Maximising benefits from local electricity generation

Consultation paper

8 October 2025

ELECTRICITY AUTHORITY
TE MANA HIKO

Executive summary

Whether it's solar panels and batteries for homes and businesses, or larger scale solar and wind farms, distributed generation will play an increasingly important role in New Zealand's electricity system. These localised, renewable energy sources strengthen our electricity system by enhancing our resilience to severe weather events and disasters. They can also reduce emissions, and enable those who invest in residential solar, or other distributed generation, to reduce their own power bills and put downward pressure on electricity prices for everyone.

The Electricity Authority Te Mana Hiko (Authority) is proposing to remove unnecessary barriers to more efficient investment in distributed generation and maximise the benefits it brings for all New Zealanders.

This consultation paper seeks feedback on proposed changes to how export limits are set by distributors. An export limit is the maximum amount of electricity an owner of distributed generation is permitted to supply, or export, to the network at any given time. In general, we expect our proposed changes to lead to higher export limits.

Export limits are necessary. Too much energy being exported at once could impact power quality (for example, by increasing voltage) or overload the network. For distributors, export limits are an important tool to manage their networks, so consumers have a consistent, reliable and uninterrupted electricity supply. The current rules give distributors wide discretion for setting export limits.

However, if these limits are set too low, consumers will not see the full benefits from distributed generation. Many distributors set a 5kW 'blanket' limit for residential solar on homes and small businesses. This limit may not reflect the network's capacity and be based on outdated standards.

When export limits are set too low, owners of distributed generation can supply less electricity to the network. This, in turn, lowers the returns on their investment and fails to capitalise on the full value or potential cost savings from cheaper, localised and renewable energy. There is further opportunity lost as people are encouraged to invest only in systems big enough to meet their own energy needs.

We are proposing to improve the industry rules to set more efficient export limits

Through this consultation, we are seeking feedback on four proposed changes to the Electricity Industry Participation Code 2010 (Code). The proposals aim to maximise distributed generation export for the benefit of all consumers, and support the efficient operation of networks, while maintaining safety and reliability.

Our proposals support distributors to set higher export limits, including by mandating a default 10kW export limit on low voltage networks for straightforward connections, while retaining distributors' ability to set lower limits where needed. We also propose prohibiting distributors from imposing any limits on the nameplate capacity of installed distributed generation.

The Authority is proposing a practical default 10kW limit, noting that network capacity and technology will evolve along a continuum to allow higher exports in future. Ongoing, we want distributed generators to be able to export larger amounts of electricity if they choose.

Other proposed changes include citing the latest equipment standards in the Code, requiring distributors to publish their export limits, and mandating the use of an industry-developed methodology to determine export limits when the default 10kW limit is not appropriate, and for larger capacity DG applications.

We received input from the independent Network Connections Technical Group when developing these proposals. This group is made up of industry and consumer technical subject matter experts, and we thank the members for their valuable input.

Higher export limits will have widespread benefits for distributors, generators and all New Zealanders in the long term

As the volume of distributed generation and battery storage increases over time, higher export limits will be particularly beneficial during times of peak demand because they reduce the need to:

- use higher-cost generation, leading to ***lower electricity costs***
- use thermal generation, like coal and gas, ***reducing emissions***
- build more high-cost network infrastructure to cope with increased demand peaks, ***reducing network and therefore electricity costs***.

Our proposed changes will also be useful when there is a dry year and/or low wind. In these situations, distributed generation can help support lower wholesale electricity prices and reduced power bills for consumers.

Higher export limits will also strengthen the security of the electricity supply. For example, distributed generation can increase the energy resilience of local communities by reducing reliance on electricity generated from centralised, grid-scale generation.

The Authority intends to monitor changes in exports limits over time and within regions, to assess the impacts of our proposals, and may consider further rule changes as necessary.

Our proposals work together with other recent reforms

This work complements recent regulatory changes led by the Energy Competition Task Force to ensure fairer rewards when people supply electricity to networks when needed.

These proposals also support the Government's recently announced widening of the allowable low voltage range in changes to the Electricity (Safety) Regulations 2010. Following the Government's announcement, we informed distributors of our expectation that they update their processes and settings to give effect to the new limits. The proposed changes in this paper will help to ensure New Zealanders benefit from the new range.

This work is the next stage of our wider 'Network connections project'[1] to improve industry rules and support more efficient connections to networks. Stage one of the project was recently completed, with a suite of changes to make network connection processes faster, easier, more consistent and more equitable.

This consultation marks the first part of stage two of the Network connections project. We have divided stage two into three smaller packages, allowing us to address specific issues more quickly and allow consumers to realise benefits sooner. Later in stage two we will consider the application processes for residential solar and other small-scale DG, and the fees that access seekers pay for distributors to process their applications.

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[1] https://www.ea.govt.nz/projects/all/network-connections/consultation/network-connections-project-stage-one/

In parallel, we are also doing work to make pricing methodologies more efficient for new and upgraded connections to the network,[2] and on pricing principles to promote more efficient investment in distributed generation.[3] In combination, this work supports the efficient, reliable and cost-effective operation of networks for the long-term benefit of all New Zealanders.

[2] https://www.ea.govt.nz/projects/all/distribution-connection-pricing-reform/

[3] https://www.ea.govt.nz/news/general-news/have-your-say-on-ways-to-improve-distributed-generation-pricing/

Contents

1. What you need to know to make a submission

This consultation proposes Code changes to deliver more efficient export limits

1.1. This consultation seeks feedback on changes to Part 6 of the Code 'Connection of distributed generation'[4] to support more efficient export limits for distributed generation (DG).[5] Export limits are 'caps' on the rate at which DG can export (inject) electricity into networks at any given time. Distributors use these limits to ensure the safe and effective operation of networks.

1.2. Efficient export limits provide long-term benefits to DG owners (eg, owners of residential solar and batteries), electricity consumers, and New Zealand in general. These benefits include, for example:

(a) positive returns for DG owners, encouraging more efficient DG uptake

(b) reduced and/or deferred investment in network upgrades (eg, by using DG to meet peak electricity demand), saving consumers money

(c) improved security of supply, through greater investment in generation

(d) increased energy supply when there is a dry year and/or low wind, leading to lower wholesale electricity prices and reduced power bills for consumers

(e) reduced greenhouse gas emissions.[6]

1.3. The Authority proposes Part 6 changes to support greater levels of DG export while ensuring networks continue to operate safely and effectively (see Table 1 below). Detailed information on the proposals is provided in section 5 of this paper.

Table 1: Proposed changes to Part 6 of the Code

A. Proposals to improve export limits for small-scale DG
A1: The Code sets a default 10kW export limit and allows for distributors to set lower limits where appropriate using an industry-developed export limits assessment methodology
A2: The Code sets default voltage response settings for inverters[7] (using Australian settings[8]) and allows for distributors to set different settings where appropriate

[4] https://www.ea.govt.nz/documents/7456/Part_6_-_Connection_of_distributed_generation_-j_1_November_2024.pdf.

[5] Distributed generation is electricity that is generated at an ICP for local use within the ICP or injected into distribution networks. For a definition see Part 1 of the Code (https://www.ea.govt.nz/documents/7968/Part_1_-_Preliminary_provisions_-_31_July_2025.pdf).

[6] The emissions profile of DG is typically lower than traditional generation as it is mostly solar photovoltaic generation (see www.emi.ea.govt.nz/Retail/Dashboards).

[7] Most DG generates direct current (DC) electricity. An inverter is a component of a DG installation that converts DC to alternating current (AC), the type of electricity generated by the electricity system.

[8] Australian distributors can operate their networks on a wider voltage range than New Zealand. See more detail at paragraphs 5.58-5.635.525.66 including Figures 10 and 11.

B. Proposal to improve export limits for larger-scale DG
The Code mandates distributors use an industry-developed bespoke export limits assessment methodology when setting export limits for larger DG
C. Proposal for all low voltage DG applications
The Code mandates use of the latest inverter performance standard for all low voltage DG applications

1.4. Section 39(1)(c) of the Act requires the Authority to consult on any proposed amendment to the Code and corresponding regulatory statement. Section 39(2) provides that the regulatory statement must include a statement of the objectives of the proposed amendment, an evaluation of the costs and benefits of the proposed amendment, and an evaluation of alternative means of achieving the objectives of the proposed amendment. The regulatory statement is set out in section 7 of this paper.

How to make a submission

1.5. The Authority's preference is to receive submissions in electronic format (Microsoft Word) in the format shown in Appendix B. Submissions in electronic form should be emailed to connection.feedback@ea.govt.nz with 'Maximising benefits from local electricity generation' in the subject line.

1.6. If you cannot send your submission electronically, please contact the Authority (connection.feedback@ea.govt.nz or 04 460 8860) to discuss alternative arrangements.

1.7. Please note the Authority intends to publish all submissions it receives. If you consider that the Authority should not publish any part of your submission, please:

(a) indicate which part should not be published

(b) explain why you consider we should not publish that part

(c) provide a version of your submission that the Authority can publish (if we agree not to publish your full submission).

1.8. If you indicate part of your submission should not be published, the Authority will discuss this with you before deciding whether to not publish that part of your submission.

1.9. However, please note that all submissions received by the Authority, including any parts that the Authority does not publish, can be requested under the Official Information Act 1982. This means the Authority would be required to release material not published unless good reason existed under the Official Information Act to withhold it. The Authority would normally consult with you before releasing any material that you indicated should not be published.

1.10. The Network Connections Technical Group (NCTG),[9] an industry group set up by the Authority to provide advice on network connections, will help the Authority in reviewing submissions to this paper.

When to make a submission

1.11. Please deliver your submission by 5pm on Wednesday **19 November 2025**

1.12. Authority staff will acknowledge receipt of all submissions electronically. Please contact the Authority: info@ea.govt.nz or 04 460 8860 if you do not receive electronic acknowledgement of your submission within two business days.

[9] https://www.ea.govt.nz/about-us/our-people/our-advisory-and-technical-groups/network-connections-technical-group/.

2. Introduction

2.1. This section of the paper provides some contextual information on where our work on export limits sits within the Authority's wider network connections work programme. It also provides information on the use and nature of export limits, how distributors set limits under the Code, and the Australian regulatory approach.

This work is the next stage of the Network connections project

2.2. This work on more efficient DG export limits is part of a wider work programme under the Network connections project.[10] The project seeks more efficient network application processes, so these are easier, faster, more equitable, and more consistent across distribution networks. The Authority made decisions on some aspects of network connections in July 2025.[11]

2.3. This work is also complemented by the Authority's work on distribution pricing. That work considers issues such as pricing methodologies, connection costs and use of system charges.[12] Similarly, the Authority has also made decisions on some aspects of distribution pricing in July 2025.[13]

2.4. The Authority is also engaging with Electricity Networks Aotearoa (ENA) and the Electricity Engineers' Association (EEA) on a complementary connections work programme. As part of the 'Streamlining Connections Programme':

(a) The Authority is updating the Code through the Network connections project and other work.

(b) The ENA is co-creating connection solutions with stakeholders, such as processes and documentation, to respond to the Code changes and other connection challenges.

(c) The EEA is developing technical standards to promote reliable and secure networks and respond to Code changes.

2.5. In combination, the Authority, ENA and EEA work is intended to be complementary and lead to greater efficiencies.

Distributors set export limits to support network operations

2.6. Export limits are an important management tool for distributors. Distributors can limit the amount of electricity a generator exports to (injects into) the network to:

(a) support network reliability – export limits support distributors to manage power quality on their networks - distributors must operate their networks within prescribed limits (eg, voltage levels) to ensure reliable supply to network users, and to optimise the life of equipment (eg, transformers)

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[10] https://www.ea.govt.nz/projects/all/network-connections/.

[11] https://www.ea.govt.nz/documents/7859/Network_connections_project_stage_one_decision_paper.pdf.

[12] https://www.ea.govt.nz/projects/all/distribution-connection-pricing-reform/consultation/distribution-connection-pricing-proposed-code-amendment/.

[13] https://www.ea.govt.nz/documents/7857/Distribution_connection_pricing_Code_amendment_-_Decision_paper.pdf.

(b) enable more DG installations to connect – networks have limited hosting capacity[14] for generation and setting export limits allows a greater number of generators to connect.

2.7. Export limits provide additional benefits for distributors. These include:

(a) faster processing of small-scale DG applications – setting an export limit confines the network impact of individual applications, and makes applications more uniform and easier to process

(b) easier network planning – distributors know the maximum size of future applications and can project the number of applications they will receive in future years.

2.8. The Authority recognises networks are currently built to a standard that serves traditional load. When customers seek to connect DG, distributors may need to limit export and/or require network upgrades to help manage the applicant's connection costs and ensure networks can maintain reliability for all consumers.

2.9. Export limits may encourage investors to install smaller DG systems than they might otherwise. System size is also influenced by the 'buy-back' rates retailers offer for exported electricity; when these are low, this puts further downward pressure on the size of installed DG.[15]

2.10. These practices restrict customer choice and slow the uptake of renewable generation. They also shift the costs and risks of the energy transition away from distributors and onto consumers.

2.11. The Authority acknowledges export limits will always be required. However, in future we expect distributors to design their networks to fully use the upcoming new allowable low voltage range of 230v ±10%, that is to be introduced into the Electricity (Safety) Regulations, and to ensure customers are not unnecessarily limited. We understand distributors have already started doing this. This proposals in this paper provide some direction on how distributors could respond.

Export limits can be represented in either kW or kVA

2.12. In this paper we represent export limits in kilowatts (kW) for simplicity, rather than kilovolt-amperes (kVA), unless directly quoting from a particular document. Kilowatts is a measure of 'real power' - the actual usable energy produced by DG systems.

2.13. Kilovolt-amperes is a measure of 'apparent power', which includes both real power and reactive power. Reactive power does not do useful work directly but is essential for maintaining voltage and keeping networks stable.

2.14. There is also a difference between power (kW) and energy (kWh). Power (kW) is the rate at which electricity is generated or used at a particular point in time and thus

[14] For this paper, 'hosting capacity' is the amount of DG export that can be accommodated on a network without adversely impacting power quality or reliability, under existing control configurations and without requiring infrastructure upgrades.

[15] The Authority has recently introduced Code requirements relating to 'buy-back' rates via the Energy Competition Task Force work (see paragraphs 3.12-3.15).

relevant to export limits. Energy (kWh) is the amount of electricity used or generated over time and is not a focus of this paper.[16]

2.15. Most DG generates electricity as direct current (DC), measured in kW, and therefore the industry operates in kW (eg, 2kW solar array). For simplicity, Part 6 of the Code uses kW. However, electricity networks operate using alternating current (AC), so DG systems must convert DC to AC before it is exported. This conversion is done by an inverter.

There are three basic types of export limits – static, dynamic and bespoke

Static export limits

2.16. Static export limits are when a distributor sets a fixed 'cap' on the rate at which a generator can export electricity to a network at any one time. Static export limits are typically applied for residential DG. They may apply to all or part of a network and are in effect at all times of the day.

2.17. Static limits are generally set without considering the specific network conditions at the point of connection (eg, congestion levels). Distributors' static limits differ nationally. However, 5kW is a common default for residential DG. Some distributors may allow higher export limits for houses with multiple phases.[17]

Dynamic export limits

2.18. Dynamic export limits are flexible limits that change depending on 'real-time' network conditions. Currently, dynamic export limits for lower capacity generation (eg, residential solar) are primarily managed via the voltage response modes in inverters. The inverter adjusts its export in response to changes in voltage at the inverter terminals.[18] This approach is inherently conservative as there is usually a voltage difference between the inverter terminals and the installation control point (ICP)[19] point of supply where the voltage standard applies.

2.19. Some large capacity generation is subject to dynamic export limits based on either network or grid capacity at the time. The limits are controlled by offers and dispatch, rather than inverter voltage response modes.

2.20. Distributors set dynamic export limits for residential DG by citing AS/NZS477.2 *Grid connection of energy systems via inverters, Part 2: Inverter requirements* ("inverter

[16] For example, a battery energy storage system (BESS) will have a power rating in kW which is the maximum rate at which the battery can charge and discharge, and an energy storage capacity in kWh which is the maximum amount of electricity the battery can hold.

[17] For example, a distributor may allow 5kW of generation to be installed on each phase of a multi-phase supply, eg 10kW in total at a 2-phase property. However, most houses in New Zealand have single-phase electricity supply (ie, a single 230V AC connection). Houses (and small commercial properties) with multi-phase supply have a single point of connection that carries two or three 230V electrical supplies. Multi-phase supply has advantages for properties with certain high energy-using devices (eg, electrical motors).

[18] Over time, it is likely dynamic export limits will be increasingly managed by 'smart' technology like advanced meters or other central control systems. These can respond in a more sophisticated way to network conditions, providing greater benefit for distributors and consumers.

[19] A point of connection at which an electricity consumer or generator is connected to a network. See Part 1 of the Code (*Preliminary provisions*) for a definition of installation control point: https://www.ea.govt.nz/documents/8274/Part_1_-_Preliminary_provisions_-_1_September_2025.pdf.

performance standard")[20] in their connection requirements. The standard includes settings to be entered into an inverter's firmware when installed. This ensures the inverter operates as required by the distributor.

Bespoke export limits

2.21. Bespoke export limits are typically set for individual generation connections (usually larger generation). These export limits respond to a range of network conditions. They are typically determined via a network study during the application process that calculates how much export is possible without compromising network operations and power quality. In some instances, the distributor may require export limiters or other specialised equipment (such as harmonic filters) to be installed.

Export limits are maximums, not guaranteed export levels

2.22. In practice, a DG installation is unlikely to export at its export limit for extended periods as:

(a) solar only generates at its full capacity when there is sufficient energy from sunlight hitting solar panels

(b) most DG (eg, solar, wind) is intermittent (eg, solar does not generate when cloudy or at night)

(c) some generation is used locally (eg, in the house), so only a portion of the electricity generated is exported, especially during peak times such as weekday evenings when local use is high (eg, for cooking and heating)[21]

(d) some generation will be used to charge batteries, if installed, and some batteries may not be able to export electricity at a rate above the export limit

(e) dynamic export limits will curtail the level of exported electricity when network voltage is approaching the threshold.

The Code implicitly allows distributors discretion to set export limit levels

2.23. The Code does not require distributors to set export limits but implicitly allows this. Distributors set limits via their connection and operation standards (COPS). They can also set bespoke limits for larger-scale applications via connection conditions. Generators may also agree limits with distributors case-by-case. We provide more detail and discussion on the process distributors use to set limits in Appendix C.

Australia has made changes to more efficiently connect DG

2.24. In August 2021, the Australian Energy Market Commission updated the National Electricity Rules and National Energy Retail Rules[22] to more efficiently integrate DG into networks. The changes enabled distributors to offer more flexible export limits,

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[20] *Grid connection of energy systems via inverters, Part 2: Inverter requirements* (https://www.standards.govt.nz/shop/ASNZS-4777-22020).

[21] Even if discretionary loads are turned off, houses typically have baseload electricity demand for refrigeration, water heating and appliances in standby mode.

[22] https://www.aemc.gov.au/sites/default/files/2021-08/Final%20determination%20-%20Access%2C%20pricing%20and%20incentive%20arrangements%20for%20DER.pdf.

introduced pricing reforms, and a regulatory framework for export services. The final rules had three key components:

1. Clear obligations on distributors to support more distributed electricity resources

2.25. A fundamental feature was clarifying export services are part of the core services to be provided by distributors. A key requirement of this was restricting complete DG export bans (known as static zero-export limits).

2. Enabling distributors to offer options to encourage solar owners to limit solar waste, save money, and benefit the grid

2.26. This included a series of pricing-related requirements including requiring all distributors to offer a basic export level in all their tariffs, without charge to the customer, for 10 years.

3. Strengthening customer protections and regulatory oversight by the Australian Energy Regulator

2.27. These requirements involved several pricing and other measures, including that the Australian Energy Regulator (AER) would:

(a) review incentive arrangements for distribution businesses to deliver efficient levels of export service and performance

(b) report annually on distributors' performance in providing export services

(c) develop customer export curtailment values to support efficiency

(d) update its connection charge guideline to reflect the restrictions on static zero-export limits.

2.28. An important catalyst of the changes was to address a challenge in some parts of Australia that faced problems with excess DG solar export. This has not been a widespread problem in New Zealand to date.

2.29. The Authority intends to monitor changes in export limits over time and within regions, to assess the impacts of our proposals, and may consider further Code changes as necessary. This includes expanding our approach to include more oversight, like that undertaken by the AER above, if necessary.

3. This is the right time to consider export limits

3.1. This is an appropriate time to consider DG export limits, due to recent changes in New Zealand, including the following developments:

(a) DG uptake is increasing in New Zealand.

(b) Larger DG systems could use the faster, streamlined application process to connect, due to be in place from late 2026.

(c) A review of export limits complements recent work by the Energy Competition Task Force to incentivise distributed generation.

(d) The recent announcement of an expansion of the allowable voltage range supports higher export limits.[23]

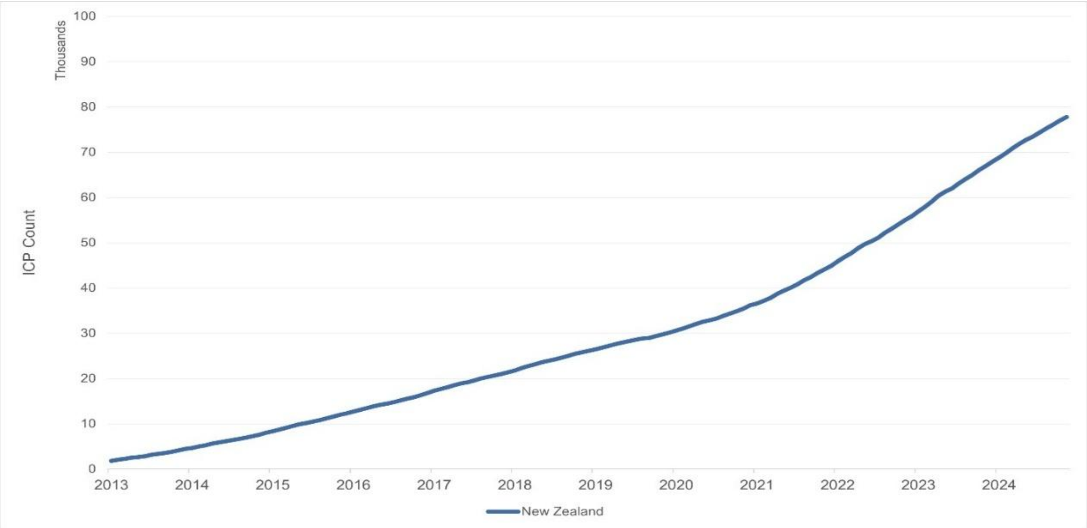
(e) Network visibility is improving, which helps distributors monitor increased export limits.

3.2. This section describes these changes in more detail, as background to our Code amendment proposals.

Distributed generation is increasing in New Zealand

3.3. There has been significant growth in DG in recent years. This is both in terms of total connections (number of ICPs), see Figure 1 below, and total installed capacity (MW), see Figure 2 below. This makes it an important time to review export limits, as these directly impact the operation of DG. In turn, export limits also have a significant impact on the incentives and willingness of consumers to invest.

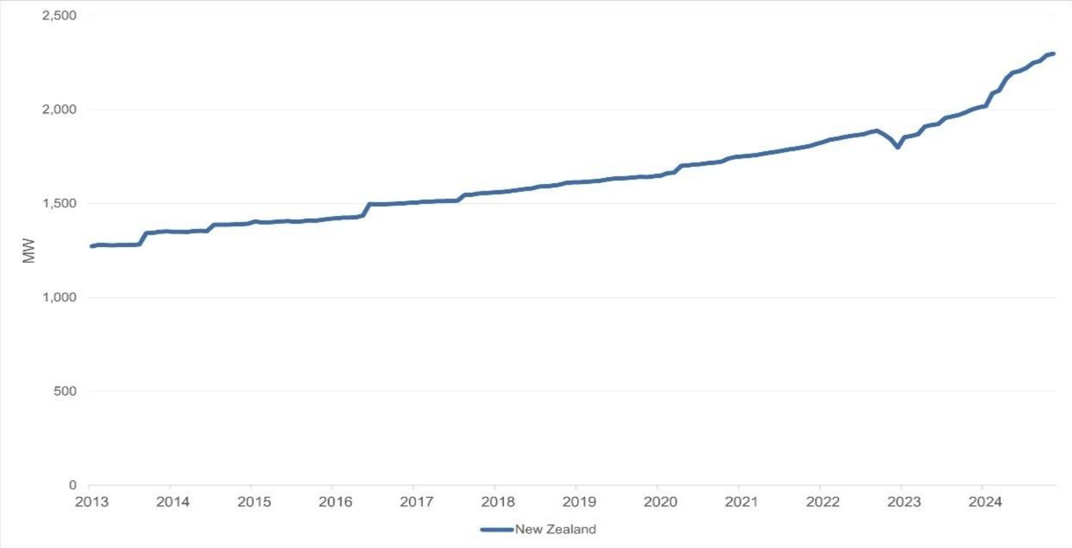
Figure 1: Total number of distributed generation connections (ICPs) in New Zealand 2013-2024[24]



[23] https://www.beehive.govt.nz/release/supercharging-residential-solar-power-generation.

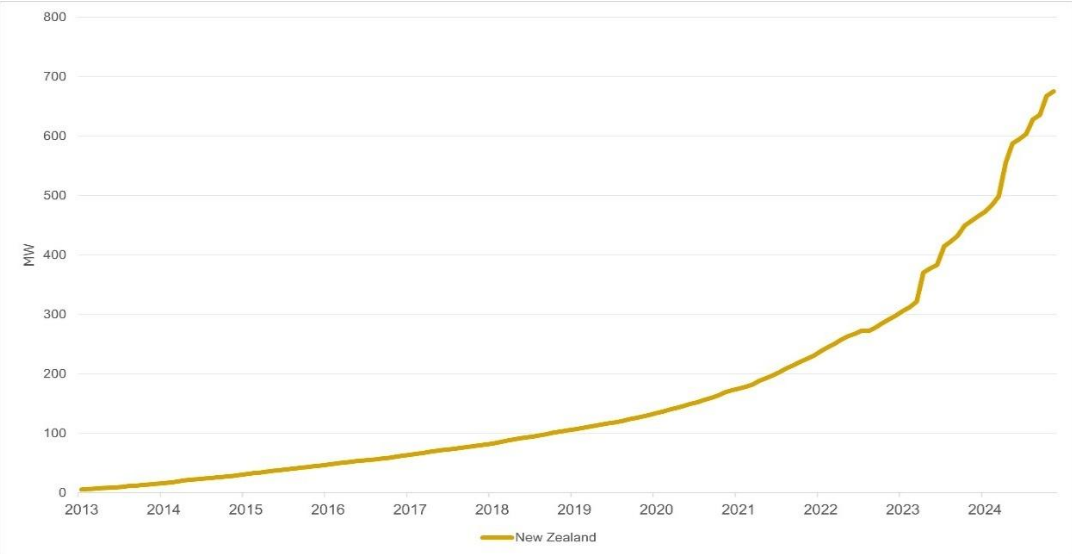
[24] Source: www.emi.ea.govt.nz.

Figure 2: Total installed capacity of distributed generation (MW) in New Zealand 2013-2024[25]



3.4. The adoption of solar DG has been the key driver of this increase, with most of New Zealand's DG investment now in solar. Figure 3 below shows that in the five years between 2019 and 2024, solar DG installed capacity grew by about 400%.

Figure 3: Total installed capacity of solar distributed generation in New Zealand 2013 - 2024[26]



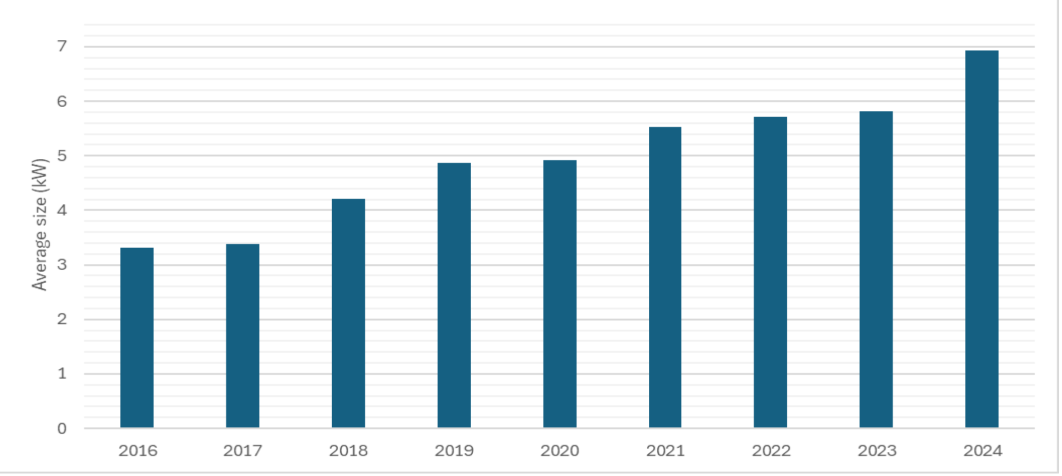
3.5. Also, the importance of export limits increases as the average size of individual DG installations increases. For example, many distributors set a static 5kW export limit for residential solar. This was less pertinent when residential solar was much smaller than 5kW. However, the average size of solar in New Zealand has steadily increased

[25] Source: www.emi.ea.govt.nz.

[26] Ibid.

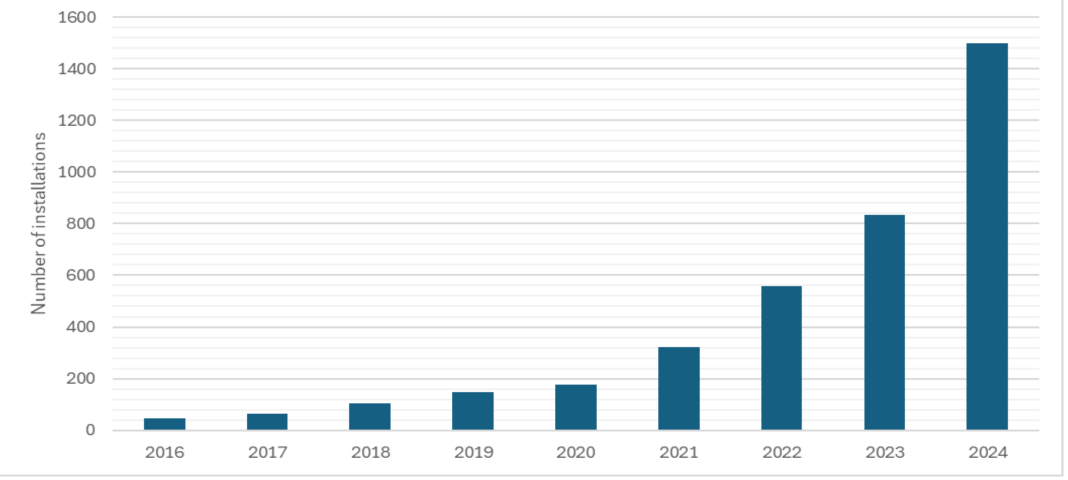
over time and is now almost 7kW[27] (see Figure 4 below). This trend is likely to continue.

Figure 4: Average size of residential solar installations in New Zealand 2016 - 2024[28]



3.6. In addition to the average size of residential solar increasing, the number of residential installations over 10kW is also increasing, as shown in Figure 5 below.

Figure 5: Number of residential solar installations greater than 10kW 2016 – 2024[29]



3.7. When considering Figures 4 and 5, it should be noted there has been significant growth in solar *and* batteries in recent years. The addition of batteries impacts how much and when DG export occurs.

Larger distributed generation systems can use the faster, streamlined application process to connect from late 2026

3.8. As part of recent decisions on the Network connections project (stage 1), DG application thresholds will be based on 'maximum export power' rather than

[27] Solar installations do not always generate at their rated output (eg, if there is low solar irradiance), and some of the electricity they generate is normally used in the household (eg, for baseload supply such as refrigeration and water heating). As such, actual export is generally lower than the rated size of the installation.

[28] Source: www.emi.ea.govt.nz.

[29] Ibid.

'nameplate capacity' from late 2026.[30] This means DG applications will be assessed on the maximum level of electricity they *will* export, rather than the maximum level of electricity the DG installation *can* export.

3.9. This approach takes into account that some electricity is used directly at the installation (eg, to power household appliances) and is therefore not exported. It recognises the main consideration for distributors is the electricity exported from DG, not what occurs 'behind the meter' at a DG installation.

3.10. This means there is no need for distributors to restrict the size of what distributed generators can install behind the meter. Provided inverter settings are in line with distributors' limits, consumers should be able to install whatever they like for internal consumption and charging batteries.

3.11. From late 2026, larger DG applications can use application processes previously reserved for smaller DG if the actual export is below the application threshold. For example, a 20kW application may use the streamlined application process for DG of 10kW or less (Part 1A) if its export does not exceed 10kW. Part 1A applications must be processed within 10 business days and be approved by the distributor if the application complies with Part 6 of the Code.

This review of export limits complements recent work by the Energy Competition Task Force

3.12. Following work by the Energy Competition Task Force, the Authority recently made decisions to improve DG benefits for consumers.[31] These changes will reward households that supply electricity to networks from small-scale DG (such as residential solar and batteries) at times when it is needed most to keep the country 'powered up'.[32]

3.13. Most retailers' current buy-back rates (the amount they pay for exported electricity) do not reflect the changing value of electricity throughout the day. The Authority expects retailers to offer higher rates for electricity sold into the network at peak times by 1 July 2026. This will fairly reward DG owners and incentivise other consumers to invest in DG.

3.14. Optimising export limits complements this work. Not only will a consumer be able to get more for the electricity they export, but they will also be incentivised to export more electricity for even greater gain.

3.15. We acknowledge this reward may incentivise DG owners to 'herd together' to export electricity at peak times, potentially causing voltage issues. However, the expanded 230V ±10% voltage range (discussed below) should mitigate the effects of this. The

[30] For definitions of maximum export power and nameplate capacity, see Part 1 of the Code: (https://www.ea.govt.nz/code-and-compliance/the-code-electricity-industry-participation-code-2010/part-1-preliminary-provisions/).

[31] https://www.ea.govt.nz/projects/all/energy-competition-task-force.

[32] For example, on 19 August 2025 Transpower issued a warning notice indicating insufficient transmission capacity in Hawke's Bay. DG can be valuable in these situations.

Code also requires distributors to consider network stability when developing their rebates for DG.[33]

We expect the newly expanded voltage range to help increase export limits

3.16. In June the Government announced a change to the Electricity (Safety) Regulations 2010 to expand the allowable low voltage supply range from 230V ±6% to 230V ±10%.[34] This is expected to take effect by the end of 2025.

3.17. The change is intended to allow DG owners to export more electricity to networks and deliver broader benefits to New Zealand.[35] Modelling suggested the change would allow solar exports to increase for both residential and commercial consumers and could boost solar investment and overall generation by 507GWh.[36] The expanded voltage limits present a key opportunity to deliver more value to all parties.

3.18. The new limits had the overall objective to ensure low voltage networks continue to operate safely and cost-effectively, while managing trade-offs between three sub-objectives[37]:

(a) reduce the curtailment of DG at times of voltage-induced network congestion

(b) mitigate distributors' costly upgrades to low voltage network infrastructure

(c) maintain the safe operation of low voltage networks.

3.19. In June 2025, the Authority sent an open letter to distributors[38] indicating it expects them to revise and update their processes and settings to give effect to the new voltage limits. This requires distributors (and others) to adjust their planning, design, COPS, practices and guidance for connecting to networks. The Authority indicated it would monitor industry adoption of the new limits and may consider further measures if change is slow.

3.20. However, given the importance of realising the benefits of more DG, we have now decided to bolster industry efforts with Code proposals to assist with the setting of efficient export limits. We consider firm requirements for distributors, with flexibility where justified, will assist distributors to deliver benefit from the voltage range change in a timely manner.

3.21. The EEA is the representative body for power system engineers. It is supporting distributors to review their export limits and determine hosting capacities.[39] The EEA

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[33] Code clause 12A.7(1).

[34] https://www.beehive.govt.nz/release/supercharging-residential-solar-power-generation

[35] The process of exporting electricity from DG to the network increases local voltage. In short, the exported electricity must be at a higher voltage than network voltage to leave the installation and travel along network lines to be used elsewhere. This exported electricity in effect pushes against network electricity, which increases local voltage, which distributors are required to keep within regulatory limits. This effect on local voltage is more pronounced when more than one DG installation is exporting locally at the same time.

[36] https://www.mbie.govt.nz/dmsdocument/29626-ansa-modelling-report-rooftop-solar-pv-and-increasing-the-standard-maximum-low-voltage-pdf.

[37] https://www.mbie.govt.nz/have-your-say/proposals-to-expand-the-permitted-voltage-range-for-electrical-supply.

[38] https://www.ea.govt.nz/documents/7496/Open_letter_to_distributors_-_13_June.pdf.

[39] https://eea.co.nz/government-expands-permitted-low-voltage-range-implications-for-edbs-and-der-hosting/.

will incorporate the voltage changes into a suite of connection guidelines it is developing for industry, as part of the Streamlining connections programme.[40]

3.22. The case study below shows the increased voltage range for low voltage networks can be a catalyst for change.[41]

Case study: Aurora Energy has doubled its residential solar export limit to 10kW

On 1 August 2025, Aurora Energy increased its export limit for single-phase residential DG from 5kW to 10 kW. Aurora made this change in response to strong customer growth and the upcoming increase to the allowable voltage range.

Aurora had undertaken a smart meter data trial, which provided data on solar and electric vehicle use, local voltage, power quality issues and safety, to support network planning and operations. This, and the change to voltage limits, gave Aurora the confidence to proceed. Currently, the average size of a DG installation on its network is around 5.1kW.

Aurora acknowledges that while its export limit has increased, the rate at which generators can export electricity at any given time may be less, based on Aurora's local network capability.

Aurora considers the change represents a move towards a 'smart' and future-ready network encouraging greater adoption of renewable energy while maintaining grid safety and stability. Aurora states that by increasing solar export limits they are not just responding to customer demand but showing how distributors can support the transition to renewable energy.

Aurora also says it is looking to increase its use of non-network solutions, like solar and batteries, and demand shifting. This is to help defer or avoid network investments and reduce customer costs.

Regarding connections for solar export, Aurora notes that the inverter must automatically control and regulate voltage to prevent excursions beyond legislated thresholds. Further, it notes that compliance with the Electricity (Safety) Regulations 2010 and AS/NZS 4777 series standards is mandatory.

Network visibility is improving which helps distributors increase export limits

3.23. The visibility of distribution networks is improving. Distributors are increasingly investing in smart technology to provide a more accurate picture of what is occurring on their networks.[42] This information enables distributors to manage their networks more efficiently, particularly as two-way electricity flows from DG increases and new

[40] https://eea.co.nz/what-we-do/projects/streamlining-connections/?no_frame=1.

[41] https://www.auroraenergy.co.nz/get-connected/solar-and-distributed-energy.

[42] These systems use smart meter data and specialist IT systems to determine network operating data such as local voltage and time-of-use capacity. Examples include the iTron Metering System, the Hiko smart meter-data analysis system and the Future Grid DSO Box solution.

loads emerge (eg, electric vehicles). It also provides more confidence around determining export limits.

3.24. However, the transition to greater network visibility is ongoing, and it is likely to be some time before all distributors have improved visibility of their networks. The Authority has a workstream considering network visibility and recently published a discussion document on the costs, benefits and value improved visibility could bring.[43] This workstream will consider whether anything needs to be done to speed up this transition.

3.25. Distributors that have not yet invested in network visibility systems may need to undertake more analysis to support an export limit change. Also, access to smart meter data is likely to be needed to make best use of these systems, which may create further challenge for distributors that currently do not have access to that data.

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[43] https://www.ea.govt.nz/news/general-news/have-your-say-on-the-costs-benefits-and-value-of-network-visibility/.

4. Current export limits constrain distributed generation benefits

4.1. This section discusses the drivers of the increase in DG and the benefits to generators and consumers. It further notes the challenges/costs for networks and need to safeguard network functioning. We outline our intention to maximise DG exports while maintaining efficient and reliable network operations.

There are various drivers to increased distributed generation investment

4.2. As outlined in section 3 of this paper, there is increasing investment in DG in New Zealand. The drivers to invest in DG include, among others:

(a) the average wholesale cost of electricity has increased, and the cost of DG (eg, utility-scale solar) has fallen to a level where it is cost competitive with traditional electricity generation

(b) consumers are concerned about rising electricity costs and consider that DG (eg, residential solar) can reduce electricity costs

(c) DG, particularly when combined with storage:

(i) is flexible, so can be used for various purposes like deferring network investment or reducing electricity costs

(ii) can safeguard a consumers' electricity availability from network outages or electricity shortages.

Distributed generation and storage benefits all consumers

4.3. Aside from the benefits for generators, DG and storage also benefits all consumers. These benefits flow from:

(a) more efficient use of networks – DG can help with network congestion, peak electricity demand, and when electricity supply is limited

(b) improved security of supply through fewer and shorter interruptions

(c) increased electricity generation leading to lower wholesale prices and lower power bills

(d) reduced investment in network infrastructure – the efficient use of DG can defer or potentially offset the need to invest in network infrastructure

(e) reduced emissions – DG typically has a lower emissions profile than electricity generated during peak demand.

4.4. All the benefits above should flow through to lower electricity prices for consumers.

4.5. The Authority seeks efficient export limits that provide the greatest long-term benefit to consumers. Given the benefits, we want the Code to support levels of DG exported to networks that will maximise benefits to consumers, while ensuring effective network operation is maintained.

Distributed generation imposes costs and challenges on networks

4.6. Despite its significant benefits, DG imposes some costs and challenges on networks. The electricity exported from DG, particularly at low voltage, is decentralised and involves two-way electricity flow. As such, DG can create power quality issues on networks that distributors need to address (eg, by installing larger transformers and lines, reconfiguring existing transformers for increased voltage). Otherwise, power quality can be compromised and supply interrupted.

4.7. Export limits must not unduly compromise the efficient use of networks. Otherwise, the added benefit for generators could result in higher added costs for other network users (eg, network upgrades that could have been avoided). However, if a generator agrees to fund the work required for a higher export limit, this option should be made available.

We seek a balance between maximising distributed generation exports and ensuring efficient network operations

4.8. Although the Authority sees export limits as an important management tool for distributors, we think there is room for improvement in how they are determined. Distributors are aware high export levels may cause power quality issues at peak generation and low load periods, or overload equipment, and they should set their export limits accordingly.

4.9. This approach is simple and predictable for network management. However, a ‘blanket’ approach to export limits that does not fully consider the network conditions at the installation may result in inefficient export limits that:

(a) discourage DG investment, reducing the private and public benefits from greater levels of DG, such as:

(i) more efficient, effective and flexible network management

(ii) less need for network upgrades

(iii) positive returns from DG owner investment

(iv) more choice in DG-related products and services for the public

(v) lower cost electricity overall

(vi) improved decarbonisation.

(b) provide short-term flow-on benefits for existing network users (eg, by reducing short-term network costs) but reduce the overall societal benefit from DG.

4.10. We have noted previously many distributors set ‘blanket’ export limits (eg, 5kW for residential solar) across their networks. This is despite the capacity for DG export varying across parts of a network, and between different networks. This appears an arbitrary approach. We would prefer distributors determine their export limits based on network capacity to realise more benefits. Some distributors are already changing, or are considering changing, their export limits to a level more reflective of actual capacity.

4.11. The Authority seeks a balance between maximising DG export and supporting efficient network operations. We have reviewed current Code requirements, which set base requirements only, and the export limits being applied by distributors. In this paper we propose Code changes to support higher export limits, with distributors able to set lower export limits where justified. That is providing the lower limits are set according to an industry-developed export limits assessment methodology we propose is put in place (see paragraphs 5.28-5.30).

5. Proposals

5.1. This section of the paper discusses our proposed changes to Part 6 of the Code 'Connection of distributed generation'.[44] Part 6 sets out the application processes to connect DG to distribution networks, and to upgrade existing DG installations. It is the part of the Code where export limits are considered.

5.2. For each proposal, we have outlined the current Code requirements and details of our proposed Code change.

5.3. Currently there are three DG application processes set out under "Part" subheadings in Schedule 6.1 of the Code.

Table 2: Current DG application processes in the Code

Part 1A	Part 1	Part 2
DG ≤ 10kW	DG ≤ 10kW[45]	DG > 10kW
Simplified process for small DG	Comprehensive process for small DG	Comprehensive process for large DG

5.4. However, these processes will change in late 2026 in response to decisions from stage one of the Network connections project.

Table 3: DG application processes in the Code from late 2026

Process 1A (Part 1A renamed)	Process 1 (Part 1 renamed)	Process 2	Process 3
DG ≤ 10kW	DG ≤ 10kW	DG > 10kW < 300kW	DG ≥ 300kW
Simplified process for small DG	Comprehensive process for small DG	Comprehensive process for Medium DG	Comprehensive process for Large DG

5.5. We plan to introduce export limit changes ahead of the Network connections project stage 1 changes in late 2026. Therefore, we have referred to the current Code application processes when discussing proposals in this section. However, we intend for the export limit changes to remain in place after the stage 1 amendments come into force in late 2026. Proposals are discussed in the following order:

(a) Proposals A1 and A2: Export limits for Part 1A applications.

(b) Proposal B: Export limits for Part 2 applications.

(c) Proposal C: Export limit for all low voltage DG applications.

5.6. The Authority is not proposing change to the Part 1 application process.

[44] https://www.ea.govt.nz/code-and-compliance/the-code-electricity-industry-participation-code-2010/part-6-connection-of-distributed-generation/.

[45] DG applications must use the slower and more costly Part 1 process if they do not meet the requirements to use the Part 1A process (eg, compliance with specific installation standards, export limits).

5.7. These proposals are designed to support distributors to set more efficient export limits, so greater DG benefits can be realised. The Authority engaged with the independent Network Connections Technical Group[46] when considering the proposals.

5.8. The proposals have implications for distributors. Distribution networks have been built, over many years, to maintain voltage levels at 230V ±6%. Reconfiguring these for 230V ±10% will not always be straightforward. In some instances, a distributor may need to impose lower export limits until they can upgrade physical assets (eg, transformers, lines) to accommodate the higher voltage range. However, with limited visibility of their networks, they may not always know this until issues occur.

5.9. It is likely distributors will face more risk from higher than lower voltages. As the level of DG export on a network increases, network voltages increase. This creates an additional challenge for distributors as they typically set customers closest to a transformer at higher allowed voltages. This allows for the voltage drop that occurs as you move further from a transformer, helping to ensure the customer furthest from the transformer is within statutory limits.

5.10. However, the Authority's proposals are based on the Government's announced change to the Electricity (Safety) Regulations 2010 which allows higher voltages. To deliver the benefits from this change, distributors would have to transition to the wider voltage band. The Authority has set out its expectation that this occurs in its letter to distributors, and the EEA is supporting distributors with technical solutions.

5.11. The Authority acknowledges distributors need to undertake a range of work to transition to 230V ±10%. The proposals in this paper support that transition by proposing how default export limits could apply. As there is great variability in how distributors currently set their COPS, with some distributors updating these regularly and others not,[47] default export limits in the Code would deliver faster and more consistent change.

5.12. The proposals in this paper, if implemented, will require distributors to more carefully consider and manage export limits than currently. The Authority is proposing defaults only and distributors can override these where justified.

5.13. Our proposals may have an impact on frequency[48] which, like voltage, must be maintained within a required range. However, the Authority considers the impact will be small and a consequence of networks moving to 230V ±10%, rather than changes to export limits.

A. Proposals to improve Part 1A small-scale export limits

5.14. Part 1A is the preferred application process for residential solar. Distributors must process a Part 1A application in 10 business days. If not, the application is deemed to

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[46] The NCTG is a group of industry and consumer technical subject matter experts. NCTG members provide input as independent advisors, and in the interests of the industry. See https://www.ea.govt.nz/about-us/our-people/our-advisory-and-technical-groups/network-connections-technical-group/.

[47] Stuart Johnston & Peter Berry (2025) *Review of Distributor Connection Technical Standards: Findings and recommendations for Aotearoa New Zealand*, Electricity Engineers' Association (EEA) https://eea.co.nz/what-we-do/projects/streamlining-connections/technical-connections-review-report/?utm_source=chatgpt.com.

[48] How many times current (AC) changes direction per second, measured in hertz (Hz).

have been approved after 10 business days. Also, an application must be approved if it meets the conditions set out in Part 6. To use the Part 1A process, an application must be for DG lower than 10kW (or any lower limit set by the distributor) and must have compliant inverter voltage response settings.

5.15. The Authority has two proposals for Part 1A applications, to be implemented together:

(a) Proposal A1: Part 6 sets a default 10kW export limit (static export limit)

(b) Proposal A2: Part 6 sets default inverter response settings (dynamic export limits).

Proposal A1: Part 6 sets a default 10kW export limit (static export limit)

Current requirements

5.16. Currently, Part 1A is the only Part 6 application process with explicit provisions for *static* export limits:[49]

(a) distributors must publish the maximum export power threshold (export limit)[50] and the methodology used to determine the export limit[51]

(b) generators can only use Part 1A if their application does not exceed the export limit, if any, specified by the distributor[52]

(c) the inverter must be designed and installed in accordance with AS/NZS 4777.1:2016 Grid connection of energy systems via inverters - Part 1: Installation requirements[53] ("inverter installation standard").[54]

5.17. Requirements (a) and (b) above are due to 'sunset' on 1 September 2026. They were implemented in 2021, along with dynamic export limit requirements (discussed below) to provide distributors with some assurance around Part 1A applications. The limited duration of these two Code provisions was intended to give distributors time to adjust their business models, while avoiding unreasonable barriers to small-scale DG connections.

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[49] See clause 1D and 9B(2A) of Schedule 6.1: https://www.ea.govt.nz/documents/7456/Part_6_-_Connection_of_distributed_generation_-_1_November_2024.pdf.

[50] Part 6 uses the term 'maximum export power threshold' for export limits as 'maximum export power' is a defined term in the Code. However, we refer to 'export limits' in this paper as this is term commonly used by industry. The maximum export power threshold defines the maximum amount of electricity that can be exported from a DG installation without triggering additional technical assessments or mitigation requirements.

[51] Clause 6.3.

[52] Clause 1D(2)(d) of Schedule 6.1.

[53] Although cited in the Code, inverter standards are not part of the Code nor the responsibility of the Authority. These are maintained by Standards New Zealand, jointly with Standards Australia.

[54] See section 2.3 'General requirements for inverter energy systems (IES) of *Grid connection of energy systems via inverters - Part 1: Installation requirements* (https://www.standards.govt.nz/shop/ASNZS-4777-12016). This standard applies for low voltage DG connections only (400/230V).

5.18. In practice, many distributors set a static export limit of 5kW for all Part 1A applications across their network. In some instances, this may be based on an interpretation of the inverter installation standard,[55] which states:

> "*Unless specifically stated by the electricity distributor, the rating limit for a single-phase IES in an individual installation shall be equal to 5 kVA, and a multi-phase IES shall have a balanced output with respect to its rating with a tolerance of no greater than 5 kVA unbalance between any phases*."[56]

5.19. However, the above wording allows distributors discretion to set export limits for single-phase installations other than 5kVA.

Proposal

5.20. We propose to set a default export limit of 10kW for Part 1A applications. This would deliver increased DG export and flow-on benefits for generators and consumers. We consider this a practical current limit but note network capacity and technology will evolve along a continuum to allow higher exports in future. As this occurs, we want distributed generators to be able to export larger amounts of electricity if they choose.

5.21. Therefore, the Authority expects distributors to evolve their approach to export limits, so consumer benefit is maximised. For example, this could include distributors allowing higher limits with pre-conditions (eg, requiring smart inverter control) to allow more streamlined approval under the Part 2 application process for larger DG.

5.22. Endeavour Energy in Australia, for example, is establishing a Flexible Exports programme that employs responsive inverter technology.[57] This aims to allow customers to export 10kW of excess solar, for 95% of the time on average. This is notable given Australia's generally greater need to curtail excess solar export.

5.23. As the industry context and technology develops, the Authority will also review the regulatory framework to ensure it supports higher export limits.

5.24. Our proposed 10kW export limit:

(a) matches the maximum size threshold for Part 1A applications

(b) is higher than the current average size of residential solar in New Zealand (see Figure 4 following paragraph 3.5)

(c) complies with the current inverter installation standard which allows distributors to set export limits for DG other than 5kVA.

5.25. Also, the Authority intends to amend Part 6 to clarify distributors cannot set nameplate capacity limits on Part 1A applications. Part 1A is used for DG applications of 10kW or less. A distributor can set an export limit for Part 1A applications, but it cannot limit the nameplate capacity of the installation unless it exceeds 10kW, which

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[55] Distributors may allow a higher export limit for multi-phase electricity supply (eg, The Lines Company allows up to 10kW for multi-phase supply: https://www.thelinescompany.co.nz/my-account/generate-your-own-power).

[56] 5kVA refers to the, is alternating current (AC) export limit for exported electricity. However, most DG generates electricity as direct current (DC) and therefore the industry operates in kW (eg, 400W solar panels). For simplicity, Part 6 of the Code adopts this terminology also.

[57] https://www.endeavourenergy.com.au/modern-grid/flexible-exports.

means using the Part 2 application process. The applicant may use the Part 1A process and configure their inverter to meet any export limit applied by the distributor.

5.26. Although aimed primarily at Part 1A applications, the proposal will also prevent the distributor setting limits on nameplate capacity for Part 1 applications. This is less of a concern as Part 1 applications are individually assessed, and the distributor and distributed generator can agree approval conditions that are appropriate to the connection.

5.27. Proposal A1 has implications for network management, as total export levels from Part 1A applications would increase. This brings an increased but small likelihood that individual DG applications will result in localised voltage issues. This creates some risk for distributors as Part 1A applications must be processed in 10 business days, which limits the time available to undertake detailed network assessments.

5.28. To support the efficient operation of networks, the Authority proposes 10kW as a default export limit. Where justified, distributors can set a lower static export limit for parts of their network. This will require a distributor to:

(a) undertake a network assessment to determine in what areas, if any, a lower export limit will apply, using the industry-developed export limits assessment methodology (ELAM), that the Code will require all distributors to adopt

(b) publish the network assessment, and a copy of the ELAM (or a link to it), on the distributor’s website

(c) publish a signed statement by its CEO that export limits have been determined in accordance with Code requirements and the ELAM

(d) for applicants, include easily accessible lists or maps of areas on a network where lower than 10kW export limits apply

(e) repeat the network assessment where there has been a material change on the network (eg, changes to low voltage conductors (lines/cables) or transformers, or high voltage network changes) – the distributor can also reassess earlier if they choose.

5.29. We propose the ENA leads the development of the above industry-developed ELAM, in consultation with the EEA, distributors and the DG sector. It would apply to small-scale DG and must be used by all distributors. We consider an industry-developed ELAM would support:

(a) a more robust approach for export limits

(b) workability and practicality for industry

(c) national consistency in setting export limits.

5.30. Industry may want to consider the EEA guide *Connection of Small-Scale Inverter-Based Distributed Generation* as the basis for the ELAM. The EEA guide sets out a low voltage assessment approach and methodology to derive hosting capacity and hence export limits for small-scale DG.[58]

[58] https://eea.co.nz/publication/connection-of-small-scale-inverter-based-distributed-generation-pdf/.

5.31. The Authority considers the benefits of Proposal A1 outweigh the costs. We expect:

(a) consumers to benefit from:

(i) increased generation from DG, which will help to defer or offset the need for network upgrades, saving consumers money

(ii) reduced wholesale electricity prices, especially during a dry year and/or low wind, leading to lower electricity costs

(iii) better security of supply from increased generation from DG

(b) DG investors to benefit from:

(i) better returns on their investment, encouraging more people to invest in DG

(ii) faster processing of small-scale DG applications, and lower processing fees, as fewer applications will need to use the slower and more expensive Part 1 application process.[59]

(c) distributors to benefit from improved network visibility from network assessments.

5.32. The Authority acknowledges there will be costs for distributors to undertake network assessments to establish lower than 10kW export limits for Part 1A applications. However, some distributors may be able to adopt 10kW relatively easily if they have sufficient network visibility and/or significant hosting capacity on their network.

5.33. We consider many distributors will be comfortable with the 10kW default limit, noting the widening of the allowable voltage band and increasing visibility of low voltage networks. Some distributors are already considering a 10kW export limit to match that now allowed by Aurora Energy.

5.34. There will also be distributor costs to develop the ELAM. However, the Authority considers the EEA guide noted in paragraph 5.30 offers a good basis for the ELAM, so these costs should not be significant.

5.35. Distributors are currently required to forecast areas of their network that will become congested in the following 12 months.[60] If those forecasts show the hosting capacity of the network is being used more quickly, the distributor will need to impose lower export limits on that area of the network to manage the congestion risk. This will allow distributors to ensure networks do not become congested prior to any planned upgrades.

5.36. The widespread benefits of increased DG exports are also noted in section 4 of this paper. This includes increased long-term value to DG owners/investors, consumers, and improved network efficiency, which increases value to all parties.

5.37. The proposal, if adopted, will replace the current Part 1A requirements for static export limits that 'sunset' on 1 September 2026.

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59 The maximum costs distributors can charge to process DG applications are set out in Schedule 6.5 'Prescribed maximum fees' (see https://www.ea.govt.nz/code-and-compliance/the-code-electricity-industry-participation-code-2010/part-6-connection-of-distributed-generation/).

60 Clause 6.3(2)(da) and (db).

We propose to cite the latest version of the inverter installations standard as a minor and technical update

5.38. Also, as a minor and technical update, we propose to require the latest 2024 version of the inverter installation standard for Part 1A applications.[61] This standard reflects latest industry thinking and includes several improvements over the 2016 version of the standard currently cited. This change also aligns with the Ministry of Business, Innovation and Employment's intention to cite the same standard in the Electricity (Safety) Regulations 2010, as a technical update, by the end of 2025.

5.39. The Authority will consider whether the upper size threshold for Part 1A (and Part 1) applications should increase in the next stage of the Network connections project. This may result in a change to upper size thresholds but change through that process will take longer to implement than the proposals in this paper.

Q1. What are your views on the proposal to set a default 10kW export limit for Part 1A applications?

Q2. What are your views on the Code clarifying that a distributor cannot limit the nameplate capacity of a Part 1A application, unless the capacity exceeds 10kW?

Q3. There are requirements for distributors in Proposal A1. Which of these do you support, or not support, and why?

Q4. What are your views on the proposal for industry to develop an export limits assessment methodology?

Q5. What would you do differently in Proposal A1, if anything?

Q6. What concerns, if any, do you have about requiring the 2024, rather than 2016, version of the inverter installation standard for Part 1A applications?

Proposal A2: Part 6 sets default inverter response settings (dynamic export limits)

Current requirements

5.40. Currently, Part 1A is the only Part 6 application process with explicit provisions for dynamic export limits.[62] Dynamic export limits are primarily managed via inverter settings. To use the streamlined Part 1A process, the applicants' inverter must:

(a) conform to the inverter performance standard

(b) have a volt-watt and volt-var mode

(c) have control settings and volt response mode settings (volt-watt and volt-var) that meet the distributor's COPS.[63]

5.41. Generators must maintain voltage in a prescribed range. Volt-watt and volt-var are functions in an inverter that adjust export levels in response to voltage fluctuations at

[61] https://www.standards.govt.nz/shop/ASNZS-4777-12024.

[62] See clause 1D and 9B(2A) of Schedule 6.1: https://www.ea.govt.nz/documents/7456/Part_6_-_Connection_of_distributed_generation_-_1_November_2024.pdf.

[63] Clause 1D of Schedule 6.1.

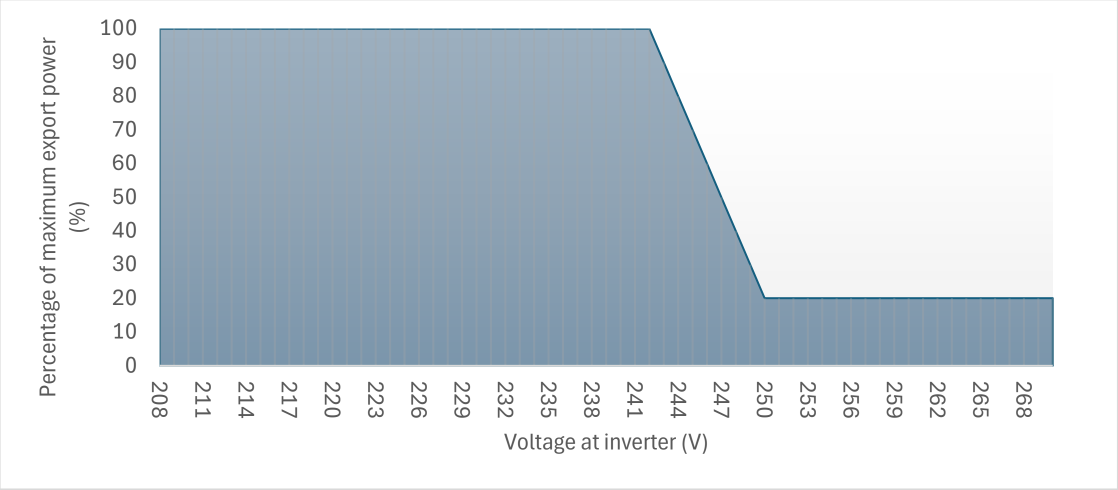
the DG installation. The volt-watt and volt-var functions work in conjunction to optimise local voltage control and maintain system stability.

Current volt-watt requirements

5.42. It is important volt-watt settings are efficient, as volt-watt directly curtails export as voltages approach the upper threshold. Although beneficial for network management, volt-watt settings can have a negative impact on DG owners if these are not set correctly, particularly for owners without batteries to store the electricity that would otherwise be exported.

5.43. The volt-watt function progressively reduces export as voltage rises. This only occurs when the voltage at the inverter[64] starts to reach the maximum allowed, and a minimum level of export is maintained. Figure 6 below shows the behaviour of an inverter that conforms to the inverter performance standard. The DG installation fully exports until voltage reaches 242V when curtailment via volt-watt starts. The level of curtailment progressively increases until it levels out at 20% of maximum export power at 250V.

Figure 6: Volt-watt settings for New Zealand inverters in the inverter performance standard (AS/NZS 4777.2:2020)[65]



5.44. The inverter performance standard also sets volt-watt limits for multiple mode inverters (also known as hybrid inverters). A multiple mode inverter is an inverter with an onboard battery and/or battery charging capability. Rather than limiting export, the inverter standard limits the rate at which a battery can be charged when voltage is low. This helps to stop local voltage from reducing further.

5.45. The volt-watt settings for multiple mode inverters in New Zealand are set out below (see Figure 7). A multiple mode inverter can enable the charging of a battery at 100% of the rated capacity until voltage drops to 224V. The allowable charging rate progressively decreases until it hits a minimum 20% at 216V.

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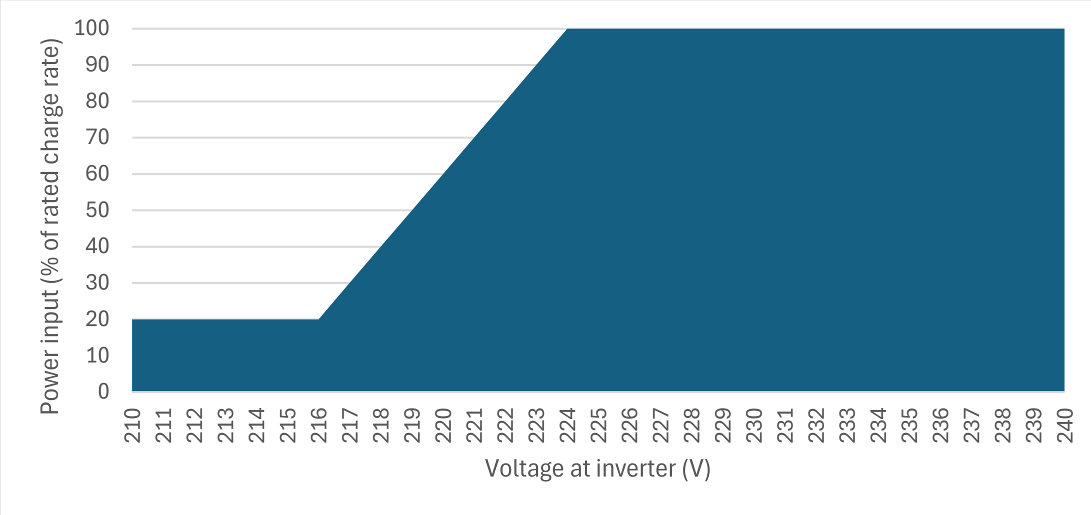
[64] An inverter measures voltage at its ‘grid-interactive port’, which is called ‘voltage at the inverter’ in this paper. This voltage at the inverter will closely match local network voltage but will not be the same, as network voltage is measured at the point of supply to the property, not at the inverter.

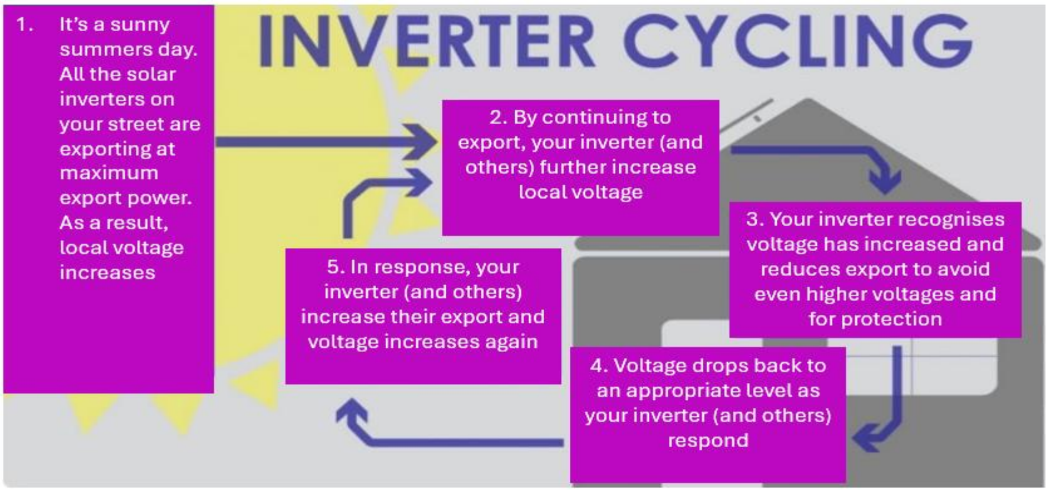
[65] See Table 3.6 of the inverter performance standard.

Figure 7: Volt-watt settings for New Zealand multiple mode inverters in the inverter performance standard (AS/NZS 4777.2:2020)[66]



5.46. Volt-watt leads to 'inverter cycling' where a single inverter at a property, and multiple inverters in a location, ramp their export up and down as voltage fluctuates (see simplified explanation in Figure 8 below). Although this is unpopular with some DG owners, it is necessary for volt-watt to effectively manage local voltage.

Figure 8: Inverter cycling of DG export from the volt-watt function



Current volt-var requirements

5.47. Volt-var works in combination with volt-watt. It provides more constant voltage for consumer appliances, improving performance and product life, and helps distributors with voltage management. Although it does not impact export limits directly, efficient volt-var settings can enable greater levels of export from DG. This is done through the internal electronics in the inverter, without significant electricity losses for the DG owner.

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[66] See Table 3.8 of the inverter performance standard.

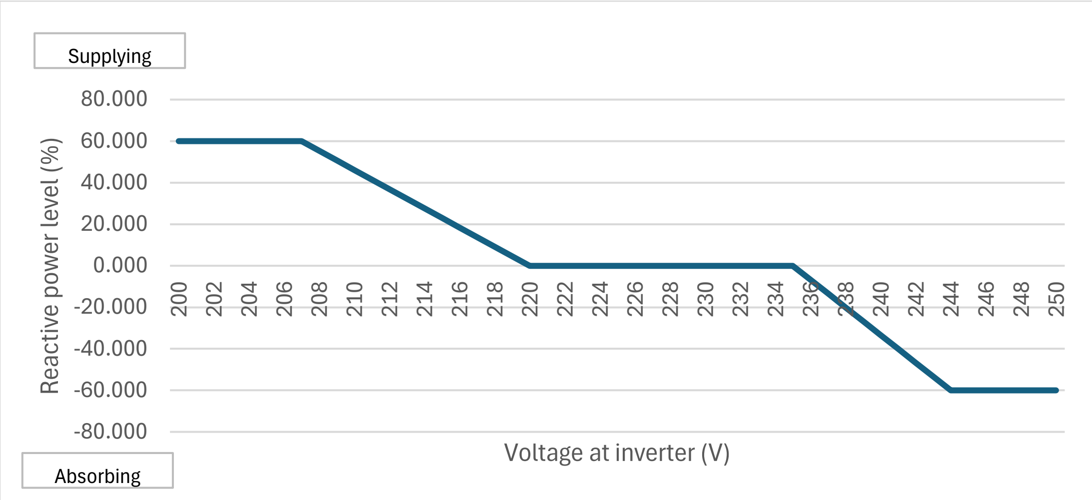
5.48. Volt-var requires an inverter to absorb reactive power from the network when voltage is high. This helps to decrease local voltage and enables DG to export more electricity before it is curtailed through volt-watt. Conversely, volt-var requires an inverter to inject reactive power into a network when voltage at the installation is low, helping to increase local network voltage.

5.49. The volt-var settings in the inverter performance standard are set out in Figure 9 below:

(a) For low voltage - the inverter starts to supply reactive power into the network at 220V. If voltage drops further, the inverter supplies higher levels of reactive power, up to a maximum of 60% of the inverter's rating[67] at 207V.

(b) For high voltage – the inverter starts to absorb reactive power at 235V. If voltage rises further, the inverter absorbs higher levels of reactive power up to a maximum of 60% of the inverter's rating at 244V.

Figure 9: New Zealand volt-var settings in the inverter performance standard (AS/NZS 4777.2:2020)[68]



Current application of volt response mode settings

5.50. Part 6 allows distributors to set volt-watt and volt-var settings for their network. Currently, they cite the settings from either the 2015 or 2020 version of the inverter performance standard.[69] The 2015 settings allow a consumer to export more electricity before it is curtailed by the inverter. This may be appropriate where the distributor has strong voltage control and sufficient hosting capacity on their network. However, the 2015 standard has been superseded and does not represent best industry practice.

5.51. The static and dynamic export limits provisions for Part 1A applications are due to 'sunset' on 1 September 2026. The Part 6 requirements were implemented for five years only. This was to allow distributors time to develop more efficient ways to

[67] This is 60% of the inverter's apparent power rating in volt amps.

[68] See Table 3.7 of the inverter performance standard.

[69] A few distributors cite a pre-2015 version of the inverter performance standard.

connect Part 1A applications and to manage any voltage and/or power quality issues that may arise. However, distributors continue to use the approach prescribed in the Code and have not proposed an alternative approach to the Authority.

Proposal

5.52. The Authority proposes to update Part 6 of the Code, so it references:

(a) the Australian volt-watt and volt-var settings in the inverter performance standard (as detailed in Figures 10, 11 and 12 below)

(b) the Australian inverter settings for sustained operation at high voltage

(c) the latest version of the inverter performance standard (AS/NZS 4777.2:2020 incorporating Amendment No.1 and 2).

5.53. The widening of the voltage band in New Zealand supports more export from DG before it is curtailed. However, the New Zealand volt-watt and volt-var settings in the inverter performance standard are based on 230V ±6%, not 230V ±10%. DG export will be unnecessarily curtailed, and consumer benefit compromised, if updated settings are not used.

5.54. The inverter performance standard is a joint standard, with volt response settings for both Australia and New Zealand.[70] As Australian distributors can operate at 230V ±10%, the voltage range New Zealand is adopting, we propose to adopt the Australian volt-watt and volt-var settings as defaults in Part 6.[71] This would allow New Zealand DG to export more electricity than currently.

5.55. In support of this change, many New Zealand distributors already refer to the Clean Energy Council list of approved inverters[72] for their networks, the list used by Australian distributors. Further, Australia and New Zealand share a common product market, so household appliances should not be unduly affected by adopting the Australian volt response settings.

5.56. The inverter performance standard should be revised if Proposal A2 is adopted, although this is not essential. The revision would align New Zealand's settings with those for Australia and be undertaken during the next scheduled revision of the standard. The standard is jointly administered by Standards Australia and Standards New Zealand.

5.57. The Authority has not proposed new voltage response mode settings for New Zealand. The Australian settings have been in place for some years without issue

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[70] The inverter performance standard has three settings for Australia: 'Australia A' for all of Australia except 'Australia B' (Western Australia which operates on a different voltage) and 'Australia C' (Tasmania, and isolated and remote power systems). The Authority has proposed 'Australia A' settings for New Zealand as these apply for Australian main centres at 230V.

[71] Australia adopted 230V +10% in 2000. In 2022, Australia updated the standard voltages standard (AS IEC 60038:2022) to support a move from 230V -6% to 230V -10% (see Appendix A: https://www.standards.org.au/standards-catalogue/standard-details?designation=as-iec-60038-2022). Although the inverter performance standard was published in 2020, two years before Australia revised its voltage standard, the Australian voltage settings were developed with an expectation Australia would transition to the lower voltage. Some Australian distributors have not transitioned to 230V -10% yet and continue to manage their networks to a narrower range. For example, Queensland operates supply voltages down to 207V (230V -10%) but currently uses 216V for network planning, with the lower range used for contingencies.

[72] https://cleanenergycouncil.org.au/industry-programs/products-program/inverters.

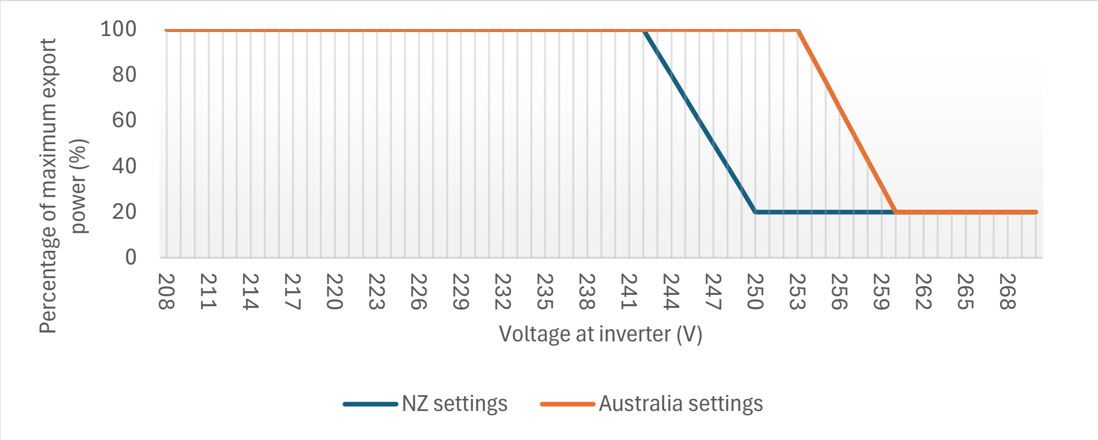
and, by adopting these, change can occur more quickly. The case to develop new settings for New Zealand, and the work required to do this, could be considered at the next revision to the standard. We seek stakeholder views on this approach.

Proposed volt-watt settings for inverters

5.58. As noted previously, volt-watt is particularly important for export limits as it directly curtails export when voltage is high.

5.59. Figure 10 below shows the additional benefit if New Zealand were to adopt the Australian volt-watt settings. The area between the blue and orange lines represents the extra electricity that could be exported. DG export would not be curtailed until voltage reaches 253V, rather than 242V currently. The change would help to realise the extra 507 GWh that modelling indicated was possible from New Zealand's change to 230V ±10%.[73]

Figure 10: A comparison on Australian and New Zealand volt-watt settings in the inverter performance standard (AS/NZS 4777.2:2020)[74]



5.60. The Authority proposes the Australian volt-watt settings as defaults only. As currently, we want distributors to be able to use alternative settings where justified. That is, providing these are set according to the ELAM and BELAM, discussed at paragraphs 5.28-5.30 and 5.93-5.94 respectively (eg, for parts of their network where managing voltage is difficult). However, these alternative settings must not exceed the 'allowed range' for volt-watt settings in the inverter performance standard.[75]

Proposed volt-watt settings for multiple mode inverters

5.61. Similarly, we propose to adopt the Australian volt-watt settings for multiple mode inverters (see Figure 11 below). This would allow the battery of a multiple mode inverter to charge at 100% of its rated capacity at lower voltages than currently (215V rather than 224V). The minimum charge rate remains at 20% of the rated maximum charge.

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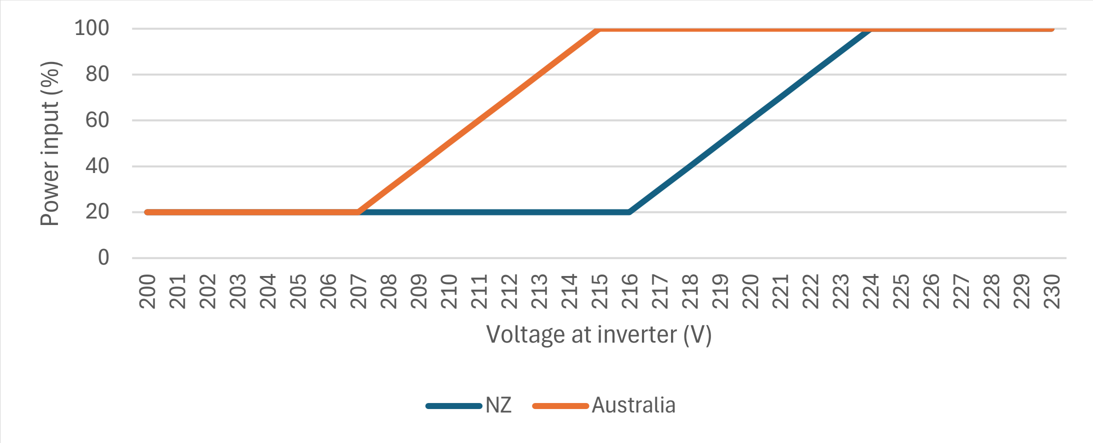
[73] https://www.mbie.govt.nz/dmsdocument/29626-ansa-modelling-report-rooftop-solar-pv-and-increasing-the-standard-maximum-low-voltage-pdf.

[74] See Table 3.6 of the standard. Figure references 'Australia A' settings.

[75] See the 'allowed range' row in Table 3.6 in the standard. The allowed range sets volt-watt limits for all jurisdictions where the prescribed settings may not be appropriate.

Figure 11: A comparison on Australian and New Zealand volt-watt settings for multiple mode inverters in the inverter performance standard (AS/NZS 4777.2:2020)[76]



5.62. Adopting the Australian volt-watt settings for multiple mode inverters would increase the utility of the battery, ensuring more stored electricity is available when needed. This would be particularly valuable when network supply is constrained and/or costly. The settings may put downward pressure on voltages when they are already low, but this is supported as New Zealand is moving to 230V -10%.

5.63. Again, the Authority proposes the Australian volt-watt settings for multiple mode inverters as defaults only. We propose the Code mandates distributors could use alternative settings where justified, but these must not exceed the 'allowed range' in the inverter performance standard.

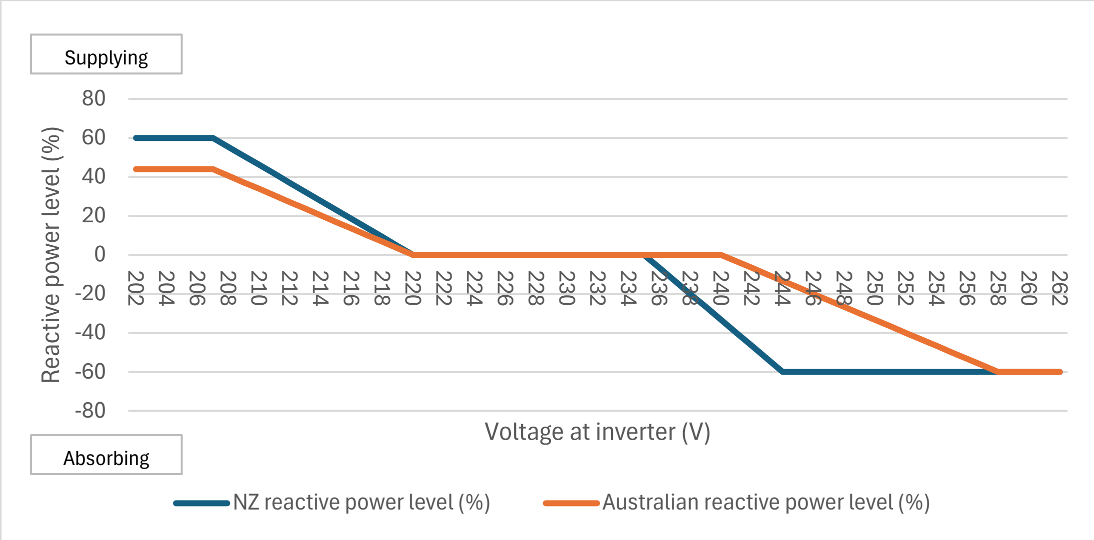
Volt-var settings

5.64. As previously noted, volt-watt and volt-var settings work in combination. Volt-var is important for export limits as it absorbs reactive power from a network, lowering voltage, which then allows a DG installation to export more electricity before volt-watt engages.

5.65. The Authority proposes to adopt the Australian volt-var settings for Part 1A. Figure 12 below shows how the volt-var settings would change. The inverter would supply less reactive power when voltages are low, as lower voltages will be permissible following changes to the Electricity (Safety) Regulations 2010. Likewise, the inverter would not start to absorb reactive power until voltage reaches 240V.

[76] See Table 3.8 of the standard. Figure references 'Australia A' settings.

Figure 12: Volt-var settings for Australia and New Zealand in AS/NZS 4777.2:2020[77]



5.66. As for volt-watt, the Authority proposes to set default volt-var values in Part 6. However, again, we propose to mandate in the Code distributors could use alternative settings where justified, but these must not exceed the 'allowed range' in the inverter performance standard.

We propose to cite the Australian settings for sustained inverter operation when voltage is high

5.67. In response to the change in allowable voltage in New Zealand, the Authority proposes to cite in the Code the Australian settings for sustained inverter operation when voltage is high.[78] This means an inverter will automatically disconnect when the average voltage at the inverter is above 258V for 10 minutes, rather than 249V as currently.

We propose to cite the latest version of the inverter performance standard as a minor and technical update

5.68. Proposals A1 and A2 would replace the current Code requirements that 'sunset' on 1 September 2026. We propose to keep the inverter performance standard but update the Code to require the latest version (incorporating Amendments 1 and 2).[79] Amendment 2, which came into effect in Australia on 23 August 2025, includes some improvements over the previous version of the standard.[80]

Q7.	Do you support amending the New Zealand volt-watt and volt-var settings to match the Australian values - why or why not – what do you think are the implications?

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[77] See Table 3.7 of the inverter performance standard. Figure 12 references 'Australia A' settings.

[78] See Table 4.3 of the inverter performance standard.

[79] The Code is unable to cite 'evergreen' standards. That is, only the version of the standard cited in the Code that is current on the date the Code citation came into effect applies, not later revisions to that standard.

[80] For example, improvements to supply type terminology, removal of IEC 62109 requirements for battery only products, better documentation and marking, and electric vehicle supply equipment (EVSE) specific clauses.

Q8. What would you do differently in Proposal A2, if anything?

Q9. Do you have any concerns about the Authority citing the Australian disconnection settings for inverters when high voltage is sustained?

Q10. Do you have any concerns about the Authority requiring the latest version of the inverter performance standard for Part 1A applications?

5.69. Amending the volt-watt and volt-var settings on inverters can deliver significant benefits to consumers. This allows DG systems to operate more efficiently and export more electricity to the network without compromising voltage stability.

5.70. Optimised volt response settings enable inverters to respond more effectively to local voltage fluctuations. This reduces unnecessary curtailment of DG output and increases the amount of energy available for self-consumption or export. This improves financial returns on residential DG. It also enhances overall energy use, helping consumers capture more value from their investment, while supporting a more resilient and flexible electricity network.

5.71. We consider there would be relatively minor operational costs for distributors to adopt the Australian volt response settings under Proposal A2. This would mainly involve, where required, analysis to determine which parts of a network should use alternative settings and updating their processes, website and documentation to reflect the new default values.

5.72. Applicants wanting to connect DG would see immediate benefit from the updated volt response settings. The settings can be entered into the inverter before it is installed, at no or negligible cost. Consequently, the Authority considers the benefits of the proposal outweigh the costs.

Industry would need to support existing DG consumers to benefit from Proposals A1 and A2

5.73. In addition to new applications, the Authority wants owners of existing DG systems (~70,000 in total) to also benefit from Proposals A1 and A2.

5.74. Currently a Part 6 application is required only if the owner of existing DG changes the nameplate capacity or fuel type of the installation. Therefore, a change to maximum export power and/or voltage response settings would not trigger the need for a new application.

5.75. We propose a change to the Part 1 and 1A application processes, so a Part 6 application is required when the maximum export power of an existing DG installation is increased, or the voltage response settings in the inverter are changed.[81] This would provide some assurance to distributors, who may otherwise have to manage the network implications of existing DG changing its settings sight unseen.

5.76. A full Part 6 application may not be required, as the current clause 6.4A of the Code allows a simpler process to be used (if the distributor and applicant agree) where there is a change to nameplate capacity. Further, clause 6.4A is being amended as

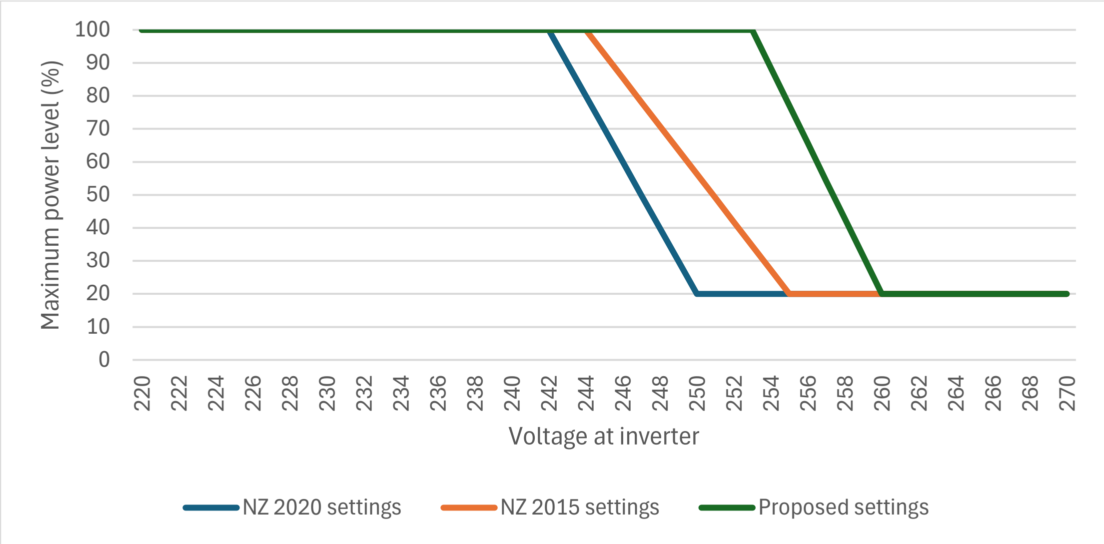
[81] As part of stage one of the Network connections projects, a change to maximum export power will trigger a new Part 1 and 1A application from late 2026. However, as we seek a change to export limits and volt response settings ahead of late 2026, we have included this proposal now.

part of stage one of the Network connections project to allow a simpler process to be used where there is a change to maximum export power.[82]

5.77. It would be beneficial for owners of existing DG to update their voltage response settings if Proposal A2 is implemented. Otherwise, existing DG will do much of the work to manage local voltage before new DG is affected.

5.78. For example, Figure 13 below compares the volt-watt settings for existing DG (installed to the 2015 or 2020 version of the inverter performance standard) and the proposed new volt-watt settings for New Zealand. This shows the export of existing DG would be significantly curtailed before any curtailment of new DG occurs.

Figure 13: Volt-watt settings for existing DG (NZ 2020 and NZ 2015) and proposed volt-watt settings for DG in New Zealand (as set out in versions of AS/NZS 4777.2)



5.79. Inverter cycling will continue if the proposals are implemented (see paragraph 5.46 and Figure 8). However, this is more likely to occur with existing DG installations if they do not implement the new voltage response settings.

5.80. It will be challenging for some owners of existing DG systems to realise the benefits from Proposal A2. Volt-watt and volt-var settings are adjusted via firmware settings in the inverter. It will be possible to adjust some installed inverters remotely (eg, via the internet) at minimal cost. Others may need adjusting at the inverter itself, which could require a site visit from a professional at some cost.[83] There may be a few inverters, particularly older models, that are not able to be adjusted. The additional benefits will not be realised until they are replaced as they reach end-of-life, typically 8-12 years after installation.

5.81. We understand the solar industry is engaging with distributors on how best to respond to the impending change to 230V ±10%. This engagement should consider

[82] The Authority may consider a streamlined 'variation' application process for updating existing installations in the next stage of the Network connections project.

[83] Alternatively, it may be possible to provide instructions to a trusted person if the risk can be managed.

the proposals in this paper and, if implemented, how industry can support existing DG owners to realise the full benefits of the proposals at least cost and effort.

Applicants who do not meet Part 1A requirements would still need to use the Part 1 process

5.82. As currently, applicants can only use the faster and less expensive Part 1A application process if the application meet the qualifying criteria in Part 6. Part 1 must be used for DG applications ≤10kW when the generator wants to:

(a) export more than the export limit cited in a distributor's COPS, or

(b) use an inverter not designed and installed to the inverter installation standard, or

(c) use an inverter not conforming to the inverter performance standard, or

(d) use inverter control settings that do not comply with a distributor's COPS.

5.83. The requirements above would continue if Proposals A1 and A2 are implemented. Where a distributor sets an export limit below 10kW for parts of its network and the applicant wants to exceed this, the Part 1 application process must be used unless Part 2 applies.

We will consider whether more applications can use the Part 1 and 1A processes in the next stage of the Network connections project

5.84. Most DG applications ≤10kW use the faster and less costly Part 1A process to connect. However, the Part 1 process provides a valuable pathway for small-scale generators that want to deviate from the norm. As a one-stage process, it is still typically faster and easier to use than the two-stage Part 2 process.

5.85. In 2022, the Authority consulted on whether the size threshold for small-scale DG applications should increase.[84] If, by lifting the threshold, more applications could be processed through the Part 1 and 1A processes, this would support increased DG uptake and deliver more consumer benefit.

5.86. There was general support for the proposal at the time, although some stakeholders had concerns. A one-stage process to connect DG may not always be appropriate when a detailed network assessment is required. An assessment may also require ongoing liaison between the applicant and distributor, and the services of a specialist third party (eg, power systems engineer). In this instance, a two-stage process generally works best.

5.87. The Authority will revisit the issue of Part 1 and 1A application thresholds in the next stage of the Network connections project, starting in late 2025. It may be easier to increase the size threshold for Part 1 applications as these are not time-bound to 10 business days, unlike Part 1A. Small applications also generally require less analysis than larger applications. We will consider any change to size thresholds alongside other potential changes to Part 1 (eg, processing fees).

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[84] https://www.ea.govt.nz/documents/1743/Issues-paper_-Updating-the-regulatory-settings-for-distribution-networks.pdf.

5.88. We will also consider whether the size threshold for Part 1A should increase. However, it is important to retain a streamlined process for small-scale DG in the Code and raising the current size threshold from 10kW may compromise this.

B. Proposal to improve setting larger scale export limits (Part 2 bespoke export limits)

5.89. The Authority proposes that distributors must use an industry-developed assessment methodology when determining bespoke export limits for Part 2 applications.

Current requirements

5.90. There are currently no export limit requirements for Part 2 applications or a methodology to determine limits applied from the Part 2 assessment (ie, 'network study'). This means distributors can set limits without the need to follow or publish a methodology. This hampers transparency and may not fully support distributors to set limits in the best interests of networks or generators. Given distributors are required to maintain networks within statutory voltage limits, this can sometimes result in conservative export limits being applied.

5.91. There is also currently a limited right of review for applicants when a distributor imposes an export limit under Part 2. If the limit is a connection condition, an applicant can use the Code's process. However, as applicants need to maintain a working relationship with distributors, this is unlikely.

5.92. The Rulings Panel[85] provides a means to resolve disputes and hears appeals under the Code. However, these are generally limited to breaches or procedural issues - not technical decisions like export limits, unless a Code breach is alleged.

Proposal

5.93. We propose distributors must use an industry developed bespoke export limits assessment methodology (BELAM) when setting export limits for Part 2 applications. Industry may want to consider the EEA's guide *Connection of Generating Plant: Guide to Assist and Advise Distribution Network Engineers*[86] as the basis for the BELAM. However, the Authority is advised there are other industry guides that may also be appropriate, such as Powerco's *Utility Scale Distributed Generation Standard*.[87]

5.94. The Authority recommends the ENA leads the development of the BELAM, in consultation with the EEA, distributors and the DG sector. As for the ELAM, the BELAM would be a single methodology that must be used by all distributors and published on distributor websites.

5.95. Proposal B would:

(a) ensure a robust methodology is used to determine bespoke export limits

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[85] https://www.electricityrulingspanel.govt.nz/.

[86] https://eea.co.nz/publication/connection-of-generating-plant-pdf.

[87] https://www.powerco.co.nz/-/media/project/powerco/powerco-documents/get-connected/distributed-generation/utility-scale-distributed-generation-standard-2024.pdf.

(b) improve the consistency of analysis undertaken across distributors

(c) allow applicants, and their consultants, to understand the basis on which their export limits will be assessed, helping them formulate applications for best return

(d) provide efficiencies for both distributors and applicants as applications are less likely to require rework.

5.96. Network assessments may be undertaken by a distributor or by a specialist third party (eg, power systems engineering consultancy), with the cost met by the applicant. Regardless of the approach used, and where export limits analysis is undertaken, we propose to amend the Code so distributors must:

(a) provide the export limits analysis, using the BELAM, to the applicant

(b) where the analysis has deviated from the BELAM, provide an explanation to the applicant

(c) where viable, and unless the applicant agrees otherwise, provide the applicant with export limit options and their associated costs.

5.97. Although distributors may already be openly and actively engaging with applicants on export limits, the requirements above would ensure the BELAM is used, the export limits analysis is shared with the applicant, and the applicant is aware of their export limits options. The latter enables applicants to assess the options and tailor their application for greatest benefit.

5.98. We also propose amending the Code so applicants can dispute static and dynamic export limits for Part 2 applications. This would require a generator that is a 'participant'[88] and the distributor, to initially resolve disputes in good faith and enter mediation and/or arbitration, if required. A distributed generator that is not a participant would be permitted to raise a dispute with the distributor. The distributor would then be under an obligation to resolve the dispute in good faith and offer mediation to the non-participant.

5.99. Again, we do not consider Proposal B places material costs on distributors or DG applicants compared to the status quo. Assessing DG applications under Part 2 of the Code, given larger DG capacity, already often requires network assessments and applicants to engage in this process. Further, we consider the industry-developed assessment methodology should make assessments more efficient, given standardisation, and eventually reduce costs for distributors.

5.100. The Authority expects the BELAM would be developed from current resources and practice and, as such, should not require significant time and cost to develop.

5.101. Consequently, we consider the benefits of Proposal B to outweigh the costs.

Q11. What are your views on the proposal that where distributors set bespoke export limits for Part 2 applications, they must do so using the industry developed assessment methodology?

[88] 'Participant' is defined in the Electricity Industry Act 2010 as those industry participants and specified persons listed in section 7 of the Act as being a participant in the electricity industry (and the extra definition in Code clause 1.5). See: https://www.legislation.govt.nz/act/public/2010/0116/latest/DLM2634330.html#DLM2634330.

Q12. What are your views on the several requirements that must be adhered to regarding the distributors' documentation (see paragraph 5.96) relating to setting export limits under Part 2?

Q13. Do you agree it is fair and appropriate that where distributors set export limits for Part 2 applications, applicants can dispute the limit? If so, what sort of process should that entail?

Q14. What would you do differently in Proposal B, if anything?

Proposal C: All low voltage DG applications must comply with the inverter performance standard

5.102. The Authority proposes a Code change to require all low voltage DG applications to comply with the latest inverter performance standard. This would apply for 230/400V connections only, and regardless of the Part 6 application process used.[89] New Zealand settings would be adhered to, except for voltage response settings and the sustained operation for voltage variation settings, where Australian settings would apply.[90]

Current requirements

5.103. The inverter performance standard sets technical requirements for inverters, including, for example, voltage response settings, fault ride-through[91] and anti-islanding requirements.[92]

5.104. Currently the Code requires inverters to conform to the inverter performance standard for Part 1A applications only. Distributors can require the standard for other application processes or size of DG application, should they choose. Currently most distributors cite the 2020 or 2015 version of the standard in their COPS.

5.105. Australia made the inverter performance standard mandatory in December 2021. This followed a 2019 review of the 2015 standard by the Australian Energy Market Operator.[93] The review identified power system security risks from increasing DG penetration and insufficient capabilities in the incumbent 2015 standard.

5.106. The Authority sought preliminary feedback on whether the inverter performance standard should be mandatory in a 2022 issues paper.[94] In general, there was strong support for the proposal. Submitters noted the standard represented international

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[89] AS/NZS 4777.2:2020 applies only to low voltage DG connections.

[90] As previously noted, 'Australia A' settings would apply (see Tables 3.6, 3.7, 3.8 and 4.3 of the standard). Distributors would be able to set alternative voltage response settings within the 'allowed range' in the standard.

[91] Fault ride-through allows generation to stay connected and operational during and after short voltage disturbances such as voltage sag, voltage swells, or transient faults. It provides greater assurance against network shutdowns.

[92] Anti-islanding stops generation from exporting electricity to a non-functioning network. This safeguards against harm to people working on the network and prevents potential surges that could disrupt network operation. By controlling electricity flow, it also helps maintain consistent and reliable electricity supply.

[93] www.aemo.com.au.

[94] See: https://www.ea.govt.nz/documents/1743/Issues-paper_-Updating-the-regulatory-settings-for-distribution-networks.pdf.

best practice and was important for network security and resilience, particularly as DG populations increase.[95]

5.107. The Part 6 issues discussed in the 2022 issues paper are being progressed as part of the broader Network connections project. The Authority prioritised the issues and addressed key Part 6 priorities in stage one of the project. Now that stage one is largely complete, we are formally consulting on whether the inverter performance standard should be mandatory in this current stage of the project.

Proposal

5.108. The Authority proposes to mandate the use of AS/NZS 4777.2:2020, incorporating Amendments 1 and 2, for all low voltage DG applications in New Zealand. An inverter conforming to this standard provides a minimum level of performance to support network operations, deemed to be international best practice by industry experts. Inverters that conform to an earlier version of the standard provide a lower level of performance.

5.109. The latest version of the standard has advantages over the 2015 version:

(a) improved volt response mode settings

(b) improved fault ride-through and anti-islanding requirements, with greater certainty on when inverters stay connected and generate, or disconnect, to support electricity system security and prevent major events

(c) improved accuracy and stability of measurement systems in inverters, so they respond better to different network conditions

(d) improved and new testing procedures to ensure inverters operate as required

(e) greater clarity the standard applies to electric vehicles that export to networks.

5.110. The benefits of mandating the latest version of the standard include:

(a) better network management and reduced need for upgrades – by improving the ability of inverters to better respond to network issues as they occur

(b) greater certainty of how DG will operate during network events (eg, potential cascade failure[96]) – network operators have greater assurance as inverters increasingly have the same, best practice, capabilities and settings.[97]

5.111. The proposal, if implemented, would reduce consumer choice of inverter which may result in higher purchase costs in some instances. However, New Zealand and Australia share a common product market, the standard has been mandatory in Australia for four years, and the Australian market is larger than New Zealand's. Consumers in New Zealand would continue to have access to a wide range of inverter models and manufacturers.

[95] Submitters also suggested allowing using equivalent standards, setting AS/NZS 4777.2:2020 as the minimum standard, and needing to maintain standards and keep the Code current.

[96] When a fault or overload in one part of the transmission system or network triggers a chain reaction of failures in other parts, potentially leading to a widespread blackout.

[97] The certainty will increase as older inverters, which typically last around eight to 12 years, are replaced.

5.112. Distributors would retain the ability to set alternative volt response settings should they choose, if these comply with the allowed range in the standard. We consider this may be valuable as networks transition to the wider allowable voltage band. However, we seek stakeholder views on this.

5.113. The Authority considers the benefits of Proposal C outweigh the costs. The benefits from the increased performance of inverters, including network benefits, outweigh the marginal cost of having to purchase a standards-compliant inverter, and for distributors to update documentation.

5.114. When the Authority consulted in 2022, some stakeholders argued for alternative standards to be allowed in addition to the inverter performance standard. The Authority seeks stakeholder views on this, including what alternatives might be used and how they are equivalent to the inverter performance standard.

5.115. The Authority has not proposed to make the latest inverter installation standard (AS/NZS 4777.1:2024) mandatory as we expect this to be referenced in the Electricity (Safety) Regulations 2010 by the end of 2025.

Q15. What are your thoughts on requiring the inverter performance standard (AS/NZS 4777.2:2020 incorporating Amendments 1 and 2) for low voltage DG applications in New Zealand?

6. Transitional arrangements

6.1. In this section of the paper we set out proposed transitional arrangements for the introduction of our proposed changes to the Code. The Authority has considered the timing of the voltage level change to 230V ±10% in developing the proposed transitional arrangements.

6.2. Proposals A1 and B require industry to develop an ELAM or BELAM respectively. For Proposal A1, distributors must use the methodology if they want to set export limits below 10kW, and for Proposal B for all limits set. We consider four months is sufficient for industry to develop these methodologies.

6.3. We propose the default limit in Proposal A1 come into force 28 days after gazetting of the Code amendment.[98] We consider this is sufficient time for distributors to implement the default as this is a simple process change for straight forward Part 1A applications. Further, distributors can still set an alternative limit where necessary.

6.4. However, this means the default limit would come into force before industry has finalised the ELAM or BELAM. We therefore propose:

(a) industry can use an alternative assessment methodology of their choosing for the first four months after gazetting of the Code amendment, but must apply the ELAM or BELAM after this, including to any analysis done in the previous four months

(b) the distributor’s chosen alternative assessment methodology, and any network assessment undertaken, must be published on the distributor’s website.

(c) if (a) and (b) are not undertaken, the distributor must use the default 10kW limit for Part 1A applications.

6.5. The latest inverter installation standard and inverter performance standard-related requirements would also come into effect 28 days after gazetting for Part 1A applications. We consider this is sufficient implementation time as this is a minor and technical Code change and merely requires distributors to update documentation for straight forward applications

6.6. We propose a four-month transition period for Proposal A2, following gazetting. This provides time for distributors to assess whether alternative volt response settings are needed for parts of their network, and to change documentation. Most New Zealand inverters in stock will comply with the inverter performance standard and can be adjusted to Australian settings. Distributors could implement Proposal A2 more quickly than four months should they choose.

6.7. Proposal B, with distributors needing to use the BELAM to assess export limits, would also come into force four months after gazetting, noting paragraph 6.4 above. This gives distributors time to assess steps needed regarding these less straightforward applications.

6.8. Similarly, we propose a four-month transition period following gazetting for Proposal C, involving mandating the use of AS/NZS 4777.2:2020 for all low voltage DG

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[98] New Code rules cannot come into force until 28 days after notification in the New Zealand Gazette.

applications in New Zealand. We consider this is a reasonable timeframe for distributors to implement as there are various updated settings and requirements in the standard that distributors will need to consider. However, distributors would also retain the discretion to set their own volt response settings for inverters.

6.9. The Authority wants to implement these proposals quickly to deliver consumer benefit. However, we have allowed transition time to give distributors ability to consider implications of the proposals to ensure effective, efficient and safe implementation.

6.10. We propose they come into effect before upcoming changes to Part 6 via stage one of the Network connections project (effective late 2026). The export limits proposals, if adopted, would continue to apply after the late 2026 changes come into effect. Therefore, we suggest submitters consider the proposed export limits-related amendments alongside the changes being introduced as part of stage one of the Network connections project.

Q16. Do you consider the transitional arrangements workable regarding requirements and timeframes? If not, what arrangements would you prefer?

7. Regulatory statement for the proposed amendments

Objectives of the proposed amendments

7.1. The proposed amendments uphold the Authority's statutory objective to promote competition in, reliable supply by, and the efficient operation of, the electricity industry for the long-term benefit of consumers.

7.2. The objective of the proposed amendments is to support more efficient export limits for DG to provide the most benefit possible to DG investors, networks, and all consumers. This is while continuing to ensure safe and effective networks where power quality to all users is maintained.

Q17. What are your views on the objective of the proposed amendments?

The proposed amendment

7.3. The proposed amendments to Part 6 of the Code are discussed throughout this paper. The drafting of the proposed amendments is contained in Appendix A.

We expect the proposed amendments' benefits to outweigh the costs

7.4. We consider that expected benefits for all proposed amendments will outweigh their costs. We have outlined various costs and benefits regarding the proposals in section 5 of this paper. Establishing more efficient DG export limits has potential to provide significant benefits to DG investors, distributors, and consumers including:

(a) improving returns to DG investors, thereby encouraging more DG investment

(b) making more DG available for distributors to use to manage load peaks and congestion, thus reducing need for expensive network upgrades

(c) the above factors enhancing security of electricity supply and resilience for consumers, and flowing through to reduced electricity costs

(d) increased electricity supply leading to lower wholesale electricity prices (especially in dry year/low wind conditions), meaning lower electricity costs for consumers

(e) DG's reduced carbon footprint benefitting all New Zealanders.

5kW export limits may cost around $4 million in 'spilled' electricity per year

7.5. We estimate that a 5kW export limit could cost residential solar owners approximately $4.23 million per year in lost revenue.[99] This is due to energy that is generated but cannot be exported, often referred to as 'spilled' electricity. This loss could be reduced if distributors move to default 10kW export limits.

[99] Note: this estimate is intended to highlight the materiality of the cost rather than serve as a precise calculation. Actual costs may vary depending on market conditions, seasonal variance, and other factors.

Household-level impact

7.6. The Authority's EMI data[100] shows a gradual increase in the average size of residential distributed generation. For the month ended 30 June 2025, the average size of new residential distributed generation being installed was 7.92kW.

7.7. With a typical New Zealand solar yield of 1,400kWh per kW per year for each solar installation, this results in:

- annual generation: 7.92kW x 1,400kWh = 11,088kWh.

7.8. We have assumed that approximately 7% of annual generation is over the 5kW threshold and is unable to be exported, so the amount of 'spilled' electricity is:

- spilled electricity: 11,088kWh x 0.07 = 780kWh per year.

7.9. The buy-back rates offered by retailers in New Zealand varies between approximately 8c/kWh to 17c/kWh. Using 12c/kWh for this example:

- revenue loss: 780kWh x $0.12/kWh = $94/year for a household with a 7.92kWh distributed generating capacity.

7.10. Over a 25-year system lifespan, this equates to a $2,350 loss per household.

7.11. This above analysis is likely conservative. This is because the social cost (eg, of burning more coal) is likely to exceed 12c/kWh, so the total cost to society of the 5kW export limit is likely to exceed the estimated revenue loss to households.

National-level impact

7.12. EMI data shows that as of 30 June 2025, there are approximately 71,600 residential solar ICPs in New Zealand. While the overall average system size is around 5.3kW, this includes many older, smaller systems.

7.13. Based on EMI data and installation trends, we estimate that approximately 45,000 ICPs have systems larger than 5kW and are likely to be affected by export limits. Using the per-household average loss of $94/year:

- total annual revenue loss: 45,000 ICPs x $94 = $4.23m per year.

Broader implications

7.14. Based on 45,000 ICPs 'spilling' 780kWh per year, we estimate the total spilled electricity nationally is 33.5GWh/year (taking a midpoint of an estimated 20-47GWh lost). This must be replaced by other generation sources, potentially drawing down stored fuels like hydro or coal.

7.15. Additional impacts include:

(a) increased wholesale electricity prices

(b) higher emissions

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[100] Electricity Market Information website (EMI) is the Authority's website for publishing data, market performance metrics, and analytical tools to facilitate effective decision-making within the New Zealand electricity industry. See: https://www.emi.ea.govt.nz//.

(c) reputational risks from wasting renewable energy, especially during dry periods.

7.16. Low export caps also discourage further investment in residential distributed generation.

Direct costs of the proposals would mainly be to distributors

7.17. We consider the direct costs of the proposals would mainly fall on distributors, but we do not consider these significant compared to benefits. Our view is that the 10kW default limit will be acceptable to many distributors (particularly noting the coming allowable voltage increases) and not require substantial reassessment of network capacity or upgrades. We know some distributors are already considering increasing limits to 10kW and Aurora Energy has done so. Distributors' visibility of their low voltage networks capacity to handle DG is also increasing.

7.18. We consider the most substantial costs would relate to distributors needing to undertake network assessments where they wish to reduce default 10kW export limits. However, we do not consider distributors will need to commonly take this approach. We would welcome feedback on what distributors consider the costs of such assessments would be.

7.19. While this is a significant upfront cost, it is a one-off investment. Once built, the model can be updated and reused by the distributor over time. Some distributors may also already have network models in place, in which case updating them for these scenarios would be relatively low-cost.

7.20. While these are a new cost, these assessments will also benefit distributors by increasing the visibility of their network and thereby supporting more efficient management. They could therefore be considered a necessary part of distributors' business.

7.21. Other costs to distributors, like for the Network connections (stage 1) changes published in July 2025, largely involve updating processes, documentation, databases and websites and changing their operating practices to meet new Code requirements. However, we consider the benefits to distributors through more efficient network management, and more standardisation around export limit setting, will compensate for these costs.

7.22. We have considered if the proposals will impose any costs on distributors for upgrading their networks. As noted in paragraph 5.35, we consider there will be no additional costs to distributors as they will be able to use lower export limits to manage congestion until any planned upgrades.

7.23. We expect costs to DG applicants and broader consumers to be reduced.

Q18. Do you agree the benefits of the proposed amendments outweigh their costs? If not, why not?

Q19. What are your views on the Authority's estimate of costs of lost benefits from a 5kW export limit?

Q20. Are there costs or benefits to any parties (eg, distributors, DG owners, consumers, other industry stakeholders) not identified that need to be considered?

The Authority has identified other options for addressing the objectives

Allowing industry to develop its own approaches to set more efficient export limits

7.24. An option would be to allow industry to determine its own processes to set more efficient DG export limits. The case study of Aurora Energy's approach (see paragraph 3.22), illustrates that the expansion of permitted voltage range to ±10%, and strong DG customer growth, has been a catalyst for that distributor to expand its residential solar export limit from 5kW to 10kW.

7.25. Aurora's example may be followed by other distributors. However, most distributors have taken a conservative approach to setting export limits to date. Further, this is only one aspect of the several proposals the Authority wants to progress. We support appropriate industry involvement (notably in developing the industry-led assessment methodology). However, we consider Code amendments are the best way to get the full range of improvements we seek to provide benefits consistently to all New Zealand consumers.

7.26. Proposal C, concerning mandating AS/NZS 4777.2:2020 incorporating Amendments 1 and 2, contains a specific option regarding distributors retaining the ability to set their own voltage response setting for inverters if the standard's settings are unsuitable for their network.

7.27. Other reasons we do not prefer a complete industry-led approach are:

(a) the proposals will work best as a complementary package, rather than industry implementing these ad-hoc

(b) it is unlikely to lead to a consistent level of increased export limits nationally in relation to Part 1A and Part 1

(c) industry may be incentivised to develop solutions benefitting itself over DG investors and consumers

(d) distributors have tended to prioritise network solutions over using DG to address network constraints

(e) distributors may not have strong incentives to see DG connections as a customer service priority

(f) it is unlikely to lead to a consistent adoption nationally of the latest AS/NZS 4777 inverter standard series and Australian voltage response modes.

7.28. We therefore consider Code change is our preferred approach. However, we are open to feedback on alternative ways to address our objectives through changes to our proposals.

Supporting industry to develop its own approaches through guidance

7.29. Another option would be to again allow industry to determine its own processes to set more efficient DG export limits, but support this with Authority, industry-developed or joint guidance. This approach would involve providing industry with guidance around distributor discretion in setting export limits for the best outcomes. As these would be guidance, there are limited enforcement options available if a distributor chooses not to follow the guidance, short of mandating the guidance, which may be similar in effect to introducing a Code change.

7.30. Guidance could be produced to reflect the current New Zealand context of the benefit of allowing as much DG export as possible, while ensuring a safe and effective networks. However, we consider this approach a useful complement to Code change, not an alternative. The reasons we prefer Code change noted above still stand, with guidance not a strong enough approach to achieve our objectives.

Choosing a default export limit other than 10kW

7.31. We have chosen to propose a default export limit of 10kW for Part 1A applications. This is because 10kW limits for small-scale DG are where distributors that have already increased limits, or are intending to increase these, have assessed as appropriate to move to. We consider 10kW should therefore be acceptable to other distributors.

7.32. Moving to 10kW is also in line with the upcoming allowable voltage increases. Our view is also that moving to 10kW will bring sufficient benefits without generally compromising network operations.

7.33. However, there are options to set higher or lower default limits. We welcome feedback on whether other limits would be preferable and the reasons for this.

Q21. Do you agree the proposed Code amendments are preferable to the other options? If you disagree, please explain your preferred option in terms consistent with the Authority's main statutory objective in section 15 of the Electricity Industry Act 2010

The proposed amendment complies with section 32(1) of the Act

7.34. The Authority's main objective under section 15(1) of the Act is to promote competition in, reliable supply by, and efficient operation of, the electricity industry for the long-term benefit of consumers.

7.35. Section 32(1) of the Act holds that the Code may contain any provisions that are consistent with the Authority's objectives and are necessary or desirable to promote any or all of the matters listed in section 32(1).

7.36. The Authority considers that the proposed amendments are necessary or desirable to promote:

(a) competition in the electricity industry – for example, by supporting further development of the DG industry, leading to more consumer choice

(b) the reliable supply of electricity to consumers: for example, by facilitating more DG investment, to be available to distributors to manage load peaks and consumers to use themselves

(c) the efficient operation of the electricity industry: for example, by mandating a universal export limit under Part 1A of Schedule 6.1 of the Code, and use of the latest inverter standards nationally, providing more standardised and consistent processes.

Q22. Do you agree the Authority's proposed amendments comply with section 32(1) of the Act?

The Authority has given regard to the Code amendment principles

7.37. This consultation paper has been prepared in accordance with the Authority's Consultation Charter principles, to the extent they are applicable.[101]

[101] https://www.ea.govt.nz/documents/482/Consultation_Charter_2024.pdf.

Appendix A Proposed Code amendment

Note: The Authority acknowledges there is currently amendments being consulted on to Part 6 of the Code Network connections project (stage one) technical consultation | Our consultations | Our projects | Electricity Authority. The below proposed Code drafting is based on the Code as at 1 October 2025, and does not incorporate any changes from the above consultation. The Authority will ensure any final Code amendments are integrated together before finalising the Code amendments.

Part 1
Interpretation

bespoke export limits assessment methodology for distributors means the methodology **distributors** must use to perform **network** studies that determine **maximum export power**, inverter settings, or other conditions that will apply to an **ICP** that is the subject of an application to connect **distributed generation**

export limits assessment methodology for distributors means the methodology **distributors** must use to perform **network** studies that determine the **maximum export power** threshold, or inverter settings, that apply to an **ICP** or group of **ICPs** connected to a section of **network,** whether or not an application to connect **distributed generation** has been received for that **ICP** or one of those **ICPs**

Part 6
Connection of distributed generation

Contents

6.3 Distributors must make information publicly available

…

(2) Each **distributor** must make publicly available, free of charge, from its office and Internet site,—

…

(dc) ~~until 1 September 2026,~~ the **maximum export power** threshold and the **export limits assessment** **methodology** **for distributors** and the **bespoke export limits assessment methodology for distributors** used to determine that threshold, for locations at which the **distributor** has set a **maximum export power** threshold ~~for applications under Part 1A of Schedule 6.1~~; and

…

6.3A Limits on maximum export power and installed generation

(1) A **distributor** must not set a limit on the **nameplate capacity** of **distributed generation** that may be installed at an **ICP**.

(2) A **distributor** may set a limit on the **maximum export power** that may be injected into the **network** from an **ICP** (the '**maximum export power** threshold') provided the **maximum export power** threshold is not set lower than 10kW except in accordance with subclause (3).

(3) A **distributor** may set a limit on the **maximum export power** threshold that applies to an **ICP** or group of **ICPs** of lower than 10kW provided the **distributor** has undertaken a **network** study that—

(a) shows a lower **maximum export power** threshold is necessary to maintain voltage within the allowable tolerances or **network** safety in the section of **network** that carries **electricity** from the **ICP** or group of **ICPs** to the **network**; and

(b) only takes into account **distributed generation** that is connected to, and applications that are being assessed to connect **distributed generation** to, the section of **network** that carries **electricity** from the **ICP** or group of **ICPs** to the **network**.

(4) From xx (date four months after gazetting) subject to subclause (5), a **distributor** must require a **distributed generator** that injects **electricity** at low voltage to use an inverter that is compliant with, and applies the "Australia A" inverter settings specified in, AS/NZS477.2:2020 incorporating Amendments No. 1 and 2.

(5) A **distributor** may specify different inverter settings in its **connection and operating standards** if—

(a) the **distributor** has undertaken a **network** study that shows different settings are necessary to maintain voltage within the allowable tolerances and/or **network** safety in the section of **network** for or an **ICP** or group of **ICPs**; and

(b) any alternative inverter settings are consistent with the "allowed range" in Tables 3.6, 3.7, 3.8, and 4.3 of AS/NZS 4777.2:2020 incorporating Amendments No. 1 and 2.

(6) From xx (date four months after gazetting) any **network** study undertaken under subclauses (3) or (5) must use the **export limits assessment methodology for distributors**.

(7) The **distributor** must—

(a) **publish** any **network** study undertaken under subclauses (3) or (5)

(b) **publish** easily accessible lists or maps of areas on the **network** where the lower **maximum export power** threshold or different settings applies.

(c) repeat the **network** study where there has been a change on the **network** likely to alter the outcome of **network** study.

(8) Where a **distributor** undertakes a **network** study to determine a **maximum export power** threshold under subclause (3), the **distributor's** Chief Executive Officer, or a person holding an equivalent position, must **publish** a signed statement that the **maximum export power** threshold has been determined according to the requirements in Part 6 and the **export limits assessment methodology for distributors**.

6.4 Process for obtaining approval

(1) Schedule 6.1 applies if a **distributed generator** wishes to—

…

(d) change the **nameplate capacity**, **maximum export power**, or fuel type of connected **distributed generation**.

…

Schedule 6.1

cl 6.4

Process for obtaining approval

…

1D When application may be made under Part 1A

(1) A **distributed generator** may elect to apply to a **distributor** under Part 1A instead of Part 1 if the **distributed generation** to which the application relates—

(a) is designed and installed in accordance with AS/NZS 4777.1:~~2016~~2024; and

(b) incorporates an inverter that—

(i) has been tested and issued a Declaration of Conformity with AS/NZS 4777.2:2020 incorporating Amendments No. 1 and 2 by a laboratory with accreditation issued or recognised by International Accreditation New Zealand; and

(ii) has settings that meet the **distributor's connection and operation standards**

(c) will inject **electricity** less than or equal to the **maximum export power** threshold set by the **distributor** in clause 6.3A(2).

(2) ~~Until 1 September 2026, a~~A **distributed generator** may only elect to apply to a **distributor** under Part 1A instead of Part 1, if the **distributed generation** to which the application relates has, in addition to the requirements in subclause (1)—

(a) a volt-watt response mode;

(b) a volt-var response mode;

(c) control settings and volt response mode settings that comply with clause 6.3A(4) or meet the **distributor's** ~~**connection and operation standards**~~ inverter settings specified in accordance with clause 6.3A(5); and

(d) a **maximum export power** limit at the **ICP** of the **distributed generator** that does not exceed the **maximum export power** threshold, if any, specified by the **distributor** ~~in its **connection and operation standards**~~.

1E Applications that do not comply with distributor thresholds or inverter settings

(1) Despite clause 6.3A, a **distributed generator** may submit an application to connect distributed generation that does not comply with the **distributor's maximum export power** threshold or inverter settings, and the **distributor** must assess that application in good faith, under:

(a) Part 1 or Part 2 of Schedule 6.1 for **distributed generation** greater than the **maximum export power** threshold; or

(b) Part 2 of Schedule 6.1 for **distributed generation** using different inverter settings.

(2) From xx (date four months after gazetting), any **network** study undertaken as part of the assessment under subclause (1)—

(a) must use the **bespoke export limits assessment methodology for distributors**.

(b) where the analysis performed in the **network** study has deviated from the **bespoke export limits assessment methodology for distributors**, the **distributor** must provide a reason to the **distributed generator**.

(c) must be provided to the **distributed generator** before determining the application

(d) must be **published** by the **distributor** unless the **distributed generator** does not give consent to **publish**.

(3) If an application is approved, the **distributor** will adjust the **maximum export power** threshold for that **ICP** to the new **maximum export power** threshold determined during the application process.

1G Distributed generator may dispute results of network study in certain circumstances

(1) A **distributed generator** may dispute the results of the **network** study and any limit on **maximum export power** or inverter settings that operate to limit **maximum export power** set by a **distributor** by providing written notice of the dispute to the **distributor**.

(2) If a **distributed generator** notifies the **distributor** of a dispute under subclause (1), the **distributor** and the **distributed generator** ("the parties")—

(a) must attempt to resolve the dispute in good faith and without unreasonable delay:

(b) may escalate the dispute to their chief executive officers, or a person holding the equivalent position, if the dispute cannot be resolved in good faith and without unreasonable delay:

(c) the chief executive officers, or person holding the equivalent position, may—

(i) refer the dispute to mediation with costs to lie where they fall; and

(ii) if the parties cannot agree to a mediator within 5 **business days** of referring the dispute to mediation, the parties must submit a request to AMINZ (or its replacement organisation) to select a mediator and determine the mediator's fee:

(d) if the dispute cannot be resolved the **distributor** and the **distributed generator** must—

(i) refer the dispute to arbitration under the Arbitration Act 1996; and

(ii) if the parties cannot agree to an arbitrator within 5 **business days** of referring the dispute to arbitration, the parties must submit a request to AMINZ (or its replacement organisation) to select an arbitrator and determine the arbitrator's fee.

...

Part 1
Applications for distributed generation
10 kW or less in total

…

2 Applications under this Part of this Schedule

…

(3) The information may include the following:

…

(aa) whether the application is to—
(i) connect **distributed generation**; or
(ii) continue an existing connection of **distributed generation** that is connected in accordance with a connection contract if the connection contract—
(A) is in force and the **distributed generator** wishes to extend the term of the connection contract; or
(B) has expired; or
(iii) continue an existing connection of **distributed generation** that is connected without a connection contract; or

(iv) change the **nameplate capacity**, **maximum export power**, or fuel type of connected **distributed generation**:

(b) evidence of the **nameplate capacity** or **maximum export power**, that the **distributed generation** will have, or other suitable evidence that the **distributed generation** is or will only be capable of generating **electricity** at a rate of 10 kW or less:

(ba) if the application is to change the **nameplate capacity**, **maximum export power**, or fuel type of connected **distributed generation**—
(i) the **nameplate capacity** and **maximum export power** that the **distributed generation** will have after the change; and

(ii) the aggregate **nameplate capacity** that all **distributed generation** that is connected at the **point of connection** at which the **distributed generation** is connected will have after the change; and

(iii) the fuel type that the **distributed generation** will have after the change:

…

Part 1A

Applications for distributed generation of 10 kW or less in total in specified circumstances

…

9B Application for distributed generation of 10 kW or less in total in specified circumstances

(1) A **distributed generator's** application to a **distributor** must specify which of the following circumstances applies:

…

(d) the **distributed generator** wishes to change the **nameplate capacity, maximum export power,** or fuel type of connected **distributed generation**.

…

(2) An application must include the following:

…

(f) if the inverter is not included on the **distributor's** list of approved inverters, a copy of the AS/NZS 4777.2:2020 incorporating Amendments No.1 and 2 Declaration of Conformity certificate for the inverter:

…

(2A) ~~Until 1 September 2026, a~~An application must also include—

(a) confirmation ~~as to whether~~ the inverter conforms with the ~~control~~ inverter settings ~~and volt response mode settings~~ specified in clause 6.3A(4) or 6.3A(5)~~**the distributor's connection and operation standards**~~;

(b) confirmation that the **distributed generation** has a **maximum export power** limit that does not exceed the **maximum export power** threshold, if any, specified by the **distributor** ~~in its **connection and operation standards**~~; and

(c) the **maximum export power** of the **distributed generation**.

…

Q23. Do you have any comments on the drafting of the proposed amendment?

Appendix B Format for submissions

Submitter	
Submitter's organisation	

Questions	Comments
Q1. What are your views on the proposal to set a default 10kW export limit for Part 1A applications?	
Q2. What are your views on the Code clarifying that a distributor cannot limit the nameplate capacity of a Part 1A application, unless the capacity exceeds 10kW?	
Q3. There are requirements for distributors in Proposal A1. Which of these do you support, or not support, and why?	
Q4. What are your views on the proposal for industry to develop an export limits assessment methodology?	
Q5. What would you do differently in Proposal A1, if anything?	
Q6. What concerns, if any, do you have about requiring the 2024, rather than 2016, version of the inverter installation standard for Part 1A applications?	
Q7. Do you support amending the New Zealand volt-watt and volt-var settings to match the Australian values for Part 1A applications - why or why not – what do you think are the implications?	
Q8. What would you do differently in Proposal A2, if anything?	

Q9. Do you have any concerns about the Authority citing the Australian disconnection settings for inverters when high voltage is sustained?	
Q10. Do you have any concerns about the Authority requiring the latest version of the inverter performance standard for Part 1A applications?	
Q11. What are your views on the proposal that where distributors set bespoke export limits for Part 2 applications, they must do so using the industry developed assessment methodology?	
Q12. What are your views on the several requirements that must be adhered to regarding the distributors' documentation (see paragraph 5.96) relating to setting export limits under Part 2?	
Q13. Do you agree it is fair and appropriate that where distributors set export limits for Part 2 applications, applicants can dispute the limit? If so, what sort of process should that entail?	
Q14. What would you do differently in Proposal B, if anything?	
Q15. What are your thoughts on requiring the inverter performance standard (AS/NZS 4777.2:2020 incorporating Amendments 1 and 2) for low voltage DG applications in New Zealand?	
Q16. Do you consider the transitional arrangements workable regarding requirements and timeframes? If not, what arrangements would you prefer?	

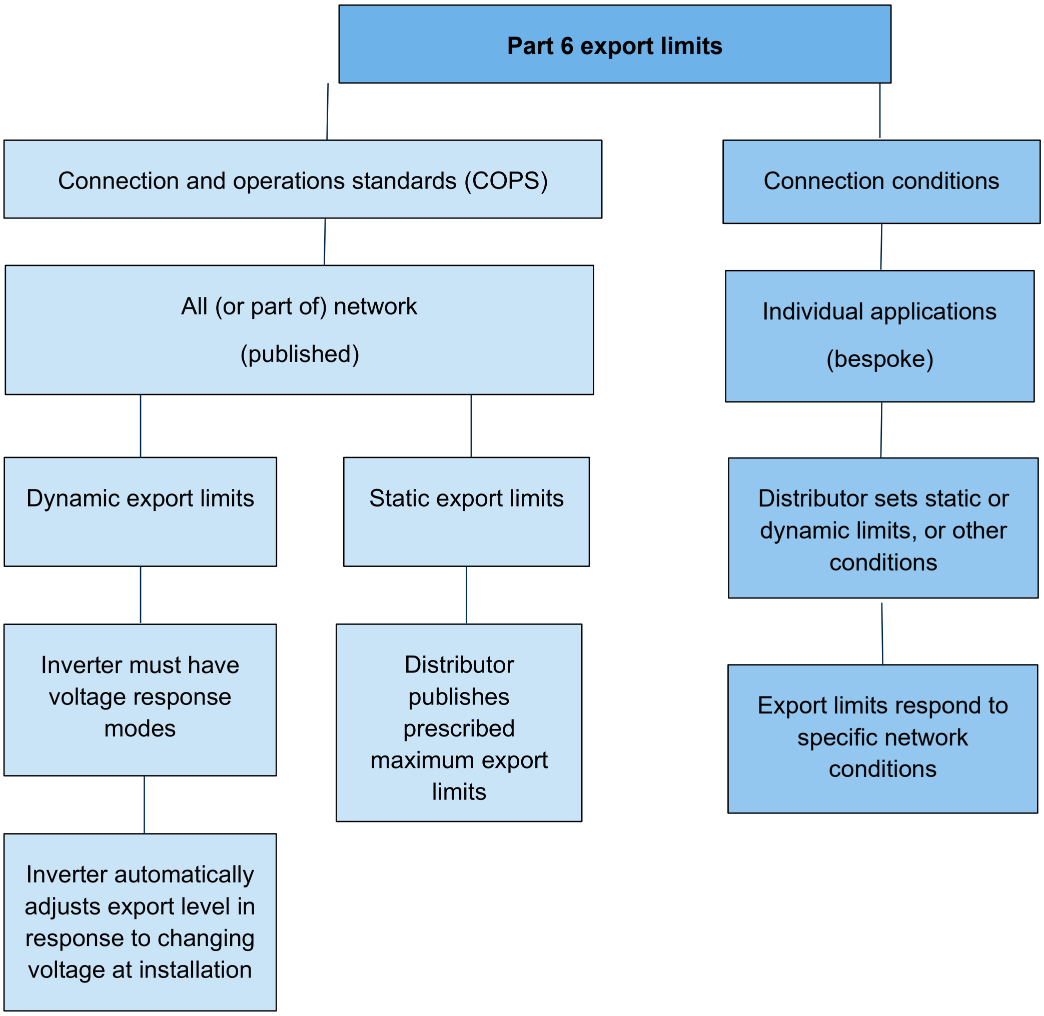
Q17. What are your views on the objective of the proposed amendments?	
Q18. Do you agree the benefits of the proposed amendments outweigh their costs? If not, why not?	
Q19. What are your views on the Authority’s estimate of costs of lost benefits from a 5kW export limit?	
Q20. Are there costs or benefits to any parties (eg, distributors, DG owners, consumers, other industry stakeholders) not identified that need to be considered?	
Q21. Do you agree the proposed Code amendments are preferable to the other options? If you disagree, please explain your preferred option in terms consistent with the Authority’s main statutory objective in section 15 of the Electricity Industry Act 2010	
Q22. Do you agree the Authority’s proposed amendments comply with section 32(1) of the Act?	
Q23. Do you have any comments on the drafting of the proposed amendment?	

Appendix C How distributors set export limits under the Code

C.1. While not explicit, Part 6 of the Code allows distributors to set static and dynamic export limits. Distributors do this via their published COPS which Part 6 applications must meet.[102] However, distributors can also set bespoke export limits for more complex, generally larger, applications via connection conditions. This process is set out in the diagram below.

C.2. Alternatively, generators may agree an export limit with distributors to avoid uneconomic network reinforcement costs while maximising their generation.

The application of export limits under Part 6 of the Code



[102] See Part 1 of the Code (Preliminary provisions) for the definition of COPS: https://www.ea.govt.nz/documents/7968/Part_1_-_Preliminary_provisions_-_31_July_2025.pdf.

C.3. Currently distributors have discretion to set export limits and levels, and the Code does not allow for any oversight of these. However, COPS must reflect or be consistent with 'reasonable and prudent operating practice in relation to distributed generation' as defined in Part 1 of the Code, which includes:

> *"(a) the industry operating standards; and*
>
> *(b) measures to avoid the injection of **electricity** from **distributed generation** that—*
>
> > *(i) exceeds the **distribution network capacity** at the point of injection; or*
> >
> > *(ii) results in a significant adverse effect on voltage levels; or*
> >
> > *(iii) results in a significant adverse effect on the quality and reliability of **electricity** conveyed to other users of the **distribution network**; and*
>
> (c) *the use or proposed use of reasonable and prudent measures to enable the connection of **distributed generation***".

C.4. Part 6 sets some requirements around network congestion. A distributor must have a congestion management policy and publish:

(a) a statement of the circumstances in which DG will be, or may be, curtailed or interrupted from time to time to ensure a distributor's other connection and operation standards are met

(b) a list of all locations on its network that the distributor knows to be subject to export congestion

(c) a list of all locations on its network that the distributor expects to become subject to export congestion within the next 12 months.[103]

C.5. For applications under (b) and (c) above, the distributor may subject the DG to export congestion requirements as set out in the distributor's congestion management policy. In this case, the distributor must take reasonable steps to work with the applicant to assess whether solutions exist to mitigate the export congestion.

C.6. In this paper, the Authority is proposing the Code takes a stronger role on how export limits are set, rather than leave this entirely to the discretion of distributors.

[103] See clause 6.3 *Distributors must make information publicly available* of the Code.

Appendix D Glossary of abbreviations and terms

Active power	A term describing actual usable energy. Also known as 'real power'. Defined in Part 1 of the Code: https://www.ea.govt.nz/documents/8274/Part_1_-_Preliminary_provisions_-_1_September_2025.pdf
AC	Alternating current - a flow of electric charge, changing direction at the frequency rate, used to transmit electricity throughout networks
Apparent power	A term describing generated energy including both 'real' power (actual usable energy produced by DG systems) and 'reactive' power (not doing useful work directly but essential for maintaining voltage and keeping networks stable)
AS/NZS 4777.1	Australian/New Zealand inverter installation standard
AS/NZS 4777.2	Australian/New Zealand inverter performance standard
Authority	Electricity Authority Te Mana Hiko
Act	Electricity Industry Act 2010
Bespoke export limits	Customised DG export limits and inverter settings, set for individual generation connections (usually larger generation), based on or responding to, network conditions
BELAM	Bespoke export limits assessment methodology – the industry developed methodology for determining any export limits relating to an individual DG application under Schedule 6.1
Code	Electricity Industry Participation Code 2010
COPS	Connection and operation standards – distributors' requirements relating to connecting distributed generation to a distribution network, consistent with good operating practice. Defined in Part 1 of the Code: https://www.ea.govt.nz/documents/8274/Part_1_-_Preliminary_provisions_-_1_September_2025.pdf
DG	Distributed generation - electricity that is generated at an ICP for local use within the ICP or injected into electricity networks. Defined in Part 1 of the Code: (https://www.ea.govt.nz/documents/7968/Part_1_-_Preliminary_provisions_-_31_July_2025.pdf)
DC	Direct current - a flow of electric charge, flowing in a constant direction, commonly generated by DG. An inverter is needed to convert DC to AC for export to networks.
Dynamic export limits	Flexible DG export limits that change depending on 'real-time' network conditions

ELAM	Export limits assessment methodology – the industry developed methodology for determining export limits that will apply to an ICP or section of a network, whether or not an application has been made under Schedule 6.1
EMI	Electricity Market Information website. The Authority website for publishing data, market performance metrics, and analytical tools to facilitate effective decision-making within the New Zealand electricity industry. See: https://www.emi.ea.govt.nz/
Energy	The total amount of electrical work done or consumed over time, typically measured in kilowatt-hours (kWh)
Frequency	How many times current (AC) changes direction per second, measured in hertz (Hz)
GWh	Gigawatt-hour - a unit of energy representing one billion watt-hours, used to measure large-scale electricity consumption or generation over time.
ICP	Installation control point - a point of connection at which an electricity consumer or generator is connected to a network. Defined in Part 1 of the Code: https://www.ea.govt.nz/documents/8274/Part_1_-_Preliminary_provisions_-_1_September_2025.pdf
Inverter	Part of the generation equipment. A device that converts direct current (DC) electricity, produced by most distributed generation types (eg, solar), into alternating current (AC) electricity as used in New Zealand networks.
kW	Kilowatts - a unit of power equal to 1,000 watts, used to measure the rate at which electricity is used or produced. kW is a measure of 'real power' - the actual usable electricity produced by DG systems.
kWh	Kilowatt hours - a unit of energy that measures how much electricity is used or produced over time, equal to using one kilowatt of power for one hour.
kVA	Kilovolt-amperes - a measure of 'apparent power', which includes both real power and reactive power, both defined below
Maximum export power	The maximum 'active power' (also known as 'real power' as defined below) permitted to be exported into the local network or embedded network at an ICP of a distributed generator. Defined in Part 1 of the Code: https://www.ea.govt.nz/documents/8274/Part_1_-_Preliminary_provisions_-_1_September_2025.pdf
Multiple mode inverter	An inverter with an onboard battery than can adapt to different power sources and needs
MW	Megawatt - a unit of power equal to one million watts, used to describe the rate of electricity production or use.

Nameplate capacity	The maximum continuous output a generating plant or its inverter can produce under specified conditions, whichever is lower, measured in kilowatts (kW) or megawatts (MW). Defined in Part 1 of the Code: https://www.ea.govt.nz/documents/8274/Part_1_-_Preliminary_provisions_-_1_September_2025.pdf
Part 1A	The streamlined application process in Part 6 of the Code for straightforward small DG connections with capacity less than or equal to 10kW
Part 1	The comprehensive application process in Part 6 of the Code to connect small DG with capacity less than or equal to 10kW, but not meeting Part 1A requirements
Part 2	The application process in Part 6 of the Code to connect large DG with capacity greater than 10kW
Photovoltaic	The process of converting sunlight directly into electricity using materials like solar cells
Power	The rate at which electricity is generated or consumed, typically measured in watts (W)
Reactive power	A term describing generated energy not doing useful work directly, but essential for maintaining voltage and keeping networks stable
Real power	A term describing actual usable energy. Also known as ‘active power’
Static export limits	A fixed ‘cap’ on how much electricity a generator can export from DG into networks
Volt-var	A function in an inverter that progressively absorbs reactive power from DG exports to the network when voltage is high (thereby enabling maximum export), or injects reactive power to the network when voltage is low, to keep voltage at desired levels
Volt-watt	A function in an inverter that progressively reduces DG export to the network as voltage rises, to keep voltage within desired levels