Marlborough Lines Network Standard

DN015 – Distributed Generation Congestion Management

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1 General

1.1 Purpose

This standard provides guidelines for how Marlborough Lines (MLL) manages congestion on our network as a result of distributed generation.

1.2 Scope

This standard applies to new connections and connection modifications of any DG connected to the Marlborough Lines distribution network at any voltage.

EG connected to MLL's network at **LV** will need to comply with DN016 – LV EG Connection and operation Standard found on our website.

EG connected to MLL's network at **HV** will need to comply with DN017 – HV EG Connection and operation Standard found on our website.

This standard is approved for external release.

1.3 References, Standards and Codes

The following documents are referred to in this standard or provided background material for the development of this standard:

Internal Document	Description
DN014	DG Connection Policy
DN016	LV DG Connection and Operation Standard
DN017	HV DG Connection and Operation Standard

External Document	Description
AS/NZS 3000	Electrical installations (known as the Australian/NZ wiring rules)
AS/NZS 4777.1:2016	Grid connection of energy systems via inverters. Part 1: Installation Requirements
AS/NZS 4777.2:2020	Grid connection of energy systems via inverters. Part 2: Inverter Requirements
Electricity Safety Regulations	NZ Regulations to ensure the health and safety of members of the public and prevent damage to property. Found here.
Electricity Industry Participation Code	The Electricity Authority's Electricity Industry Participation Code 2010 governs how the electricity market operates. (the Code). In particular Part 1 or Part 1A of Schedule 6.1.
EEA Guide	EEA Guide for the connection of Small-Scale Inverter Based Distributed Generation 2018

1.4 Definitions and Abbreviations

The following definitions are referred to in this information pack:

Definition	Explanation
Distributed generation (DG)	Generation installed at a customer's installation that is capable of exporting electricity back into the local network. When viewed from MLL's perspective the generation is distributed throughout our network.
Embedded Generating System (or EG)	One or more generating units embedded behind an installation control point (ICP).
Inverter Energy System (or IES)	A system comprising one or more inverters together with one or more energy sources (which may include an ESS) and controls, where the inverter(s) satisfies the requirements of AS/NZS 4777.2.

The following abbreviations are referred to in this information pack:

Abbreviation or Acronym	Definition
DG	Distributed Generation
EG	Embedded Generation
HV	High Voltage
ICP	Installation Control Point
IES	Inverter Energy System
LV	Low Voltage

2 DG Congestion Management

Distribution networks have primarily been designed and established for electricity flows in one direction. With an increasing number of distributed generation systems connecting this could introduce bi-directional electricity flow on parts of our network not designed for it.

The addition of new load or Distributed Generation (DG) may require the provision of additional network capacity. This is particularly true where sections of network could exceed their maximum rated current capacity or where voltages will exceed the upper or lower limits.

Marlborough Lines manages network congestion by:

- Modelling of HV and LV power flows
- Prescribing connection standards for loads and distributed generation.
- Ensuring EG operates with power quality control modes enabled.
- Export limiting EG where network capacity does not exist.
- Network upgrades or demand response systems.

For LV connected EG systems, the customer can determine their export thresholds automatically. Refer to section 4.

For HV connected EG systems, MLL will assess the likelihood that the new distributed generation proposal will cause network congestion after receiving the initial application.

If MLL's assessment shows that congestion is likely to occur, it may be necessary to impose export limits or reinforce or support the distribution network. This, and its cost, will be discussed with the distributed generator at the time, and in line with the Code, the incremental cost will be recovered from the distributed generator.

3 DG Hosting Capacity

DG hosting capacity is defined as the maximum active export power (in Watts), per ICP with DG installed, that can be tolerated without causing voltage or current limits to be exceeded in the network.

DG hosting capacity is specified for each medium to low voltage distribution transformer. All ICPs on all downstream LV feeders connected to a transformer are determined to have uniform DG hosting capacity, independent of their location along the LV network.

Marlborough lines models a conservative DG uptake of 50% per LV network. That is, we expect 50% of all ICP's on an LV network to connect DG within the next 10 years. This ensures connections today do not impact the ability for customers to connect in the future.

4 Export Thresholds

The export threshold for a location is determined from the hosting capacity study and will be available on our website to search by address shortly.

In the interim the export threshold across our network at each ICP is set at 5kW per phase. Exclusions to this can be found in section 6 below.

If your maximum export power is below this threshold, or you propose to export limit your system, you may apply via the Part 1A application pathway, otherwise you need to apply via Part 1 or Part 2 which involves a manual review.

5 DG Curtailment

MLL may, from time to time, interrupt or curtail output of any distributed generation due to the following reasons:

1. To manage distribution network congestion, such as excessive voltage levels on MLL's distribution network or overloading of certain equipment on MLL's distribution network.
2. To perform necessary planned maintenance tasks, construction, or repairs on the distribution network.
3. To protect, or prevent danger or damage to, persons or property.
4. To manage the distribution network capacity.
5. If the customer modifies the system in any way that contradicts the approved application without consulting MLL.
6. Any other technical reason that may arise and which in the opinion of MLL's Operations Manager could pose a threat to the stability of MLL's own distribution network.
7. An event on Transpower's transmission network.
8. Any other reason referred to in the Terms of Connection.

6 Areas known to have Export Congestion

There are several remote areas of the Marlborough Lines electricity network currently known to be, or reasonably expected to become, subject to export congestion within the next 12 months. These areas are represented graphically in Appendix A. However, at a high level include:

- SWER networks have generation export limit of 2kW. Details on this can be found in DN016
- The Kenepuru Sound from Linkwater
- The Wairau Valley beyond Wairau Valley Township
- Riverlands & Cloudy Bay Industrial Estates
- Seaview in Seddon.
- Ward Township

MLL will review this regularly and publish any areas which may become congested.

Appendix A – Congestion Areas Map