



Electricity Engineers'
Association

**ASSET
MANAGEMENT**

Asset Management Forum 2024

Common Connection Technical Requirements Guidelines

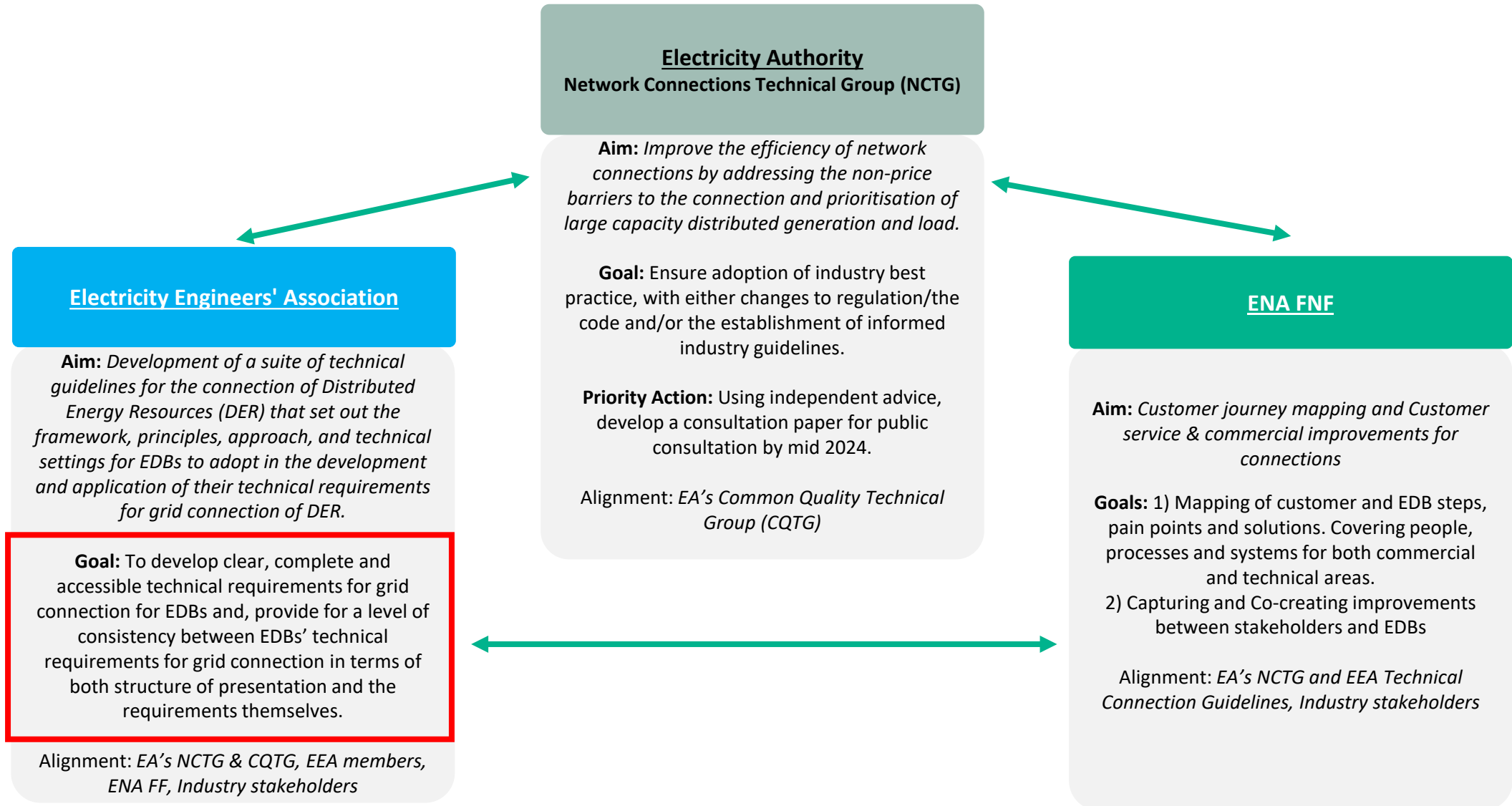
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Streamlining Connections Programme

Bringing together New Zealand experts in the connections sector to swiftly improve the new connections journey for all stakeholders involved.















What is the issue

Perception that the current process is costly and time consuming for DER proponents due to a combination of :

- Inconsistency across networks in terms of level of technical requirements, documentation requirements and structure of documents
- Lack of clarity with respect to technical and documentation requirements.



Who would these guidelines apply to?

Stakeholder Type	Directly applies?	Indirectly applies	How the Guidelines should be used.
Electricity Distribution Businesses (EDBs)			To directly adopt in the development and application of their technical requirements for grid connection of DER
Electricity Authority			Align the technical requirements of the code with the connection process (NCTG & CQTG)
Proponents			To navigate and understand the technical requirements for connection to EDB networks
Transpower			For awareness as the system operator & to ensure consistency
Commerce Commission			To assist in determining whether the technical requirements as proposed by EDBs are fair and reasonable
Other Stakeholders (i.e. installers)			To navigate and understand the technical requirements for connection to EDB networks



Proposed principles in developing technical requirements

- Deliver consistency
- Improve clarity and transparency
- Balancing network risk with connection efficiency (reducing unnecessary onerousness)
- Creation of a process that can quickly respond to changing requirements of the industry
- Promoting innovation



The objectives of the guidelines

1. To provide clear, complete and accessible technical requirements for grid connection for each EDB
2. Provide for a level of consistency between EDBs' technical requirements for grid connection in terms of both structure of presentation and the requirements themselves
3. Ensure that EDBs' technical requirements give regard to the long-term interest of consumers by appropriately balancing the economic benefits, costs and risks that the requirements impose upon their network, proponents and New Zealand's electricity system more generally
4. Establish a platform for EDBs' to develop common standards and protocols for future management of active DER and load.



Proposed Connection Types/Technical Guidelines

Develop a series of technical guides based on size/or function (aligned to EA code classifications). For example:

- **Basic Micro EG connection** – This would apply to household PV/battery systems (inverter based) connecting to a distribution network for a generating unit with a size of up to 30kVA for three phase connections or up to 10kVA for single phase connections – ***cookie cutter approach.***
- **Low voltage connection** – This would apply to commercial connections to a low voltage distribution network for an inverter based generating unit and any non-inverter based generating unit or load. – ***cookie cutter approach?***
- **Medium/high voltage connection** - This would apply to a connection to a medium/high voltage distribution network for an inverter based generating unit and any non-inverter based generating unit greater than 10MW
- **Commercial Public EV Charges**

Note: *Priortisation for the development of these Technical Guidelines will be based on guidance from the Authorities NCTG work program*



What will they include?

Technical requirements for Basic/Micro Connection – Cookie cutter approach

1. **Standards and codes** - Shall provide a list of all the standards and codes to which all plant and equipment shall be designed, manufactured, installed and tested in accordance with
2. **Labelling and signage** - Shall indicate where and for what reasons labels and signs should/must be used on equipment components and on the installation
3. **Maximum generation capacity** - Shall state the maximum allowable capacity of the inverter energy system (30kVA or 10kVA per phase unless otherwise stated) and how the combined capacity of two inverter energy systems (e.g. battery and storage) at the same connection point are to be treated
4. **Network connection and isolation** - Shall provide information on the service protection device to be used and/or the outcomes to be achieved and the extent to which these are consistent with relevant New Zealand or International Standards
5. **Earthing** - Shall give details on the effective earthing system to be used and/or the outcomes to be achieved and the extent to which these are consistent with relevant New Zealand or International Standards
6. **Protection** - Shall detail the protection measures to be taken and/or the outcomes to be achieved and the extent to which these are consistent with relevant New Zealand or International Standards
7. **Voltage** - Shall specify limits to voltage rises and dips (maximum and minimum) from the connection point to the inverter and the extent to which these are consistent with relevant New Zealand or International Standards
8. **Generation control** - Shall specify how the generating unit should/must operate and describe those scenarios where output may need to be constrained (including but not limited to via export limitations)
9. **Metering** - Shall stipulate the metering standards that apply to the connection, how bi-directional power flow should/must be measured and registered, and whether changes are required to existing metering arrangements consistent with regulations
10. **Inverters** - Shall provide information on the type of inverters allowed
11. **Communications systems** - Shall detail the requirements of communications systems that apply to the connection
12. **Communication and data protocols** - Shall set out the requirements for transmitting data and information to and from the EDB and any other bodies
13. **Cybersecurity** - Shall set out the cybersecurity requirements including the safeguards and controls necessary to deter, detect, protect, respond to and recover from cybersecurity threats
14. **Commissioning and testing** - Shall state the requirements and responsibilities around testing the system to confirm compliance with the connection agreement including the intended design of all safety, protection, control, metering, monitoring systems associated with the IES, together with the electrical integrity of all primary circuit equipment
15. **Operations and maintenance** - Shall describe the responsibilities and practices around operating and maintaining the system



Technical requirements for High Voltage Connections

1. **Relevant rules and regulations** - Shall list the rules and regulations, as well as standards and codes that apply to the connection arrangement
2. **Connection arrangements** - Shall outline the connection arrangements for any standard and negotiated connection types and any generation control (including export limitations) on standard connection types and any general technical considerations
3. **System requirements** - Shall detail the distribution network's performance requirements as well as the specific requirements for the generating unit and the installation and how these differ for each standard and negotiated connection type
4. **Labelling and signage** - Shall indicate where and for what reasons labels and signs should/must be used on equipment components and on the installation
5. **Generation control** - Shall specify how generation should/must be constrained (including but not limited to via export limitations) for any standard and negotiated connection types
6. **Fault levels and protection impacts** - Shall outline the protection systems to be used to manage faults and abnormalities and any limits to fault contribution levels
7. **Means of isolation** - Shall state how the system is to be isolated (i.e. number of isolation points needed and locking requirements)
8. **Operating voltage and frequency** - Shall describe the standard power system voltage and frequency to which the generating unit should/must be designed and operate to including how the generating unit should/must respond to disturbances
9. **Inverter Energy Systems** - Shall provide details on standards compliance, voltage limits for sustained operations, power quality modes, power limiting controls, and systems with multiple inverters
10. **Non inverter systems** - Shall provide details on standards compliance, re-energisation and synchronising, and power control
11. **Protection** - Shall detail the protection measures to be taken and/or the outcomes to be achieved and how these differ for each standard and negotiated connection type. Shall detail the extent to which these are consistent with relevant New Zealand or International Standards
 - **IES protection** - Shall detail specific protection measures to be taken by proponents for IES. Measures to be considered shall be, but are not limited to: loss of mains, voltage, frequency, power limits, and any other relevant IES protection settings (such as a grid protection relay device and wireless communication system).
 - **Non IES protection** - Shall detail specific protection measures to be taken by proponents for non IES. Measures to be considered shall be, but are not limited to: loss of mains, voltage, unbalance, frequency, a grid protection relay device, power limits, overcurrent, and anti-islanding
12. **Earthing** - Shall give details on the effective earthing system to be used and/or the outcomes to be achieved and how these differ for each standard and negotiated connection type. Shall detail the extent to which these are consistent with relevant New Zealand or International Standards
13. **Metering** - Shall stipulate the metering standards that apply to the connection, how bi-directional power flow should/must be measured and registered, the supply options available for bulk metering, and whether changes are required to existing metering arrangements consistent with the regulatory requirements.
14. **Power quality** - Shall describe the requirements around the connection point power factor, voltage changes and flicker, harmonic distortions with IES and non-IES, and voltage unbalance and how these differ for each standard and negotiated connection type. Shall detail the extent to which these are consistent with relevant New Zealand or International Standards
15. **Communications systems** - Shall detail the requirements of communications systems for remote monitoring and control that apply to the connection
16. **Communication and data protocols** - Shall set out the requirements for transmitting data and information to and from the EDB and any other bodies
17. **Cybersecurity** - Shall set out the cybersecurity requirements including the safeguards and controls necessary to deter, detect, protect, respond to and recover from cybersecurity threats
18. **Technical studies** - Shall detail the requirements, scope and responsibilities for any technical studies which may be required to be completed by proponents and/or the NSP Shall detail the EDB acceptance criteria for any technical studies to be prepared by the proponent
19. **Commissioning and testing** - Shall state the requirements and responsibilities around testing the system to confirm compliance with the connection agreement including the intended design of all safety, protection, control, metering, monitoring systems associated with the IES, together with the electrical integrity of all primary circuit equipment how these differ for each standard and negotiated connection type
20. **Operations and maintenance** - Shall describe the responsibilities and practices around operating and maintaining the system how these differ for each standard and negotiated connection type



How will we establish the correct technical settings?

1. Aligned with the Electricity Authority (i.e. NCTG) and ENA – “Streamlining Connections Programme”
2. Establishment of a steering group – including representatives from across industry including (but not limited to):
 - EDBs
 - Transpower
 - SEANZ
 - The Electricity Authority – i.e. CQTG
 - The Commerce Commission
 - Proponents/consultants etc
3. Direct engagement with primary stakeholders through meetings, workshops and public webinars
4. Draft revision process via email submission from EDBs and stakeholders



Contact

If you would like more information or would like to engage with the team, please contact:

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