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CL-OS2001

Centralines' Distributed Generation Congestion Policy

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CL-OS2001 Centralines' Distributed Generation Congestion Policy

Overview

Document purpose

This policy outlines Centralines' approach to managing congestion on the Centralines' network (Network) to ensure compliance with Centralines' relevant connection and operation standards.

It sets out how Centralines meets its obligations under Part 6 of the Electricity Industry Participation Code 2010 (Code) to facilitate the connection and ongoing operation of distributed generation, and to describe the circumstances under which distributed generation may be curtailed or interrupted to maintain compliance with the Code, the Electricity Act 1992, and relevant technical and safety regulations.

Intended audience

This policy applies to all forms of distributed generation connected to the Network.

Document contributors

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Key dates

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Recommended renewal period – two years, or earlier if any of the following occur

- legislative or regulatory changes
- risk reviews
- continuous improvements
- user feedback, or
- audit findings.

Related references

Legislation

- Electricity Industry Participation Code 2010, Part 6
- Electricity Act 1992
- Electricity (Safety) Regulations 2010

Controlled Documents

- CM2001 Network Connection Standard
- CM0003 Applications and Standards for Connection to a Distributed Generation of 10kW or Less in Total
- NK1408 Applications and Standards for Connection to a Distributed Generation Greater than 10kW in Total

Standards

- AS 4777.2:2020 Grid connection of energy systems via inverters – Part 2: Inverter requirements

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Definitions/Abbreviations

Code For the purposes of this document Code refers to the Electricity Industry Participation Code 2010.

Commercial Distributed Generation (Commercial DG) Distributed generation installations exceeding Prosumer DG thresholds or designed primarily for export to the wider network.

Congestion/ congested The output of one or more generators flowing into a distribution network such that:

- a stable and legally compliant service cannot be maintained to one or more ICPs, or
- thermal overload of any line, cable, transformer, or other network plant would or could occur.

DGO Distributed Generation Operator(s).

End User Any person who is:

- electrically connected to a distribution network for receiving electrical energy, and
- in a direct or indirect contractual relationship with Centralines for such supply.

Export Congestion As defined in the Electricity Industry Participation Code 2010.

Generator A device that converts energy obtained from an external source into electrical energy as output. It is any source of active and/or reactive electrical power.

GXP Grid Exit Point(s) – any point of connection between Transpower's transmission system and the distributor's network.

Hosting Capacity The amount of generation that can be connected to a defined part of the Network without breaching voltage, thermal, or protection limits under normal operating conditions.

ICP	<p>Installation Control Point(s) – a point of connection on the distributor network which:</p> <ul style="list-style-type: none">• the distributor nominates as the point at which the retailer is deemed to supply electricity to a consumer, and• has the attributes set out in the Code.
NOC	<p>Network Operations Centre – Unison’s control room where the network is controlled in real-time 24 hours a day and seven days a week.</p> <p>Under the Managed Services Agreement (MSA) between Centralines Limited and Unison Networks Limited, Unison provides a range of network management and operational services on behalf of Centralines.</p> <p>This includes the provision and operation of the Network Operations Centre (NOC), which monitors, controls, and coordinates Centralines’ electricity network on a 24-hour basis.</p> <p>Accordingly, any references within this policy to ‘Unison’ or the ‘NOC’ should be read as referring to Unison Networks Limited acting in its capacity as the contracted service provider to Centralines Limited.</p>
Prosumer Distributed Generation (Prosumer DG)	<p>Distributed generation installed at consumer sites that both imports and exports electricity, where total inverter nameplate capacity $\leq 25\text{kW}$ or as otherwise published by Centralines.</p>
Retailer	<p>An Electricity Retailer – the company that supplies electricity to consumers with installations connected to the distributor’s network.</p>
Rules	<p>Electricity Governance Rules made by the Minister of Energy under Section 172H of the Electricity Act 1992 by notice published in the Gazette. This may be amended from time to time.</p>
System busbar	<p>A point of connection on the distribution network that will self-adjust the active and reactive power flows into the network. It does this to match the load requirements and maintain reference frequency. The system busbar will usually be the GXP.</p>
VAR	<p>Voltage-ampere reactive – a term that is used extensively in definition and measurement of reactive power within electrical circuits.</p>

1. Scope of Policy

1.1 Purpose This policy outlines Centralines' approach to managing congestion on the Centralines' network (Network) to ensure compliance with Centralines' relevant connection and operation standards.

1.2 When this applies This policy applies when generation output becomes congested and cannot be adequately continued on the Network. Refer to *Section 4 - Congestion Criteria* for a description of what is likely to lead to congestion and the congestion criteria.

1.3 What happens A reduction or disconnection occurs when the generation output becomes congested and cannot be adequately continued on the Network.

1.4 Who/what is affected? This policy applies to all suppliers of electrical energy into any point (except for Transpower and its associated GXP) on Centralines' distribution networks. This includes:

- connections of generating plant, or
- lines where the generating plant is connected to Centralines' distribution networks for the purpose of using the Network for the conveyance of the generated output.

1.5 Scope exclusions This document does not apply:

- to distributed generation under 10kW connected in accordance with **CM0003 Applications and Standards for Connection to a Distributed Generation of 10kW or Less in Total**, and
- where Distributed Generation Operators (DGOs) have contractual agreements where restrictions in this document have been specifically provided for.

1.6 Assumptions The assumptions listed below are considered part of the scope of this document:

- The technical issues associated with any specific generator connection are resolved and under normal load conditions full (or an agreed amount of) generator output can be accommodated by the Network.
- In any distribution network, only one system busbar will exist, and this will normally be the grid exit point (GXP).
- All commercial and contractual agreements affecting the application of the issues in this document have been completed.

2. Consequences of Non-Compliance

2.1 Network reliability performance

The consequences of non-compliance with this policy document include:

- a safety hazard to field staff
 - overloading of Network components
 - non-compliant quality of supply to consumers, and
 - damage to Network and equipment causing Network outages and supply interruption.
-

3. Distributed Generation and Congestion Management

3.1 Centralines' approach

Distributed generation is actively encouraged at a national level and Centralines is obliged under the Electricity Participation Code 2010, Part 6, to provide rules to facilitate their connection. These are outlined in:

- **CM2001 Network Connection Standard**
 - **CM0003 Applications and Standards for Connection to a Distributed Generation of 10kW or Less in Total**, and
 - **NK1408 Applications and Standards for Connection to a Distributed Generation Greater than 10kW in Total.**
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3.2 Network design

The Network is primarily designed and established for electricity flows in one direction. Increasingly, distributed generation is introducing bi-directional electricity flow on the Network. This may lead to congestion on both the low voltage and high voltage parts of the Network.

Centralines' distribution networks have been designed to:

- take power from a GXP, and
- deliver load requirements to individual installation control points (ICP).

This means all transformers, tap positions, lines, cables, and regulators are traditionally designed for a single power flow direction.

3.3 DG technical issues

When distributed generators are added to the Network the following issues arise:

- generator inputs may vary with time
- a generator may or may not be connected at any particular time
- power flows may fluctuate significantly

- voltages at various points in the Network may exceed legal limits
- the import or export of voltage-ampere reactive (VAR) may significantly affect current ratings and system voltages
- if distributed generation is significant, there may be times when power flow from a distribution network is exported into the GXP, and/or
- there may be excessive waveform distortion.

These and other effects may, on occasions, necessitate the reduction or removal of generation.

4. Congestion Criteria

4.1 Network congestion

Network congestion is a situation where the Network cannot accept electricity exported from distributed generation because the injection of additional power into the Network would:

- cause a component in the Network (e.g. a circuit or a transformer) to operate beyond its rated maximum capacity, or
- give rise to an unacceptably high level of voltage at the point of connection between the Network and the distributed generation.

4.2 Conditions likely to lead to congestion

The following circumstances arising on a distribution network may lead to congestion conditions, including but not limited to:

- planned or unplanned outages
- capacity limits on network components
- unexpectedly low loads
- high generation from higher priority generators, and
- various combinations of the above, and/or network damage, equipment failures, and other unforeseen circumstances.

4.3 Criteria defining congestion

An actual or threatened condition of congestion is when one or more of the following circumstances occur, including but not limited to:

- exceedance of:
 - voltage limits at the generator ICP
 - plant thermal ratings
 - Centralines' security limits, and
 - power flow stability limits
- power surges, unacceptable fluctuations in supply, or other Power Quality breaches occur at one or more end-user ICP

- excessive tap-change operations occur at substations or line regulators, and
- other unforeseen situations occur which are directly attributable to distributed generation input and could threaten security or reliability of supply.

For de-congestion actions to be initiated, the congestion criteria outlined above must or should be taking place in the judgement of NOC Distribution Network Controllers.

5. De-congestion of Generator Input

5.1 De-congestion approach

It is expected that arrangements with DGO will be such that the requirement to disconnect generators, or reduce their exported load, will be unlikely.

However, there may be times of exceptional light loads or loss of capacity of Centralines' circuits that limit the power that can be injected into specific points of the distribution network.

The points in this section apply if, and when, such non-normal states occur.

Centralines manages Network congestion by:

- ensuring new distributed generation connections are in unconstrained areas or, if they are not in unconstrained areas, ensuring they are accompanied by appropriate Network upgrades (refer to *point 6.12 Network Congestion and Upgrades* for more information)
- implementing real-time operational curtailment rules and arrangements, assessed and implemented on a case-by-case basis and in accordance with this policy, and
- where necessary, interrupting (temporarily disconnecting) distributed generation.

5.2 Rights of the NOC

NOC reserves the right to:

- protect its Network and plant
- determine:
 - where, when and whether a state of distributed generation congestion has occurred, or may occur
 - if only a local group of distributed generation is to be controlled or global control is required for the distribution network affected
 - if it is preferable to have generator inputs to a distribution network reduced without those generators being disconnected, and

- to ask generators to adjust their import or export of VAR (where this is possible).
-

5.3 DGO requirements

Every endeavor will be made to have a uniform requirement of all generators, however, this may not always be possible to achieve due to specific technical reasons.

Centralines will endeavor to minimise such requests so that generation parameters are kept as stable as possible.

DGO may be required (in principle) to reduce output by a percentage of their current generator output. In any event the kVA reduction required by Centralines is to prevail.

5.4 Automation

Where technically feasible, Centralines may seek to secure agreement with DGO for some direct NOC control of the import of active and/or reactive power into its Network. Control may be exercised by ripple signal, telephone, radio, or other means, and will be initiated by NOC according to system needs.

Centralines recognises this may not always be practicable. It may require alternative contractual obligations of active and/or reactive power flow to be agreed to.

Distributed generation, either manual, automated, or under NOC direct control, will be treated in the same order and under the same protocols. The only exception being if there is specific contractual agreement allowing a variation.

In all situations Centerlines has control of connection and disconnection to Centralines' Network through the ICP circuit breaker and associated protection equipment.

6. Disconnection

6.1 Application

The disconnections referred to in this section are those affected by the automatic operation of:

- any protection relays, or
- other equipment designed and installed specifically for that purpose.

These do not prevent protection operations that the DGO may wish to apply to their own equipment.

Relevant factors Centralines considers when determining whether and what to implement as a Network congestion management measure include:

- the extent of the Network congestion
 - technical and operational characteristics of the Network and distributed generation (e.g. whether the distributed generation connected to the Network is Prosumer DG or Commercial DG) (refer to *point 6.7*), and
 - any applicable connection terms and conditions and legal requirements (including, for example, those contained in the Code and the Electricity (Safety) Regulations 2010).
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6.2 Disconnection without notice

Centralines reserve the right to disconnect any generator from its Network automatically and without notice for any of the following reasons:

- a short circuit anywhere on the distribution network that is, or could be, affected by the connected distributed generation
 - an inadvertent disconnection of any:
 - line
 - cable
 - transformer, or
 - other necessary components used for the transport of electrical energy within the distribution network. These components cause or could cause an overload of other plant items or non-compliant voltages to occur
 - over-voltages caused by lightning, switching surges or other causes, and
 - any other similar problems arising on the Network and associated with electrical power flow.
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6.3 Congestion management events

Circumstances where Centralines will or may employ congestion management measures include (for example):

- in the case of a prevalence or saturation of distributed generation installations on any part of Centralines' Network leading to operational issues, including (but not limited to):
 - an excess of voltage
 - an excess of reactive power, or
 - an excess of voltage fluctuations or harmonics
 - where Network protection equipment or settings have been, or may be, compromised, or
 - Network capacity is compromised due to a system outage (planned or unplanned).
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6.4 Curtailments and interruptions

Where Network congestion occurs, e.g. when the Network is under constraint conditions, Centralines reserves the right to:

- curtail the operation and/or output of distributed generation on the Network, or
 - interrupt (temporarily disconnect) distributed generation on the Network.
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6.5 Curtailments

Electricity networks are dynamic. This means that future changes to Network conditions and connections may result in congestion conditions that were not present when distributed generation installations were first connected.

Where congestion conditions occur, Centralines may require a distributed generation customer to curtail their operation of its distributed generation to reduce output, operate within nominated times or under nominated conditions, or both.

No compensation will be paid by Centralines if distributed generation is curtailed due to congestion conditions.

The curtailment may be to any or all of the distributed generation on the part of the Network experiencing the congestion conditions.

Where possible and practicable, Centralines will always employ curtailment measures to manage congestion before it interrupts any distributed generation on the Network.

6.6 Interruptions

If curtailment of distributed generation fails to address congestion conditions on the Network, interruption (temporary disconnection) of any or all of the distributed generation on the affected part of the Network may be required.

Distributed generation installations must adhere to Centralines' technical standards, which, for distributed generation installations of 10kW or lower capacity, requires that inverter-based systems:

- comply with AS 4777.2:2020 Grid connection of energy systems via inverters – Part 2: Inverter requirements, including protection and anti-islanding settings.

For distributed generation installations of greater than 10kW capacity, distributed generation must automatically disconnect via the inverter protection settings, unless alternative options such as curtailment have been previously agreed.

Distributed generation interrupted due to congestion conditions may be reconnected to the Network when the congestion conditions clear.

6.7 Prioritising curtailment and interruption

Centralines applies differentiated curtailment and interruption measures based on the classification of distributed generation as either:

- prosumer distributed generation (Prosumer DG); or
- commercial distributed generation (Commercial DG).

As a general rule, where there is congestion on the Network, Centralines will look to curtail or interrupt Commercial DG before it considers curtailing or interrupting Prosumer DG. This is because Prosumer DG is less likely to contribute to congestion on the Network in the first place (and if it does, it is unlikely to be to a significant degree).

Commercial DG will be curtailed/interrupted applying a last-in, first-out principle. Generation will only be curtailed to the extent, and for the period, required to manage the congestion on the Network.

Further information on our approach to Prosumer DG and Commercial DG is set out in *points 6.8* and *6.9* below.

6.8 Prosumer DG

Prosumer DG refers to distributed generation that both consumes electricity from the Network and exports electricity onto the Network, in each case, to broadly equivalent levels. On Centralines' Network, Prosumer DG is distributed generation that both consumes electricity from the Network and exports electricity back onto the Network.

Centralines considers that the risk of significant or material export congestion due to Prosumer DG in the near to medium term future is low because existing Network capacity is typically aligned with load requirements and, as a result, is capable of accommodating similar levels of Prosumer DG without issue.

Where export constraints do arise (or may arise in the future), they are generally addressed through optimised network investment planning rather than through operational curtailment or interruption measures.

Prosumer DG almost exclusively connects to the low voltage parts of the Network. As Centralines implements improved monitoring and management systems for these low voltage areas, it will also introduce processes for forecasting future uptake and injection levels.

These insights will help inform future planning and, where reasonably practicable, support opportunities for distributed generation. **However, forecasting and planning activities do not constitute a guarantee of future network capacity or export availability**, and all connections remain subject to network conditions at the time.

If future Prosumer DG connections give rise to increased export constraints, increased Network congestion, or otherwise necessitate significant Network upgrades, Centralines will review this approach. However, at this stage, curtailment or interruption of Prosumer DG is not treated as Centralines' preferred or standard measure to manage congestion.

6.9 Commercial DG

In contrast to Prosumer DG, Commercial DG is generally more focused on exporting bulk generation to remote markets, and as a result, often imposes a larger strain on available Network capacity.

Commercial DG is also less predictable (i.e. more variable) in terms of its location, scale, and timing, which limits Centralines' ability to manage potential or actual congestion caused or contributed to by Commercial DG through systematic investment planning alone.

As a general rule, Commercial DG connections are permitted up to the Network's hosting capacity and will only be curtailed or interrupted as needed to manage outages and events where Network export capacity is temporarily reduced.

Where operational congestion management becomes necessary on a section of Network with multiple Commercial DG connections, the last connected generator will generally be the first to be curtailed or interrupted (unless Centralines considers, acting reasonably, that curtailing or interrupting generation in a different order would be more effective to manage the particular congestion event).

Notwithstanding the above, additional scenarios or circumstances may also arise where operational factors require targeted curtailment or interruption of some Commercial DG connections but not others, e.g. curtailing flexible generation (e.g. batteries) ahead of intermittent generation plant, e.g. wind, for practical or system stability reasons. In this case, Centralines may deviate from the 'last-in, first-out' approach described above.

While Centralines will generally employ congestion management measures on the basis set out above, it may change its approach depending on the specific circumstances applying to the congestion management event.

6.10 Priority for the removal of generator output

The principle adopted by Centralines is that generators will be obliged to disconnect from the Network on the basis of 'Last On – First Off'. This refers to the date order generators were officially connected to the distribution network. This date will determine the order generators will be disconnected, with the earliest ones connected being the last to be disconnected.

6.11 Emergency and fault operation

In the event of any fault on a distribution network any generator may, through their own or Centralines' protection systems, be automatically disconnected from the Network without notice. The DGO has sole responsibility for the safety of their generating plants and equipment under such conditions.

6.12 Network congestion and upgrades

In some cases, new distributed generation connections may add to existing congestion, or potentially cause congestion, on the Network. In these cases, Network upgrades may be required.

Centralines will assess the incremental cost to relieve the congestion or potential congestion and allocate a share of the Network upgrade cost to the customer consistent with its Capital Contribution Policy (available on Centralines' website).

6.13 Other relevant information

Locations of any congestion on the Network are identified and published on Centralines' website: Distributed Generation Hosting Capacity Map. As at the date of this policy, there are no specific locations or parts of our low voltage Network subject to export congestion.

For further information relating to the connection of distributed generation to the Centralines' Network, visit the documents below on Centralines website:

- **CM0003 Applications and Standards for Connection to a Distributed Generation of 10kW or Less in Total**
- **NK1408 Applications and Standards for Connection to a Distributed Generation Greater than 10kW in Total, and**
- **CM2001 Network Connection Standard.**

7. Communications

7.1 DGO contact information

Each DGO provides (as part of their application to connect distributed generation) the following information:

- contact phone number
 - email address, and
 - for verification purposes, the name(s) of authorised contact people.
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7.2 Notification times

NOC will endeavor to advise DGO of any impending congestion situations as early as possible. This is to advise them of the requirements of the:

- generator output reduction, or
 - disconnection from Centralines' Network.
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7.3 Acceptable communication

Email is the only acceptable form of communication between the DGO and NOC.

7.4 Exceptions

Telephone or radio communications are acceptable but must be confirmed by the initiator in writing or email.

Notification may not be necessary when the DGO has a suitable arrangement with NOC for automatic disconnection or load reduction.

7.5 Expected response times

If no prior arrangement exists, a response is expected within 30 minutes. Otherwise, Centralines may act independently, including disconnecting service.

Appendix A – Summary of Document Changes

Date	Version No.	Changes to Document	Owner	Authoriser	Approver
18/03/2026	1.0	New Document	Innovative Solutions Manager	Group General Manager Customer, Commercial & Regulatory	GM Networks and Operations
