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To:	**Electricity Authority (EA)** connection.feedback@ea.govt.nz
From:	**Electricity Engineers' Association of NZ**
Date:	**19 November 2025**
Subject:	**EEA Submission – Consultation Paper - *Maximising benefits from local electricity generation***

OVERVIEW

The Electricity Engineers' Association (EEA) welcomes the opportunity to comment on the Electricity Authority's consultation on Maximising the benefits from local generation. The EEA represents engineers, asset owners, and technical practitioners from across New Zealand's electricity supply chain, including all electricity distribution businesses (EDBs), Transpower, generators, retailers, service providers, and contractors. Our role is to support safe, reliable, and efficient electricity systems through nationally consistent engineering practice and technical guidance.

The EEA strongly supports the overall direction of the Authority's proposals. The shift toward higher default export limits, updated inverter standards, clearer technical requirements, and consistent national expectations represents a significant step forward in enabling consumer energy resources (CER), distributed generation (DG), and cost-effective decarbonisation. These changes align with the EEA's Streamlining Connections programme and the development of new national Technical Connection Guidelines.

At the same time, as a technical body, the EEA emphasises that successful implementation depends on sound engineering practice, realistic transitional arrangements, and flexibility for network diversity. Several areas in the proposals require modification to ensure that safety, network performance, and long-term consumer outcomes are not compromised.

In particular:

1.1. Voltage management is foundational

The recent move to the statutory ±10% LV voltage range is a significant enabler of solar PV and other DER. However, as highlighted by our member discussions on this issue, this change must be supported by:

- Practical operational guidance for under-voltage and over-voltage extremes
- Inverter settings that reflect New Zealand network conditions

- Sector-wide monitoring of real-world voltage and inverter performance
- Evidence-based refinement of voltage response settings over time

The EEA supports adopting Australian "Australia A" inverter voltage-response settings as an interim baseline, because they are widely available in inverters today and easily implementable. However, New Zealand's LV networks differ from Australia's in feeder length, impedance, and voltage-regulation characteristics, making it essential that these settings are validated with real PQ data over the coming year.

As discussed with the Technical Connections Steering Group and noted by EA technical experts, an alternative transitional approach would be to retain the existing New Zealand inverter voltage-response profile while adding an additional ±4% band. This could provide a more graduated transition pathway and may better reflect New Zealand's longer, higher-impedance LV feeders. We also note the limitations of the Australia A settings — specifically the asymmetrical +10% / –6% tolerance — which further reinforces the need for careful monitoring to ensure these thresholds are appropriate for New Zealand conditions.

It is critical that the EA and Worksafe remain fully aligned on safety and technical requirements. Any divergence between regulatory and safety settings risks confusion for installers and will complicate implementation.

If sector monitoring identifies issues such as instability, nuisance tripping, or problematic interactions between volt-var and volt-watt behaviour, the Authority should work with the EEA, Standards NZ, and industry to incorporate a New Zealand-specific voltage-response profile into AS/NZS 4777.2. This reflects the technical advice from multiple EDB engineers and aligns with the guideline development work currently underway.

1.2. ELAM and BELAM must align with EEA guidance

The EEA strongly supports the development of a nationally consistent methodology for determining export limits. However, ELAM and BELAM must build upon — rather than duplicate — the significant body of technical guidance that already exists and is applied today.

Two EEA guides currently form the national foundation for hosting-capacity assessment and export-limit methodology:

Connection of Small-Scale Inverter-Based Distributed Generation (EEA, 2018)

This guide sets out the LV assessment approach widely used across the sector, including:

- voltage-rise calculations

- thermal and impedance considerations
- hosting-capacity assessment
- methodology for deriving export limits

It is available at:

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

Connection of Generating Plant: Guide to Assist and Advise Distribution Network Engineers (EEA, 2007)

This guide details engineering principles relating to:

- protection coordination
- network stability
- power quality impacts
- assessment processes for generation

It is available at:

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

These guides underpin how New Zealand EDBs currently determine hosting capacity and export limits. As part of the Streamlining Connections Programme, these methodologies are being reviewed, updated, and consolidated into the new Technical Connection Guidelines (LV, non-residential LV, and MV). The Steering Group is progressing this work now.

Therefore, the Authority's ELAM/BELAM framework must:

- recognise and leverage existing EEA methodologies
- align with the updated guidance under development
- avoid embedding detailed technical process in the Code
- remain flexible as new data, standards, and practice evolve

Referencing the existing EEA guidance as the interim position and the Technical Connection Guidelines as the enduring home for ELAM/BELAM provides continuity, ensures technical robustness, and reduces duplication.

1.3. Transitional arrangements must be realistic

A four-month development window for ELAM/BELAM is not workable. December-February includes major industry downtime and EDB engineering teams are already heavily committed to implementing the voltage settings change, transitioning to new standards, and responding to numerous reform programmes.

A minimum six-month period is required to develop methodologies, update network documentation and COPS, and support consistent implementation by installers and engineers.

In addition, implementing the full package — including updated modelling workflows, monitoring, training, and internal system changes — will require substantial sector-wide effort. A realistic implementation timeframe is closer to eighteen months to two years, as reflected in feedback from EEA members.

1.4. Certification should be technical, not CEO-level

The proposal to require CEO attestation of export-limit decisions is unnecessary, inconsistent with other Code requirements, and technically inappropriate. Certification should be undertaken by an appropriately qualified engineering authority within the EDB.

The EEA also notes that the Licensed Electrical Worker (LEW) framework may provide a more practical foundation for delivering safety, quality, and assurance than constructing a new CEO-level attestation regime. While the LEW framework does not yet map directly to export-limit governance, it is an established mechanism that could be adapted or strengthened. Leveraging existing structures is likely to enhance consistency and reduce administrative burden. Further discussion with the Authority is warranted.

1.5. Support for updated standards and national consistency

The EEA strongly supports the proposals to modernise and align inverter requirements across the sector. In particular, we support:

- Requiring AS/NZS 4777.2:2020 (+ Amendments 1 & 2) for inverter performance
- Requiring AS/NZS 4777.1:2024 for inverter installation
- Citing the relevant Australian disconnection and voltage-response settings
- Providing clear national guidance and consistent inverter settings for installers, designers, and consumers

These standards represent contemporary, safety-focused engineering practice and will significantly reduce inconsistency and confusion in the field.

However, because AS/NZS 4777.1 and 4777.2 will continue to evolve, it is essential that future updates of these standards are reflected promptly and consistently in the Regulations and Code. Delays or misalignment between standard revisions and regulatory references risk creating compliance uncertainty for installers, manufacturers, and distributors.

Accordingly, the EEA recommends that the Regulations and Code incorporate a mechanism — or a commitment — to update references to AS/NZS 4777.1 and 4777.2 whenever the standards are revised, ensuring New Zealand remains aligned with contemporary best practice and avoids divergence from Australian and international requirements.

This will support long-term consistency, reduce compliance risks, and maintain clear expectations for industry participants.

1.6. Dynamic Operating Envelopes (DOEs) are essential for long-term hosting capacity

While a 10 kW default export limit is appropriate today, networks will require flexibility to use DOEs to manage hosting capacity efficiently over time. The Code should explicitly recognise DOEs as a valid future approach.

The detailed responses below expand on the positions set out in the Executive Overview and provide specific, engineering-based feedback on each of the Authority's questions. These answers draw directly on the EEA's existing technical guidance, the development work underway through the Streamlining Connections Programme, and the practical experience of distribution network engineers engaged in the EEA Technical Connections Steering Group. Our aim is to support a smooth and technically robust implementation of the proposals—one that maintains safety, enables greater export opportunities for consumers, and preserves the flexibility needed to manage the diverse conditions across New Zealand's distribution networks.

Responses to Consultation Questions

Q1. Views on the proposal to set a default 10 kW export limit for Part 1A applications?

The EEA supports the proposal to adopt a default 10 kW export limit as this provides clear, nationally consistent expectations for consumers, installers, and distributors. A default export limit of this size reflects international trends toward larger home solar PV systems, aligns with increasingly common inverter sizes in the New Zealand market, and enables households to obtain better returns from their investments.

However, as a technical body, the EEA emphasises that a default export limit is not synonymous with universal suitability. Distribution networks vary widely in design and performance. While many urban networks have sufficient LV hosting capacity to accommodate 10 kW systems, rural and remote feeders often have:

- Much longer LV lines,

- Higher impedance,
- Limited or no voltage regulation infrastructure,
- Lower density of PQ monitoring devices, and
- Greater sensitivity to voltage rise and variability.

In such environments, exporting 10 kW could lead to voltage excursions above statutory limits unless mitigations are applied. The EEA therefore strongly supports a default of 10 kW only where justified, paired with the ability for EDBs to apply lower limits under ELAM/BELAM assessment.

The EEA also notes that adopting 10 kW as the default may accelerate the consumption of "latent" hosting capacity — capacity available today simply because few DG systems are installed. As more 10 kW systems emerge on a feeder, the available headroom can quickly reduce, causing future customers to face export constraints. Over time, this risk underscores the importance of dynamic operating envelopes (DOEs) as an essential future tool. This reinforces the need for robust, forward-looking methodologies to ensure export-limit decisions remain transparent and technically justified.

In summary, the EEA supports the 10 kW default as a strategic direction, provided it is implemented with engineering flexibility and future-proofed through appropriate methodologies.

Q2. Clarifying that distributors cannot limit nameplate capacity unless exceeding 10 kW?

The EEA supports this clarification. The technical concern for EDBs is export, not nameplate capacity. A consumer may have multiple DER devices behind the meter — e.g., solar PV, battery storage, EV-to-home capability. Limiting nameplate size could unintentionally discourage storage or flexibility technologies that actually reduce export.

By focusing on total simultaneous export at the point of connection (ICP), the Authority provides clarity and allows innovation behind the meter, while ensuring the network remains safe. Consumers and installers should remain responsible for ensuring the aggregate export of all devices does not exceed the approved limit.

Q3. Requirements for distributors in Proposal A1

The EEA supports the intent of Proposal A1: greater transparency, clear methodologies, and periodic reassessment. These are good engineering practices and align with the direction of the EEA's Streamlining Connections Programme.

However, the proposal requiring CEO attestation is neither practical nor appropriate. A CEO cannot reasonably attest to technical assessments that rely on detailed modelling, engineering judgment, and asset-specific performance data, and doing so risks undermining the technical integrity of the process.

In engineering governance, technical certification is normally delegated to a competent engineering authority.

Requiring CEO attestation also creates inconsistency across Code obligations, where typically:

- Boards or executives set governance frameworks
- Technical experts certify compliance with engineering requirements
- Audits or performance reviews provide oversight

The EEA therefore recommends replacing CEO attestation with certification by an appropriately qualified engineering authority that export limits are determined in accordance with the approved methodology.

This maintains accountability while ensuring technical accuracy.

Publishing constrained areas and reassessing after material changes are appropriate measures, though they should be implemented using guidance under the EEA's national guidelines to ensure consistency across networks.

Q4. Views on the proposal for industry to develop an export limits assessment methodology?

The EEA strongly supports an industry-led ELAM/BELAM, recognising this as the most effective way to align technical expertise, practical feasibility, and regulatory intent.

However, the proposed development timeframe of four months is not feasible for several reasons:

- **December–February industry shutdown:** Many engineering teams operate with reduced capacity, delaying essential workshops, modelling trials, and internal reviews.
- **Methodology complexity:** Export-limit assessment requires integrating voltage rise calculations, thermal limits, inverter behaviour under AS/NZS 4777.2, and feeder-specific impedance data. This cannot be developed hurriedly.
- **Alignment with EEA guidelines:** The EEA is currently developing comprehensive LV/MV Technical Connection Guidelines through the Technical Connections Steering Group. These guidelines include methodologies for hosting capacity, voltage-management techniques, PV-placement impacts, and connection process improvements. The ELAM/BELAM must be consistent with these.
- **Testing and validation:** Methodologies should be trialled on real feeders with sample datasets to ensure usability and avoid unintended outcomes.

For these reasons, the EEA recommends a minimum six-month development period, ensuring a high-quality, consistent methodology that will stand the test of time. Developing ELAM/BELAM too quickly risks producing a methodology that is inconsistent, difficult to apply, or misaligned with real-world network performance.

Q5. What would you do differently in Proposal A1?

The EEA proposes the following refinements:

- Replace CEO attestation with engineering authority certification.
- Link ELAM/BELAM directly to EEA's Technical Connection Guidelines as the primary home for technical methodologies.
- Provide adequate time for development and testing, ideally six months.
- Ensure flexibility for future adoption of DOEs, which will improve hosting capacity management as technology evolves.

These changes preserve the intent while ensuring implementation is workable and technically sound.

Q6. Concerns about requiring the 2024 inverter installation standard?

The EEA supports requiring AS/NZS 4777.1:2024. This revision includes enhancements to wiring configurations, isolation requirements, testing procedures, and installer responsibilities. Modern installation standards reduce installation risk, improve safety outcomes, and align installers' practices across the country.

Q7. Support for adopting Australian volt-watt and volt-var settings?

The EEA supports adopting Australia A as an interim setting. It offers practical benefits:

- Widely supported in inverter firmware
- Already familiar to installers
- Immediately implementable
- Aligns with the ±10% statutory voltage range

However, as highlighted in EEA's Steering Group meeting, there are several technical caveats:

1. Interaction between volt-var and volt-watt modes

The overlap between 253–258 V can cause oscillation, where the inverter rapidly switches between reactive and real power curtailment modes. This behaviour could exacerbate instability on long rural feeders.

2. Upper trip point of 260 V

While suitable for Australian networks, this setting can push New Zealand networks close to non-compliance once a realistic 1.5–2% rise through consumer mains is included. This may place undue burden on networks to maintain voltages significantly below 253 V.

3. Network differences

New Zealand networks often have:

- Longer LV feeders
- Less granular voltage regulation
- More overhead architecture
- Greater impedance variability

These differences impact how voltage-response curves behave.

4. Need for monitoring and data collection

Before locking settings permanently into the Code, EDBs and manufacturers need time to monitor PQ behaviour, inverter responses, and curtailment impacts.

These issues do not undermine the usefulness of Australia A as a starting point, but they highlight the importance of retaining flexibility for refinement based on real-world evidence.

EEA recommendation

Adopt Australia A as the initial setting but explicitly provide for development of a New Zealand-specific voltage response profile if PQ monitoring reveals issues.

Any future NZ profile should be incorporated through the Standards NZ / Standards Australia process and reflected in Regulations. This provides certainty now while ensuring long-term suitability.

Q8. What would you do differently in Proposal A2?

The EEA supports the direction of Proposal A2 but recommends several refinements to ensure the framework remains flexible and evidence based.

First, while adopting Australia A is a practical interim step, the Code should allow explicit flexibility to adopt a New Zealand-specific profile in future if PQ monitoring identifies issues unique to New Zealand networks.

Second, detailed inverter-setting requirements should be maintained through EEA Technical Connection Guidelines, which can be updated as standards evolve or new evidence becomes available, rather than embedding detailed technical parameters directly in the Code.

Third, the Code should avoid wording that effectively locks in an interim standard permanently, as this may hinder future improvements.

Finally, inverter-setting decisions must ultimately be informed by real New Zealand PQ data, particularly from rural and long-feeder networks where voltage conditions differ from Australia.

Together, these changes would retain the practicality of the Authority's approach while ensuring it remains adaptable and technically robust over time.

Q9. Concerns about citing Australian disconnection settings

The EEA supports the adoption of the Australian sustained over-voltage disconnection settings. These thresholds are already embedded in AS/NZS 4777.2, are widely implemented by inverter manufacturers, and are familiar to installers across both New Zealand and Australia. Using the same disconnection settings promotes consistency, avoids unnecessary customisation for the New Zealand market, and ensures predictable inverter behaviour during prolonged high-voltage conditions.

These settings are technically appropriate for maintaining safety and equipment protection, and they help prevent inverters from operating outside their safe voltage envelope. While the EEA notes that ongoing monitoring of LV voltage performance will remain important, the Australian disconnection thresholds represent a sound and suitable basis for New Zealand at this time.

Q10. Requiring the latest inverter performance standard

The EEA supports the requirement for all new inverters to comply with AS/NZS 4777.2:2020, including Amendments 1 and 2. This is an important step in ensuring that inverter behaviour remains predictable, safe, and aligned with contemporary international practice.

The 2020 edition and its amendments introduce several critical improvements, including:

- **Enhanced frequency–watt response,** which supports system stability during high-frequency events and prevents excessive generation during disturbances.
- **Clearer requirements for disconnection and reconnection behaviour,** reducing the risk of inverters simultaneously tripping or reconnecting in ways that could destabilise the wider network.

- **Updated harmonic and power-quality limits,** ensuring modern inverters contribute minimal distortion to LV networks—particularly important as penetration increases.
- **Refined volt-var and volt-watt capabilities,** enabling more effective voltage management at the LV level when paired with the new statutory ±10% voltage range.
- **Improved ride-through expectations,** supporting resilience during short-duration voltage dips or swells.

Requiring all new DER inverters to meet this standard will:

- Improve overall LV network stability,
- Reduce variability between different inverter brands and models,
- Minimise nuisance tripping or inappropriate responses to voltage fluctuations, and
- Provide a consistent platform for implementing future settings (including any NZ-specific voltage-response profiles if monitoring identifies a need).

In addition, aligning regulatory requirements with the latest standard avoids divergence between Australia and New Zealand, ensures manufacturers supply compliant equipment into the New Zealand market, and reduces confusion for installers who already work with these standards across both jurisdictions.

Q11. Views on requiring distributors to use ELAM/BELAM for bespoke Part 2 export limits

The EEA supports the requirement for distributors to use a consistent methodology for bespoke export limits, as this will improve transparency and reduce variation in how assessments are carried out across the country.

However, it is essential that ELAM/BELAM is aligned with EEA's Technical Connection Guidelines, which already include methodologies for hosting capacity, voltage rise, and inverter behaviour. This will avoid duplication, ensure technical consistency, and allow the methodology to evolve over time as new evidence emerges.

The framework should also recognise that distributors will continue to need engineering judgement, particularly on rural or constrained feeders where data availability and network characteristics vary. Embedding ELAM/BELAM within EEA's guideline structure ensures consistent alignment with other ongoing work, including hosting capacity, voltage-management practices, and broader DER integration.

Q12. Requirements for documentation related to Part 2 export limits

The EEA supports the documentation requirements, as clear and consistent information helps applicants understand the basis for export-limit decisions and supports efficient processing.

We recommend that this documentation be aligned with formats and templates developed through the EEA's Technical Connection Guidelines, so that industry participants have common expectations and minimise administrative variation.

Q13. Dispute resolution process

The EEA does not support the dispute resolution process as drafted. Export-limit decisions involve detailed engineering analysis based on safety, statutory limits, and local network conditions. These are fundamentally technical decisions, and mediation is not an appropriate mechanism for resolving disagreements over engineering evidence.

The current proposal also creates ambiguity in the grounds for dispute and places asymmetric obligations on distributors.

A more workable approach would set clear, objective grounds for dispute, and ensure the process culminates in an independent engineering review, rather than a negotiated outcome. An independent engineering review ensures that decisions are based on objective evidence and technical merit, rather than compromise.

Q14. What would you do differently in Proposal B?

The dispute resolution section should be rewritten to ensure it is technically appropriate, fair, and clear. This includes defining the types of decisions that can be disputed, setting out a transparent escalation pathway, and ensuring the process relies on engineering evidence rather than compromise.

An independent engineering review ensures that decisions are based on objective evidence and technical merit, rather than compromise. This protects both network safety and consumer confidence.

Q15. Requiring AS/NZS 4777.2:2020 for low-voltage DG

The EEA supports this requirement.

Ensuring all new inverters comply with AS/NZS 4777.2:2020 (including the amendments) provides consistency across the country, improves network stability, and ensures modern inverters respond appropriately to voltage and frequency variations.

This also aligns with manufacturer practice and avoids divergence from Australia.

Q16. Are the transitional arrangements workable?

The EEA supports the overall structure of the transitional arrangements but recommends extending the timeframe for developing ELAM/BELAM to at least six months.

This reflects the seasonal slowdown in engineering capacity over December–February and the need to ensure alignment with EEA's own guideline development process.

Adequate time is also needed for distributors to update internal processes, IT systems, and COPS, and for installers to adjust to the new standards and settings.

Q17. Views on the objective of the amendments

The EEA supports the objective to enable improved access to export opportunities, streamline processes, and modernise technical requirements.

We note, however, that many distributors had already moved toward higher export limits, meaning the incremental benefit may be smaller than estimated.

The objectives should also explicitly recognise the need for flexibility, particularly the ability to implement dynamic operating envelopes, which will become increasingly important as hosting capacity tightens.

Q18. Do benefits outweigh costs?

The EEA agrees the benefits broadly outweigh the costs, but the margin is likely narrower than the analysis suggests.

Costs associated with updating IT systems, PQ monitoring, modelling tools, and inverter settings may be higher than estimated, and benefits may be overstated in areas where higher export limits are already the norm.

Nevertheless, with appropriate implementation, improved export access and greater consistency should deliver long-term consumer benefits.

The analysis should also consider that higher exports may increase reactive power flows and associated network losses, which impose additional operational costs.

Q19. Cost of lost benefits from 5 kW export limits

The Authority's estimates overstate the benefits lost under a 5 kW limit, as many EDBs do not currently impose a strict 5 kW default.

Several have already moved to 10 kW or use case-by-case assessments.

As a result, the incremental gain from raising the default may be lower than assumed, although it still delivers clarity and consistency.

Q20. Additional costs or benefits not identified

Additional costs are likely to include:

- Updating inverter settings on existing installations
- Increased PQ monitoring and data management
- Higher engineering workload related to long-feeder voltage issues
- Customer education and installer training
- Training for installers and electrical inspectors to ensure consistent application of updated standards and inverter settings.

There are also additional benefits:

- Reduced administrative burden over time as more applications fall within the 10 kW default
- Improved consumer confidence through consistency and transparency
- Better alignment between inverter capabilities and network need

These should be recognised in the final impact assessment.

Q21. Whether the proposed amendments are preferable to other options

The EEA agrees that the proposed amendments are broadly preferable, provided several refinements are made to ensure th ey remain flexible, technically accurate, and future focused.

Key elements include allowing for New Zealand-specific inverter settings if needed, embedding ELAM/BELAM within EEA guidelines, enabling DOEs, and removing CEO attestation.

With these changes, the proposal provides a balanced and effective framework.

Q22. Compliance with section 32(1)

The EEA agrees the proposed amendments comply with the requirements of s32(1).

The changes are consistent with the Authority's statutory objective and contribute to long-term consumer benefit when implemented with appropriate technical safeguards.

Q23. Comments on drafting

The EEA recommends several drafting refinements to ensure clarity and long-term workability:

- Replace CEO attestation with certification by a qualified engineering authority
- Avoid embedding detailed technical parameters (such as Australia A) in Code text
- Ensure the drafting allows for updating inverter settings as evidence evolves
- Improve the dispute-resolution provisions to reflect the technical nature of export-limit decisions
- Reference EEA guidelines as the place where methodologies and detailed technical processes will be maintained

With the refinements proposed by the EEA, the package offers a balanced framework that supports consumer participation while preserving network safety and operational flexibility.

Contact

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