

SECURITY OF SUPPLY

PARTICIPANT OUTAGE

PLAN



ELECTRICITY NETWORK CONTINGENCY PLAN

October 2012

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1. Introduction

This plan was written to comply with the Electricity Commission's Security of Supply Outage Plan (SOSOP) and it will be reviewed and updated annually.

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 Electricity Commission should communicate its requests are detailed.

The main energy saving measures listed is rolling outages and how these are structured and implemented is discussed.

2. Purpose

Under the regulations, Participant Outage Plan (POP) is required to specify the actions that would be taken to;

- Reduce electricity consumption when requested by the Electricity Commission
- Comply with requirements of the Electricity Commission's Security of Supply Outage Plan (SOSOP)
- Comply with Electricity Governance (Security of Supply) Regulation 2008 and Electricity Governance (Security of Supply) Amendment Regulations 2009
- Supplement the Electricity Commission's Security of Supply Plan

Reducing demand by disconnecting supply to customers would be a last resort after all other forms of savings including voluntary savings had been exhausted. Eastland Network will always endeavor to keep consumers supplied and will only disconnect consumers when directed to by the Electricity Commission.

3. Definitions

AUFLS	Automatic Under Frequency Load Shedding
Commission	Electricity Commission
ENL	Eastland Network Limited
Feeder	A high voltage circuit typically supplying up to 2000 customers
GXP	Transpower Grid Exit Points
GEN	Grid Emergency Notice
POP	Participant Outage Plan (this plan)
Regulations	Electricity Governance (Security of Supply) Regulation 2008 and Electricity Governance (Security of Supply) Amendment Regulations 2009
Retailers	Electricity Retail Companies

Rolling Outages	Planned electricity disconnections spread over different parts of the network at different times to avoid prolonged outages at any one location
SOSOP	Security of Supply Outage Plan
Supply Shortage regulation 9 Declaration	Declaration made by the Electricity Commission under
System Operator	Operator of the national electricity transmission grid

4. Background

4.1 Electricity Commission

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

A function of the Electricity Commission under the Electricity Act is to use reasonable endeavors to ensure the security of electricity supply. The commission's activities include forecasting supply and demand, developing and publishing guideline hydro levels for security and supply, contracting for reserve energy, and improving the ability of consumers to manage price risks in the market.

4.2 Transpower

Transpower is a State Owned Enterprise, which owns and operates New Zealand's National Grid-the network of high voltage transmission lines and substations that transports electricity from where it is generated to distribution line companies, such as ENL.

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 Eastland Network

Eastland Network is the electricity network company that owns and maintains the electricity assets (lines, cables, substations etc) that deliver power to the upper East Coast of the North Island (Gisborne and Wairoa districts).

5. Range of Events

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

Developing Event: Events that evolve over time, for example low hydro lake levels.

Immediate Event: Events that occur with little or no warning, usually as a result of a transmission line or major generation failure.

5.1 Major Incident

A Developing or an immediate event will be classified by ENL as a major incident and ENL's management team will activate the appropriate contingency plan and will manage the incident accordingly.

Communication with retailers, local authorities, civil defense and other stakeholders will be done by the ENL control centre by the appropriate notification procedures in place.

6. ENL Staff Responsibilities

Role	ENL Personnel
Receive communication from Commission	Network General Manager
Receive Communication from System Operator	ENL Control Centre
Implement this plan	Network General Manager
Prepare load shedding schedule	Network Asset & Planning Manager
Weekly savings reporting	ENL Control Centre
Retailer and Consumer Notification	ENL Control Centre
Revoking rolling outages	Network General Manager
Reporting to Electricity Commission	Network General Manager
Reporting to media and public agencies	Network General Manager
Reporting to CDEM and Lifelines	Civil Defense Liaison

7. Communication with the Commission

The Commission can contact ENL using the following details:

Eastland Network Ltd
 Fax: +64 06 867 8563
 PH: +64 06 869 0700
 PO Box 1048
 172 Carnarvon Street
 Gisborne 4040

For Operational enquiries the EC can contact the ENL Control Centre at:

Fax: +64 06 8690710
 PH: +64 06 869 0720 (daytime)
 +64 0800 237 900 (afterhours)

ENL will contact the Commission's Emergency Response Project Manager for administrative purposes (including reporting performance against targets) using the following details:

Electricity Commission
 Fax: 04 460 8879
 PH: 04 460 8860
 PO Box 10041
 Level 7, ASB Bank Building, 2 Hunter Street
 Wellington

8. Actions for Immediate Events

8.1 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 50 Hz. If a large generator trips or a transmission line failure, 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 generators can pick up load. Automatic load shedding groups reduce load in stages until the frequency stabilises.

To recover from immediate events electricity demand can be reduced by;

8.2 Reserve Market

Generators and load users with interruptible load such as heating/cooling and pumping process may offer in reserve capacity to cover the risk of the generation unit failure or a critical transmission line tripping. In order for this to be achieved investment in control and monitoring equipments must occur. In addition the likely revenue stream from the market less the compliance costs of participating in the market must make the investment viable. ENL does not presently participate in this market.

8.3 Automatic Under Frequency Load Shedding (AUFLS)

If the actions by the Reserve Market are insufficient to stabilize 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.

8.3.1 AUFLS Zone 1

If system frequency fails to recover after Reserve market load shed, AUFLS Zone 1 load shedding will occur by disconnecting customer supply. At Eastland Network this is done by the feeder protection relays owned by ENL, which will disconnect specific feeders when the system frequency drops below 48.5 Hz for 0.2 seconds and will shed at least 16% of the network load.

8.3.2 AUFLS Zone 2

If Zone 1 tripping fails to restore frequency, the next stage, Zone 2 activates, if the system frequency is still below 48.5 Hz for 15 seconds or if the system frequency drops to 47.5 Hz for 0.2 seconds. This will disconnect a further 16% of ENL's load by disconnecting more feeders.

If Further Load shedding is required to stabilize the network, the System Operator will request ENL to shed more loads manually. ENL will reduce load demand at the Transpower GXP by: Running its diesel generators, turning off water heating loads, disconnecting large industrial loads and then general load shedding by disconnecting feeders.

8.4 ENL Generators

ENL owns six 1 MW and one 0.6 MW portable diesel generators that can be run to reduce ENL's maximum demand at Transpower GXP by anything up to 5 MW. Typically these

generators are in standby mode and can be quickly brought to operational state and be online within ten minutes.

8.5 Water Heating Load

ENL has manual control to turn off water heating loads quickly if required. This load is varying in nature and will depend on the time of the day but it could relieve up to 2MW of load demand.

8.6 Disconnection of Loads

8.6.1 JNL & AFFCO Seasonal Load

JNL & AFFCO are two large industrial loads connected to ENL's network. ENL has quick control of the circuit breakers that can interrupt the load of JNL & AFFCO. If more load shedding is required by the System Operator ENL will switch off supply to JNL & AFFCO if their seasonal load exists.

8.6.2 General Load Shedding

If ENL is required to reduce its demand even further ENL will shed more loads by disconnecting more feeders as per feeder disconnection list in Appendix A.

The feeder disconnection list is in general order of low to high priority. The basis of priority depends on the region and considers impact on the community. For instance in the rural townships the substation feeders that supply to the town centers will be disconnected last after all the other feeders in that region have been disconnected. Also consideration will be taken not to disconnect town centers of two adjacent rural townships so that the affected people have the option to procure supply and amenities from the town closet to them if needed. In the urban regions the industrial loads will be disconnected before the residential loads as the residential feeders also have school, dairies and street lightings connected to them so they are given a higher priority. And as a last resort after all the rural, semi rural, industrial and residential feeders have been disconnected; the feeders that supply predominantly to the CBD area will be disconnected.

Once the frequency has stabilized the System Operator will advise the ENL control centre when load can be restored.

8.7 Supply Restoration

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

8.8 Transmission Grid Emergency

When an Immediate event occur, it is likely that the System Operator will activate the Grid Emergency provisions since the nature of a grid emergency is similar in nature to an immediate event. If the System Operator request ENL to reduce load under a Grid Emergency Notice (GEN), the steps taken to reduce demand will be same as the steps described in the above section for an Immediate event, depending on which stage ENL has undertaken already as a result of an immediate event in place, before the declaration of the grid emergency and will proceed further if required with the plan once grid emergency is declared. If the Commission declares a supply shortage following a grid emergency, then ENL will respond by implementing rolling outages in accordance with the following "Developing Events" section.

9. Developing Events

If the Commission requests through the System Operator a load reduction for a planned Developing event, ENL will reduce supply to meet the Commission's weekly energy savings target that will be reviewed each week. To reduce energy usage ENL will at first use its diesel generators and then disconnect feeders in a controlled manner to enable targets to be reached. The shedding of water heating load is generally not a viable option for energy saving.

ENL acknowledges that there are financial penalties for not meeting the targets specified by the Commission.

9.1 Declaration of Developing Events

The Commission will endeavor to provide nine days prior notice of the requirement for weekly energy savings and any increase in the weekly savings target.

The Commission would need to request through the System Operator the specific energy savings target to be enforced for a specific region for a specific time-frame.

The Commission is responsible for general media advertising of the need to conserve electricity and the impending rolling outages when they are requested.

If ENL plans to issue a public message related to rolling outages then this will be sent to the Commission for review before being released. Any such communication will give time for response from the Commission, so as their feedback can be included before ENL issue the message to the general public.

9.2 Communication with System Operator

All communication with the System Operator will be between the ENL Control Centre and Transpower's Regional Operating Centre (TUA1) using Transpower's telephone or normal communication system.

Prior to notifying and implementing rolling outages, ENL will consult with the System Operator to establish a process for load shedding and restoration, which may include a MW load cap to operate under during restoration phases. The System Operator has advised that load shedding and restoration shall be no more than 25MW per 5 min, unless agreed upon with the System Operator.

9.3 Shutdown Notification

When implementing rolling outage plan, ENL will notify the customers and the retailers, where possible 7 days in advance, of the pending outages. Notification will be done in a number of ways:

- **Public Notices:** ENL will place public notice advertisements (see draft in Appendix B) providing a rolling outage timetable showing the times and areas affected by rolling outages. ENL will also use local radio stations to broadcast in advance on the rolling outage timetable.
- **ENL Website:** ENL will set up a dedicated website page which will show the planned rolling outage timetable.
- **Retailer Notification:** ENL will provide the timetable of the rolling outages to all electricity retailers together with a schedule showing which rolling outage feeder each ICP is connected to.

9.4 Vulnerable Customers and Priority Sites

It is not possible for ENL to prevent rolling outages affecting individual vulnerable customers and priority sites. ENL will endeavor to provide the retailers as much advance notice as possible of the pending rolling outages to enable them to individually notify their vulnerable customers.

9.5 Rolling Outages

9.5.1 Generators

In order to reduce supply at the Transpower GXP by reducing energy usage, as a first measure ENL will be running all of its six 1 MWe diesel generators. By running the generators up to 12 hours a day for seven days ENL can accommodate up to 7.4% of energy savings based on the average weekly energy usage during the winter period of last year (2009). For greater energy savings ENL will proceed with the rolling outages by planning shutdowns on the rolling outage feeders. If any of the generators are unable to start and operate during the rolling outage period, ENL will include more feeders into the rolling outages to increase savings so that the weekly energy savings target will be met.

9.5.2 Criteria for Rolling Outages

To ensure public health and safety is preserved and costs to economy are minimized the following table shows desired criteria for selecting feeders to be included in rolling outages.

Priority	Priority Concern	Maintain Supply to:
1	Public health & Safety	Major hospitals, air traffic control centers, and emergency operation centers
2	Important public services	Energy control centers, communication networks, water & sewage pumping, fuel delivery system and major ports
3	Public Health & Safety	Minor hospitals, medical centers, schools, and street lighting
4	Food Production	Dairy farms and milk producing facilities
5	Domestic production	Commercial & industrial premises
6	Disruption to consumers	Residential premises

Table 1: Priority Loads

Feeders generally have a variety of loads, so it's not possible to assign a single feeder to a single priority group as shown in Table 1. ENL has classified its substations and feeders that are to be included in the rolling outages, accordingly to their location and the type of loads predominantly connected to them. With this classification of the feeders, ENL will best endeavor to meet the criteria for the Table 1 priority loads, during rolling outage planning. The following points have also been noted during the selection of the rolling outage feeders:

- The Gisborne, Wairoa and Te Puia Hospitals have their own standby diesel generators to be used during power outages.
- The Gisborne Airport has standby generator.
- The ENL main building has a standby diesel generator.
- The Gisborne and Wairoa District Councils have generators to run their office and the utility plant sites.
- The Gisborne and Wairoa Police stations have generators to keep their communication and building functional during power outages.
- All telecommunication major connections in the Gisborne and Wairoa regions have their own backup emergency generation.
- All the ENL owned Radio repeater sites have standby generators.

9.5.3 Rolling Outages Strategy and Methodology

The Network General Manager, Network Asset Manager and the ENL Control Center will be responsible for implementing the rolling outage plan, including reviewing the weekly targets and preparing plans for weekly rolling outages based on the savings requested by the EC. These plans will include the schedules of estimated load shedding, amount of load shed and restoration times. These plans will be forwarded to the System Operator seven days before the planned outage, and if any significant variation is noticed or expected to these plans the System Operator will be informed of these changes.

ENL has classified its rolling outage feeders into rural, semi-rural, residential and industrial category. The rural & semi-rural feeders predominantly supply to small rural townships and comprise of mostly residential loads with few higher priority loads mentioned in table 1. These feeders are given the lowest priority and will be disconnected first during rolling outages in a controlled manner so that the rural regions in close proximity are not affected at the same time as described in the following paragraph below. The feeders that supply predominantly to residential loads in the urban regions will be disconnected following the rural & semi rural feeders. And then the feeders supplying to the industrialized areas will be disconnected if required, to achieve higher energy savings during the rolling outages.

In general, rolling outage times will be as follows:

- Rural Feeders: Between 12am-6am, extending to either a morning or afternoon outage when greater energy savings is required.
- Semi-rural & Residential Feeders: Either between 6am–12pm or between 12pm-6pm and these times will be alternated each day of the week.
- Industrial Feeders: Between 6pm-12am
- These times are indicative only and will vary to accommodate for more savings when required. For Instance the Residential feeders' outage time may be shifted from the morning or afternoon to the evening when energy consumption is higher and the Industrial feeders' outage time may be shifted from the evening into day time when energy usage is higher.

Majority of ENL's Rural Feeders are part of the AUFLS group. In order for them to be included in the rolling outages ENL has grouped these feeders into two different groups (can be seen in Appendix D). When group 1 of the AUFLS rural feeders is included in the rolling outages, group 2 will not be included and vice versa. This is done to maintain the AUFLS obligations for the remaining system load while including these AUFLS feeders in the rolling outages. Also these rural feeders are grouped in a way so that when outages are taking place in a particular rural area, supply will be maintained to the closest township so that the people in the affected areas still have the means to procure supplies if they need to.

The feeders that supply to the Gisborne CBD and the Wairoa town centre have not been included in these rolling outages. As the Gisborne and Wairoa CBDs predominantly comprise of higher priority loads mentioned in Table 1, such as healthcare centers, supermarkets, petrol stations, commercial businesses, food and retail outlets, these important public services will be unaffected during rolling outages, thus preserving public health and safety as well as minimizing costs to the economy.

Having established the week ahead rolling outage plan, ENL will use best endeavors to provide the System Operator with daily week-ahead forecast of half hourly load, at each GXP. If any unexpected changes occur to the forecast for a GXP of more than 20% for any trading period, ENL will notify the System Operator directly to ensure the real time security issue can be managed.

The indicative energy savings plans shown below are based on the data from ENL’s energy usage during the winter period of 2009 (Appendix D was used as a guide to make these plans). The actual savings plan will be based upon the network energy usage for the same period previous year.

5% Savings Plan			
<i>Groups</i>	<i>Days per week</i>	<i>Maximum Duration (hr)</i>	<i>Weekly Savings (MWh)</i>
Generators	7	8	302.4
Rural	0	0	0
Semi-rural	0	0	0
Residential	0	0	0
Industrial	0	0	0
Total			302.4
Average weekly winter volume (2009)			6,094
Estimated Percentage Saving			4.96%

10% Savings Plan			
<i>Groups</i>	<i>Days per week</i>	<i>Maximum Duration (hr)</i>	<i>Weekly Savings (MWh)</i>
Generators	7	12	453.6
Rural	7	6	156.74
Semi-rural	0	0	0
Residential	0	0	0
Industrial	0	0	0
Total			610.34
Average weekly winter volume (2009)			6,094
Estimated Percentage Saving			10.02%

15% Savings Plan			
<i>Groups</i>	<i>Days per week</i>	<i>Maximum Duration (hr)</i>	<i>Weekly Savings (MWh)</i>
Generators	7	12	453.6
Rural	7	6	156.74
Semi-rural	7	6	224.39
Residential	7	6	142.08
Industrial	0	0	0
Total			976.81
Average weekly winter volume (2009)			6,094
Estimated Percentage Saving			16.03%

20% Savings Plan			
<i>Groups</i>	<i>Days per week</i>	<i>Maximum Duration (hr)</i>	<i>Weekly Savings (MWh)</i>
Generators	7	12	453.6
Rural	7	6	156.74
Semi-rural	7	6	224.39
Residential	7	6	142.08
Industrial	7	6	211.7
Total			1188.51
Average weekly winter volume (2009)			6,094
Estimated Percentage Saving			19.50%

<i>Groups</i>	<i>Days per week</i>	25% Savings Plan		<i>Weekly Savings (MWh)</i>
		<i>Maximum Duration (hr)</i>		
Generators	7	12		453.6
Rural	7	12		405.71
Semi-rural	7	12		346.07
Residential	7	6		142.08
Industrial	7	6		211.7
Total				1559.16
Average weekly winter volume (2009)				6,094
Estimated Percentage Saving				25.58%

9.6 Target Monitoring

To avoid discrepancy over the accuracy of different data sources, the EC (in conjunction with the System Operator) will report on actual demand versus the target.

For load shedding to a weekly target, the Network controller will review EC report of energy savings against the target and together with the Network General Manager, review future load shedding to increase or decrease the amount of rolling outages to enable the weekly target to be met. The Network Controller will be responsible for daily and weekly reporting of consumption relative to the target levels (using ENL's data source) and it will be made available to the EC and the System Operator.

In the case of daily or real time limits where the EC reporting will be too slow for real time action to be taken, the Network Controller along with the Network General Manager will monitor ENL's savings and adjust accordingly in the timeframe required. These savings will be calculated using GXP loads measured by ENL's SCADA system and compared with the targets supplied by the System Operator.

9.7 Log of Rolling Outages

The Network controller will log times of disconnections and reconnections of all the feeder interruptions and enter into the rolling outage log. The log sheet to be used by the Network Controller is shown in Appendix C.

9.8 Grid Emergency during Developing Event

If the System Operator declares a grid emergency during a Developing event, the grid emergency will take priority. As water heating loads are generally not used as a measure to save energy in a developing event, ENL will have water heating load as a first measure to reduce load when required for the grid emergency. Then ENL will run all of its remaining diesel generators' to maximum capacity if they are not already operating as part of the rolling outage. If more load shedding is required then ENL will shed more loads by disconnecting feeders as per feeder disconnection list in Appendix A.

9.9 AUFLS under Rolling Outages

The EC requires that the level of AUFLS during rolling outages needs to be maintained during a Developing event. ENL will include the AUFLS feeders into rolling outages but will limit the load shedding of these feeders to ensure the two AUFLS blocks are still maintained. For instance if 10% of ENL's load have been shed, 10% of AUFLS load will also be shed, so that the AUFLS obligation will still be maintained for the remaining system load.

10. Contingent Events

If any unplanned event occurs, such as a Civil Defense emergency that could alter the planned rolling outages, ENL Control Centre will be responsible for all the decisions, and where possible will inform the Retailers and the System Operator about the changes.

Appendix A: ENL Feeder Disconnection List

The Table below shows a list of all the substations and the feeders in ENL's Network. At each GXP the substations at the top of the list will be disconnected first and will follow down the list as required. It also shows estimated percentage of load shed expected by disconnecting a particular feeder.

SUBSTATIONS			Average (kW)	
GISBORNE GXP	FEEDERS		Demand	% of System Load
Te Araroa	AWATERE	AUFLS 1	62.87	0.17
	HICKS BAY	AUFLS 1	222.91	0.61
	TE ARAROA	AUFLS 1	121.94	<u>0.33</u>
				1.11
Ruatoria	MAKARIKA	AUFLS 1	140.99	0.38
	TIKI-TIKI	AUFLS 1	266.74	0.73
	RUATORIA	AUFLS 1	400.10	<u>1.09</u>
				2.21
Tokomaru Bay	SEASIDE	AUFLS 1	114.32	0.31
	MATA RD	AUFLS 1	243.87	0.67
	INLAND	AUFLS 1	179.09	<u>0.49</u>
				1.47
Tolaga Bay	TOKO-TIE	AUFLS 1	59.06	0.16
	ROTOTAHI	AUFLS 1	177.19	0.48
	TAUWHAREPARE	AUFLS 1	114.32	0.31
	TOWN	AUFLS 1	224.82	<u>0.61</u>
				1.57
NGATAPA	TAHORA	AUFLS 1	154.33	0.42
	TOTANGI	AUFLS 1	9.53	0.03
	NGATAPA	AUFLS 1	95.26	<u>0.26</u>
				0.71
PUHA	WHATATUTU	AUFLS 1	184.81	0.50
	KANAKANAIA	AUFLS 1	186.72	0.51
	TE KARAKA	AUFLS 1	217.20	0.59
	MATAWAI	AUFLS 1	432.49	<u>1.18</u>
				2.79
PATUTAHI	LAVENHAM RD	AUFLS 1	144.80	0.40
	WAIMATA	AUFLS 1	478.22	1.31
	MURIWAI	AUFLS 1	421.06	1.15
	TE ARAI	AUFLS 1	287.69	<u>0.79</u>
				3.64

MATAWHERO	DUNSTAN	AUFLS 1	539.19	1.47
	JNLA	AUFLS 1	19.05	0.05
	WAIPOA	AUFLS 1	438.21	1.20
	BELL RD	AUFLS 1	209.58	<u>0.57</u>
				3.29
PORT	PORT	AUFLS 2	102.88	0.28
	CRAWFORD	AUFLS 2	642.07	1.75
	ESPLANADE	AUFLS 2	1,648.05	4.50
	HARRIS	AUFLS 2	1,731.88	<u>4.73</u>
				11.26
PEHERI	WARENGA O Kuri		106.69	0.29
	PARIKANAPA		11.43	0.03
	TINIROTO		91.45	0.25
	TAHUNGA		45.73	<u>0.12</u>
				0.70
MAKARAKA	CAMPION		927.86	2.53
	NELSON RD		1,838.57	5.02
	HAISMAN RD		1,265.09	3.45
	BUSHMERE RD		811.64	<u>2.22</u>
				13.22
JNL	JNL		1,891.92	5.17
PARKINSON	LYTTON RD		602.06	1.64
	WILLOWS RD		83.83	0.23
	ELGIN		971.68	2.65
	CEDEN CO		287.69	0.79
	SOLANDIS		276.26	0.75
	INNES ST		95.26	<u>0.26</u>
				6.33
KAITI	HERSCHELL		152.42	0.42
	DALTON		724.00	1.98
	TAMARAU		1,074.56	2.93
	WAINUI		643.98	1.76
	WHANGARA		594.44	<u>1.62</u>
				8.71

CARNARVON	KAHUTIA		417.25	1.14
	WATTIES		584.91	1.60
	ANZAC ST		400.10	1.09
	CHILDERS RD		1,106.95	3.02
	AWAPUNI RD		663.03	1.81
	ABERDEEN RD		1,225.08	3.35
	PALMERSTON RD		1,023.12	2.79
	GLADSTONE RD		884.04	2.41
	CITY		775.44	<u>2.12</u>
				19.33
WAIROA GXP				
KIWI	NUHAKA/FRASERTOWN	AUFLS 1	760.20	2.08
	BOROUGH ONE	AUFLS 1	1,303.20	3.56
	AFFCO		1,286.05	3.51
	BRICKWORKS/RAUPUNGA		624.92	1.71
TUAI	TUAI		436.90	1.19
WAIROA	BLACKS		453.45	1.24
	TAHAENUI		255.30	0.70
KIWI	BOROUGH TWO		<u>1,653.76</u>	4.52
			36,621.52	

Appendix B: Rolling Outage Public Notice (Draft)

Electricity Supply Interruptions

Please Read – Your Supply may be affected

Eastland Network Limited is required to reduce electricity consumption with rolling power outages across the Upper East Coast region, Ngatapa, Patutahi, Makaraka, Kaiti and Wairoa surrounding rural areas, to meet a 15% energy savings target set by the Electricity Commission in response to the current energy crisis.

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

Outages will occur within the time period shown below. Wherever possible, Eastland Networks will delay cuts and restore power early, **so please treat all lines as live.**

Eastland Networks has prioritised the feeders that will be turned off to minimise the cost of disruption to the community, and timed outages accordingly.

To find out the feeder for your connection, you can call your electricity retailer.

YOUR SAFETY AND PROTECTION

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

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

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

All other electricity distribution networks are likely to have similar outages. If you are travelling, some traffic lights may not be working. Avoid using lifts during these power restrictions.

Feeder Area	Monday 4 July 20XX	Tuesday 5 July 20XX	Wednesday 6 July 20XX	Thursday 7 July 20XX	Friday 8 July 20XX	Saturday 9 July 20XX	Sunday 10 July 20XX
TeAraroa, Toko Bay, Patutahi, Puha	12am-6am		12am-6am		12am-6am		12am-6am
Ngatapa, Ruatoria, Tolaga Bay		12am-6am		12am-6am		12am-6am	
Pehiri, Tuai, Tahaenui, Raupunga	12am-6am	12am-6am	12am-6am	12am-6am	12am-6am	12am-6am	12am-6am
Makaraka , Kaiti	12pm-6pm	6am-12pm	12pm-6pm	6am-12pm	12pm-6pm	6am-12pm	6am-12pm

(Note: only general areas are listed, some nearby areas will be affected)

Consumers on feeders other than those listed are not scheduled for rolling outages in this period.

Appendix D: ENL's Energy Usage Data

The Table below shows ENL's Average weekly energy usage during different time periods of the day based on the data from the winter months of 2009 (1/6/09 – 31/8/09).

SUBSTATIONS	FEEDER	Avg Weekly MWh	Weekly MWh 6am-12pm	% of Weekly Avg 6am-12pm	Weekly MWh 12-6pm	% of Weekly Avg 12-6pm	Weekly MWh 6pm-12am	% of Weekly avg 6pm-12am	Weekly MWh 12-6am	% of Weekly Avg 12-6am
Te Araroa	AWATERE	10.61	2.72	0.04	2.93	0.05	3.28	0.05	1.68	0.03
	HICKS BAY	37.35	9.94	0.16	10.59	0.17	10.94	0.18	5.87	0.10
	TE ARAROA	<u>20.36</u>	<u>5.77</u>	<u>0.09</u>	<u>5.95</u>	<u>0.10</u>	<u>5.48</u>	<u>0.09</u>	<u>3.16</u>	<u>0.05</u>
		68.32	18.43	0.30	19.47	0.32	19.71	0.32	10.71	0.18
Tokomaru Bay	INLAND	30.08	8.01	0.13	7.94	0.13	8.18	0.13	5.94	0.10
	SEASIDE	19.05	4.84	0.08	5.40	0.09	5.55	0.09	3.25	0.05
	MATA RD	<u>40.74</u>	<u>10.37</u>	<u>0.17</u>	<u>11.10</u>	<u>0.18</u>	<u>11.79</u>	<u>0.19</u>	<u>7.48</u>	<u>0.12</u>
		89.87	23.23	0.38	24.45	0.40	25.52	0.42	16.67	0.27
PATUTAHI	LAVENHAM RD	24.45	7.27	0.12	6.85	0.11	6.60	0.11	3.74	0.06
	WAIMATA	80.48	21.92	0.36	21.95	0.36	23.15	0.38	13.46	0.22
	MURIWAI	70.86	19.77	0.32	18.89	0.31	20.98	0.34	11.23	0.18
	TE ARAI	<u>48.35</u>	<u>12.96</u>	<u>0.21</u>	<u>12.35</u>	<u>0.20</u>	<u>14.15</u>	<u>0.23</u>	<u>8.89</u>	<u>0.15</u>
		224.14	61.91	1.02	60.04	0.99	64.87	1.06	37.32	0.61
PUHA	WHATATUTU	31.21	8.13	0.13	8.39	0.14	9.40	0.15	5.30	0.09
	KANAKANAIA	31.26	7.45	0.12	8.69	0.14	9.74	0.16	5.39	0.09
	TE KARAKA	36.60	10.05	0.16	10.21	0.17	10.31	0.17	6.03	0.10
	MATAWAI	<u>72.52</u>	<u>18.29</u>	<u>0.30</u>	<u>20.20</u>	<u>0.33</u>	<u>21.63</u>	<u>0.35</u>	<u>12.40</u>	<u>0.20</u>
		171.59	43.91	0.72	47.48	0.78	51.08	0.84	29.12	0.48
Rural 1 (AUFLS Group 1)				2.42		2.48		2.64		1.54

NGATAPA	NGATAPA	15.83	4.06	0.07	4.12	0.07	4.52	0.07	3.12	0.05
	TAHORA	26.00	6.64	0.11	7.09	0.12	7.73	0.13	4.54	0.07
	TOTANGI	<u>0.18</u>	<u>0.02</u>	<u>0.00</u>	<u>0.03</u>	<u>0.00</u>	<u>0.13</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>
		42.01	10.71	0.18	11.24	0.18	12.38	0.20	7.67	0.13
Ruatoria	RUATORIA	67.08	19.41	0.32	19.45	0.32	17.49	0.29	10.73	0.18
	MAKARIKA	23.82	6.24	0.10	6.61	0.11	6.49	0.11	4.48	0.07
	TIKI-TIKI	<u>44.78</u>	<u>11.82</u>	<u>0.19</u>	<u>12.41</u>	<u>0.20</u>	<u>13.15</u>	<u>0.22</u>	<u>7.40</u>	<u>0.12</u>
		135.69	37.47	0.61	38.47	0.63	37.13	0.61	22.62	0.37
Tolaga Bay	TOKO-TIE	9.77	2.99	0.05	2.67	0.04	3.32	0.05	0.80	0.01
	TOWN	37.82	10.66	0.17	10.76	0.18	10.00	0.16	6.40	0.11
	ROTOTAHI	29.90	8.04	0.13	8.10	0.13	8.83	0.14	4.92	0.08
	TAUWHAREPARE	<u>19.12</u>	<u>4.77</u>	<u>0.08</u>	<u>5.29</u>	<u>0.09</u>	<u>6.20</u>	<u>0.10</u>	<u>2.85</u>	<u>0.05</u>
		96.61	26.46	0.43	26.82	0.44	28.36	0.47	14.97	0.25
KIWI	BOROUGH ONE	218.89	60.68	1.00	61.12	1.00	62.62	1.03	34.48	0.57
	NUHAKA/ FRASERTOWN	127.58	35.00	0.57	36.92	0.61	34.70	0.57	20.96	0.34
Rural 2 (AUFLS Group 2)				2.79		2.86		2.87		1.65
PEHERI	WARENGA O Kuri	17.98	5.67	0.09	5.90	0.10	3.52	0.06	2.89	0.05
	PARIKANAPA	1.98	0.46	0.01	0.57	0.01	0.76	0.01	0.20	0.00
	TINIROTO	15.29	4.01	0.07	4.15	0.07	4.81	0.08	2.32	0.04
	TAHUNGA	<u>7.70</u>	<u>1.94</u>	<u>0.03</u>	<u>2.06</u>	<u>0.03</u>	<u>2.59</u>	<u>0.04</u>	<u>1.10</u>	<u>0.02</u>
		42.95	12.08	0.20	12.68	0.21	11.68	0.19	6.51	0.11
TUAI	TUAI	<u>58.92</u>	<u>15.43</u>	0.25	<u>15.93</u>	0.26	<u>16.67</u>	0.27	<u>10.89</u>	0.18
WAIROA	BLACKS	76.12	20.22	0.33	21.61	0.35	20.99	0.34	13.30	0.22
	TAHAENUI	42.79	12.29	0.20	12.62	0.21	11.16	0.18	6.72	0.11

KIWI	RAUPUNGA	105.12	27.83	0.46	29.44	0.48	28.95	0.48	18.89	0.31
Rural 3 (Non AUFLS)				1.44		1.51		1.47		0.92

MAKARAKA	CAMPION	155.85	43.03	0.71	43.27	0.71	46.32	0.76	23.24	0.38
	NELSON RD	308.87	86.09	1.41	85.51	1.40	88.77	1.46	48.51	0.80
	HAISMAN RD	212.63	57.65	0.95	58.62	0.96	67.33	1.10	29.03	0.48
	BUSHMERE RD	<u>136.30</u>	<u>38.19</u>	<u>0.63</u>	<u>37.00</u>	<u>0.61</u>	<u>40.20</u>	<u>0.66</u>	<u>20.90</u>	<u>0.34</u>
		813.65	224.96	3.69	224.39	3.68	242.62	3.98	121.68	2.00

Semi-rural

KAITI	HERSCHELL	25.55	6.43	0.11	7.30	0.12	8.04	0.13	3.78	0.06
	DALTON	121.59	32.00	0.52	32.58	0.53	39.02	0.64	17.99	0.30
	TAMARAU	180.50	47.45	0.78	50.14	0.82	57.65	0.95	25.25	0.41
	WAINUI	108.09	29.35	0.48	31.19	0.51	31.28	0.51	16.27	0.27
	WHANGARA	<u>99.79</u>	<u>26.86</u>	<u>0.44</u>	<u>27.31</u>	<u>0.45</u>	<u>31.58</u>	<u>0.52</u>	<u>14.03</u>	<u>0.23</u>
		535.51	142.08	2.33	148.53	2.44	167.57	2.75	77.33	1.27

Residential

JNL	JNL	318.03	91.50	1.50	85.13	1.40	73.26	1.20	68.14	1.12
KIWI	AFFCO	216.07	67.62	1.11	59.79	0.98	45.88	0.75	42.78	0.70
PARKINSON	LYTTON RD	101.11	32.52	0.53	33.00	0.54	19.43	0.32	16.16	0.27
	WILLOWS RD	14.02	3.51	0.06	3.40	0.06	3.71	0.06	3.40	0.06
	ELGIN	163.35	45.74	0.75	47.11	0.77	47.20	0.77	23.30	0.38
	CEDEN CO	48.27	14.08	0.23	13.42	0.22	10.21	0.17	10.57	0.17
	SOLANDIS	46.51	15.25	0.25	14.42	0.24	8.92	0.15	7.93	0.13
	INNES ST	<u>16.14</u>	<u>5.35</u>	<u>0.09</u>	<u>4.53</u>	<u>0.07</u>	<u>3.10</u>	<u>0.05</u>	<u>3.16</u>	<u>0.05</u>
	389.40	116.45	1.91	115.88	1.90	92.56	1.52	64.51	1.06	

Industrial

4.52**4.28****3.47****2.88**

NOT INCLUDED IN ROLLING OUTAGES

PORT	PORT	17.43	4.96	0.08	5.18	0.08	3.81	0.06	3.48	0.06
	CRAWFORD	107.86	28.33	0.46	29.88	0.49	33.48	0.55	16.17	0.27
	ESPLANADE	276.84	84.16	1.38	87.10	1.43	61.26	1.01	44.33	0.73
	HARRIS	<u>290.86</u>	<u>76.86</u>	<u>1.26</u>	<u>79.42</u>	<u>1.30</u>	<u>92.27</u>	<u>1.51</u>	<u>42.32</u>	<u>0.69</u>
		693.00	194.31	3.19	201.57	3.31	190.82	3.13	106.29	1.74
MATAWHERO	DUNSTAN	90.50	30.48	0.50	26.97	0.44	16.97	0.28	16.07	0.26
	JNLA	3.11	1.08	0.02	1.00	0.02	0.68	0.01	0.34	0.01
	WAIPOA	73.60	23.38	0.38	20.37	0.33	14.37	0.24	15.48	0.25
	BELL RD	<u>35.11</u>	<u>9.79</u>	<u>0.16</u>	<u>9.60</u>	<u>0.16</u>	<u>10.71</u>	<u>0.18</u>	<u>5.01</u>	<u>0.08</u>
		202.32	64.74	1.06	57.94	0.95	42.74	0.70	36.91	0.61
KIWI	BOROUGH TWO	277.84	86.31	1.42	61.12	1.00	86.71	1.42	43.71	0.72
CARNARVON	KAHUTIA	70.09	23.00	0.38	24.83	0.41	14.14	0.23	8.13	0.13
	CITY	130.29	42.06	0.69	44.98	0.74	25.22	0.41	18.04	0.30
	WATTIES	98.44	32.18	0.53	30.76	0.50	19.25	0.32	16.25	0.27
	ANZAC ST	67.27	18.17	0.30	19.41	0.32	18.76	0.31	10.93	0.18
	CHILDERS RD	185.97	51.89	0.85	53.31	0.87	54.12	0.89	26.66	0.44
	AWAPUNI RD	111.42	35.12	0.58	32.47	0.53	27.11	0.44	16.72	0.27
	GLADSTONE RD	148.64	44.56	0.73	44.87	0.74	36.59	0.60	22.62	0.37
	ABERDEEN RD	205.77	55.27	0.91	56.69	0.93	65.56	1.08	28.25	0.46
	PALMERSTON RD	<u>172.08</u>	<u>55.30</u>	<u>0.91</u>	<u>55.03</u>	<u>0.90</u>	<u>35.73</u>	<u>0.59</u>	<u>26.01</u>	<u>0.43</u>
	1,189.97	357.54	5.87	362.35	5.95	296.47	4.86	173.60	2.85	

Total Average
Weekly Energy: **6,094.39** MWH