



Northpower Participant Rolling Outage Plan Guideline

Document summary

This Participant Rolling Outage Plan (PROP) is written to comply with:

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



Table of contents

1.0	Introduction	4
1.1	Purpose	4
2.0	References	5
3.0	Definitions	5
4.0	Background	6
4.1	Electricity Authority	6
4.2	Transpower	6
4.3	Northpower	6
5.0	Authorisation to Receive Direction and Activate	6
5.1	Range of Events	6
5.2	Major Incident	6
5.3	Roles and Responsibilities	7
6.0	Communication with the System Operator	7
7.0	Actions for Immediate Events	8
7.1	System Stability	8
7.2	Reserve Market	8
7.3	Disconnecting Customers	8
7.3.1	Automatic Under Frequency Load Shedding (AUFLS)	8
7.3.2	Manual Shedding	9
7.4	Supply Restoration	9
7.5	Transmission Grid Emergency	9
8.0	Actions for Developing Events	9
8.1	Declaration of a Developing Event	10
8.2	Acknowledgment of receipt of a direction	10
8.3	Implementing rolling outages	10
8.4	Translating Savings Targets into an Operational Plan	15
8.5	Coordination with the System Operator	16
8.6	Grid Exit Points (GXP's) and Rolling Outages	16





8.7	Automatic Under-frequency Load Shedding (AUFLS) Requirements	17
9.0	Format of the Operational Plan	17
10.0	Timeframes to respond to a Developing and an Immediate Event	17
11.0	Load Restoration	18
12.0	Communicating the Operational Plan to the System Operator	18
13.0	Communication Strategy and Notification	18
14.0	Communicating Health & Safety Issues Affecting Consumers and Retailers	19
15.0	Backup / Contingency Planning	19
16.0	Coordination with Grid Emergencies	19
17.0	Maintaining Performance Overtime	19
18.0	Monitoring and Reporting Performance against Targets	20
19.0	Revoke Declaration of Supply Shortage	20
20.0	Document Review History	21





1.0 Introduction

1.1 Purpose

This plan has been prepared in accordance with the requirements of clauses 9.6 to 9.8 of Part 9 of the Electricity Industry Participation Code (“The Code”) which requires each.

specified participant (in this case: Northpower) to prepare and publish a Participant Rolling Outage Plan (“PROP”) which is consistent with the System Operator Rolling Outage Plan (“SOROP”).

The PROP advises the System Operator and the public of Northpower’s planned response to a declared ‘Supply Shortage Declaration’ if issued by the System Operator. Typical scenario where this plan might be called into effect would be during generation constraint due to a low inflow spring and/or a drought summer, when low water levels in the main hydro lakes

seriously reduce electricity generation capacity or loss of multiple generation stations or transmission failures.

For avoidance of doubt, the plan is not intended to be used to recover from grid emergencies or localised disruption of supply where normal operational procedures apply.





2.0 References

Internal Reference	Details
Coordinated Incident Management Plan	This Coordinated Incident Management Plan sets out the arrangements for coordinated action by Northpower Network in response to a significant Network Incident occurring or being likely to occur. When activated, these major incidents and the response/recovery process will be managed by the Incident Management Team ("IMT").
CDEM and Lifeline Utility Requirements	This standard details Northpower's requirements as a 'Lifeline Utility' under the Civil Defence Emergency Act and the National Civil Defence Emergency Management Plan. It covers the responsibilities of a Lifeline Utility in being prepared for a Civil Defence Emergency and the response activities after a state of local emergency has been declared.

External Reference	Details
www.ea.govt.nz	Electricity Industry Participation Code 2010
www.legislation.govt.nz	Electricity Industry Act 2010
www.legislation.govt.nz	Civil Defence Emergency Management Act 2002
www.civildefence.govt.nz	The New Zealand Coordinated Incident Management System (CIMS) 3rd Edition (2019)

3.0 Definitions

Terminology	Definition
AUFLS	Automatic Under Frequency Load Shedding.
The Code	Electricity Industry Participant Code 2010
Electricity Act	Electricity Industry Act 2010
Authority	Electricity Authority
CDEM	Civil Defence Emergency Management
Feeder	A high voltage supply line typically supplying between 100 and 2000 customers at 11kV
GXP	Transpower Grid Exit Point
PROP	Participant Rolling Outage Plan (this plan)
SOROP	System Operator Rolling Outage Plan
Rolling Outages	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
GEN	Grid Emergency Notice
NOC	Northpower Network Operations Centre



4.0 Background

4.1 Electricity Authority

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

In accordance with the Code the Authority must approve the System Operator Rolling Outage Plan (SOROP) submitted by the System Operator.

4.2 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 connect areas of generation with distribution lines networks such as Northpower.

As 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.

4.3 Northpower

Northpower operates and maintains electricity distribution network in the Whangarei and Kaipara region with more than 60,000 connected customers.

5.0 Authorisation to Receive Direction and Activate

5.1 Range of Events

Events that could lead System Operator to make a supply shortage declaration can in general terms be categorized as;

- **Developing Events** – Events that evolve over time, for example low hydro lake or fuel levels.
- **Immediate Events** – Events that occur with little or no warning, usually as a result of a transmission line or major generation failure.

5.2 Major Incident

As per Northpower's *Coordinated Incident Management Plan*, both events, developing events and immediate events will be classified as a major incident and Northpower Network management team will activate Incident Management Team structure as appropriate and will manage the event accordingly.

Communication with retailers, civil defence, local government authorities and other stakeholders will be carried out in accordance with normal notification procedures. Northpower has Default Distributor Agreement with retailers to ensure that Northpower has ability to manage load as per direction from System Operator.



5.3 Roles and Responsibilities

The following Northpower personnel who will be expected to receive the instructions, and to activate the PROP, are:

Role	Responsibilities
Receive communication from System Operator	Chief Operating Officer - Network General Manager - Engineering and Operations
Implement this plan	Incident Controller: Chief Operating Officer - Network
Preparation of load shedding schedules	Response Manager: General Manager - Engineering and Operations
Customer notification	General Manager - Customer and Community
Reporting to System Operator	Response Manager: General Manager - Engineering and Operations
Reporting to media, public agencies	General Manager - Customer and Community
Reporting to CDEM and Lifelines	Response Manager: General Manager - Engineering and Operations
Weekly savings reporting	Operations Manager
Revoking rolling outages	Incident Controller: Chief Operating Officer - Network

6.0 Communication with the System Operator

The System Operator will contact Northpower using the following details for both operational and managerial matters:

Northpower Limited
28 Mt Pleasant Road
Raumanga
Whangarei 0110
Email: control@northpower.com
Phone: +64 9 430 1778 (preferred)
Phone: +64 9 438 9811 (as a back up)



Northpower will contact the System Operator for administration purposes (including reporting performance against targets) using the following details:

Transpower System Operator
Waikoukou
22 Boulcott Street
Wellington
Email: system.operator@transpower.co.nz
Phone: +64 4 590 7000

7.0 Actions for Immediate Events

7.1 System Stability

Transpower, as the System Operator, is required to keep enough reserve generation to cover the risk of the largest connected generator tripping. They are also required to keep the system frequency at 50Hz. If a large generator trips, it may cause a reduction in frequency which if not rectified 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 additional generation can pick up load. Automatic load shedding groups reduce load in stages until the frequency stabilises.

7.2 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 number of frequency capable relays installed and the likely revenue stream from the market less the compliance costs of participating in the reserve market.

7.3 Disconnecting Customers

7.3.1 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 will eventually occur to prevent system collapse.

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. Northpower's AUFLS network reserve load is pre-configured, operated by frequency-sensitive relays hard-wired to 11kV feeder tripping circuits at Zone Substations.

- **AUFLS Zone 1**

If system frequency fails to recover after Reserve Market load shed, AUFLS Zone 1 shedding will occur by disconnecting customers supply. This will disconnect a minimum of 16% of Northpower network load.



- **AUFLS Zone 2**

If AUFLS zone 1 tripping fails to restore frequency, the next stage, AUFLS zone 2 activates. This will disconnect a further 16% of Northpower network load.

The Code was amended with an effective date of 21 December 2021 to re-introduce the 4-Block “automatic under-frequency load shedding” relays (AUFLS). The nation is moving towards decarbonisation which poses more challenges with intermittent generation and less system inertia and therefore vulnerable to system events and disturbances.

In addition, the Code amendment implements the provision of a 4 block AUFLS scheme to replace the current 2 block scheme and incorporates into the Code by reference the AUFLS Technical Requirements Report.

7.3.2 Manual Shedding

If AUFLS Zone 1 and Zone 2 tripping fails to stabilise frequency the System Operator will give direction for more load to be shed. Emergency load shedding feeders are listed in SCADA. Once the frequency has stabilised the System Operator will advise the Northpower Control Centre when load can be restored.

7.4 Supply Restoration

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

7.5 Transmission Grid Emergency

The System Operator may request Northpower to reduce load under a Grid Emergency Notice (GEN). Northpower will shed all controllable load, the System Operator will give direction, if more shedding is required, the System Operator will instruct the Grid Owner to further disconnect load by shedding feeders to provide a nominated demand reduction. Northpower will ensure to revise its interruptible load bided into the market which may eventually become unavailable.

If an Immediate Event is in place, the grid emergency will take precedence. If the System Operator declares a supply shortage during a Grid Emergency, then Northpower will respond by implementing rolling outages as described in the following “Developing Events” section.

8.0 Actions for Developing Events

If the System Operator requires a load reduction for a planned Developing Event, Northpower must reduce supply to meet the energy saving targets. The targets are likely to be in the form of a weekly energy savings target that is reviewed weekly.



8.1 Declaration of a Developing Event

The System Operator will endeavour to provide:

- At least 14 days' notice of a supply shortage declaration, and
- At least nine (9) days' notice of a direction containing a savings target. This notice will include the times and dates the savings target will likely apply.

If the System Operator declares a developing event, they will:

- Determine the energy savings target to be enforced for a specific region for a specified timeframe, and
- It may also decide to communicate the need to conserve electricity and warn about pending rolling outages through a coordinated media strategy.

Under these circumstances, any public messages/statements from Northpower will be coordinated with the System Operator. Northpower will broadcast messages via its website, social media and/or telephony (faults line) to inform the public of current circumstances and will include any System Operator messages as practicable.

8.2 Acknowledgment of receipt of a direction

Northpower will acknowledge receipt of a direction to save energy, as required under Section 6.13 of the System Operator's PROP by email to the System Operator at system.operator@transpower.co.nz.

8.3 Implementing rolling outages

This part of the Participant Rolling Outage Plan specifies the process for establishing how particular target levels of savings would be achieved for different types of events, including how 5%, 10%, 15%, 20%, or 25% savings targets might be achieved. Achieving up to 25% savings within the Northpower network poses particular problems because a significant proportion of the load is supplied to very large industrial sites. Large industrial sites consumed approximately 32% of the total annual supply from the Northpower network. Applying the priority criteria from the SOROP indicates that these very large industrial loads need to be given highest priority. The requirement to maintain AUFLS means that the 25% savings target would then need to be made by rolling outages across approximately 30% of Northpower customer load and it would be necessary to cut most rural and residential customers off for most of the time.

Energy supplied by the network (excluding the single largest industrial site) is, on average, around 14,700 MWh/week. Target energy savings are in five blocks of 5%, ranging from 700 MWh/week (MAX) to 3,500 MWh/week (MAX). An illustration of the likely impact on customers in order to achieve the prescribed energy savings under this plan is given in Table 2.





Before considering implementing rolling outages, it is prudent to consider and publicise energy saving actions that would have relatively little impact (when compared to lengthy electricity outages over widespread areas) including:

- Controllable load would be controlled more aggressively;
- Switch streetlights off at (say) midnight;
- Use available generation wherever possible (hospital, etc) – by prior agreement, and funded by the electricity retailers;
- Industry Production reduced as may be agreed.
- Other measures? (all measures to be communicated in advance via media)

All Northpower 11kV feeders are listed, prioritised and grouped in Emergency Load Shed Priority List on SCADA which was compiled by Northpower Network Engineering personnel and is accessible to the Network System Controllers for reference and for use with this procedure. The Civil Defence / Northland Utilities ‘Lifeline’ Contacts List is also accessible to enable Northpower Planners and Controllers to maintain contact with key personnel at other organisations.

The prioritisation of 11kV feeders takes into account the composition of load on each feeder according to the priority groupings in Table 1 on the following three pages. A weighting system is used because few feeders are entirely residential (Priority 6), for example: supermarkets and medical centres are located in suburban areas for the benefit of the residents in those areas.

TABLE 1 – Grouping of Load Types in Terms of Priority

The priority groupings in this table are from clause 6.8 in the System Operator Rolling Outage Plan (SOROP) dated 19 June 2016 which are referenced to the 16/and to section 13 of the Guide to the national CDEM Plan 2015.

Caution: The composition and numbering sequence of the priority groups in this table and the SOROP differs from those used in the Manual Load Shedding Plan.

Priority	Priority Concern	Maintain Supply to:
1 Highest priority to remain connected	Critical Lifelines (Public Health and Safety)	Major hospitals, air traffic control centres, and emergency operation centres. These facilities are protected by high priority usage supply agreements. However, they generally have the means to support themselves and will not be exempt from planned measures to reduce consumption from the grid. In the event of a need to reduce electricity consumption, it may be feasible to use their local electricity generation plant for reasonable periods of time (yet to be agreed) in order to ease consumption from the grid.





Priority	Priority Concern	Maintain Supply to:
2	Maintaining important public services	<p>Energy control centres, communication networks, water and sewage pumping, fuel delivery systems, major ports, public passenger transport and major supermarkets.</p> <p>Business and services that offer critical services that are highly dependent on continuous electricity supply will, more likely than not, maintain uninterruptable power supplies and have a means of local generation to continue limited operations.</p> <p>Northpower has a list of such organisations and will contact each one individually to discuss foreseeable options prior to imposing electricity cuts that might otherwise cause problems.</p> <p>Facilities such as Council-operated wastewater pumping stations with minimal storage, and where no backup generation is available, must also have a 'Plan B' should prolonged electricity outages be necessary to meet electricity reduction targets under this plan</p>

Priority	Priority Concern	Maintain Supply to:
3	Public health and safety	<p>Minor hospitals, medical centres, schools, and street lighting.</p> <p>Medical centres, where no acute / critical care procedures are affected by loss of electricity, and schools, should be able to withstand a normal rotation of electricity outage and will not be exempt from electricity cuts. In the event that rolling scheduled electricity cuts become unavoidable, Northpower will inform all schools and minor hospitals in writing and will aim to give at least 7 days advance notification of the high risk of electricity cuts.</p> <p>Traffic lights will be inoperable during area-wide electricity outages; therefore, the police will receive notice of planned outages likely to affect traffic lights so that they can plan accordingly.</p> <p>Street lighting is something which the community might have to manage without during area-wide electricity outages, and there might also be a need to reduce the night hours of street lighting across the entire network, as an energy saving measure. This might mean street lights routinely going off at say, midnight, or 1 am. The public will be notified of these intentions by media in advance of implementation.</p>





Priority	Priority Concern	Maintain Supply to:
4	Animal health and food production and storage	<p>Dairy farms, milk production facilities, chicken sheds and cool stores.</p> <p>Northpower is very mindful of the requirements for electricity in dairy production, and the disruption to process plant if electricity fails for lengthy periods. Farms and processing facilities will not necessarily be exempt from electricity cuts, however extra consultation, planning and communication with farmers and processing facilities will take place to try to minimise wasteful disruption, and to reduce the risk of suffering being caused to livestock. For example, where practical, rolling cuts in rural areas will be timed outside normal milking times.</p>
5	Maintaining production	<p>Commercial and industrial premises.</p> <p>There may be times when production will be interrupted, and this might be unavoidable if rolling electricity outages affect an entire area. Northpower will communicate plans and intentions to conserve energy via the media, and will take extra special care to communicate with, and plan around, critical industrial processes where unplanned interruption is likely to cause disproportionate financial damage and hardship to companies.</p>





Priority	Priority Concern	Maintain Supply to:
<p>6</p> <p>Lowest priority to remain connected.</p> <p>First choice for disconnection</p>	<p>Avoiding disruption to consumers</p>	<p>Residential premises</p> <p>The general public at home (and at schools and in the workplace) will be encouraged to take steps to withstand periods without electricity. Specific guidance will be published in newspapers prior to electricity cuts being implemented as a means of conserving energy.</p> <p>These statements will include such things as:</p> <p>Everyone must play their part</p> <p>Energy saved will reduce the frequency and duration of electricity cuts</p> <p>Turn down thermostat settings on heating appliances by a couple of degrees</p> <p>Switch off unnecessary lights and appliances</p> <p>Occupy less rooms in order to conserve heat and light</p> <p>Reduce the number hours watching TV</p> <p>Consider retiring to bed earlier</p> <p>Have a supply of torches and fresh batteries on hand</p> <p>Consider having alternative means of cooking</p> <p>Fridges and freezers maintain their cold state best if left closed</p> <p>Refrigerated food shouldn't be affected by just a few hours of electricity outage as long as the doors remain closed</p> <p>Ensure alarm systems have good backup batteries (they often need replacing every 3 to 5 years, so it's worth having them checked)</p> <p>Think about personal safety when out late at night if streetlights are being switched off early to conserve energy</p> <p>Ensure cars have plenty of fuel in the tank (petrol stations often can't serve petrol during electricity cuts)</p> <p>Keep a supply of convenience meals and essential supplies at home in case electricity cuts disrupt retail stores</p> <p>People with medical problems requiring use of electrical equipment (oxygen concentrators, etc.) must have a "Plan B" to cope without electricity for several hours</p>

Table 1 Priority Grouping of Load types





8.4 Translating Savings Targets into an Operational Plan

The Emergency Load Shed Priority List derives the objective ‘shed’ and ‘restore’ priority rankings for all feeders based on a weighted formula comprising the following elements:

- NP Ripple Plant load control sites
- NP key communication sites
- NP Cap Bank
- NP local service supplies
- CDEM Medical facility
- CDEM Airport
- CDEM Sanitation
- CDEM Water Supply
- Fault Restoration Category (commercial industrial)
- CDEM Restoration Category (dense urban)
- Dairy Farms (number ranked)
- Mainly Residential

Relating this to the six groups of load types in terms of priority (Table 1), feeders have been grouped for scheduled disconnection and each group has constraints intended to minimise the impact to the industry/community that is fed by particular supplies. In normal times, constraints and durations of cuts would be sensitive to the particular needs of (the majority of) customers affected by disconnection. In the exceptional operating regime anticipated in order to achieve the required energy savings, normal constraints and considerations will be largely ignored, and then it comes down to making the cuts as widespread and lengthy as is necessary based on operational data.

Table 2 is an illustration of possible frequencies and durations of rolling outages for the priority groupings (from Table 1) for the various levels of savings targets. It is important to note that an outage lasting 4 hours will not save the equivalent of 4 hours of normal electricity consumption because some appliances including fridges/freezers, and activities such as cooking, will simply “catch up” once the supply is restored.

TABLE 2 – An illustration (number of days in week) x (hours duration)

Saving target	Highest priority to remain connected			Lowest priority to remain connected			Target MWh per week
	Priority 1	Priority 2	Priority 3	Priority 4	Priority 5	Priority 6	
5%	-	-	-	-	5d x 4hr	7d x 4hr	700
10%	-	-	3d x 4hr	5d x 5hr	6d x 6hr	7d x 6hr	1400
15%	2d x 4hr	3d x 4hr	5d x 4hr	7d x 5.5hr	7d x 7.5hr	7d x 9hr	2100
20%	4d x 2hr	5d x 3hr	7d x 4hr	7d x 6hr	7d x 9hr	7d x 12hr	2800





Saving target	Highest priority to remain connected			Lowest priority to remain connected			Target MWh per week
	5d x 4hr	6d x 4hr	7d x 5hr	7d x 10hr	7d x 12hr	7d x 15hr	
25%							3500

Table 2 Possible frequencies and duration of rolling outages

8.5 Coordination with the System Operator

Load reductions (and restoration) will be coordinated with the System Operator (Security Coordinator) in real time, before rolling outages are implemented and before restoration is commenced (including meeting any reasonable requirements of the System Operator to limit the rate of disconnection). In the absence of an alternative agreement with the System Operator, the rate of disconnection and restoration of load would be limited to no more than 25 MW per 5 minute period.

Instantaneous electricity reduction will be achieved by switching off groups of feeders.

From the prioritisation of feeders detailed in Table 1 and illustrated in Table 2, Northpower would produce a confidential outage management plan for rolling electricity cuts across a mix of the priority groups in a way that was designed to minimise disruption, and which conformed to prior communications with critical organisations, industry and the System Operator. For security and public order considerations, the detail of these rotations would not be publicly disclosed.

Northpower will use best endeavour to minimise the impact on:

- frequency and voltage stability, and
- the disconnection and restoration of its demand during times when demand is typically ramping up or down.

8.6 Grid Exit Points (GXP's) and Rolling Outages

Rolling outages will be implemented on 11kV feeders from Northpower Zone Substations, rather than on the 33kV sub-transmission from GXP's. The allocation of energy savings to particular GXP's will be reported on.

GXP	Rolling Outage may occur (Yes/No)	Percentage of average annual demand available for interruptible load (MW)
Bream Bay (BRB)	Yes	0%
Maungatapere (MPE)	Yes	5.19%
Maungaturoto (MTO)	Yes	1.12%



8.7 Automatic Under-frequency Load Shedding (AUFLS) Requirements

Northpower's AUFLS network reserve load is pre-configured, operated by frequency-sensitive relays hard-wired to 11kV feeder tripping circuits at Zone Substations. These cannot be reassigned as part of planned rolling electricity outages. In order to maintain AUFLS when implementing rolling outages, Northpower would need to roll outages across AUFLS feeders to the extent that it remains possible to meet the requirement to have 32% of total load (net of the largest industrial site) covered by AUFLS. This would mean that few, if any, AUFLS feeders would be able to be included in rolling outages. Since the feeders assigned to AUFLS generally contain the lowest priority loads, this is a potential conflict of requirements which would need to be resolved by the System Operator at the time of Supply Shortage Declaration.

9.0 Format of the Operational Plan

The baseline for comparison and measurement of performance will be the energy consumed by the same 'in-scope' network load during the same weekday 52 weeks prior. In the comparison, adjustments would be made for significant plant closures, new industrial demands, exceptional temperature differences, etc., to ensure that fair and reasonable comparisons were made. Adjustments (if any) would be detailed and justified to the System Operator.

During any period of rolling outages directed by the System Operator, information will be provided by Northpower (NOC) to the System Operator (Security Coordinator) in the form of a half-hourly profile for each day of the following week. The corresponding baseline half-hourly profile for the same weekdays 52 weeks prior will also be provided. An arithmetical comparison and comments will be included in the report submitted daily to the System Operator, for the duration of the declared supply shortage together with the plan (i.e., target profile + adjustments) for a week ahead.

Any expected change to this forecast for any grid exit point, of more than 20% for any half hour, would be reported to the System Operator (Security Coordinator) as soon as reasonably practicable.

10.0 Timeframes to respond to a Developing and an Immediate Event

Immediate Event: Immediately (blackout)

Developing Event: Following receipt of the initial formal Short Supply Declaration by the System Operator, Northpower would endeavour to respond to any direction from the System Operator.

Northpower would expect engagement from the System Operator prior to a Short Supply Declaration notice being issued and Northpower would most likely already be implementing some measures to conserve energy demand. Consequently, the measurement of savings must be against energy usage for normal operations (baseline 52 weeks prior) rather than against a recent time when cutbacks might already be in existence, excluding any wind or solar and large scale generation.



11.0 Load Restoration

Following a series of rolling outages, load will be restored in a controlled manner and coordinated with the System Operator (Security Coordinator) to minimise the impact on frequency and voltage stability, and the disconnection and restoration of its demand during times when demand is typically ramping up or down.

Northpower System Control Operators will use the prioritised list of feeders alluded to above, and detailed supplementary operational procedures as their reference documents when operating to this procedure. Feeders will generally be restored manually, one at a time, to minimise step load increases.

12.0 Communicating the Operational Plan to the System Operator

The System Operator will have knowledge of this plan and the supplementary operating procedures which make reference to all necessary communications and prioritisation.

Communications with the System Operator will generally be between NOC and Transpower's Regional Operating Centre using landline or satellite phone.

13.0 Communication Strategy and Notification

In the case of a Developing Event, Northpower anticipates receiving advance notice from the System Operator that it may need to make a supply shortage declaration and direct rolling outages. Ideally, this would be several weeks in advance of any direction to implement this plan and provide an opportunity for Northpower to communicate with the Northland public in order to mitigate the need for, and the effect of, widespread electricity cuts on a regular basis. Northpower would initiate some or all of the following actions:

- Media liaison during the run-up period to inform and educate the public.
- Northpower Network staff contact critical, sensitive and important customers, emergency services, local authorities and civil defence to explain how our outage plan affects them.
- As the plan is being called into action, the General Manager- Customer & Community would:
 - Create a banner on the home page of Northpower's website, linked to further details on our plan and specific advice.
 - Co-ordinate our communications with electricity retailers who in turn should communicate directly with consumers (particularly vulnerable consumers) via telephone, electricity bills or flyers, as appropriate.
 - Issue a media release to local papers, radio stations and social media.
 - Place adverts in local papers and on social media.
 - Produce a flyer and/or letter for distribution to customers
 - Email those customers affected directly where email addresses are available.
 - Include electricity saving tips and current information on social networking website.
 - Include appropriate pre-recorded messages on the 0800 104040 'Faults Line'
 - Use the radio adverts to notify of outages and electricity saving measures and to go to our website for further information.



In the case of an Immediate Event, advance notice will not be possible, but Northpower will take steps to advise the public, electricity retailers and other agencies as soon as feasible.

14.0 Communicating Health & Safety Issues Affecting Consumers and Retailers

It is not possible for Northpower to prevent the rolling outages affecting individual vulnerable customers and priority sites. Arrangements for communication with a full range of critical, sensitive and important customers are in place within detailed operating procedures, the priority listings and Northland's Civil Defence communications plan. If rolling electricity cuts are implemented there will be need for coordination and communication between all emergency management stakeholders, of which Northpower is one.

Northpower will provide information in its public notices and website alerting customers and retailers, including vulnerable customers to the risks.

15.0 Backup / Contingency Planning

The plan will be worked through as detailed. Unexpected events and contingencies will be handled as part of normal operations. This is planned, rather than reactive, outage management. The public and all critical/industrial customers should have been forewarned.

16.0 Coordination with Grid Emergencies

Arrangements to manage Grid Emergencies take immediate priority over rolling outages.

Under-frequency events are instantly responded to by Interruptible Load (IL) and then, if necessary, by AUFLS, which has been exempted from this procedure, and normal load building operations will follow when the grid emergency has passed in order to restore the AUFLS load to its normal state of availability.

The rolling outages program would continue, once a Grid Emergency is over, if the Grid Emergency occurred during a period of rolling outages.

17.0 Maintaining Performance Overtime

Northpower has half-hour electricity loggers at GXP's that enable tracking and monitoring of all electricity outages. The target for the grid for all half-hour periods will be set at $n\%$ less than the corresponding period in the baseline set on the same day 52 weeks prior, with any particular adjustments for industrial load changes and/or temperature. Accordingly, Northpower System Controllers will be able to observe the impact rolling outages have on demand relative to target levels and will be able to use their judgement to modify the application of rolling outages to maintain savings at the target level.

To avoid discrepancy over the accuracy of different data sources, Northpower will also use the System Operator report on actual demand versus the target to ensure adjustment to future load shedding of rolling outages will enable the weekly target to be met.



18.0 Monitoring and Reporting Performance against Targets

A combination of half-hour metering and SCADA systems collect the electricity consumption data across the network to build the load profile. Comparison with half-hourly data from the same weekday 52 weeks prior, adjusted for changed industrial loads and/or temperature is reported and graphed on a daily basis. Near-real-time reports are also available to Northpower System Control Operators as required during operations.

The Network Controller will generate a report with the following information direct from SCADA. Feeder number, Load, ICP Count, Time Off, Time On, Duration, Notes

Northpower's quantified comparison of load profile against baseline and comments will be provided to the System Operator on a regular basis (as specified by the System Operator from time to time) with sufficient commentary to show compliance (or otherwise) with this plan. Northpower would otherwise summarise their findings daily and report to the System Operator weekly.

19.0 Revoke Declaration of Supply Shortage

To revoke their Declaration of Supply Shortage, the System Operator should notify the named key network personnel (see under 'Authorisation to receive direction and activate').

Upon receipt of notification, the System Operator will be issued with an acknowledgement from Northpower, copied to all (other) key personnel.

Northpower Network System Controllers will then cancel the planned rolling electricity outages and restore all supplies in a controlled way in consultation with the System Operator, using their normal operating procedures and guidelines.





20.0 Document Review History

Version Number	Date	Revision Notes (reason for change)
1.0	07/05/2010	Participant Outage Plan (“POP”) approved by the former Electricity Commission on 7 May 2010.
2.0	16/12/2014	Northpower Participant Rolling Outage Plan (“PROP”) is derived from the existing Northpower PROP dated 1 December 2014, which was approved by the System Operator on 16 December 2014
3.0	9/03/2021	Updated and align with Northpower Coordinated Incident Management Plan.
4.0	3/07/2023	Updated based on feedback from System Operator (e.g., affecting to sections 5.2, 10 and 14)
5.0	16/06/2023	2 yearly review – Operations team Replaces: <ul style="list-style-type: none">• NOP.G.13.02 Northpower Participant Rolling Outage Plan Guideline (due to ID Code change in File Name).

