Network Loss Methodology
Effective from 1 May 2023

NETWORK LOSS METHODOLOGY

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1   INTRODUCTION

Electra calculates and publishes Reconciliation Loss Factors for all loss factor codes on its network annually. Losses include energy losses from the point of transmission connection at the grid exit points (GXP) to the point of connection for all customers.

These energy losses can be categorised as follows:

- technical losses
- non-technical losses
- reconciliation losses
- unaccounted for electricity

The methodology captured within this document presents how Electra calculates its technical and non-technical losses to result in the loss factors calculated effective from 1st May 2023.

This methodology has been developed in line with the Electricity Authority's *"Guidelines on the calculation and use of loss factors for reconciliation purposes"*.

In accordance with this guideline the timeframe used for this methodology covers loss factors effective from the 1st of May 2023. This timeframe has been selected because of the availability of data and the notice periods required by the Electricity Registry.

2   DEFINITIONS OF LOSSES AND FACTORS

Technical losses are the difference between energy actually injected into a network and energy actually delivered to the points of connection. Technical losses result from load losses (also known as copper losses) and no-load losses (also known as iron losses). These are the losses that arise from the use of network equipment and are a function of the physical characteristics of the network equipment invested in by the network owner.

Non-technical losses are the difference between the volume of energy actually conveyed at the points of connections and the volume of energy reported as conveyed at the same points of connection (as stated by traders in their submission information submitted for the purpose of the reconciliation process). Non-technical losses are any form of unexplained losses, such as:
- metering inaccuracy, regardless of:
  - the size of inaccuracy and whether it is compliant with the accuracy requirements of the Code; or
  - the source of inaccuracy, whether it be tampering, faulty equipment, poor installation or misconfiguration; and
- errors or omissions in traders' back-office systems.

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Reconciliation losses are the difference between reported energy injected into a network and reported energy extracted from the network. Reconciliation losses are the combination of technical and non-technical losses.

Unaccounted for electricity is calculated from the difference between reported energy injected into a network and the reported energy extracted from the network after it has been adjusted for losses. Conceptually, it is the inevitable difference between distributors' predictions and reported reality (volumes as measured by meters). Unaccounted for electricity accounts for the difference between actual and calculated technical losses, and actual and estimated non-technical losses.

Reconciliation loss factor is the multiplier to be applied to the volume of energy measured at a point of connection within a network study area to scale the volume to account for the attributed reconciliation loss relevant to that point of connection.

3   DEFINING THE ELECTRA NETWORK STUDY AREAS

We have defined our network into two distinct network study areas:

- Northern area as normally supplied by the Mangahao Grid Exit Point
- Southern area as normally supplied by the Paraparaumu Grid Exit Point

These study areas have been selected as they form discrete areas that can be studied independently within our modelling software.

4   DETERMINING TECHNICAL LOSSES

Determining technical losses is an important step in determining reconciliation losses.

Electra uses are range of modelling software and formulae to calculate technical losses within our network study areas. The guidelines require that we undertake this assessment at least once every five years or when major changes to network topology or connections occurs. It is an estimate with an assumed accuracy of ±20%.

Technical losses were last calculated in November 2021 studying the period for the year ending August 2021.

There have been no major topology or connection changes warranting reassessment.

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5   RECONCILIATION LOSSES

Total network losses for Electra are identified through comparison of real power entering the studied network and the real power exiting the studied network.

The sum of real power injected into Electra's network is obtained from metering data sources at Electra's connection points to the Mangahao and Paraparaumu GXPs ($P_{EMS.i}$). The energy that exits Electra's network is extracted from the Reconciliation Manager's report GR265 ($P_{GR265.e}$).

Electra's total network reconciliation losses are calculated as:

$$\text{Reconciliation Losses} = P_{EMS.i} - P_{GR265.e}$$

6   NON-TECHNICAL LOSSES

Non-technical losses for Electra's network are calculated as follows:

$$\text{Non-Technical Losses} = \text{Reconciliation Losses} - \text{Technical Losses}$$

This figure gives Electra a reasonable understanding of the proportion of non-technical losses allowing us to focus resources appropriately to minimise non-technical losses in forthcoming years.

7   CALCULATED LOSSES

For the period applicable from 1 May 2023, Electra reports the following:

7.1 Reconciliation Loss Factors

Code / ICP	Description	Loss Factor Code	Loss Factor
Electra Network	LV Connections	1	1.071
0110007806EL3CF	Mangahao King Country Energy	MHO1	1.000

7.2 Losses by Category

Description	Losses (%)
Total Losses	6.60%
Total Technical losses	4.71%
Non-technical losses	1.89%

7.3 Technical Losses by Network Study Area

Network Area	Technical Losses (%)
Northern (from Mangahao GXP)	5.8
Southern (from Paraparaumu GXP)	4.1