

AURORA ENERGY LTD

Loss Factors

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1 INTRODUCTION

Aurora is obliged to calculate and publish loss factors under industry agreements. This document describes the methodology used to calculate the loss factors and sets out the loss factors applicable from 1 October 2007.

2 LOSSES

2.1 General

Distribution losses represent the electricity entering the network that is consumed during the delivery to consumers' installations. The quantity of electricity metered at consumer installations is thus after losses and in order to determine each retailer's purchase responsibilities the electricity measured at the consumer's meter has to be multiplied by a "loss factor". There are two main technical components to the loss:

- (a) A fixed component due to the standing losses of the zone substation and distribution transformers.
- (b) Variable components arising from the heating effects of the resistance in the delivery conductors. The resistive losses are proportional to the square of the load current and occur in the 66kV, 33kV, 11kV and 6.6kV and LV network conductors and in the zone substations and distribution transformers.

Non-technical loss arises from time to time including metering errors, theft and sales reporting errors and these errors are also included in the overall calculated loss determined from the sales reports received from retailers.

2.2 HV and LV Metered Installations

Most consumer installations are metered at LV. However a few consumers' installations are metered at HV and thus these installations should not incur any LV network losses nor the fixed and variable losses in the distribution transformer.

2.3 Methodology

Aurora has adopted the following methodology in determining the loss factors.

The loss ratio for the distribution network as declared for Information Disclosure purposes is used as the basis for the calculation and the average of several years' data is normally used to calculate the loss factors for the following year. A single year's data is considered to be insufficient as it can be unduly influenced by a poor calculation by the retailers for the accrual value of kWh in the "normalised" sales reports forwarded by retailers each month or due to poor data quality problems associated with the competitive market.

Once the average ratio is obtained then the kWh lost is determined for the year. The total "fixed" annual losses are determined from the data for the zone substation and distribution substation transformers. The total variable losses are the result of deducting the fixed losses from the total losses.

The variable losses are allocated to each half hour of the year using the total network demand for each half hour as these variable losses are a ratio of the square of the kW demand for each half hour. Once the variable component is determined for each half hour, the fixed component is added back and the "loss kWh" is thus available for each half hour. From this is calculated the loss factor for each half hour and implicit in this calculation is the non-technical losses.

Average loss factors have also been calculated for each of the following time zones by calculating the loss kWh for the zone and then determining the average loss factor:

Summer day	October to April	0700 - 2300 hours
Summer night	October to April	2300 - 0700 hours
Winter day	May to September	0700 - 2300 hours
Winter night	May to September	2300 - 0700 hours

2.4 Audit of Data for Calculation of Loss Ratio

The draft loss ratio calculated for Information Disclosure purposes for the Dunedin area at March 2007 was believed to be too low due in part to incorrect forward estimates by retailers billing systems for mass market ICP however that was unlikely to account for all the reduced losses and in May 2007 an audit was commissioned for the Dunedin area. This follows an earlier reduction in loss ratio for the March 2006 year. Despite extensive analysis the Electricity Commission approved auditor has not located any source of individual ICP error or systemic error in either network input data or retailers sales reports and energy reported for the market.

A smaller reduction in loss ratio has been observed for the Central area over the last 12 months.

2.5 Halfway Bush and South Dunedin GXP Areas

Previously Aurora has calculated loss factors based upon the average 5 year loss ratio for the Dunedin area however given the substantial drop in loss ratio over the last two years for which no explanation is available, Aurora has calculated loss factors based upon the average loss ratio for the 3 years 2005-2007 which is 5.04% as compared to 5.39% for 5 years.

The individual values are:

2007	4.01%
2006	5.26%
2005	5.84%
2004	5.87%
2003	5.97%

The declared loss factors for the Halfway Bush & South Dunedin GXP areas are listed in Schedule 1.

2.6 Clyde, Cromwell and Frankton GXP Areas

Previously Aurora has calculated loss factors based upon the average 5 year loss ratio for the Central area however given the drop in loss ratio over the last year, Aurora has calculated loss factors based upon the average loss ratio for the 3 years 2005-2007 which is 6.96% as compared to 7.06% for 5 years.

The losses are slightly higher for the Central network due to the greater percentage of small distribution transformers which are less efficient than large distribution transformers, and the greater length of delivery conductor needed on a per consumer basis compared to Dunedin. The individual values are:

2007	6.27%
2006	7.51%
2005	7.10%
2004	7.64%
2003	6.80%

The declared loss factors for the Clyde, Cromwell & Frankton GXP areas are listed in Schedule 2. A 33kV loss factor has also been declared since there are several 33kV connections to the network.

2.7 Heritage Estate – Te Anau Area

Until a pattern of loss is established, interim loss factors have been prescribed for the embedded network at Heritage Estate to the NSP of HER0111. The Power Company Ltd has also declared loss factors to be added to the consumption at the NSP in order to determine purchase quantities at the North Makarewa GXP.

SCHEDULE 1

AURORA ENERGY LTD
Halfway Bush and South Dunedin GXP areas

LOSS FACTORS
- APPLICABLE 1 OCTOBER 2007

The following Loss Factors are to be used by Retailers to multiply the kWh recorded on the meter at each Connected Customer's Installation in order to determine the Electricity Retailer's responsibility for the purchase of kWh within the distribution network.

LOSS FACTORS AND CODE			HV metered	LV metered
			DEHV	DELV
Summer	Day	0700 - 2300 hrs	1.0387	1.0516
Summer	Night	2300 - 0700 hrs	1.0367	1.0490
Winter	Day	0700 - 2300 hrs	1.0448	1.0597
Winter	Night	2300 - 0700 hrs	1.0371	1.0495

Note: Winter months are May - September inclusive.
Summer months are October - April inclusive.
Time is NZ Standard Time or Daylight Saving Time as applicable.

Dunedin area - the Aurora distribution network connected to the Transpower grid exit points at Halfway Bush and South Dunedin.

SCHEDULE 2

AURORA ENERGY LTD
Clyde, Cromwell & Frankton GXP areas

LOSS FACTORS
- APPLICABLE 1 OCTOBER 2007

The following Loss Factors are to be used by Retailers to multiply the kWh recorded on the meter at each Connected Customer's Installation in order to determine the Electricity Retailer's responsibility for the purchase of kWh within the distribution network.

LOSS FACTORS AND CODES	SUPPLY @ 33kV	SUPPLY @ 11kV/6.6kV	GENERAL 400V
	CE33	CEHV	CELV
Summer Day	1.0382	1.0535	1.0714
Summer Night	1.0227	1.0460	1.0613
Winter Day	1.0580	1.0666	1.0887
Winter Night	1.0406	1.0537	1.0716

Note: Winter months are May - September inclusive

Summer months are October - April inclusive

Day is 7:00 am to 11:00 pm

Night is 11:00 pm to 7:00 am

Time is NZ Standard Time or Daylight Saving Time as applicable.

Central area - the Aurora distribution network connected to the Transpower grid exit points at Frankton, Cromwell and Clyde.

SCHEDULE 3**AURORA ENERGY LTD*****Heritage Estate - Te Anau area- North Makarewa GXP*****LOSS FACTORS****- APPLICABLE 1 October 2007**

The following Loss Factors are to be used by Retailers to multiply the kWh recorded on the meter at each Connected Customer's Installation in order to determine the Electricity Retailer's responsibility at the NSP of HER0111 for the purchase of kWh within the embedded distribution network.

LOSS FACTORS AND CODES	GENERAL 400V
	HELV
Summer Day	1.0420
Summer Night	1.0200
Winter Day	1.0500
Winter Night	1.0300

Note: Winter months are May - September inclusive.

Summer months are October - April inclusive.

Day is 7:00 am to 11:00 pm.

Night is 11:00 pm to 7:00 am.

Time is NZ Standard Time or Daylight Saving Time as applicable.

Te Anau area - the Aurora embedded distribution network connected to The Power Company network supply point HER0111.

As at 1 July 2006 the Loss Factors declared by The Power Company applicable to translate kWh at the NSP HER0111 to the NMA0331 grid exit point are as follows:

LOSS FACTORS AND CODES	HER0111
	PNL25
Summer Day	1.0500
Summer Night	1.0380
Winter Day	1.0800
Winter Night	1.0570