

# PARTICIPANT ROLLING OUTAGE PLAN

SERVICE DELIVERY



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## QUALITY STATEMENT

This document has been prepared for the benefit of Alpine Energy Ltd (AEL) and for the use of AELs area of operations and The System Operator.

Any use outside of the Electricity Generation, Transmission, and Distribution industry is unauthorised.

## VERSION CONTROL

The list of amendments made to this guide are available in the table below.

Version No.	Amendment Details	Date of Amendment	Amended by
1	New document	17 May 2010	S Small
2-4	All pages amended	4 Jun–21 Jul 2010	S Small
5-6	All pages amended	6–30 Jan 2014	S Small
7	Amended Participation code	12 June 2017	S Small
8	Section 3.5 outdated AUFLS feeder information removed, Section 5.3 feeder allocation updated	14 June 2019	R Liew
9	All pages amended, New GXP table (Table 3) New sections 3.6 and 3.7	1 December 2020	R Liew

Note: any alteration to this policy must obtain final approval from the System Operator.

This plan is to be reviewed by **1 December 2022**.

## RESPONSIBILITIES

AEL employee responsibilities for this plan are tabled below.

Responsibility	Title
Approval	Chief Executive Officer
Owner	General Manager–Service Delivery
Reviewer	Operations Manager

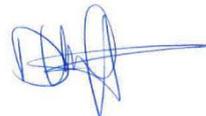
## APPROVAL

This PROP is hereby formally approved by:



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Chief Executive Officer



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General Manager–Service Delivery

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## 1. INTRODUCTION

Alpine Energy's (AEL) Participant Rolling Outage Plan (PROP) has been written to comply with legislative requirements in Part 9 of the *Electricity Industry Participant Code (the Code)*, as well as the *System Operator Rolling Outage Plan* (current version 19 June 2016).

The procedures outlined in this PROP 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 should communicate its requests are detailed.

The main load reduction scheme is implementation of rolling outages, and how these are structured and implemented is discussed.

## 2. GENERAL

This PROP should be read in conjunction with AEL's Emergency Preparedness Plan, which provides detailed contingency and emergency procedures; and specifies staff roles, emergency contact lists, resource allocation, communications etc.

### 2.1 AIMS AND OBJECTIVES

This PROP meets AEL's obligations to prepare and publish a PROP for approval by the System Operator.

Under the regulations PROPs are required to specify the actions that would be taken to:

- Reduce electricity consumption when requested by the System Operator
- Comply with requirements of the *System Operator Rolling Outage Plan*

Reducing demand by disconnecting supply to customers would be a last resort after all other forms of load reduction including voluntary load reduction had been exhausted. AEL will always endeavour to maintain the supply of electricity to its consumers.

### 2.2 SCOPE

This PROP applies to AEL's entire network. Table 1 lists all seven grid exit points (GXPs) supplying Alpine's network and whether rolling outages may occur.

**Table 1: List of Alpine's GXP's**

<b>GXP</b>	<b>Rolling outages may occur (Yes / No)</b>	<b>Reasons for there being no rolling outages</b>
<b>ABY0111</b>	Yes	N/A
<b>BPD1101</b>	Yes	N/A
<b>STU0111</b>	Yes	N/A
<b>TIM0111</b>	Yes	N/A
<b>TKA0331</b>	Yes	N/A
<b>TMK0331</b>	Yes	N/A
<b>TWZ0331</b>	Yes	N/A

## 2.3 DEFINITIONS

Definitions for the terms that are used in this PROP are listed in Table 2.

**Table 2: List of definitions**

<b>Term</b>	<b>Definition</b>
<b>AUFLS</b>	Automatic Under Frequency Load Shedding
<b>Feeder</b>	A high voltage supply line averagely supplying 350 customers
<b>GXP</b>	Transpower Grid Exit Point
<b>GEN</b>	Grid Emergency Notice
<b>LSI</b>	Lower South Island load management
<b>PROP</b>	Participant Rolling Outage Plan (this plan)
<b>Retailers</b>	Electricity retail companies
<b>Rolling Outages</b>	Planned electricity disconnections spread over different parts of the network at differing times to avoid prolonged outages at any one location
<b>SOROP</b>	System Operator Rolling Outage Plan
<b>Supply Shortage Declaration</b>	Declaration made by the System Operator under part 9 of the Code
<b>System Operator</b>	Operator of the national electricity transmission grid
<b>USI</b>	Upper South Island load management

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## 2.4 RELATED DOCUMENTS

The documents that relate to this PROP are included in Table 3.

**Table 3: Related documents**

Standard
Electricity Industry Participation Code 2010
System Operator Rolling Outage Plan
AEL Emergency Preparedness Plan
AEL Public Safety Management System

## 3. BACKGROUND

### 3.1 SYSTEM OPERATOR PROVISIONS

The role of the System Operator is to implement emergency measures only if it considers that industry participants will fail to implement emergency measures sufficient to avoid possible energy shortage that is, if planned outages are not implemented, larger unplanned outages are likely.

Transpower, as the System Operator, has operational responsibility for providing information on all aspects of security of supply and managing supply emergencies.

Implementation of emergency measures will likely be the result of either a Developing Event or Immediate Event, define as follows:

- **Developing Event**—an event that evolves over time, for example, a period of unseasonably low inflows to hydro catchments
- **Immediate Event**—an event that occurs with little or no warning, usually as a result of a transmission or major power station failure

PROPs to implement rolling outages must provide for both categories, including providing for a situation which has elements of both events at the same time.

### 3.2 OPUHA DAM

Opuha Dam generates 7 MW of electricity which is periodically injected into Albury GXP. Trustpower operates this facility and AEL have no input into any generation scheduling, nor do AEL have any supply agreement with Trustpower.

Additionally the conditions imposed in Opuha's resource consents do not allow them to generate at will.

Therefore the assumption has been made that the 7 MW from Opuha Dam would be unavailable in an emergency situation.

### 3.3 OVERLAP WITH CIVIL DEFENCE EMERGENCY

It is possible that a natural disaster could cause a major transmission or generation outage; and could also lead to the declaration of a state of national emergency or local emergency under the *Civil Defence Emergency Management Act 2002*.

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AEL shall manage its response to a Civil Defence emergency declaration as per the Civil Defence Emergency section in AEL's *Emergency Preparedness Plan*.

### 3.4 OVERLAP WITH GRID EMERGENCY NOTICE

If the System Operator has made a supply shortage declaration in response to a Developing Event; and directs rolling outages then AEL shall implement rolling outages in order to meet savings targets.

If a Grid Emergency is declared during the time the supply shortage declaration is in force, AEL will give priority to actions required to avert the grid emergency.

Should an Immediate Event occur, it is likely that the System Operator will activate the grid emergency provisions and require action from us (if affected).

Accordingly, it is likely that AEL will be acting under a grid emergency notice (GEN) and responding to requests from the System Operator. The GEN will persist for the period specified by the System Operator.

If a grid emergency is likely to persist for a sustained period, the System Operator, may make a supply shortage declaration.

The System Operator will take this action if it considers that there is a high probability that the incidence of a grid emergency for a sustained period would be more appropriately managed by rolling outages.

### 3.5 OVERLAP WITH AUTOMATIC UNDER FREQUENCY LOAD SHEDDING

As part of the grid emergency arrangements, Transpower, as the grid owner, is required to provide automatic under frequency load shedding (AUFLS) in response to a significant drop in frequency, which it undertakes at selected GXP's in conjunction with the overall Upper South Island (USI) load management or Lower South Island (LSI) load management.

AEL's AUFLS obligation is for 2 x 16% blocks of load to be available at all times at selected GXP's to cover for system events that are larger than those events covered by the Authority purchasing instantaneous reserves.

AEL currently have seven active GXP's (Albury, Bells Pond, Studholme, Temuka, Tekapo, Timaru, and Twizel) due to AEL's unique geographic location these are split between Transpower's USI and LSI load management. Therefore to simplify an assumption has been made that both USI and LSI load management would be activated together rather than independently.

The need to keep available the 2 x 16% blocks of load free for AUFLS has been factored into AEL's rolling outage savings calculations.

### 3.6 OVERLAP WITH INTERRUPTIBLE LOAD

Currently AEL does not provide load available for the provision of instantaneous reserve.

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### 3.7 AGREEMENTS WITH RETAILERS OR CONSUMERS

Currently AEL does not have agreements with retailers or consumers that may adversely affect AEL's ability to comply with this PROP.

## 4. IMPLEMENTATION

### 4.1. AUTHORISATION TO ACTIVATE PARTICIPANT ROLLING OUTAGE PLAN

After declaration from the System Operator, this PROP will be activated on the authorisation of the Chief Executive Officer (CEO), or the General Manager–Service Delivery in the CEO's absence.

Unless required for immediate safety reasons, all AEL's planned outages for maintenance will be cancelled during the period of rolling outages.

### 4.2. COMMUNICATION STRATEGY

The following sections describe the different pathways that AEL utilises for the different communication needs. For example, operational and emergency services communication needs to be in real time, whereas communications to the public can be recurrent and regularly updated.

#### 4.2.1. OPERATIONALLY WITH THE SYSTEM OPERATOR

Operational communications with the System Operator shall be undertaken by AEL's Network Controllers from AEL's Control Room, including any:

- Advance notice of a possible declaration of a supply shortage or revocation of a supply shortage declaration
- Declaration of a supply shortage
- Acknowledgment of receipt of a direction from the System Operator
- Direction to implement rolling outages, including savings targets
- Advance notice of savings targets
- Information provided by participants on demand forecasts, the nature and extent of outages, and the level of electricity savings being experienced
- Process to restore load following rolling outages
- Information about the possible overlap between Grid Emergencies, automatic under-frequency load shedding (AUFLS) and the implementation of rolling outages.
- Revocation of a supply shortage declaration

Written communications shall be emailed to [alpineenergy.controller@alpineenergy.co.nz](mailto:alpineenergy.controller@alpineenergy.co.nz) or shall be faxed to Alpine Energy Control Room (03) 684 2770. Telephone communications shall be by landline (03) 687 4324.

For all administrative matters and escalation, these can be emailed to [operationsmanagerteam@alpineenergy.co.nz](mailto:operationsmanagerteam@alpineenergy.co.nz).

#### 4.2.2. OTHER COMMUNICATION PATHWAYS

The communication pathways in an emergency event are set out in AEL's *Emergency Preparedness Plan* and summarised as follows:

- Communication with the media, stakeholders, and other distribution and transmission networks shall be the responsibility of the CEO.

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- Public messages via the media shall be organised by the CEO; after discussion with the System operator to co-ordinate efforts and ensure consistency of the message, and shall be executed by the corporate services team.
  - Liaison with NZ Police, Civil Defence Emergency Management, Timaru District Council, Mackenzie District Council, Waimate District Council, and other local authorities, utilities, and emergency services shall be the responsibility of the Safety and Risk Manager.
  - Communication with the general public, major consumers and retailers shall be the responsibility of the corporate services team, overseen by the Group Manager -Corporate Services.

## 5. ROLLING OUTAGES

### 5.1. CRITERIA FOR ROLLING OUTAGES

When determining the implementation of rolling outages AEL utilises fundamental risk management principles to ensure: minimum disruption to public health and safety infrastructure; and that costs to the economy are minimised.

For Developing Events, planning for the disconnection of demand will begin nine days out to real time based on the information and the direction from the System Operator.

AEL's priority considerations are listed in Table 4 on the next page.

As rolling outages are implemented on a feeder-by-feeder basis, it is not possible to discriminate between individual connections; this has been taken into account in feeder allocation.

Please note that some consumers with critically important infrastructure have invested in backup generation; therefore those consumers may be allocated a lower priority than non-critical infrastructure which has none, for example:

- Mackenzie District Council has a 100 kVA diesel generator capable of carrying 75% of its load for 3 days
- Timaru Fire station has an 85 kVA diesel generator capable of carrying 80% load for 24 hours
- Timaru Hospital has a diesel generator capable of carrying 100% load for 7 days

As it is not feasible for us to prevent rolling outages affecting individual vulnerable consumers, AEL will endeavour to give retailers as much advance notice as possible of pending rolling outages to enable them to notify medically dependant customers.

The time of year has been taken into consideration for the following reasons:

1. Within AEL's network's footprint there is a high percentage of intensively irrigated farmland, especially for dairy farming. This causes a huge load shift on AEL's rural feeders during the irrigation season (typically November to April) of approximately 15% of AELs total load.  
During these months dairy milking activity occurs early in the morning and mid-afternoon—therefore where possible AEL can offload the full day irrigation component of this load but not the milking shed component (for animal health requirements).
2. Additionally AEL has three dairy factories within the network (Fonterra-Clandeboye, Fonterra-Studholme, and Oceania Dairy), which not only consume 35% of AEL's available load; but due to the environmental impact of dumping large quantities of milk are considered

a high priority facility. Load to these factories should not be shed during this time period unless critical.

3. A large proportion of AEL's geographic area backs onto the main divide of the Southern Alps with seasonal climate influences causing a large residential load increase for winter heating (typically June-September) of 10 to 15% of available load.

**Table 4: AELs priority considerations**

Priority	Priority Concern	Maintain Supply to:
<b>1 (High)</b>	Public health and safety	<ul style="list-style-type: none"> <li>• Alpine Energy Control Room and Depot</li> <li>• Timaru Hospital (SCDHB), Bidwill Trust Hospital.</li> <li>• Timaru DC, Mackenzie DC, Waimate DC emergency operation centres.</li> <li>• Police, Fire and Ambulance infrastructure</li> </ul>
<b>2 (High)</b>	Important public services	<ul style="list-style-type: none"> <li>• Communication networks</li> <li>• Water and sewage pumping</li> <li>• Fuel delivery services and depots</li> <li>• Prime Port Timaru</li> <li>• Timaru Airport, Mt Cook Airport, Pukaki Airfield, Tekapo Airfield</li> </ul>
<b>3 (High)</b>	Public health and safety	<ul style="list-style-type: none"> <li>• Medical centres, rest homes and residential care facilities</li> <li>• Schools, churches and public halls acting as CD facilities</li> <li>• Street lighting and traffic signals</li> </ul>
<b>4 (Medium)</b>	Major food production and/or storage	<ul style="list-style-type: none"> <li>• Fonterra Clandeboye, Fonterra Studholme, Oceania Dairy Limited</li> <li>• Alliance Smithfield, Silver Fern Farms Pareora</li> <li>• Barkers Geraldine</li> <li>• Cool store and blast freezer facilities in Timaru</li> </ul>
<b>5 (Medium)</b>	Animal health	Dairy farms and chicken sheds
<b>6 (Low)</b>	Domestic production	Large commercial and industrial premises situated mainly in Smithfield, Washdyke and Redruth suburbs; and adjacent to PrimePort
<b>7 (Low)</b>	Disruption to consumers	<ul style="list-style-type: none"> <li>• Commercial and industrial premises</li> <li>• Residential premises</li> </ul>
<b>8 (Low)</b>	Disruption to rural areas	<ul style="list-style-type: none"> <li>• Rural premises</li> <li>• Irrigation pumping</li> </ul>

The time of day has also been taken into consideration being that the selection process needs to reflect the loading differential between industrial and residential usage especially with respect to ripple control. Also the dairy milking activity on AEL’s rural feeders needs to be taken into consideration.

Outages will be programmed to fall between 0800 and 1800 on all days. Timing of outages will be approximate and could vary daily due to either internal network or System Operator constraints.

Night time is excluded from the outage period for safety reasons.

Note that Twizel substation feeders will off-load Mountain Power’s embedded network.

## 5.2. SAVINGS CALCULATIONS

Savings calculations have been based on the daily average energy consumption at the time rolling outages would take place (08:00 to 18:00).

Feeders have been sorted into prioritised load groups of approximately 5% of total load (average of 5.5 MW).

## 5.3. ROLLING OUTAGE SELECTION

Outages shall be of maximum five hours duration (two per day), with each individual feeder load group only allocated once per day.

Over the entire network there are 39 low priority feeders, 30 medium priority feeders, and 42 high priority feeders. These would be shed on a half day cycle with the frequency based on the priority allocated to the feeder load group.

Indicative rolling outage selection table is available in Table 5.

**Table 5: Prioritised load groups**

<b>Saving Target</b>	<b>Number of feeders impacted per outage</b>	<b>Priority feeders allocated</b>	<b>Outages per day</b>	<b>Average MW saving per day</b>
<b>5%</b>	Between 4-6	Low	2	5.5 MW
<b>10%</b>	8-12	Low	2	11 MW
<b>15%</b>	12-18	Low	2	16.5 MW
<b>20%</b>	16-24	Low/Medium	2	22 MW
<b>25%</b>	20-30	Low/Medium	2	27.5 MW

## 5.4. MONITORING OF ROLLING OUTAGE TARGETS

AEL will be required to regularly provide information on the level of electricity demand and savings relative to targets to the System Operator to ensure compliance with the direction:

- A rolling week-ahead load forecast (beginning at a time specified by the system operator) that forecasts the distributor’s reasonable expectation of the half-hourly load at each grid exit point. This forecast should take into account the impact of any rolling outages.

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- Any expected variation of more than  $\pm 20\%$  shall be advised to the System Operator
  - The level of consumption relative to the target levels
  - The nature and extent of rolling outages

For load shedding to a weekly target, the Network Operations team will monitor energy savings against target and review future load shedding to increase or decrease the amount of rolling outages to enable the weekly target to be met.

The Network Operations team will be responsible for daily and weekly reporting of consumption relative to target levels, and for providing the predicted load for the next week on a seven day rolling basis.

Reports shall be forwarded daily to the System Operator.

### 5.5. LOAD DISCONNECTION AND RESTORATION PROCESS

The System Operator has requested that Alpine Energy use its best endeavours when disconnecting or restoring load during rolling outages to:

- Not increase or decrease its load by more than 25 MW in any five minute period without the system operator's prior approval. As this load corresponds to approximately 25% of AEL's total load, AEL does not have issue with these requests.
- Minimise the impact on grid frequency and voltage stability
- Minimise the disconnection and restoration of its demand during times when demand is typically ramping up or down (for example, either side of morning and evening peaks)

Load disconnection during rolling outages must be restored in conjunction with the System Operator. This is to prevent overloading the transmission network and creating further instability.

AEL will ensure that all feeders are returned to service in a controlled manner to maintain AEL's system stability.

## 6. REVOCATION

### 6.1. AUTHORISATION TO REVOKE PARTICIPANT OUTAGE PLAN

After consultation with the System Operator, the implementation of this PROP shall be revoked on the authorisation of the CEO or the General Manager–Service Delivery in the CEOs absence.

