



Auckland Network

Supplementary Information – Substation Load Characteristics

EECA

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Document History & Status

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A	Draft

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1. Executive Summary

The following figures illustrate the characteristics of the major electrical substations (both GXPs and Zone Substations) in the Auckland region. This document supplements the main report titled "*Auckland – Spare Capacity and Load Characteristics*".

For each GXP, the January 2023 through December 2023 apparent (MVA) and reactive loadings (MVAR) are presented. For each Zone Substation, the apparent power (MVA) or real power (MW) loadings only are presented. The data is presented in graphs of:

- The load profile for the entire year.
- The maximum and minimum loads for each of the 365 days.
- Load profiles for two weeks in summer and two weeks in winter.
- Typical daily summer and winter load profiles.
- A load duration curve for the entire year.

2. Zone Substations

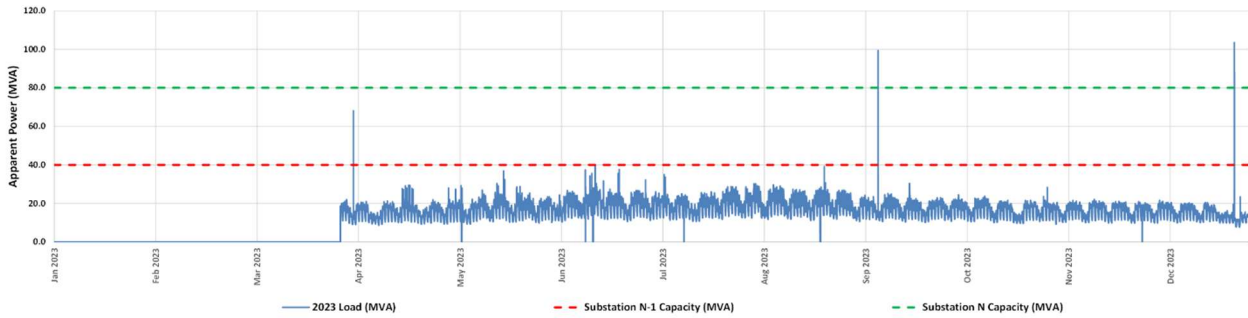
2.1 Counties Energy

The characteristics of the zone substation **apparent power loadings** within Counties Energy's network are shown in the following:

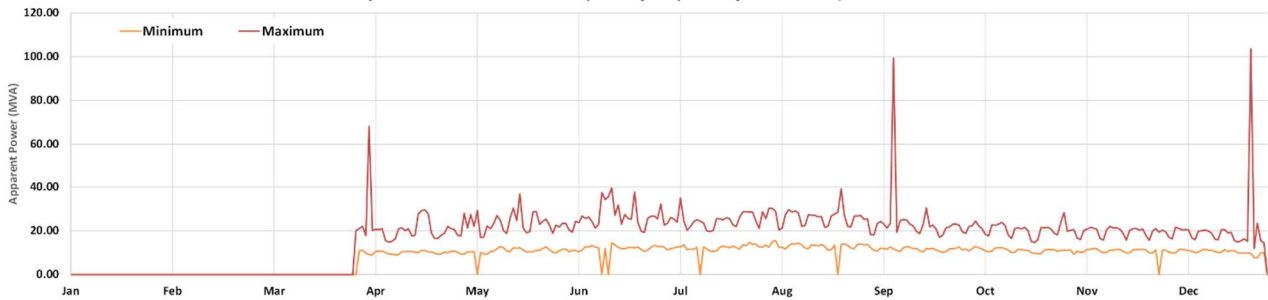
- Figure 1. Ōpaheke 110/11 kV zone substation: Apparent power (MVA) load characteristics.
- Figure 2. Barber Rd 110/11 kV zone substation: Apparent power (MVA) load characteristics.
- Figure 3. Pukekohe 110/11 kV zone substation: Apparent power (MVA) load characteristics.
- Figure 4. Pōkeno 110/11 kV zone substation: Apparent power (MVA) load characteristics.
- Figure 5. Tuakau 110/11 kV zone substation: Apparent power (MVA) load characteristics.
- Figure 6. Karaka 33/11 kV zone substation: Apparent power (MVA) load characteristics.
- Figure 7. Waiuku 33/11 kV zone substation: Apparent power (MVA) load characteristics.
- Figure 8. Maioro 33/11 kV zone substation: Apparent power (MVA) load characteristics.

Ōpaheke MVA

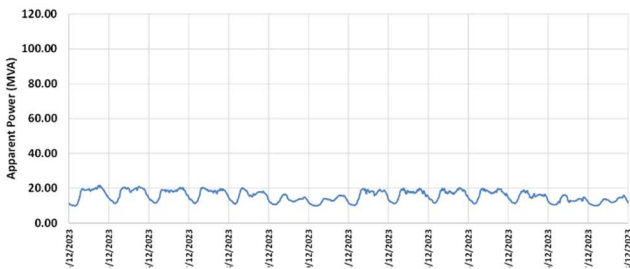
Opaheke Zone Substation (2023 year) - Half hourly loading



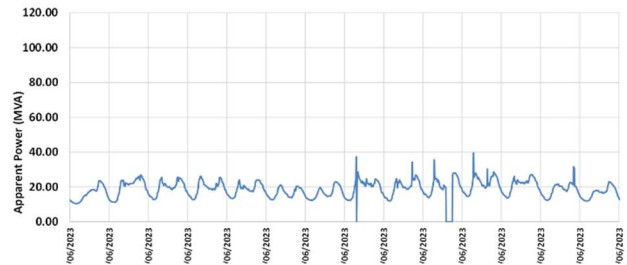
Opaheke Zone Substation (2023 year) - Daily Maximum/Minimum



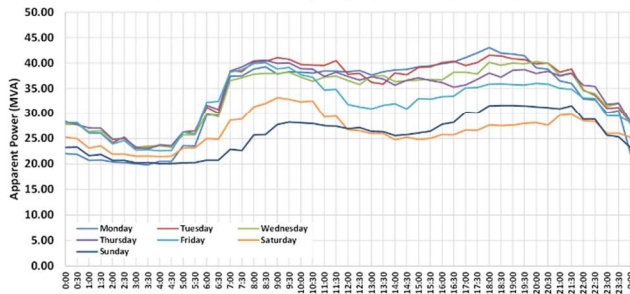
Opaheke Zone Substation (2023 year) - Summer (December)



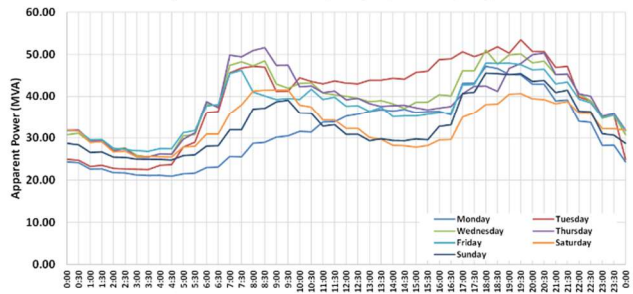
Opaheke Zone Substation (2023 year) - Winter (June)



Opaheke Zone Substation (2023 year) - Summer (December)



Opaheke Zone Substation (2023 year) - Winter (June)



Opaheke Zone Substation (2023 year) - Load Duration Curve

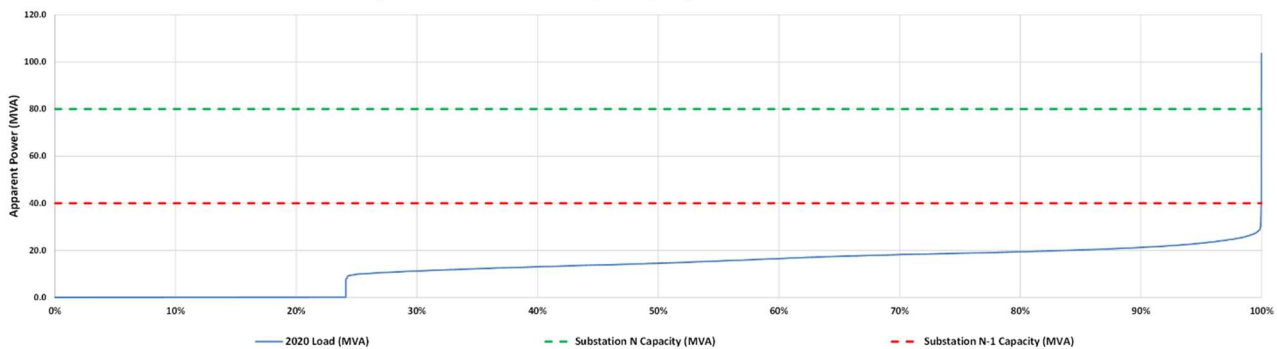
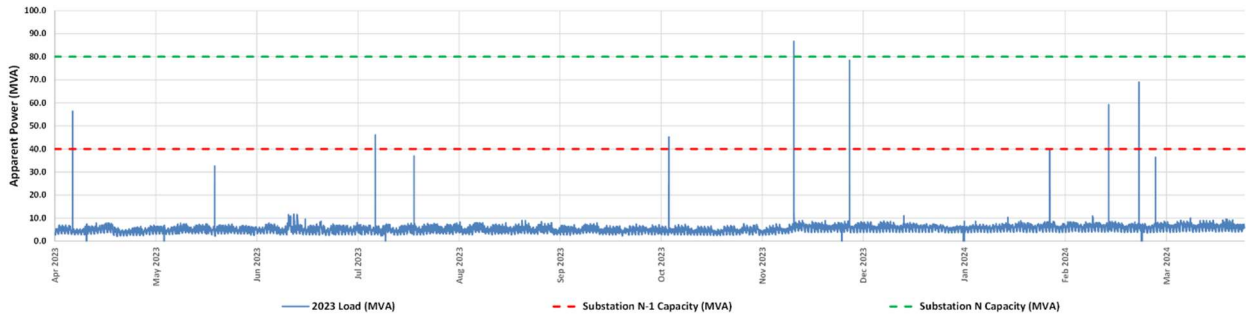


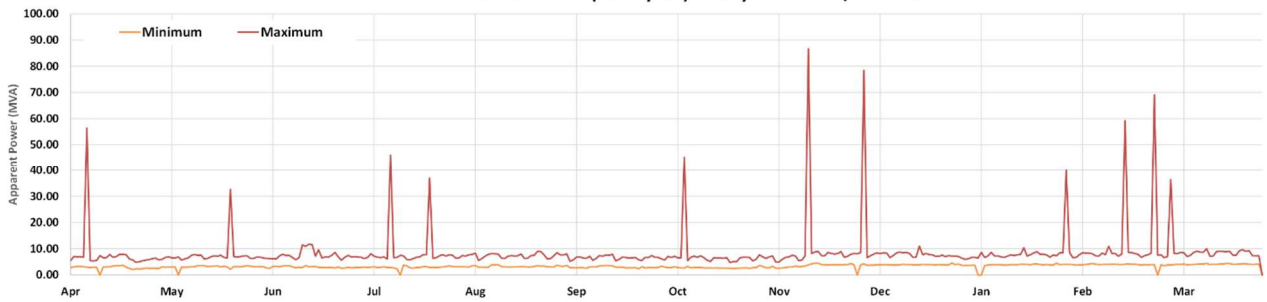
Figure 1. Ōpaheke 110/11 kV zone substation: Apparent power (MVA) load characteristics.

Barber Rd MVA

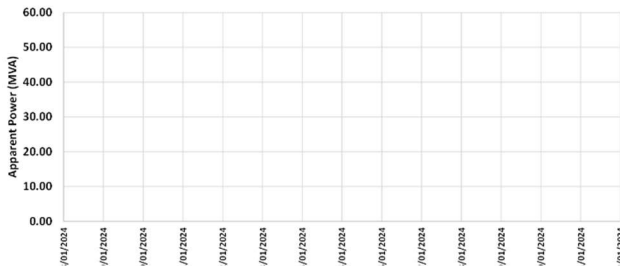
Barber Rd Zone Substation (2023 year) - Half hourly loading



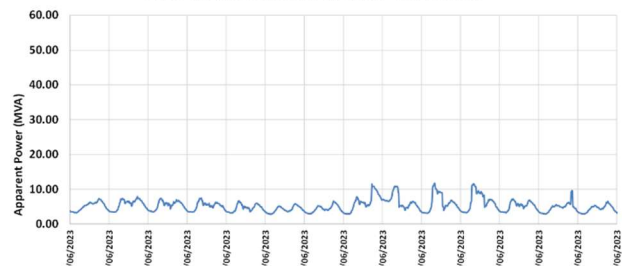
Barber Rd Zone Substation (2023 year) - Daily Maximum/Minimum



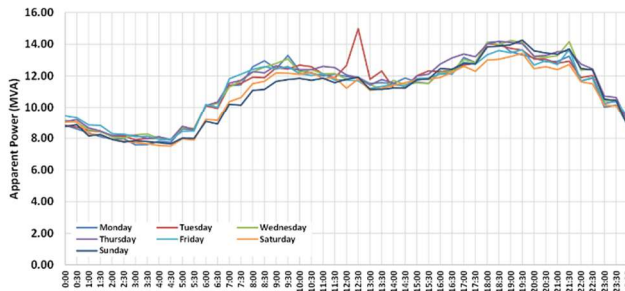
Barber Rd Zone Substation (2023 year) - Summer (January)



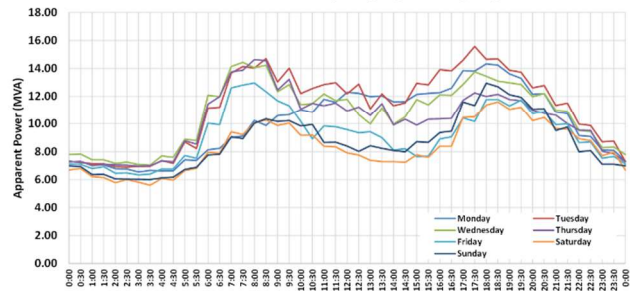
Barber Rd Zone Substation (2023 year) - Winter (June)



Barber Rd Zone Substation (2023 year) - Summer (January)



Barber Rd Zone Substation (2023 year) - Winter (June)



Barber Rd Zone Substation (2023 year) - Load Duration Curve

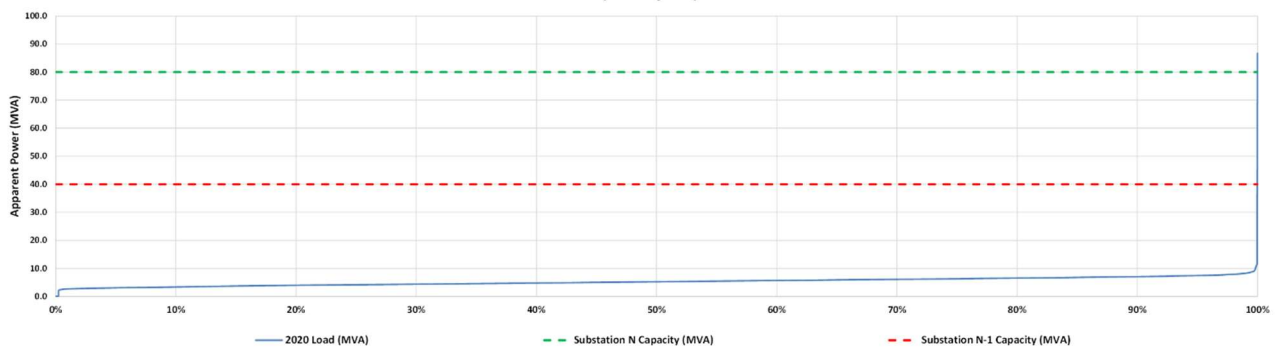
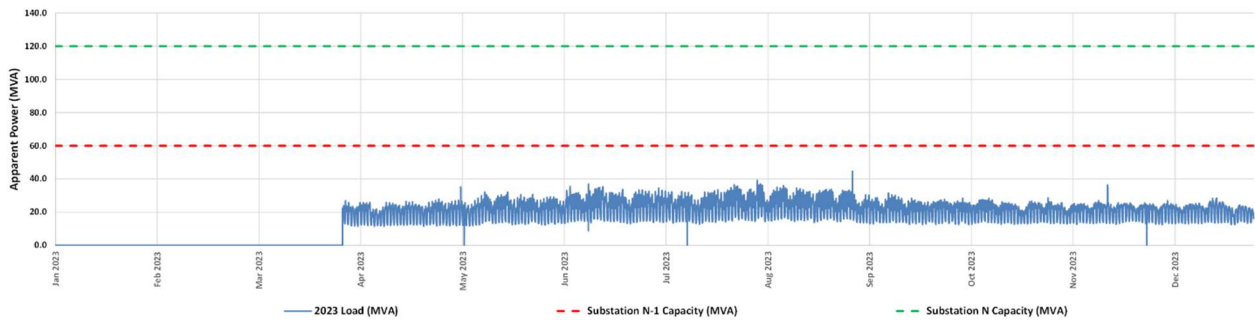


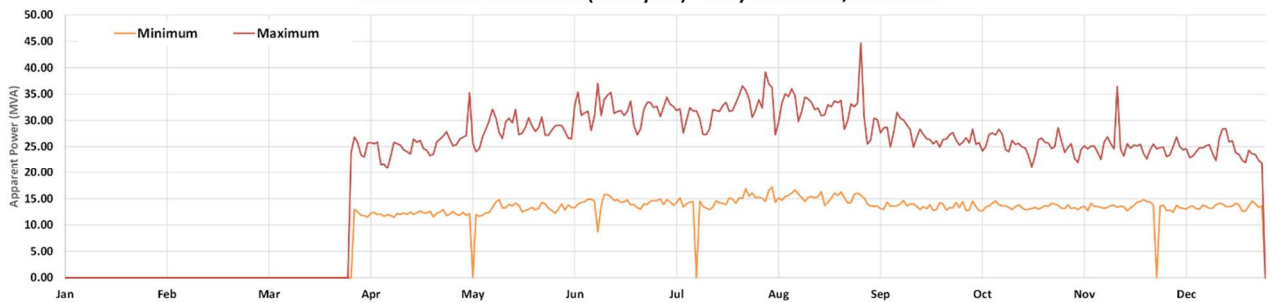
Figure 2. Barber Rd 110/11 kV zone substation: Apparent power (MVA) load characteristics.

Pukekohe MVA

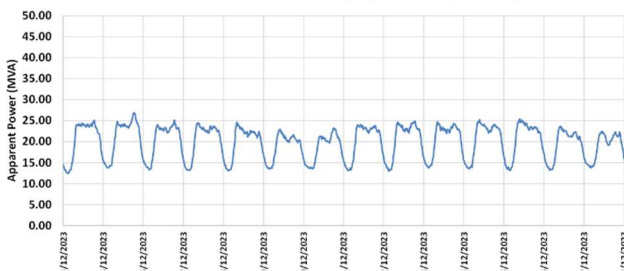
Pukekohe Zone Substation (2023 year) - Half hourly loading



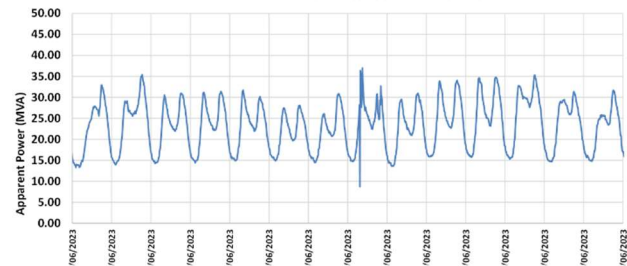
Pukekohe Zone Substation (2023 year) - Daily Maximum/Minimum



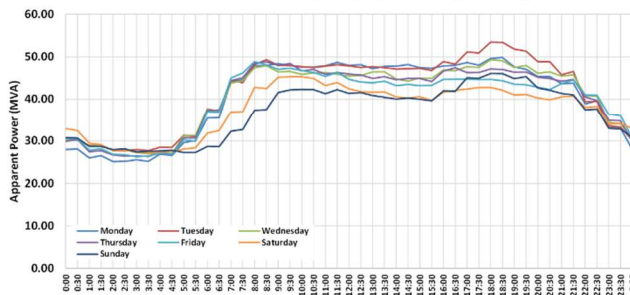
Pukekohe Zone Substation (2023 year) - Summer (December)



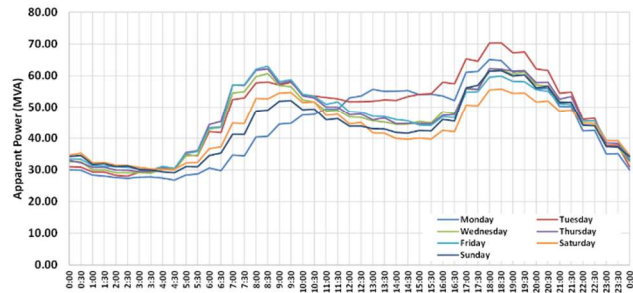
Pukekohe Zone Substation (2023 year) - Winter (June)



Pukekohe Zone Substation (2023 year) - Summer (December)



Pukekohe Zone Substation (2023 year) - Winter (June)



Pukekohe Zone Substation (2023 year) - Load Duration Curve

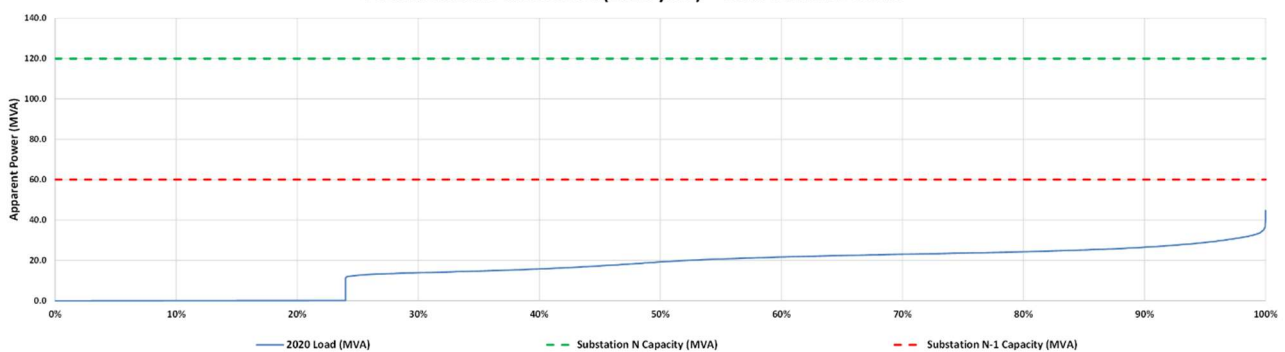
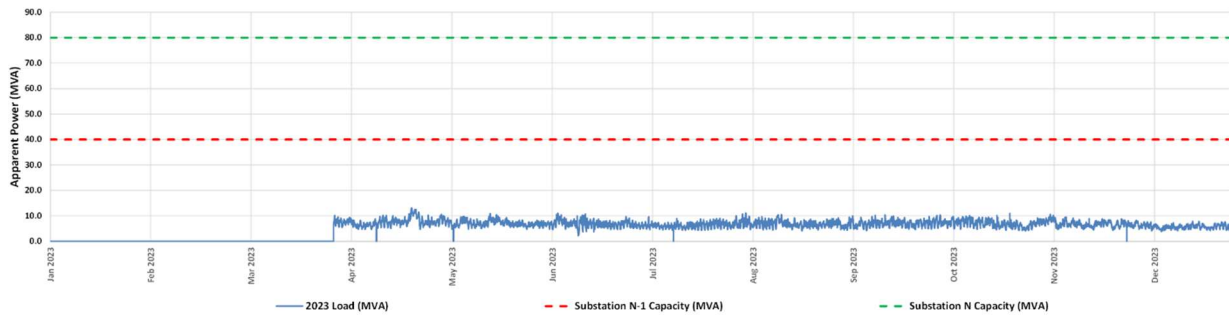


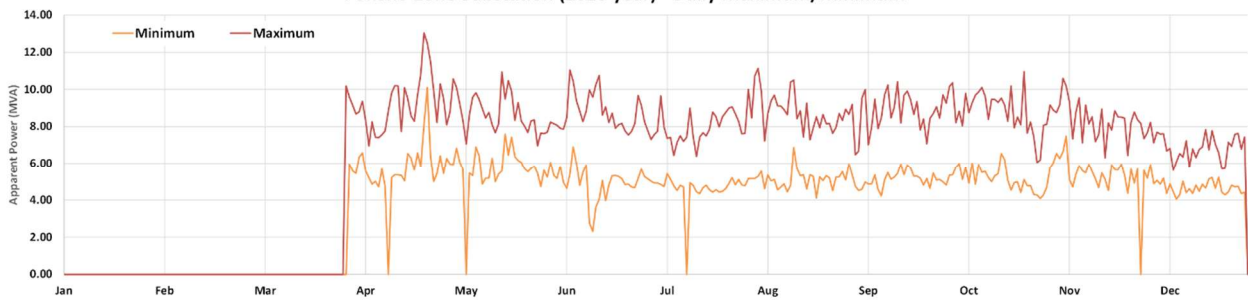
Figure 3. Pukekohe 110/11 kV zone substation: Apparent power (MVA) load characteristics.

Pōkeno MVA

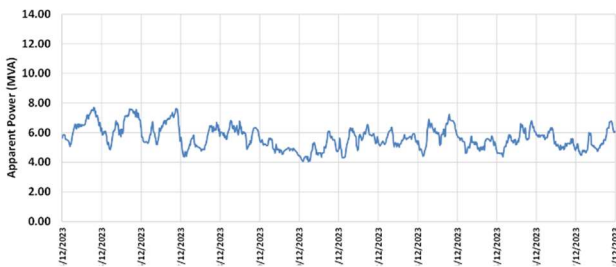
Pokeno Zone Substation (2023 year) - Half hourly loading



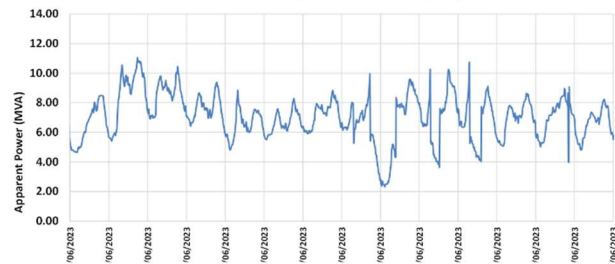
Pokeno Zone Substation (2023 year) - Daily Maximum/Minimum



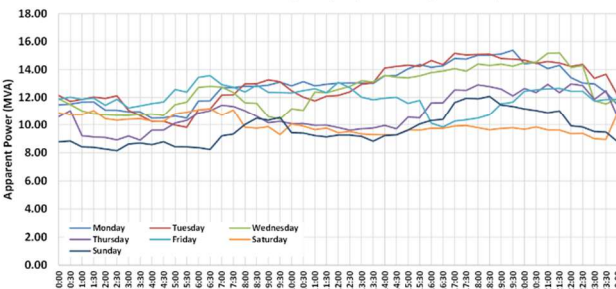
Pokeno Zone Substation (2023 year) - Summer (December)



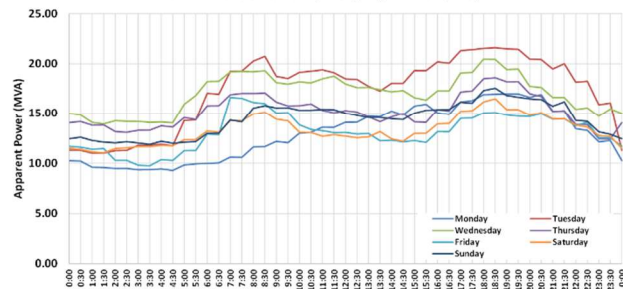
Pokeno Zone Substation (2023 year) - Winter (June)



Pokeno Zone Substation (2023 year) - Summer (December)



Pokeno Zone Substation (2023 year) - Winter (June)



Pokeno Zone Substation (2023 year) - Load Duration Curve

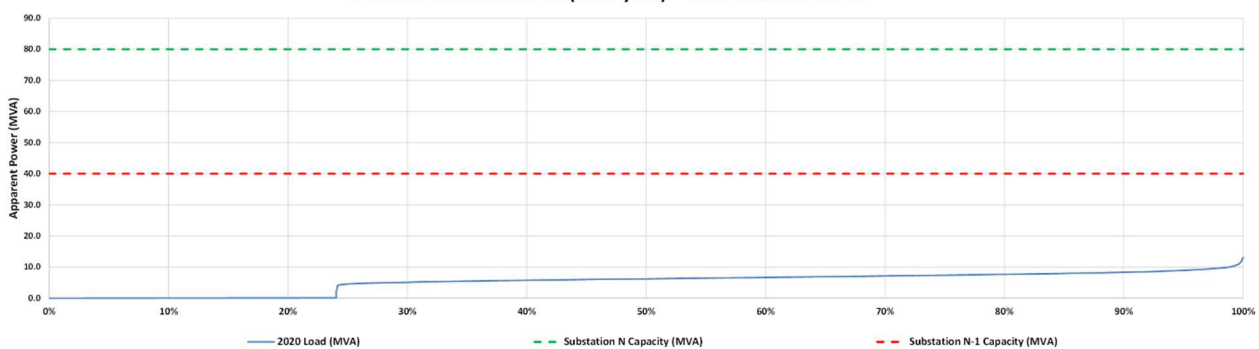
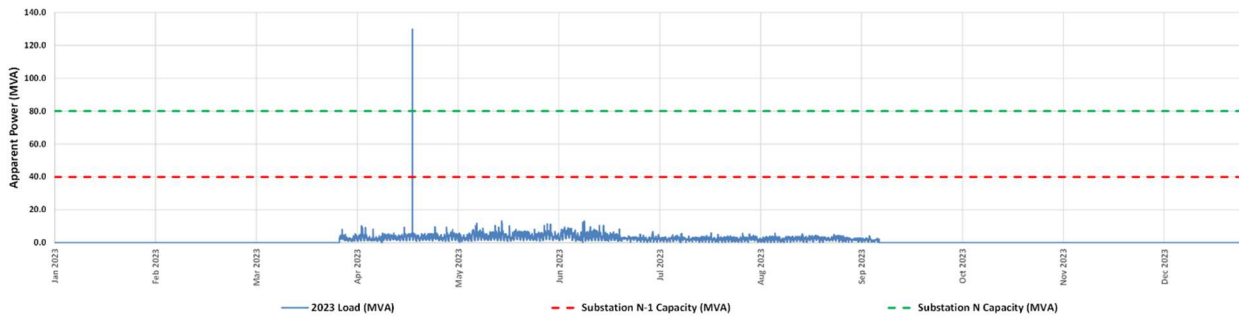


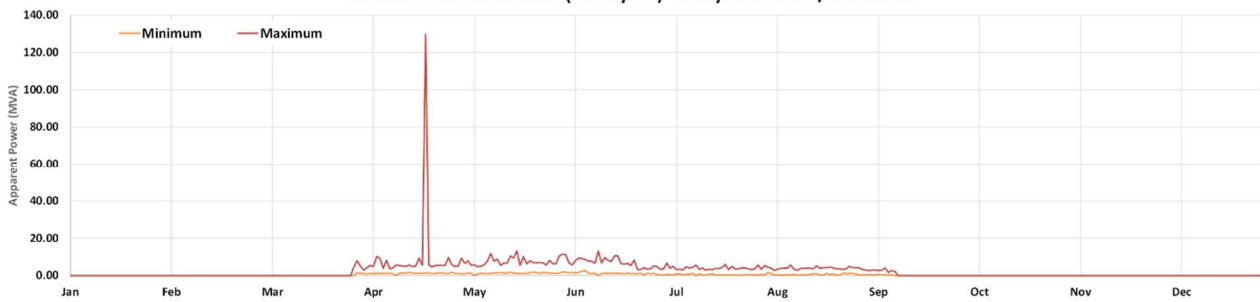
Figure 4. Pōkeno 110/11 kV zone substation: Apparent power (MVA) load characteristics.

Tuakau MVA

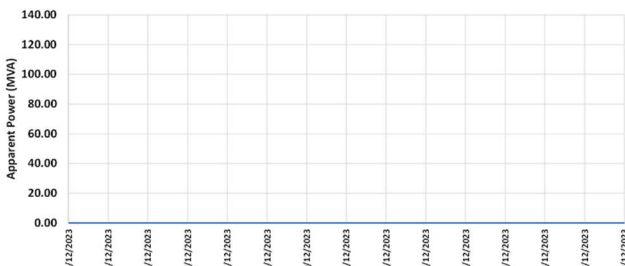
Tuakau Zone Substation (2023 year) - Half hourly loading



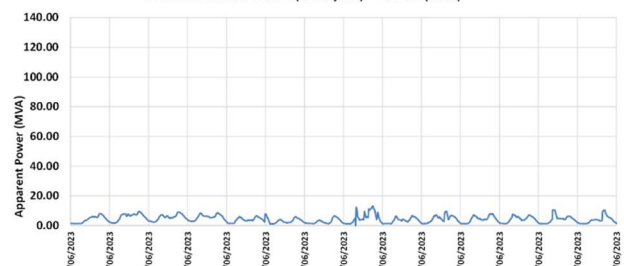
Tuakau Zone Substation (2023 year) - Daily Maximum/Minimum



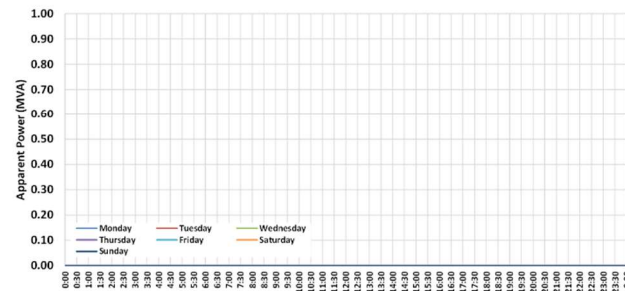
Tuakau Zone Substation (2023 year) - Summer (December)



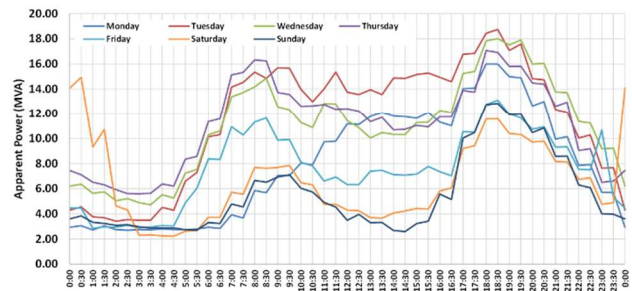
Tuakau Zone Substation (2023 year) - Winter (June)



Tuakau Zone Substation (2023 year) - Summer (December)



Tuakau Zone Substation (2023 year) - Winter (June)



Tuakau Zone Substation (2023 year) - Load Duration Curve

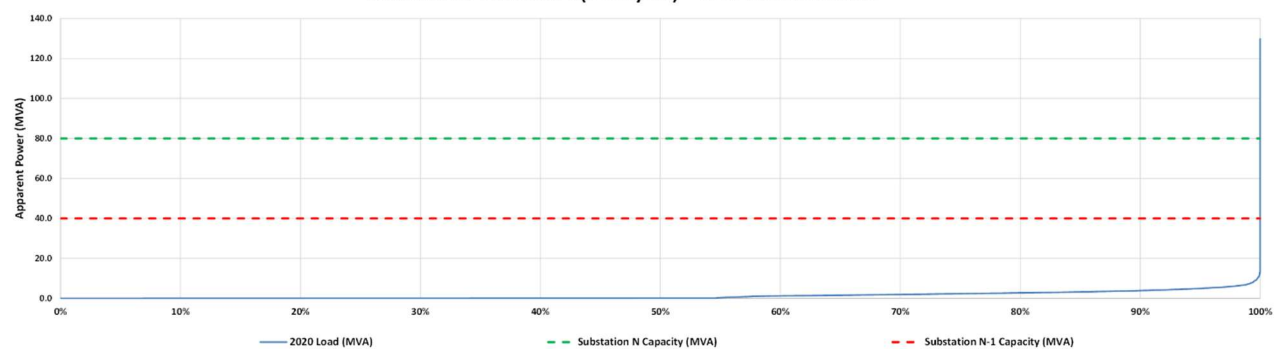
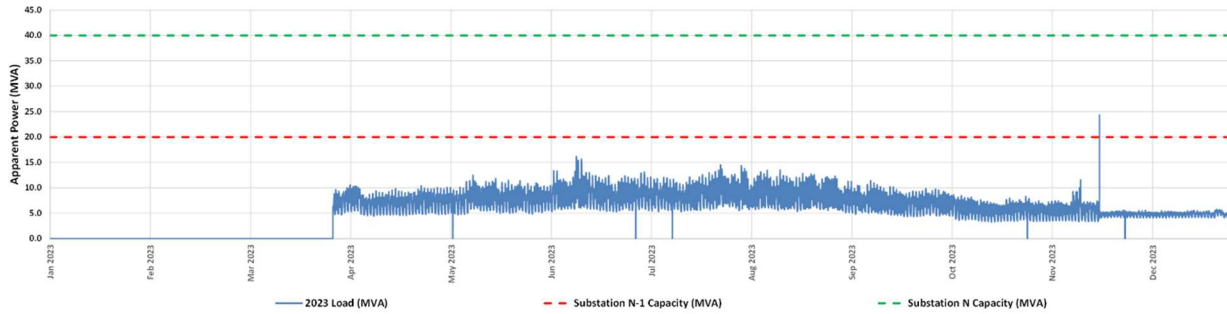


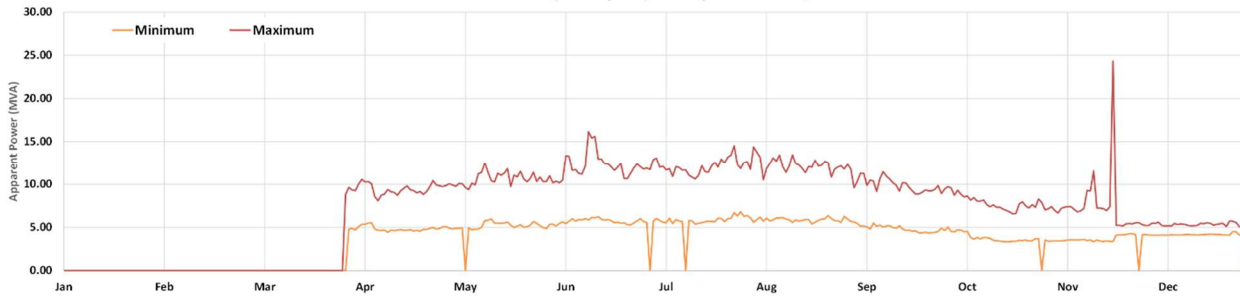
Figure 5. Tuakau 110/11 kV zone substation: Apparent power (MVA) load characteristics.

Karaka MVA

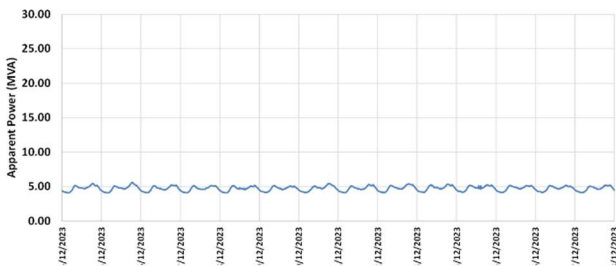
Karaka Zone Substation (2023 year) - Half hourly loading



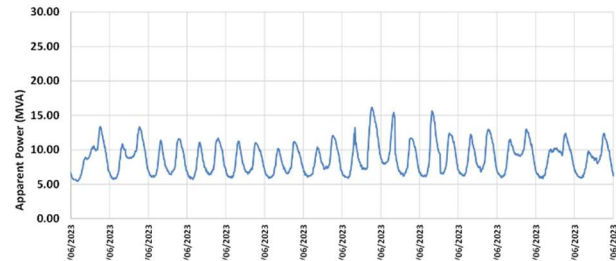
Karaka Zone Substation (2023 year) - Daily Maximum/Minimum



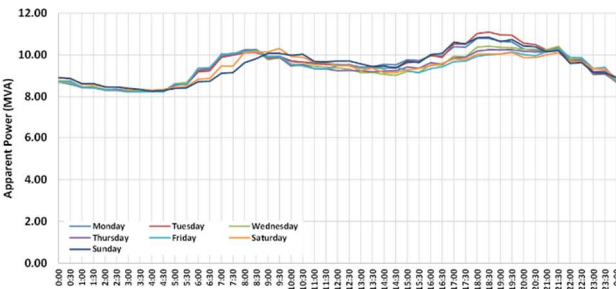
Karaka Zone Substation (2023 year) - Summer (December)



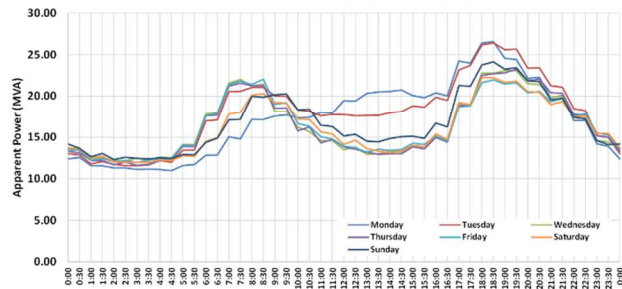
Karaka Zone Substation (2023 year) - Winter (June)



Karaka Zone Substation (2023 year) - Summer (December)



Karaka Zone Substation (2023 year) - Winter (June)



Karaka Zone Substation (2023 year) - Load Duration Curve

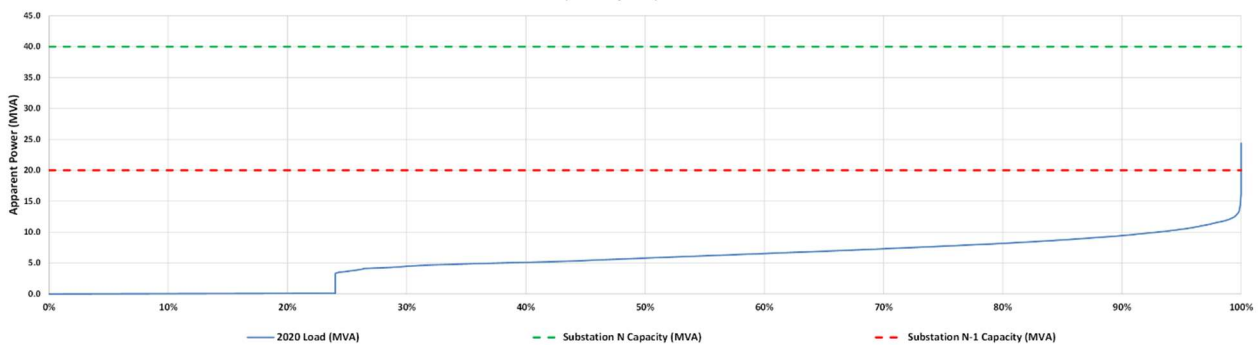
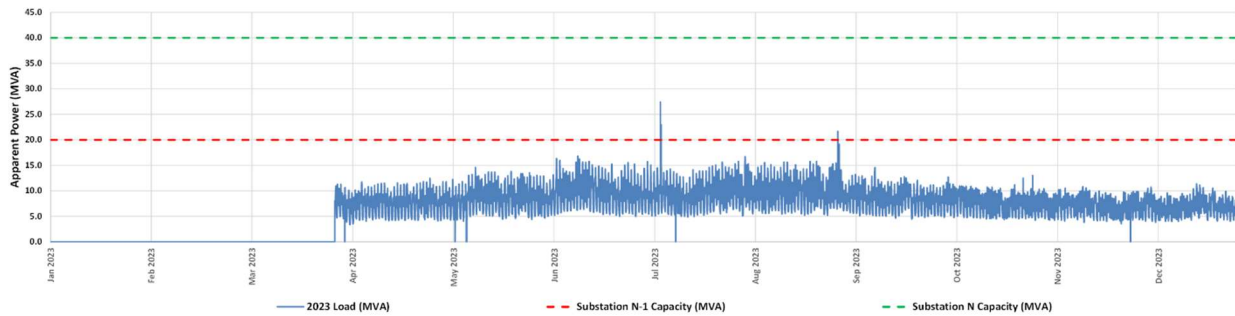


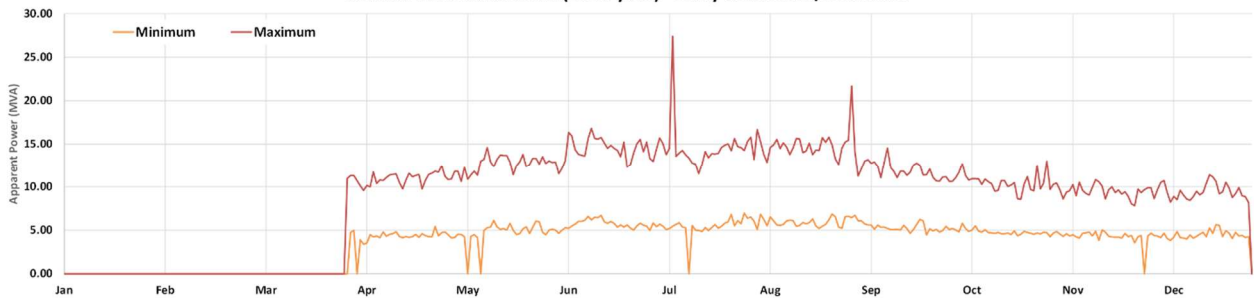
Figure 6. Karaka 33/11 kV zone substation: Apparent power (MVA) load characteristics.

Waiuku MVA

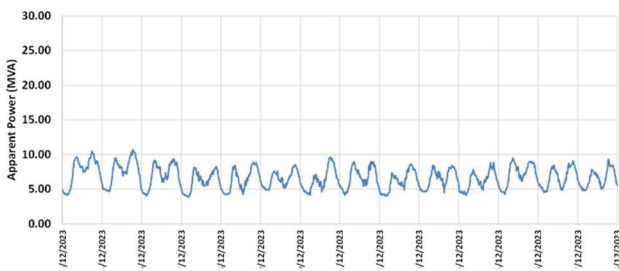
Waiuku Zone Substation (2023 year) - Half hourly loading



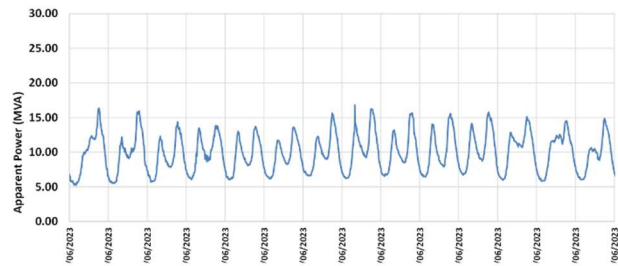
Waiuku Zone Substation (2023 year) - Daily Maximum/Minimum



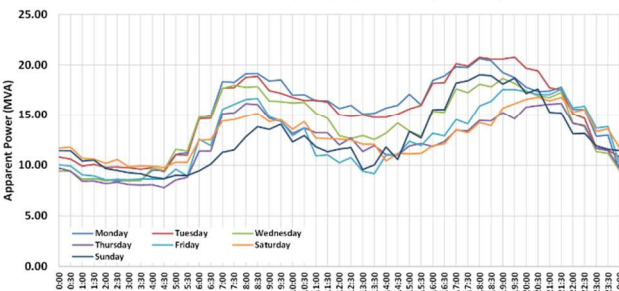
Waiuku Zone Substation (2023 year) - Summer (December)



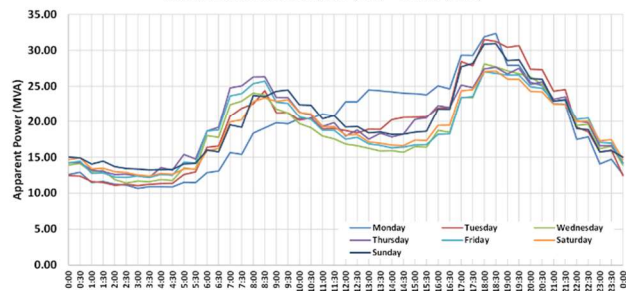
Waiuku Zone Substation (2023 year) - Winter (June)



Waiuku Zone Substation (2023 year) - Summer (December)



Waiuku Zone Substation (2023 year) - Winter (June)



Waiuku Zone Substation (2023 year) - Load Duration Curve

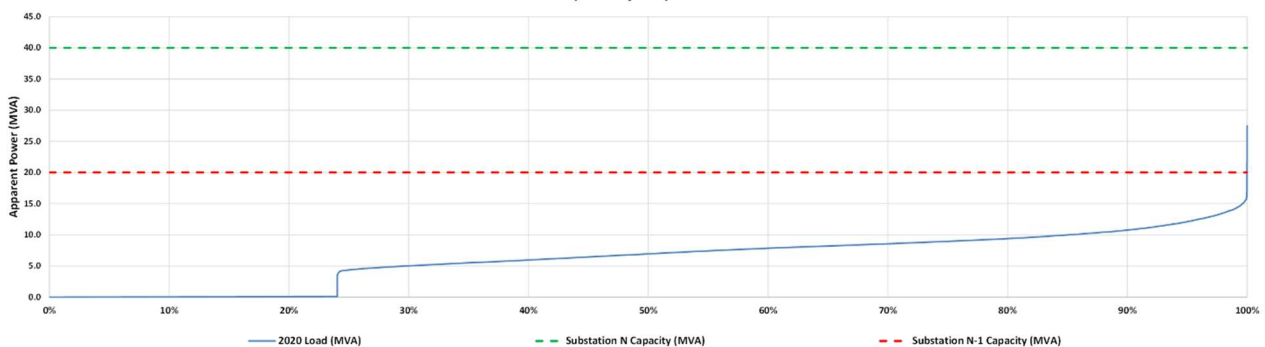
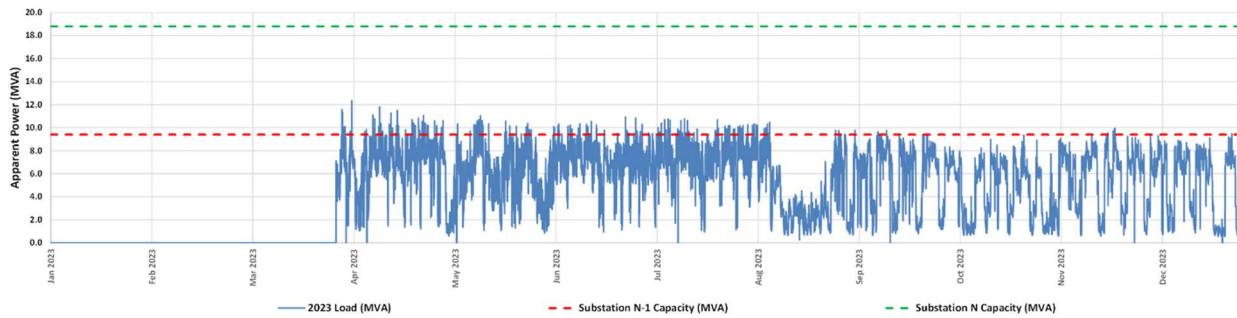


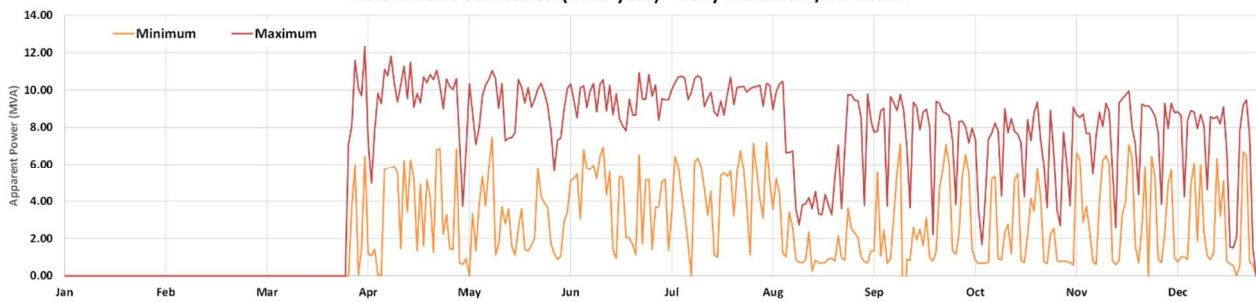
Figure 7. Waiuku 33/11 kV zone substation: Apparent power (MVA) load characteristics.

Maioiro MVA

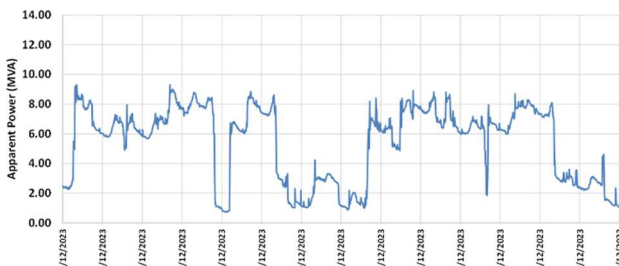
Maioiro Zone Substation (2023 year) - Half hourly loading



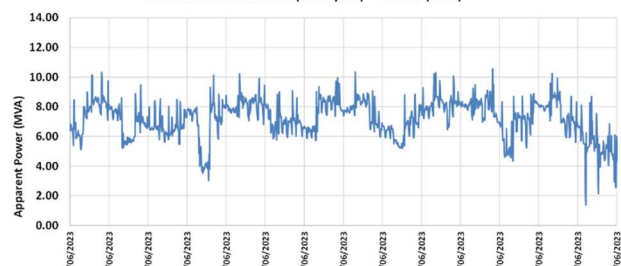
Maioiro Zone Substation (2023 year) - Daily Maximum/Minimum



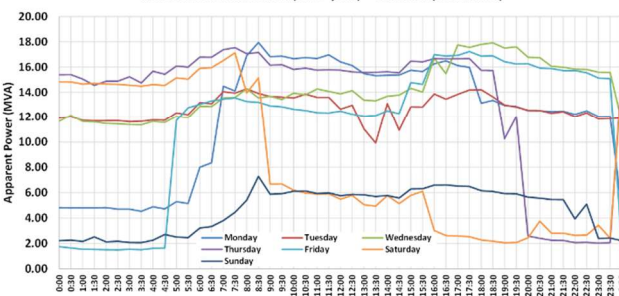
Maioiro Zone Substation (2023 year) - Summer (December)



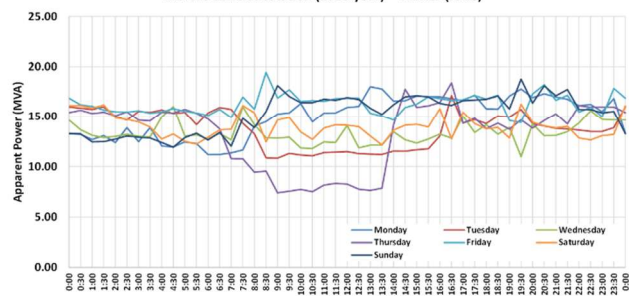
Maioiro Zone Substation (2023 year) - Winter (June)



Maioiro Zone Substation (2023 year) - Summer (December)



Maioiro Zone Substation (2023 year) - Winter (June)



Maioiro Zone Substation (2023 year) - Load Duration Curve

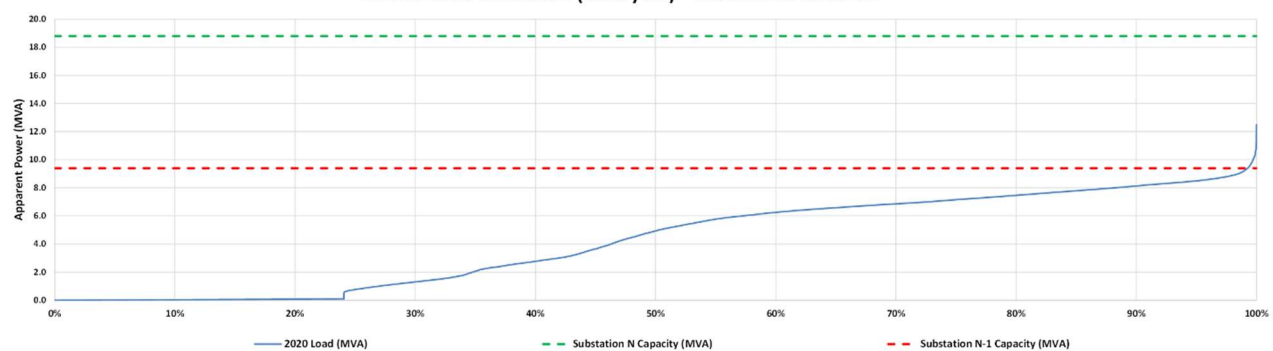


Figure 8. Maioiro 33/11 kV zone substation: Apparent power (MVA) load characteristics.