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CL-FC9014

Participant Rolling Outage Plan

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CF-FC9014

Centralines Participant Rolling Outage Plan

Overview

Document status
Draft **In Service** Under Review Archived
Document purpose

This plan was written to comply with:

- Part 9 of the Electricity Industry Participation Code 2010 (the Code), and
- the System Operator Rolling Outage Plan (SOROP).

The procedures outlined are in response to major generation shortages and/or significant transmission constraints. Typical scenarios include:

- unusually low inflows into hydro-generation facilities
- loss of multiple thermal generating stations, or
- multiple transmission failures.

How an event is declared and how the System Operator will communicate its requests are covered by the plan.

The main energy saving measure listed is rolling outages and the plan explains how these are structured and implemented.

Requirements under the Code

Under the Code, Participant Rolling Outage Plans (PROPs) are required to specify the actions that would be taken to:

- reduce electricity consumption when requested by the System Operator
- comply with the requirements of the System Operator Rolling Outage Plan
- comply with the Electricity Industry Participation Code 2010, and
- supplement the System Operator Rolling Outage Plan.

Supply of power

Reducing demand by disconnecting supply to customers would be a last resort after all other forms of savings, including voluntary savings, had been exhausted.

Centralines will always endeavour to maintain supply to our customers.

Intended audience

This plan applies to all Centralines and Unison employees, and in particular those listed in *Section 4* of this plan.

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Overview, Continued

Document contributors	Contributors	Name and Position Title	Approval Date
	Creator	Nigel Brown Unison Operations Manager	18/02/2016
Authoriser	Len Gould Unison GM Commercial	29/03/2016	
Approver	Jaun Park Unison GM Networks and Operations	31/03/2016	

Key dates	Published Date	04/04/2016
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Related references

Legislation

- Electricity Industry Act 2010
- Electricity Industry Participation Code 2010

Unison Emergency Plans

- FC9001 Crisis Management Plan
- FC9002 Crisis Communication Plan

Other References

System Operator Rolling Outage Plan

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1. Definitions/Abbreviations

AUFLS	Automatic Under Frequency Load Shedding
Authority	Electricity Authority
CDEM	Civil Defence Emergency Management
Code	Electricity Industry Participation Code 2010
Feeder	A high voltage supply line typically supplying between 100 and 2000 customers.
GEN	Grid Emergency Notice
GXP	Transpower Grid Exit Point
PROP	Participant Rolling Outage Plan (this plan).
Rolling outage	Planned electricity disconnections spread over different parts of the network at differing times to avoid prolonged outages at any one location.
Security Coordinator	The person responsible for system security at the System Operator, (Transpower).
SOROP	System Operator Rolling Outage Plan
Supply Shortage Declaration	Declaration made by the System Operator after consultation with the Authority.
System Operator	Operator of the national electricity transmission grid (Transpower).

2. Organisations Involved in the Supply of Electricity

2.1 Electricity Authority The Electricity Authority is a Crown entity set up under the Electricity Industry Act 2010 to oversee New Zealand's electricity industry and markets.

2.2 Transpower Transpower is a State Owned Enterprise, tasked with owning and operating New Zealand's National Grid - the network of high voltage transmission lines and substations that transports bulk electricity from where it is generated to distribution line companies such as Centralines.

As the System Operator, Transpower manages the real-time operation of New Zealand's electricity transmission system. It keeps the right amount of energy flowing to match generated supply with demand by:

- forecasting supply and demand
 - developing and publishing guideline hydro levels for security of supply
 - contracting for reserve energy, and
 - improving the ability of consumers to manage price risks in the market.
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2.3 Centralines Centralines Networks Limited, trading as Centralines, is the power lines company that safely delivers electricity to businesses and homes in Central Hawke's Bay.

The network is managed under contract by Unison Networks Limited. All contact and positions stated and listed in this document are Unison Networks' (Unison) personnel.

Centralines has a single grid connection point at Transpower's Waipawa substation situated at Onga Onga. It has four 33kV feeders that supply substations situated in Takapau, Waipukurau, Waipawa and Porangahau. An adjacent 33/11kV substation at Onga Onga provides four 11kV feeders for the immediate area.

Centralines has a similar winter and summer peak of 20.5MW.

3. Events Causing Supply Shortages

3.1 Supply and demand

The System Operator controls the transmission network to match generation with customer demand. Constraints on the ability to manage this may arise from insufficient generation and insufficient transmission capacity. This may be caused, for example, by:

- low lake levels reducing hydro generation
- the failure of a large generator, or
- a fault on a critical transmission circuit.

The first two causes above could lead to an energy shortage while the third could lead to a shortage of transmission capacity.

3.2 Event types

Events leading the System Operator to make a supply shortage declaration, and for directing specified participants to implement rolling outages, can be categorised as:

- Developing Event – an event that evolves over time, for example low hydro lake or fuel levels.
 - Immediate Event – an event that occurs with little or no warning, usually as a result of a transmission line or major generation failure.
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3.3 Major incident

Developing or immediate events are classed by Unison as a major incident. Unison's management team will activate the appropriate contingency plan for Centralines and will manage the incident accordingly.

Communication with retailers, Civil Defence and other stakeholders will be managed as per procedures documented in Unison's **Crisis Management Plan (FC9001)** and **Crisis Communications Plan (FC9002)**.

4. Centralines Staff Responsibilities

4.1 Responsibilities

The table below summaries the responsibilities of Centralines staff.

Tasks	Centralines Personnel
Receives communication from the System Operator	Operations Manager
Implements this plan	Operations Manager
Prepares load shedding schedules	Operations Manager
Notifies customers	System Outage Manager
Reports weekly savings	Analyst (Unison)
Revokes rolling outages	Commercial Manager
Reports to System Operator	Commercial Manager
Reports to media and public agencies	Relationship Manager
Reports to CDEM and Lifelines	Operations Manager

4.2 Authority to commence rolling outages

Upon receipt of direction from the System Operator to prepare for rolling outages, Unison's Operations Manager will:

- inform Unison's management, and
- commence specific rolling outage plan preparations to meet the requirements of the instructions issued by the System Operator.

Final authorisation to commence a programme of rolling outages will be made by Unison's Group Chief Executive.

5. Contact Details

5.1 Centralines Networks Limited

The System Operator can contact Unison on behalf of Centralines using the following details:

Unison Networks Ltd
Control Room
PO Box 555
Hastings 4156

Or

1101 Omaha Road
Hastings 4120

Ph: 0800 286 476
Fax: 06 873 9393

5.2 Transpower

Unison on behalf of Centralines will contact the System Operator for administration purposes (including reporting performance against targets) using the following details:

Transpower
System Operator
Fax: +64 4 495 7100
Phone: +64 4 495 7000

Transpower House
96 The Terrace
Wellington

6. Actions for Immediate Events

6.1 Reserve generation

The System Operator is required to keep enough reserve generation to cover the risk of the largest connected generator tripping. The System Operator is also required to keep the system frequency at 50Hz. If a large generator trips, it may cause a reduction in frequency. If not rectified this can result in other generators tripping and could lead to cascade failure of the transmission system.

As reserve generation cannot immediately pick up the load of a disconnected generator. An immediate load reduction is required until an additional generation can pick up the load. Automatic load shedding groups reduce load in stages until the frequency stabilises.

To recover from 'Immediate Events' electricity consumption can be reduced by the actions described in the following *points 6.2 and 6.3*.

6.2 Reserve market

Generators and load users with interruptible load (such as distribution networks) may offer, in reserve capacity, to cover the risk of the largest generating unit or a critical transmission line tripping. The ability to do this is affected by:

- the numbers of frequency capable relays installed, and
- the likely revenue stream from the market less the compliance costs of participating in the reserve market.

Centralines does not participate in this market.

6.3 Disconnect- ing customers

6.3.1 Automatic Under-Frequency Load Shedding (AUFLS)

If the load shed by the reserve market tripping is insufficient to stabilise the network, further automatic load reduction is required.

Each distribution network company must (unless exempted) have available at all times two blocks of load, each of 16% of its total load to be shed by automatic under frequency relays.

6.3.2 AUFLS Zone 1

If system frequency fails to recover after the reserve market load shed, AUFLS Zone 1 shedding will occur by disconnecting customers' supply. In the Centralines network the tripping relays are located at zone substations and Transpower substations where individual feeders are tripped. This will disconnect 16% of Centralines network.

6.3.3 AUFLS Zone 2

If Zone 1 tripping fails to restore frequency, the next stage, Zone 2 activates. This will disconnect a further 16% of Centralines network.

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Actions for Immediate Events, Continued

6.3 Disconnect- ing customers (cont)

In the Centralines network the tripping relays are located at Transpower GXP substation (Waipawa) and individual Zone 2 includes the tripping of Centralines Takapau zone substation via 33kV Feeder CB302.

6.3.4 Manual Shedding

If AUFLS Zone 1 and Zone 2 tripping fails to stabilise frequency the System Operator will shed more load by disconnecting direct connect industrial customers or distribution network GXP supplies.

Once the frequency has stabilised the System Operator will advise Unison's Control Room when load can be restored.

6.4 Supply restoration

Restoration of disconnected load must be restored in conjunction with the System Operator. This is to prevent overloading the transmission grid and/or creating further instability.

6.5 Transmission grid emergency

The System Operator may request Centralines to reduce load under a Grid Emergency Notice (GEN). Centralines will shed their water heating load and if necessary shed feeders.

If a 'Developing or Immediate Event' is in place, the grid emergency will take precedence.

If the System Operator declares a supply shortage following a grid emergency, Unison will respond by implementing rolling outages as described in *Section 7 - Developing Events*.

7. Developing Events

7.1 Weekly energy saving targets

If the System Operator requests a load reduction for a 'Developing Event', Centralines must reduce supply to meet the System Operator targets. The targets are likely to be in the form of a weekly energy savings target that is reviewed each week.

To reduce energy usage Centralines would disconnect feeders or groups of feeders in a controlled manner. It will happen when the feeders belong to a parallel or ring supply (rolling outage feeders) to enable targets to be reached.

There may be financial penalties for not meeting the targets specified by the System Operator.

Water heating load shedding is generally not an option for energy savings because it only defers rather than reduces energy demand.

8. Declaration of a Developing Event

8.1 Notice provided The System Operator will endeavour to provide nine days' prior notice of the requirement for:

- weekly energy savings, and
- any increase in the weekly energy savings target.

8.2 Energy savings target If the System Operator declares a supply shortage, the System Operator will specify the energy savings target to be enforced for a specific region for a specified timeframe.

8.3 Media advertising The System Operator will manage general media advertising of the need to conserve electricity and the impending rolling outages when they are requested.

8.4 Messages to the public from Centralines If Centralines plans to issue a public message related to rolling outages then this shall be sent to the Authority for review before being released. Any such communication will set a time for response by the Authority. This will enable their feedback to be included before Centralines issues the message to the public.

9. Criteria for Rolling Outages

9.1 Rolling outages actions On receipt from the System Operation of the target savings required, the Operations Manager will complete the tasks listed below.

- Review savings target received from the System Operator. Decide whether rolling outages are required to meet the target and the extent of the outages required.
- Determine the number of feeders to be included in rolling outages from the feeder priority list.
- Prepare rolling outages log sheets to list selected feeders and proposed outage times.
- Notify feeder outage times to the:
 - System Outage Planners
 - Relationship Manager, and
 - Customer Experience Manager.
- Consult with the System Operator prior to implementing rolling outages to establish a process for shedding and restoration.

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Criteria for Rolling Outages, Continued

9.2 Priority loads

The following table shows a desired criteria for selecting rolling outage feeders to be included in rolling outages. This will ensure public health and safety is preserved and costs to economy are minimised.

Priority	Priority Concern	Maintain Supply to...	Examples
1	Public health and safety	Hospitals, air traffic control centres and emergency operation centres	<ul style="list-style-type: none"> • Waipukurau Hospital • Police Stations/ Fire Services/Ambulance Services • Centralines Admin Building • CHBDC Admin Building
2	Important public services	Communication networks, water and sewage pumping	<ul style="list-style-type: none"> • Waipukurau and Waipawa water supply pumps • Waipukurau and Waipawa sewerage pumps • Telephone exchange
3	Public health and safety	Minor health/medical centres, schools and street lighting	<ul style="list-style-type: none"> • Medical centres • Schools • Colleges • Waipukurau CBD • Waipawa CBD
4	Food production	Dairy and food production facilities	<ul style="list-style-type: none"> • Dairy Farms • Bernard Matthews • Silver Fern Farms
5	Residential	Commercial and industrial premises	<ul style="list-style-type: none"> • Irrigation pumps • Orchards • Small commercial business • Residential customers

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Criteria for Rolling Outages, Continued

9.3 Rolling outage

Rolling outage feeders will all contain a variety of customers. The priority for each rolling outage feeder will be based on the priority ratings assessed for the connections within each feeder. These priority ratings are as follows:

Priority 1	Any feeder with one or more priority 1 connections
Priority 2	Any feeder with three or more priority 2 connections
Priority 3	All feeders with an average priority ≥ 2.5 and < 3.5
Priority 4	All feeders with an average priority ≥ 3.5 and < 4.5
Priority 5	All feeders with an average priority ≥ 4.5 and < 5.0

Rolling outage plans will focus on lower priority feeders to the extent possible. Higher priority feeders will be selected only at the higher required savings levels.

9.4 Vulnerable customers and priority sites

It is not possible for Centralines to prevent rolling outages affecting individual vulnerable customers and priority sites. In addition to the prioritisation of rolling outage feeders, Centralines will:

- provide information in its public notices and website alerting vulnerable customers to the risks, and
- request retailers consider individually notifying their vulnerable customers.

9.5 AUFLS under rolling outages

The level of AUFLS during rolling outage needs to be maintained. Centralines will either:

- exclude the current AUFLS feeders from its rolling outage plans, which means supply to lower value loads may be maintained while higher value loads are cut, or
- include AUFLS feeder shedding but limit the shedding to ensure two AUFLS blocks of 16% are maintained. If Centralines shed 25% of their network load they would also shed up to 25% of the AUFLS load, and
- arm additional higher value load feeders to supplement the AUFLS load, and exclude these from its rolling outage plan.

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Criteria for Rolling Outages, Continued

9.6 Shutdown notification

With the wide-scale impact of rolling outages it is not feasible to use our standard planned outage notification process (mainly because retail and postal systems could not process the thousands of outage notifications required).

When implementing a rolling outage plan, Centralines will notify the outages as listed below.

- Public Notices – Centralines will place public notice advertisements in local newspapers (see draft in *Appendix B*) providing a rolling outage timetable showing the times and areas affected by rolling outage.
- Centralines Website – www.centralines.co.nz
- Retailer Notification – Centralines will provide the rolling outage timetable to all electricity retailers together with a schedule showing the rolling outage group for all ICPs. (It is not appropriate to filter the schedule for an individual retailer's ICPs as this would place switching ICPs at risk.)

Where possible, Centralines will provide seven days' notice of all rolling outage plans. Centralines will generally publish and issue notifications on a Tuesday to apply from the following Tuesday.

10. Communication with the System Operator

10.1 Communication

All communications with the System Operator will be between Unison's (Centralines) Control Room and Transpower's Regional Operating Centre using Transpower's TSX telephone or normal communication systems.

Prior to notifying and implementing a rolling outage plan, Centralines will consult with the System Operator Security Coordinator to establish a process for shedding and restoration. This which may include a MW load cap to operate under during restoration phases. Unless agreed with the System Operator, load shedding and restoration shall be no more than 2 MW per five (5) minutes.

11. Grid Emergency During a Developing Event

11.1 Grid emergency

If the System Operator declares a grid emergency during a 'Developing Event', **the grid emergency will take priority.**

As water heating load generally would not be used to reduce load in a 'Developing Event', Centralines would have water heating load available for load reduction when required for the grid emergency. This load would be shed and the System Operator advised. If more shedding was required the System Operator would instruct the Grid Owner to disconnect load.

After the grid emergency is cancelled the rolling outages pattern would continue.

12. Rolling Outages Strategy and Methodology

12.1 Review of weekly targets

Unison's Operations Manager and Commercial Manager will:

- review weekly targets, and
 - prepare plans for weekly rolling outages based on savings required.
-

12.2 Methodology

Listed below is the methodology for rolling outages.

- Rolling outage feeders will be assigned a priority according to the criteria specified in *point 9.3*. Feeders belonging to AUFULS block 1 and 2 will be excluded from rolling outage groups unless we apply the alternative AUFLS arrangements outlined in *point 9.5*.
 - A set of switching instructions will be prepared for each rolling outage group.
 - A winter weekday morning (8am to 12pm) and an afternoon (1pm to 5pm) average energy volume will be estimated for each group. This is based on the average July daytime loadings.
 - Unison will provide to the Security Coordinator with a daily rolling week-ahead load forecast (beginning at a time specified by the System Operator). This will forecast the distributor's reasonable expectation of the half-hourly load at each grid exit point.
 - Unison will provide the Security Coordinator with any expected change to the forecast for a grid exit point of more than 20% for any trading period, as soon as reasonably practicable following the distributor becoming aware of the expected change.
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Rolling Outages Strategy and Methodology, Continued

12.3 Saving levels A plan will be prepared to target the required savings level. This plan will take account of any under or over savings carried forward from earlier periods in the security of supply outage plan.

12.4 Selection of groups As far as possible, groups should be selected depending on the saving level required, as follows:

Savings Required	Priority Groups Used
0 to 5%	5
5 to 10%	3, 4 and 5
Greater than 10%	All groups

12.5 Programmed outages To the extent possible, outages should be programmed to be held during daylight hours, between 8am and 5pm. However, they may extend into the evening where necessary to achieve the required savings level or accommodate switching logistics.

12.6 Switching of load Unless advised otherwise by the System Operator, the rolling outages plan must provide sufficient time for the switching of the load. This will ensure Centralines load does not increase or decrease by more than 2 MW in any 5 minute period. Centralines Operators carrying out switching are to monitor their activities in relation to this limit.

13. Target Monitoring

13.1 Actual demand versus targeted To avoid any discrepancy over the accuracy of different data sources, the System Operator will report on actual demand versus the target.

13.2 Monitoring of load shedding For load shedding to a weekly target, Unison will monitor the System Operator Report of Centralines' savings results to their target. Together with the Commercial Manager and Operations Manager, they will review future load shedding to increase or decrease the amount of rolling outage to enable the weekly target to be met.

13.3 Consumption vs target reporting In parallel (as a check) with the System Operator, Unison will be responsible for daily and weekly reporting of consumption relative to target levels (using our data sources).

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Target Monitoring, Continued

13.4 Monitoring savings

In the case of daily or real time limits, where the System Operator reporting will be too slow for real time action to be taken, the Operations Manager with the assistance of the Commercial Manager, will monitor our savings and adjust the timeframe required accordingly.

These savings will be:

- calculated using GXP loads measured by Centralines metering and SCADA system, and
 - compared with the targets supplied by the System Operator.
-

14. Log of Rolling Outages

14.1 Rolling Outage Log

Controllers will enter in the Rolling Outage Log, times of disconnection and reconnection of all feeder interruptions. All actions will be recorded on the SCADA log.

Appendix A shows the log sheet to be used by Controllers.

15. Contingent Events

15.1 Events

If an unplanned event occurs that will alter planned rolling outage, the Operations Manager will be responsible for all decisions. Where possible, any changes to the planned timetable should be published on Centralines website and communicated to retailers.

Appendix B – Draft Rolling Outage Public Notice

Electricity Supply Interruptions

Please read - Your supply may be affected

Centralines is being required to reduce electricity consumption with rolling power outages across Central Hawke's Bay. This is to meet an x% savings target set by the System Operator in response to the current energy crisis.

Voluntary savings have already helped us reduce the impact of rolling outages, and further savings may allow us to reduce these planned cuts further.

Outages will occur within the time periods noted in the schedule below. Wherever possible, we will delay cuts and restore power early, **so please treat all lines as live.**

Within each area we have prioritised individual circuits to minimise the cost and disruption to our community, and timed outages accordingly.

YOUR SAFETY AND PROTECTION

It is important to ensure you keep safe around electricity even when it is off.

- Power may be restored at any time.
- Please leave all appliances off during power cuts, particularly ovens and cook tops.
- To prevent damage to computers and other electrical equipment turn power off at the wall prior to outages.

Are you reliant on power?

If your health may be affected by these outages you will need to make alternative arrangements, or contact your healthcare provider for assistance. Please note telephones that rely on a mains supply may not operate during outages, so plan in advance.

Areas	Priority Group	Monday	Tuesday	Wednesday	Thursday	Friday
A	1	8-12am	8-12am	1-5pm	1-5pm	
B	2	8-12am		1-5pm		
C	1		8-12am			1-5pm
D	2		8-12am		1-5pm	
E	1		8-12am		1-5pm	

Connections in priority groups other than those listed (and those with a 'reserved' priority) are not scheduled for rolling outages in this period.

Appendix C – Summary of Document Changes

Date	Version No.	Changes to Document	Creator	Authoriser	Approver
31/03/2010	1.0	New Plan	Unison Operations Manager	Area Services Manager (Centralines)	CEO
21/05/2010	1.1	6.3 – description of CL Networks expanded. References to Category A and Category B Events replaced. 18.0 Addition of Savings Schedules from 5% to 25%	Unison Operations Manager	Area Services Manager (Centralines)	CEO
31/03/2016	2.0	<p>Full review and update into new template.</p> <p>Document renamed from Security of supply Participant Outage Plan to Participant Rolling Outage Plan.</p> <p>Updated to Definitions – Authority, Code, Supply shortage Declaration, Electricity Authority and Transpower.</p> <p>Addition of:</p> <ul style="list-style-type: none"> • point 3.1 Supply and demand, and • point 4.2 Authority to commence rolling outages. <p>Minor updates to points 2.1, 2.2, 3.1, 3.2, 4.1, 6.1, 6.2, 6.3, 6.5, 7.1, 8.1, 8.2, 8.3, and 9.3.</p> <p>Deletion of point 12.7 Planned savings.</p> <p>Reference to Commission replaced with either System Operator or the Authority.</p> <p>Appendix C – Feeder Priorities deleted.</p>	Unison Operations Manager	Unison GM Commercial	GM Networks & Operations