Wellington Electricity

Loss Factor Methodology

2022-2023

Contents

1. Introduction

This document presents Wellington Electricity's loss factor methodology which determines the loss factors for the regulatory period 2022-2023. The loss factor calculation considers energy losses from the Transpower Grid Exit Points (GXPs) to customers.

2. Methodology

The methodology employed to calculate the loss factors is derived from the Electricity Authority's (EA) guidelines and have been adapted as appropriate to suit the data and tools available. The calculation involves the following loss factors defined below.

2.1 Reconciliation Loss

Reconciliation Loss (RL) represents the difference between reported energy injected into a network and the reported energy extracted from the network. Energy injected into the network is the sum of energy from Transpower GXPs and large distributed generation connected to the network. Energy extracted at customer installations was provided by retailers for the period of 1 April 2022 to 31 March 2023.

2.2 Technical Loss

Technical Loss (TL) represents the difference between energy actually injected into a network and the energy actually delivered to points of connection. It is the electricity that is consumed due to the inherent characteristics of the electrical system like distribution transformers losses and line losses. The TL was calculated through a digsilent power factory simulation as below.

2.2.1 Sub-transmission; Zone substation and HV network

The hourly feeder data for all zone substations during the study period was utilized as input data.

2.2.2 Distribution Transformer

- The latest available data for the distribution transformers were taken from our Geographic Information System (GIS). If the data on the full load and no-load losses were available from the GIS extract, the same was mapped to the transformer.

- For any transformers without complete information, typical transformer load and non-load ratings data were used. If an equivalent sized transformer rating was not available, values from the next largest transformer size were used for the study.

- A utilization factor was derived for the various distribution transformers by analyzing the average and maximum load values for each feeder. The average loss was calculated for each transformer and was applied across the study period to produce a kWh loss value.

2.2.3 Low Voltage network

A new low voltage (LV) was modelled based on the following inputs.

- The LV network was categorized into four categories based on the type of settlement and the install control point (ICP) counts:
  - The average no. of ICP for each LV network type.
  - The average load of the LV network type.
  - The spacing and number of loads per pole.
  - A generalized LV conductor.

2.3 Non-Technical Loss

Non-Technical Loss (NTL) represents the difference between the volume of energy actually conveyed at points of connection and the volume of energy reported as conveyed at the same points of connection. It is the inaccuracies caused by measurement and data handling; metering and reading errors; incorrect meter installations; theft and unread meters.

3. Loss Factors Applicable 31 March 2023

The loss factors to be applied from 1 April 2023 remain unchanged from 2022 and are as follows.

Distribution Losses by metering voltage, transformer connection and load			
Loss Factor Code	**Consumers metering voltage**	**Distribution loss ratios with respect to the injection meter point**	**Distribution loss factors with respect to the ICP meter**
VECG1	LV	5.13%	1.0541
VECG2	LV	2.77%	1.0285
VECG3	LV	3.78%	1.0393
VECG4	HV	1.55%	1.0157