact that the Electricity (Safety) Regulations 2010 (ESRs) as currently amended do not cite the most current standards applying to inverters used to connect distributed generation in premises to electricity networks. Because of this lack of current citation, any installation of an inverter manufactured to the current standards in a low voltage electrical installation will be in breach of the ESRs unless carried out in accordance with a “certified design” to Part 1 of AS/NZS 3000. However, such a solution for domestic installations would not be permitted by ESR 59(1) without a dispensation.

As explained below, this situation, if not quickly addressed, will inflict considerable additional costs on consumers and the owners of electrical installations who wish to install small distributed generation that operates in parallel with the grid and, in our view, it is essential that it be brought to an end as soon as possible. Accordingly, the EEA recommends that Energy Safety update the ESRs to cite the latest inverter standards (namely replacing AS 4777.1:2005 with AS/NZS AS/NZS 4777.1:2016 and including AS/NZS 4777.2:2015).

The EEA has serious concerns that leaving out of date citations in regulations will hold back the adoption of emerging technologies. It is desirable that amendments citing superseding standards should be promulgated at regular intervals so that situations such as the above are short term only. The pressures placed on Government Departments to keep regulations abreast of changing standards and other matters are appreciated but, in the case of the ESRs, we point out that, after a (well-timed) series of annual amendments, the last amendment was promulgated back in 2013 and the next amendment is now well overdue.

Current regulatory requirements

ESR 59(1) states that a domestic installation (under 80A single phase) must comply with Part 2 of AS/NZS 3000:2007. This requirement does not permit a certified design to Part 1 of this standard to be applied to such an installation. ESR 60(2)(f) states specifically that if a low voltage mains parallel generation system to be connected to the grid is installed to comply with Part 2, then it must also comply with AS/NZS 3010 and AS 4777.1. Part 2 of AS/NZS 3000:2007, Clause 7.3.2 requires that the selection, installation and control of grid connected inverter systems comply with the AS 4777:2005 series. Therefore the inverter must also be compliant to AS 4777.2:2005 (inverter requirements) and AS 4777.3:2005 (grid protection requirements).

We infer from this that new generation inverters having a Declaration of Conformity to the new AS/NZS 4777.2:2015 (inverter requirements) standard may be used in a domestic installation only if all the requirements of AS 4777.2 and AS 4777.3 are present in the new AS/NZS 4777.2 standard. However our analysis shows that there are (at least) some minor differences where AS 4777.2 differs to the new AS/NZS 4777.2.

It has been noted that it would be possible to install inverters with a Declaration of Conformity to the new AS/NZS 4777.2:2015 if the installation is a 'certified design' under Part 1 of AS/NZS 3000. However this would increase the cost of the installation. Furthermore, as already remarked, a domestic installation must follow Part 2 of AS/NZS 3000 only, thus making this option unavailable to the majority of consumers likely to installing small size distributed generation.

Implications

If the ESRs continue to not permit the installation of an inverter having a Declaration of Conformity to AS/NZS 4777.2:2015 in a domestic installation, then a number of serious problems are likely to arise that will adversely affect the electrical industry and the general public.

- As stocks of old AS 4777 compliant inverters dwindle, the public may have difficulty installing solar PV systems for grid connection in their homes due to a shortage of legal inverters
- PV installer businesses may also be affected by increased compliance costs
- Inverter manufacturers would not have a market in New Zealand for their new AS/NZS 4777.2 conforming inverters designed for domestic installation. This could affect NZ's high-tech electronics reputation and create unnecessary business uncertainty
- Electricity distribution network companies will have more difficulty taking advantage of advances in inverter technology to provide congestion mitigation support.

The Electricity Industry Participation Code 2010 Schedule 6.1 allows for a fast-track connection application process for connections under 10 kW under Part 1A. The code has updated the standards for this process from requiring an AS 4777.2 conforming inverter to an AS/NZS 4777.2 conforming inverter. This application path process is currently blocked to domestic distributed generation by the existing ESRs, which neither recognise the latest standards nor permit certified designs to Part 1 to be applied to domestic installations. These blocks, unless removed, will largely defeat the purpose for which the Electricity Authority created this fast-track application process.

The EEA's *Guideline for the Connection of Small-Scale Inverter based Distributed Generation* has developed methodology to enable fast track approvals of distributed generation connections, whilst reducing the likelihood of technical problems on low voltage networks as the intensity of distributed generation increases. This requires, depending on the technical circumstances of the connection application, that advanced inverter technology (i.e. volt-var response) be used. However, this technology is most likely available only with new AS/NZS 4777.2 conforming inverters. The ESRs, by prohibiting the use of such inverters, will seriously hinder the implementation of the Guideline's methodology for domestic installations. Undue delays in effecting such changes as are necessary will have negative consequences for the connection application process and the ability of low voltage networks to host increasing levels of distributed generation.

Conclusion

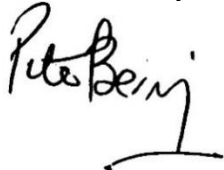
Given the serious impact of these potential problems, the EEA recommends that Energy Safety resolve this issue with urgency by permitting AS/NZS 4777.2:2015 conforming inverters to be used in addition to AS 4777:2005 series conforming inverters, under ESR 60(2)(f) for domestic installations. This action would also avoid the need to amend ESR 59(1) to permit the use of a certified design to Part 1 for domestic installations. The EEA suggests a transitional period be defined during which inverters conforming to either of these standards would be acceptable for domestic installations.

The EEA requests that Energy Safety releases a formal response and resolution timeline to provide to the wider industry.

The EEA expects that Energy Safety will in due course update ESR 60(3)(f) and Schedule 2 to specify that the domestic installation must comply with AS/NZS 4777.1:2016. The EEA requests that Energy Safety provides early formal guidance to the wider industry as to when this update will occur.

Should you wish to further discuss or clarify any matters regarding this submission, please contact Juliet Clendon at juliet@eea.co.nz or Peter Berry at peter@eea.co.nz or 04 4738 600.

Yours sincerely,

A handwritten signature in black ink, appearing to read 'Peter Berry', with a stylized flourish at the end.

Peter Berry
Executive Director