



Bay of Plenty Network

Supplementary Information – Substation Load Characteristics

EECA

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Document History & Status

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B	Final

Table of Contents

1. Executive Summary	3
2. Transmission/GXP Substations	4
3. Zone Substations	31
1.1 Horizon Energy	31
1.2 Powerco	40
1.3 Unison (Rotorua Region)	63

1. Executive Summary

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

For each GXP, the January 2022 through December 2022 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. Transmission/GXP Substations

The characteristics of the transmission substation **apparent and reactive power loadings** are shown in the following:

- **Edgecumbe GXP**
 - Figure 1 Edgecumbe: Apparent power (MVA) load characteristics.
 - Figure 2 Edgecumbe: Reactive power (MVar) load characteristics.
- **Kawerau GXP**
 - Figure 3 Kawerau: Apparent power (MVA) load characteristics.
 - Figure 4 Kawerau: Reactive power (MVar) load characteristics.
- **Waiotahi 11 kV GXP**
 - Figure 5 Waiotahi 11 kV: Apparent power (MVA) load characteristics.
 - Figure 6 Waiotahi 11 kV: Reactive power (MVar) load characteristics.
- **Waiotahi 50 kV GXP**
 - Figure 7 Waiotahi 50 kV: Apparent power (MVA) load characteristics.
 - Figure 8 Waiotahi 50 kV: Reactive power (MVar) load characteristics.
- **Tauranga 11 kV GXP**
 - Figure 9 Tauranga 11 kV: Apparent power (MVA) load characteristics.
 - Figure 10 Tauranga 11 kV: Reactive power (MVar) load characteristics.
- **Tauranga 33 kV GXP**
 - Figure 11 Tauranga 33 kV: Apparent power (MVA) load characteristics.
 - Figure 12 Tauranga 33 kV: Reactive power (MVar) load characteristics.
- **Kaitimako GXP**
 - Figure 13 Kaitimako: Apparent power (MVA) load characteristics.
 - Figure 14 Kaitimako: Reactive power (MVar) load characteristics.
- **Mount Maunganui GXP**
 - Figure 15 Mt Maunganui: Apparent power (MVA) load characteristics.
 - Figure 16 Mt Maunganui: Reactive power (MVar) load characteristics.
- **Te Matai GXP**
 - Figure 17 Te Matai: Apparent power (MVA) load characteristics.
 - Figure 18 Te Matai: Reactive power (MVar) load characteristics.
- **Rotorua 11 kV GXP**
 - Figure 19 Rotorua 11 kV: Apparent power (MVA) load characteristics.
 - Figure 20 Rotorua 11 kV: Reactive power (MVar) load characteristics.
- **Rotorua 33 kV GXP**
 - Figure 21 Rotorua 33 kV: Apparent power (MVA) load characteristics.
 - Figure 22 Rotorua 33 kV: Reactive power (MVar) load characteristics.
- **Owhata GXP**
 - Figure 23 Owhata: Apparent power (MVA) load characteristics.
 - Figure 24 Owhata: Reactive power (MVar) load characteristics.
- **Takurenga GXP**
 - Figure 25 Takurenga: Apparent power (MVA) load characteristics.
 - Figure 26 Takurenga: Reactive power (MVar) load characteristics.

Edgecumbe MVA

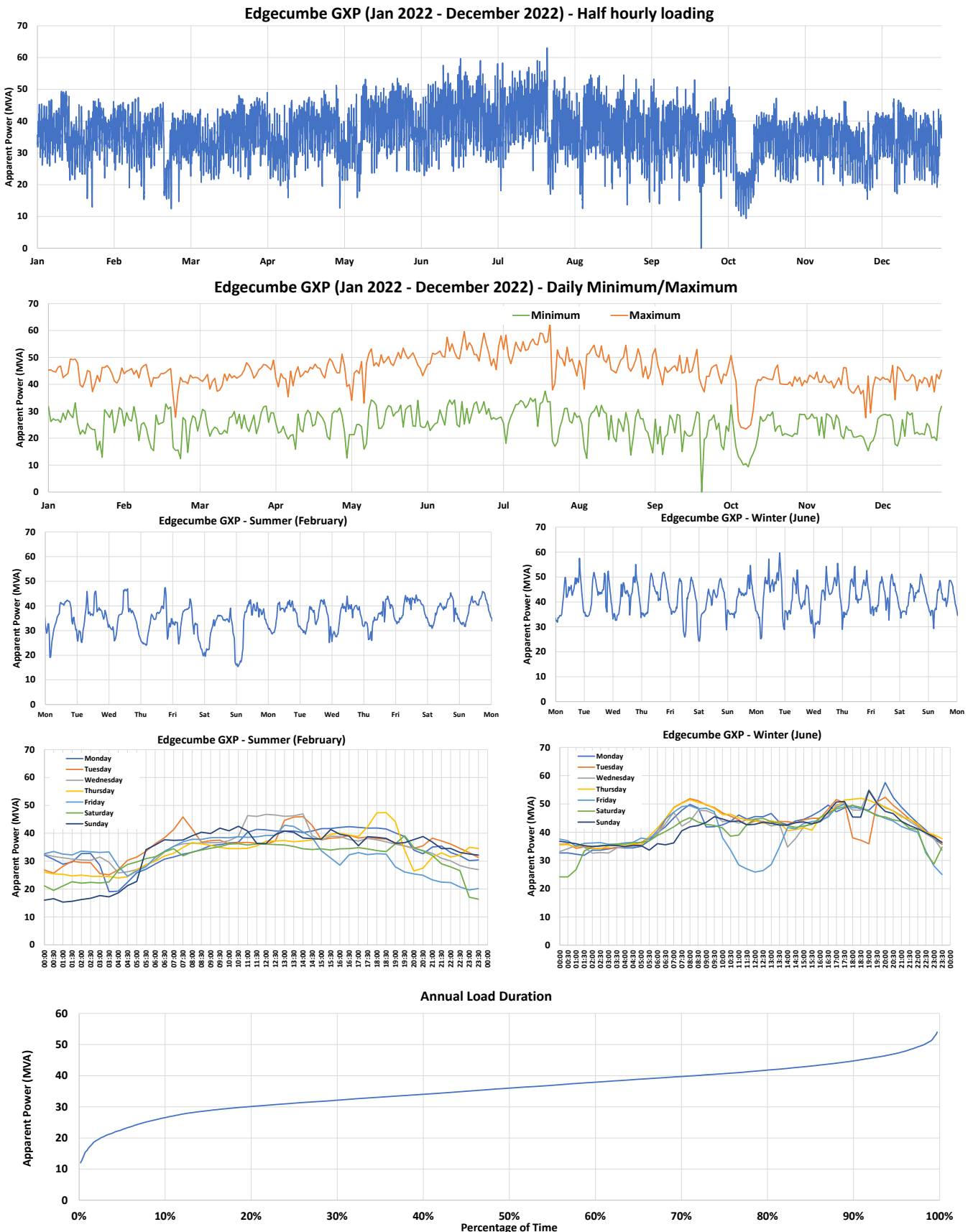


Figure 1 Edgecumbe: Apparent power (MVA) load characteristics.

Edgecumbe MVar

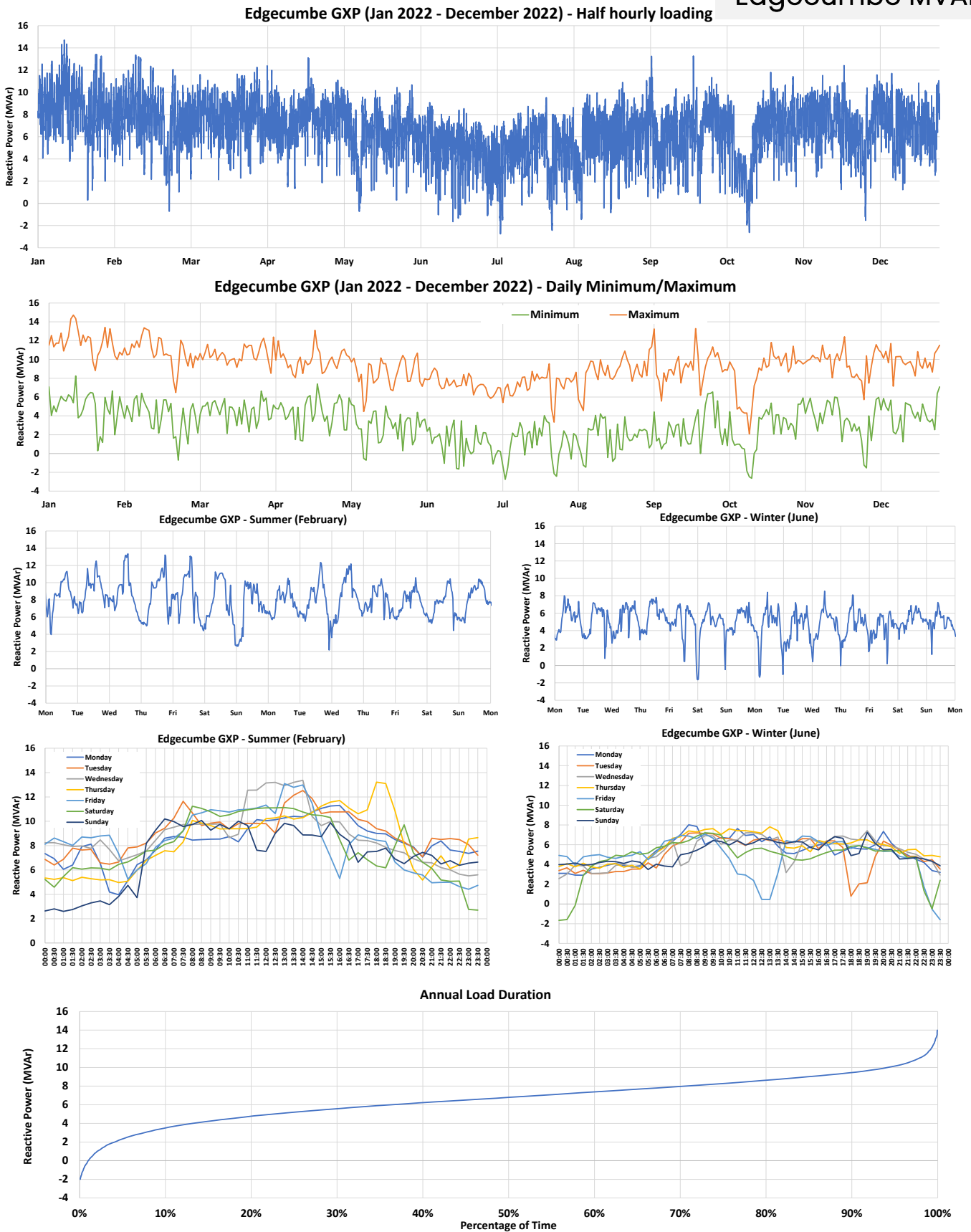


Figure 2 Edgecumbe: Reactive power (MVar) load characteristics.

Kawerau

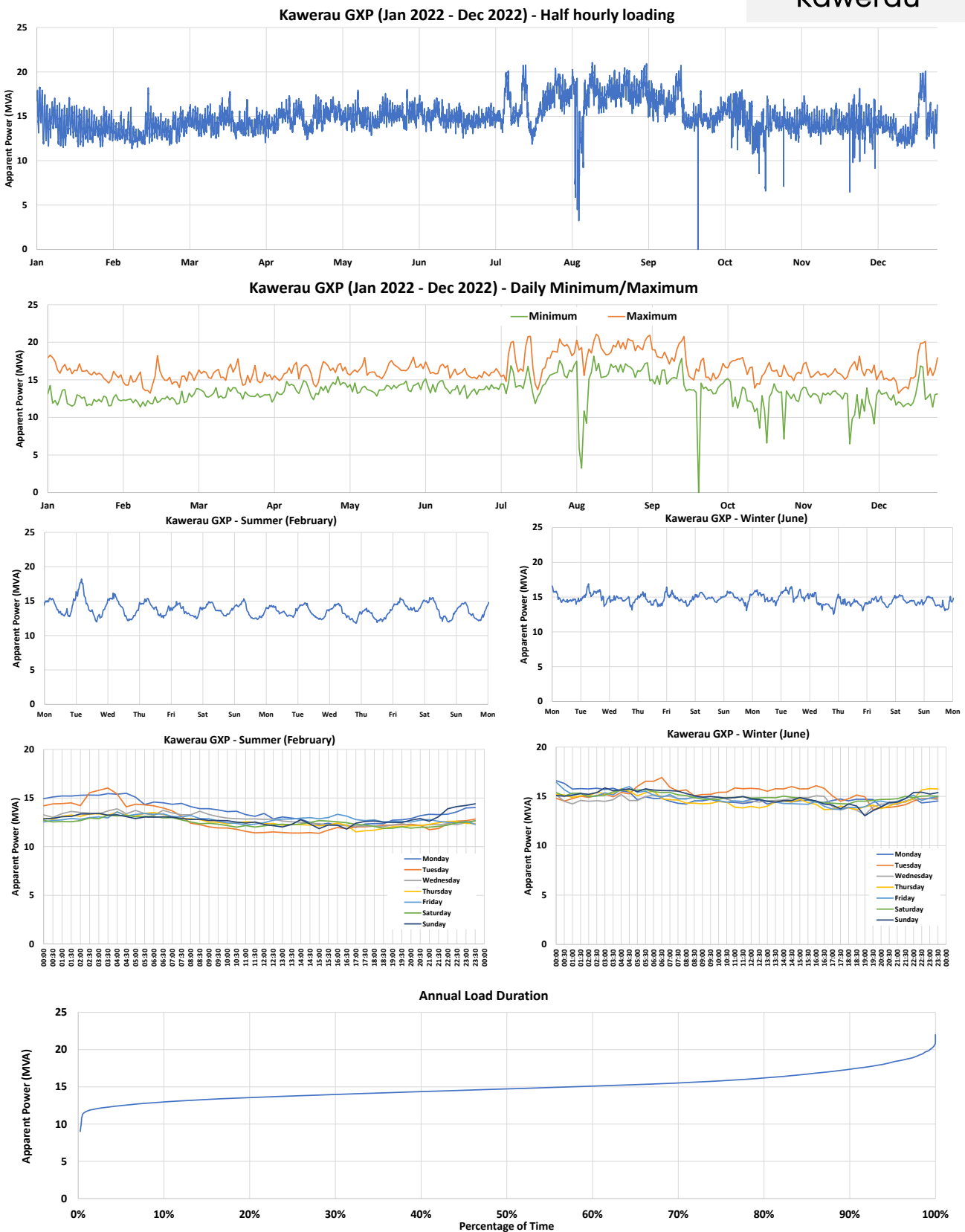


Figure 3 Kawerau: Apparent power (MVA) load characteristics.

Kawerau

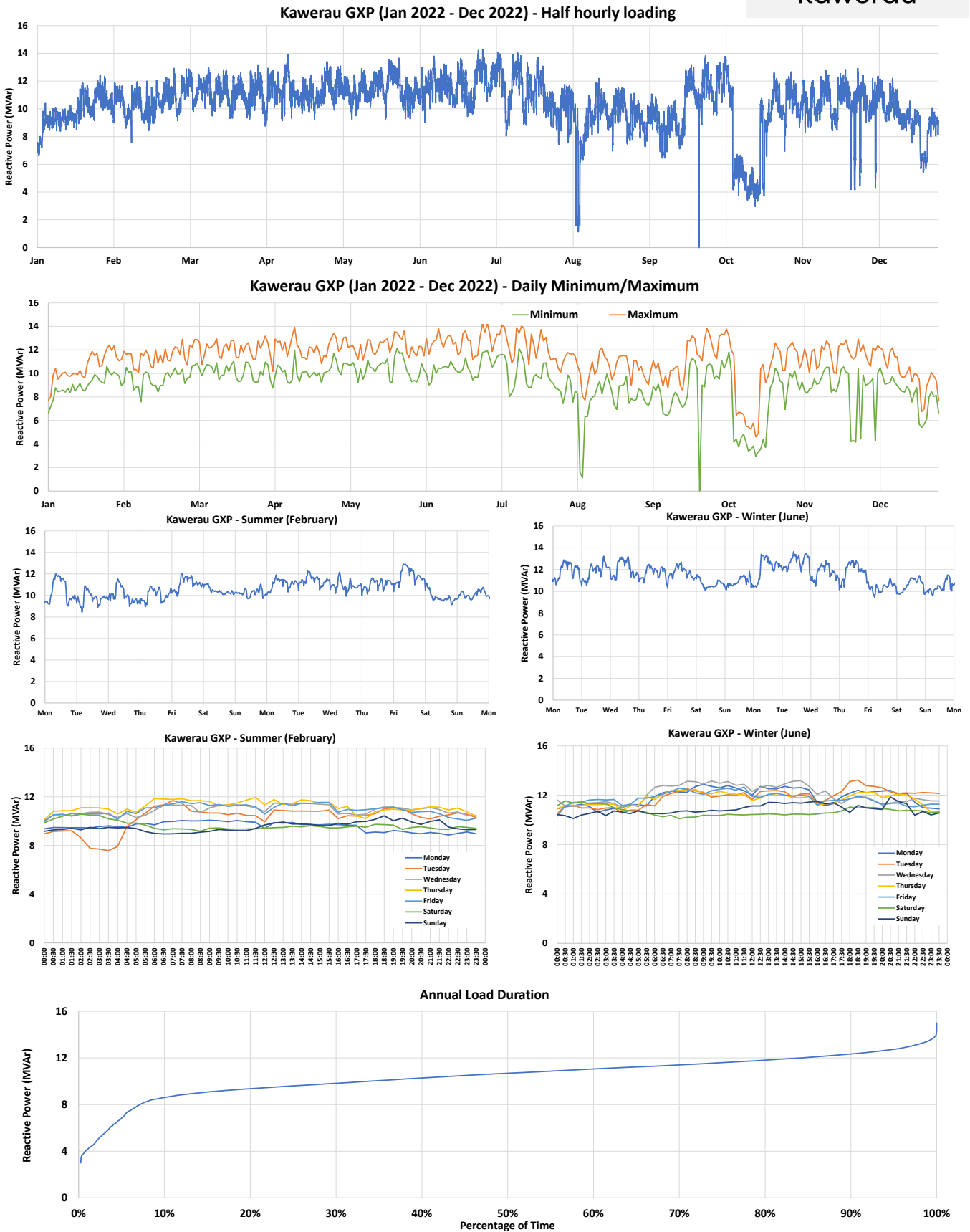


Figure 4 Kawerau: Reactive power (MVar) load characteristics.

Waiotahi 11 kV

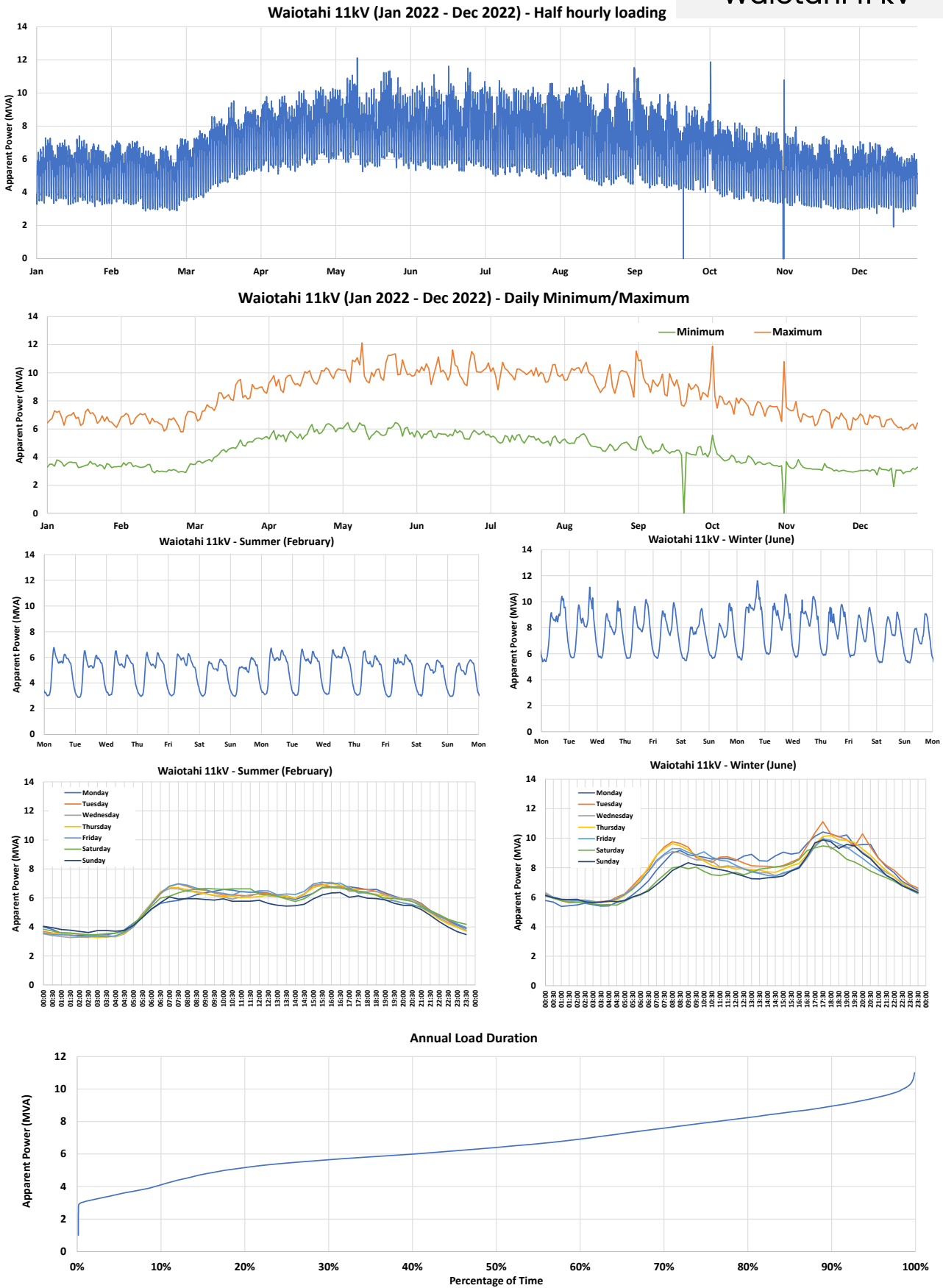


Figure 5 Waiotahi 11 kV: Apparent power (MVA) load characteristics.

Waiotahi 11 kV MVar

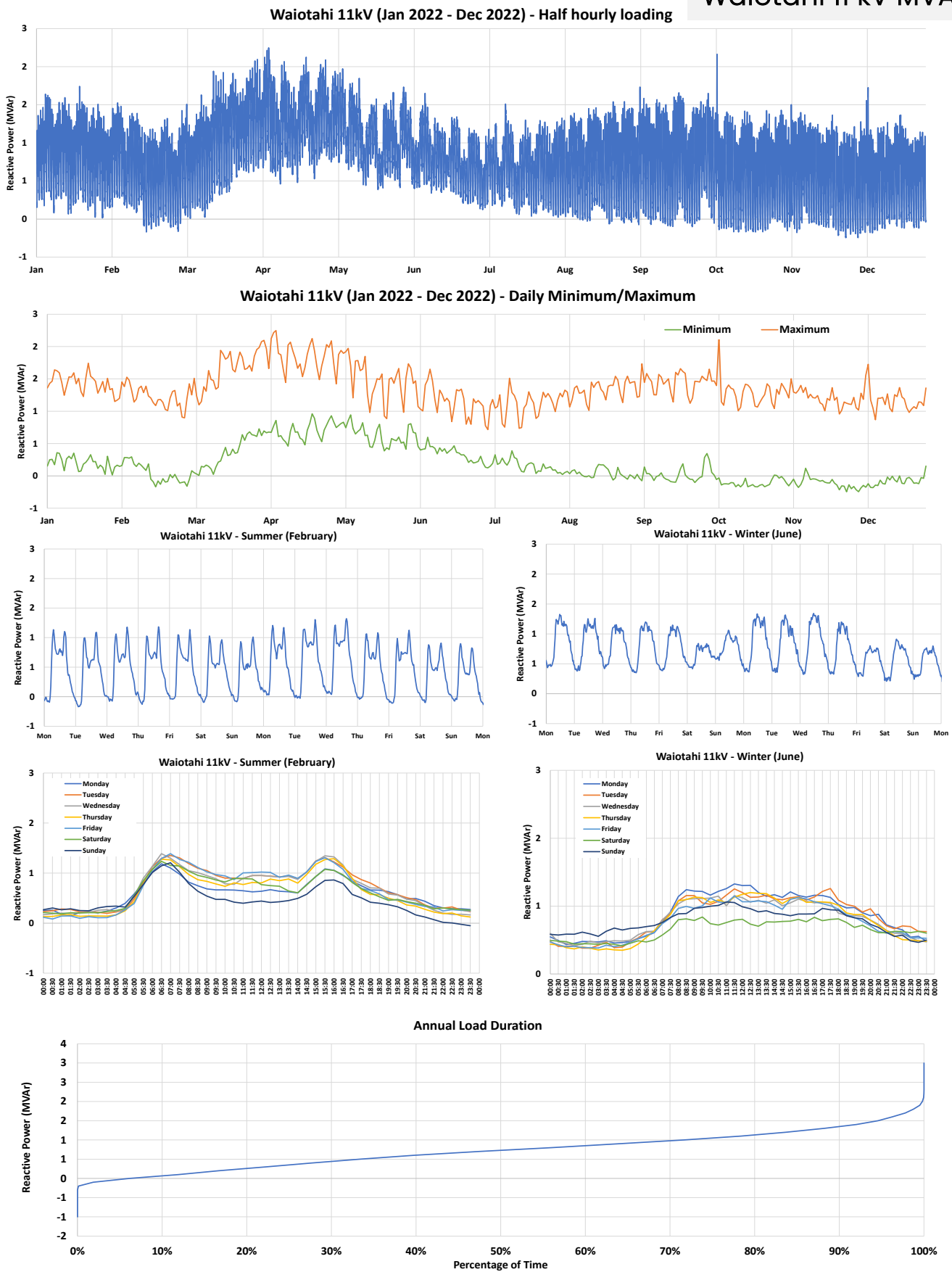
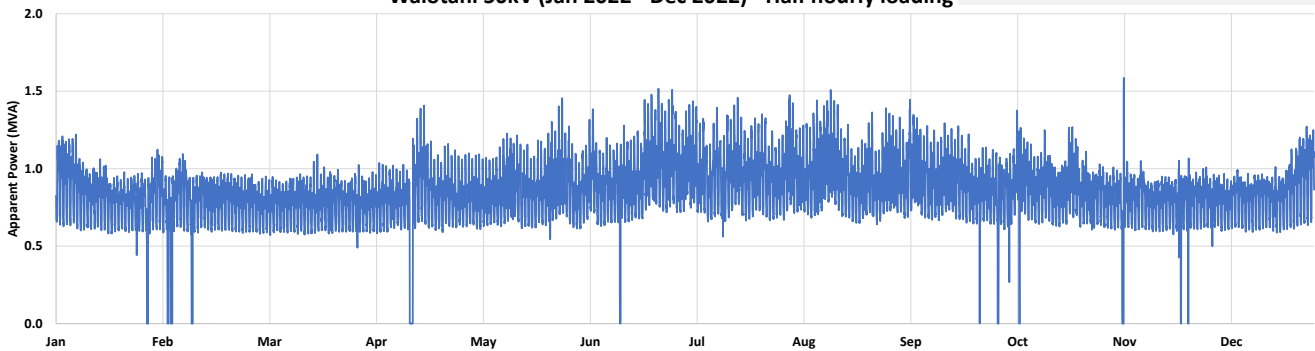


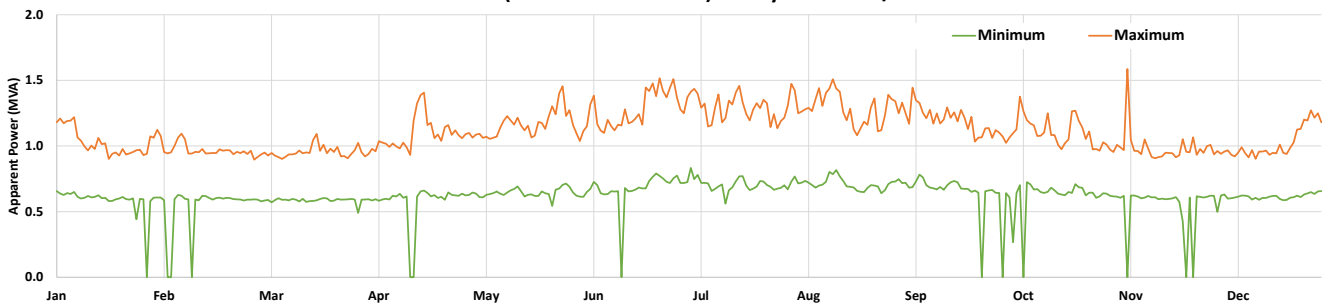
Figure 6 Waiotahi 11 kV: Reactive power (MVar) load characteristics.

Waiotahi 50 kV

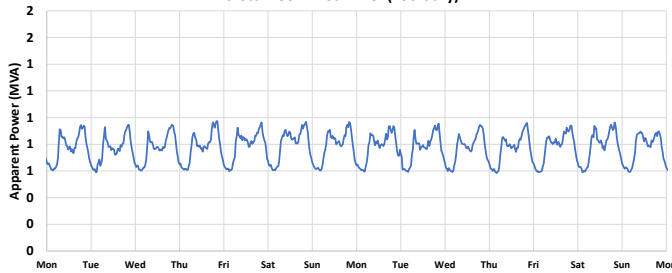
Waiotahi 50kV (Jan 2022 - Dec 2022) - Half hourly loading



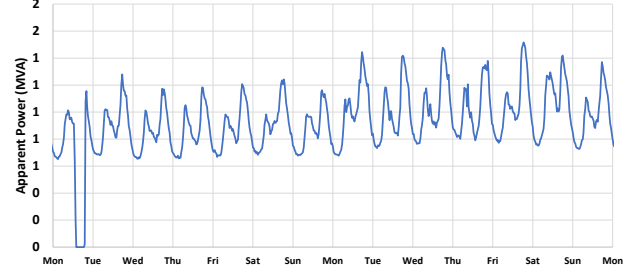
Waiotahi 50kV (Jan 2022 - Dec 2022) - Daily Minimum/Maximum



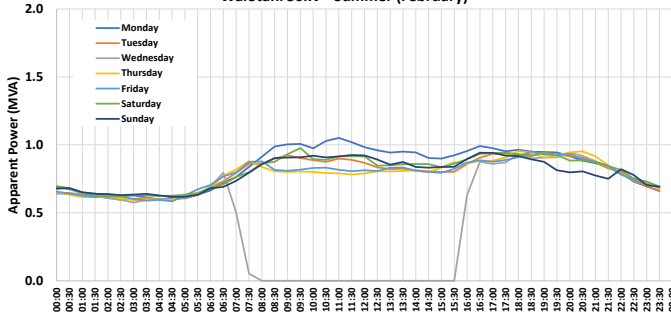
Waiotahi 50kV - Summer (February)



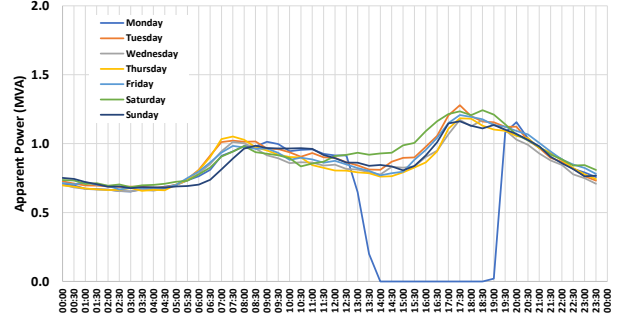
Waiotahi 50kV - Winter (June)



Waiotahi 50kV - Summer (February)



Waiotahi 50kV - Winter (June)



Annual Load Duration

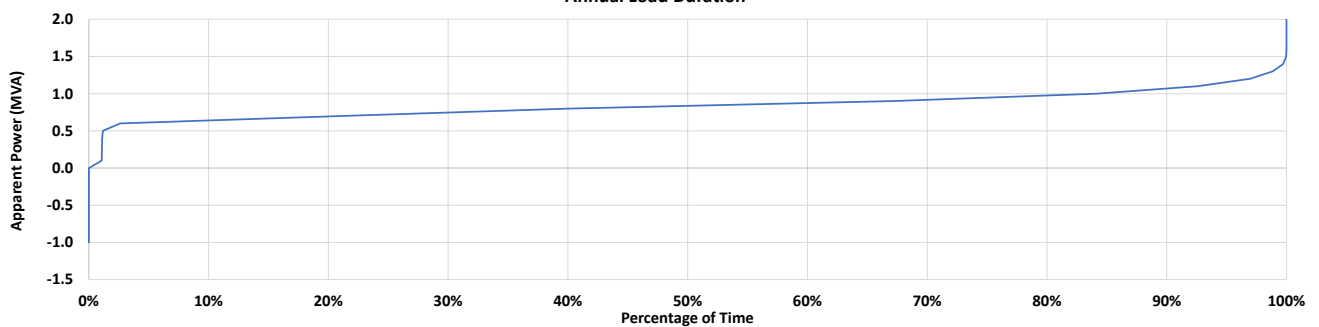
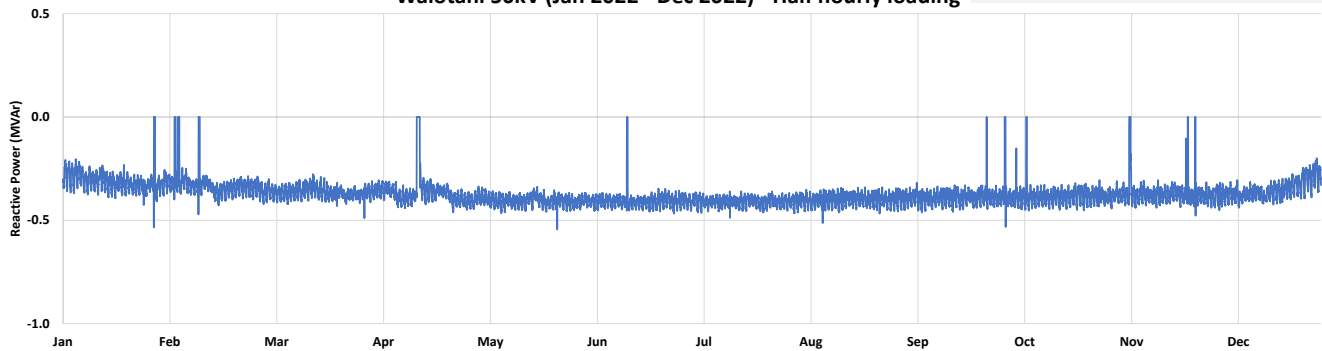


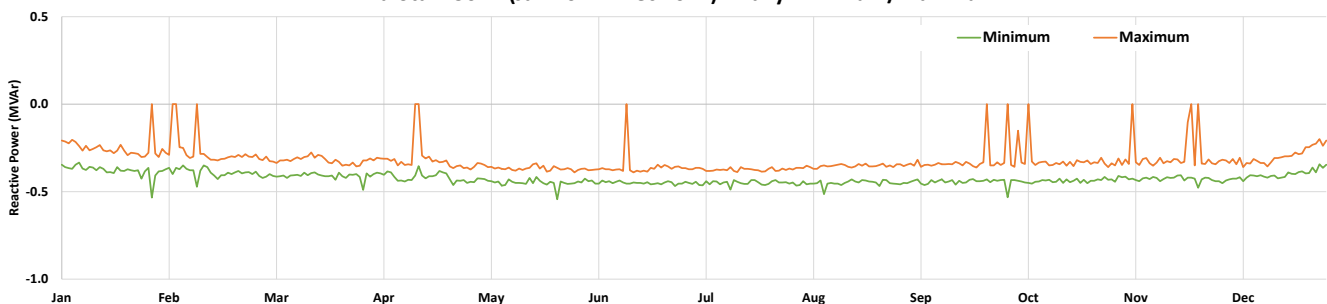
Figure 7 Waiotahi 50 kV: Apparent power (MVA) load characteristics.

Waiotahi 50 kV

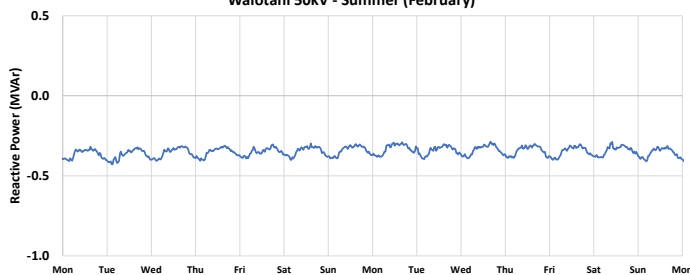
Waiotahi 50kV (Jan 2022 - Dec 2022) - Half hourly loading



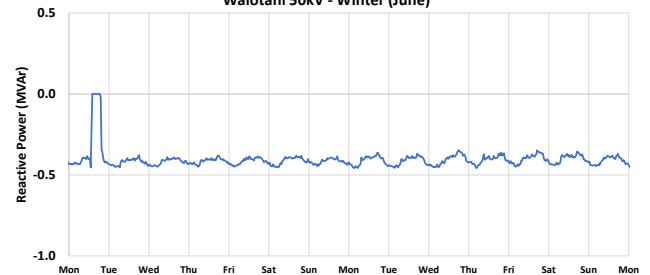
Waiotahi 50kV (Jan 2022 - Dec 2022) - Daily Minimum/Maximum



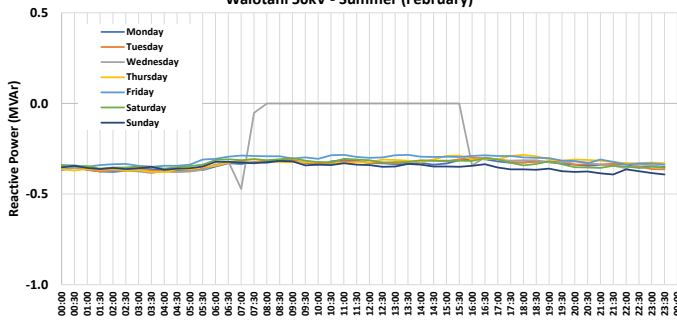
Waiotahi 50kV - Summer (February)



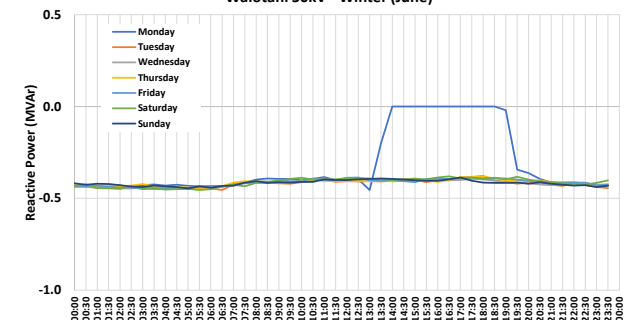
Waiotahi 50kV - Winter (June)



Waiotahi 50kV - Summer (February)



Waiotahi 50kV - Winter (June)



Annual Load Duration

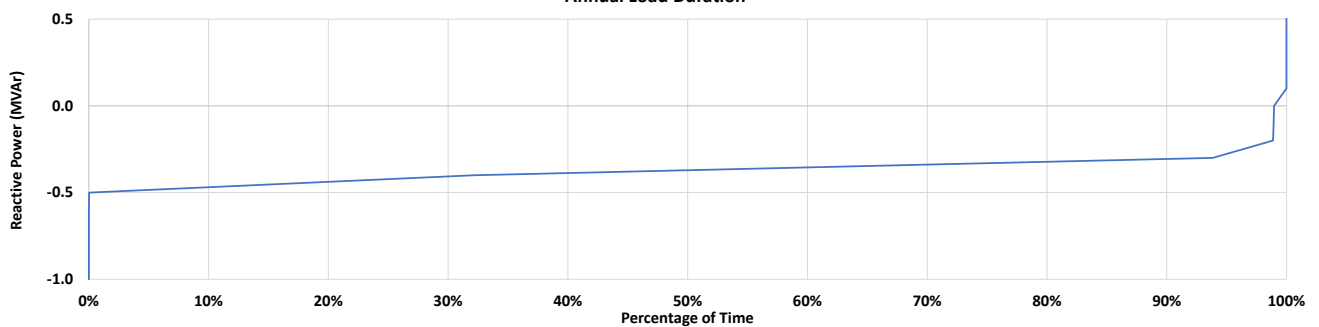


Figure 8 Waiotahi 50 kV: Reactive power (MVar) load characteristics.

Tauranga 11 kV MVA

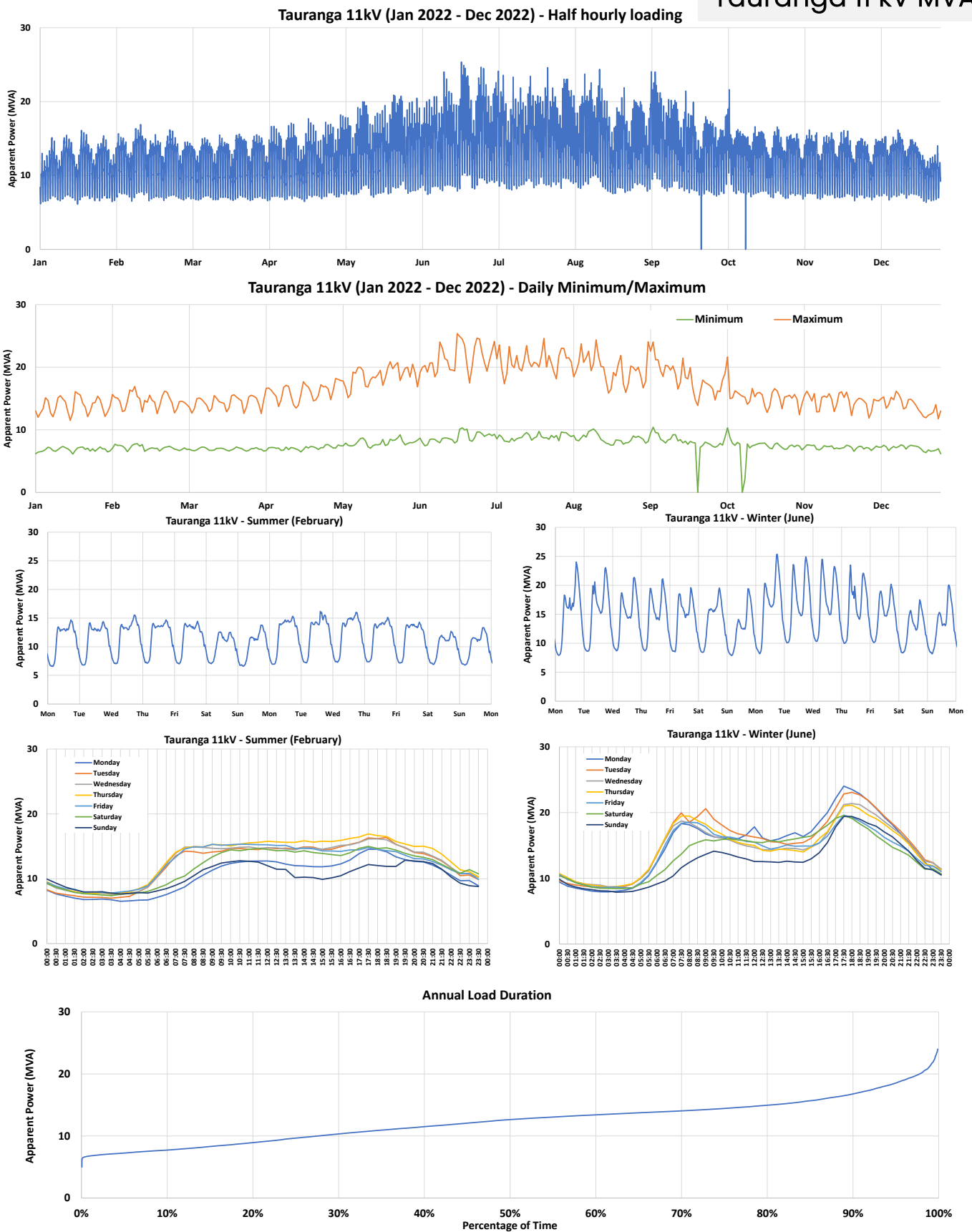


Figure 9 Tauranga 11 kV: Apparent power (MVA) load characteristics.

Tauranga 11 kV MVar

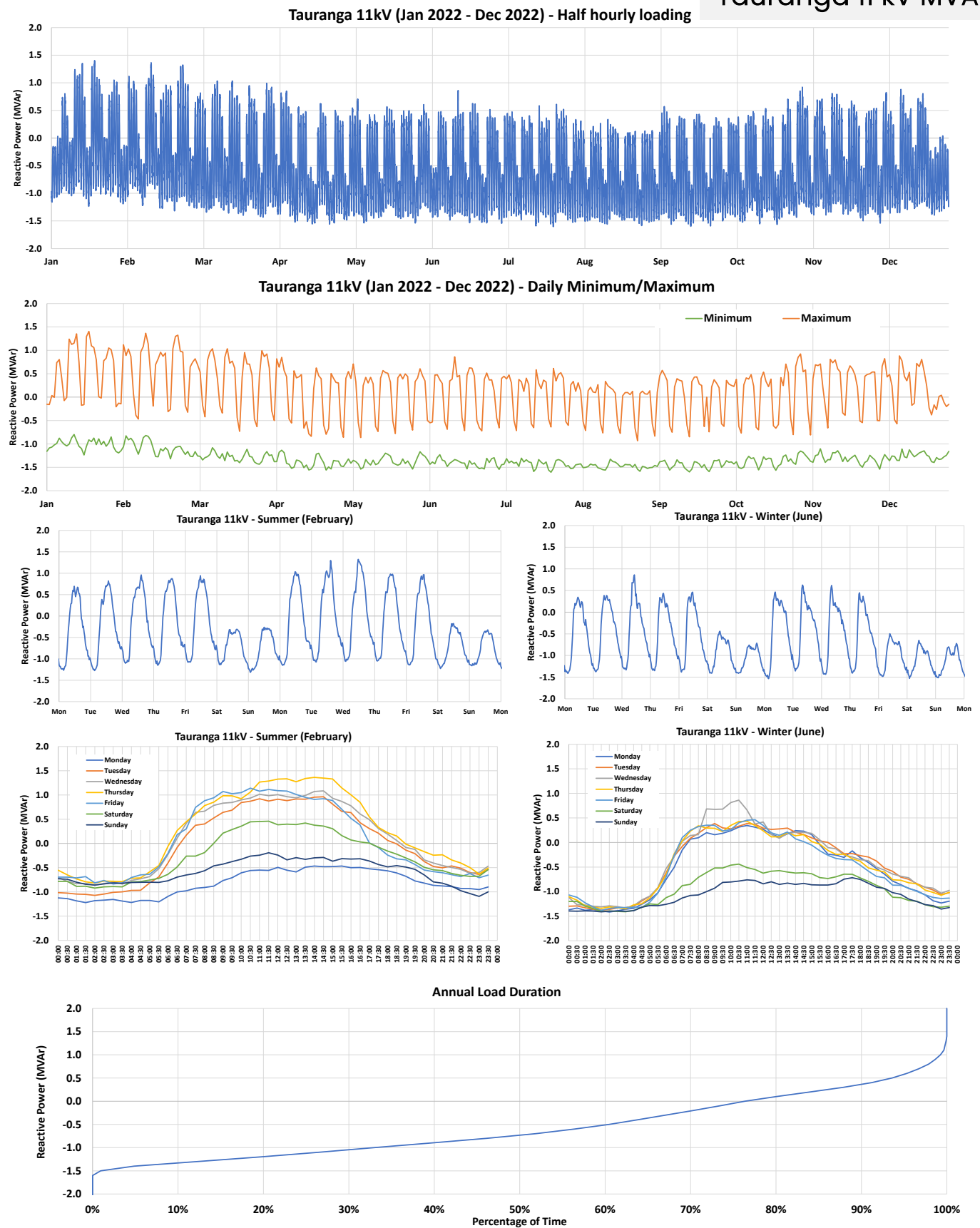


Figure 10 Tauranga 11 kV: Reactive power (MVar) load characteristics.

Tauranga 33 kV

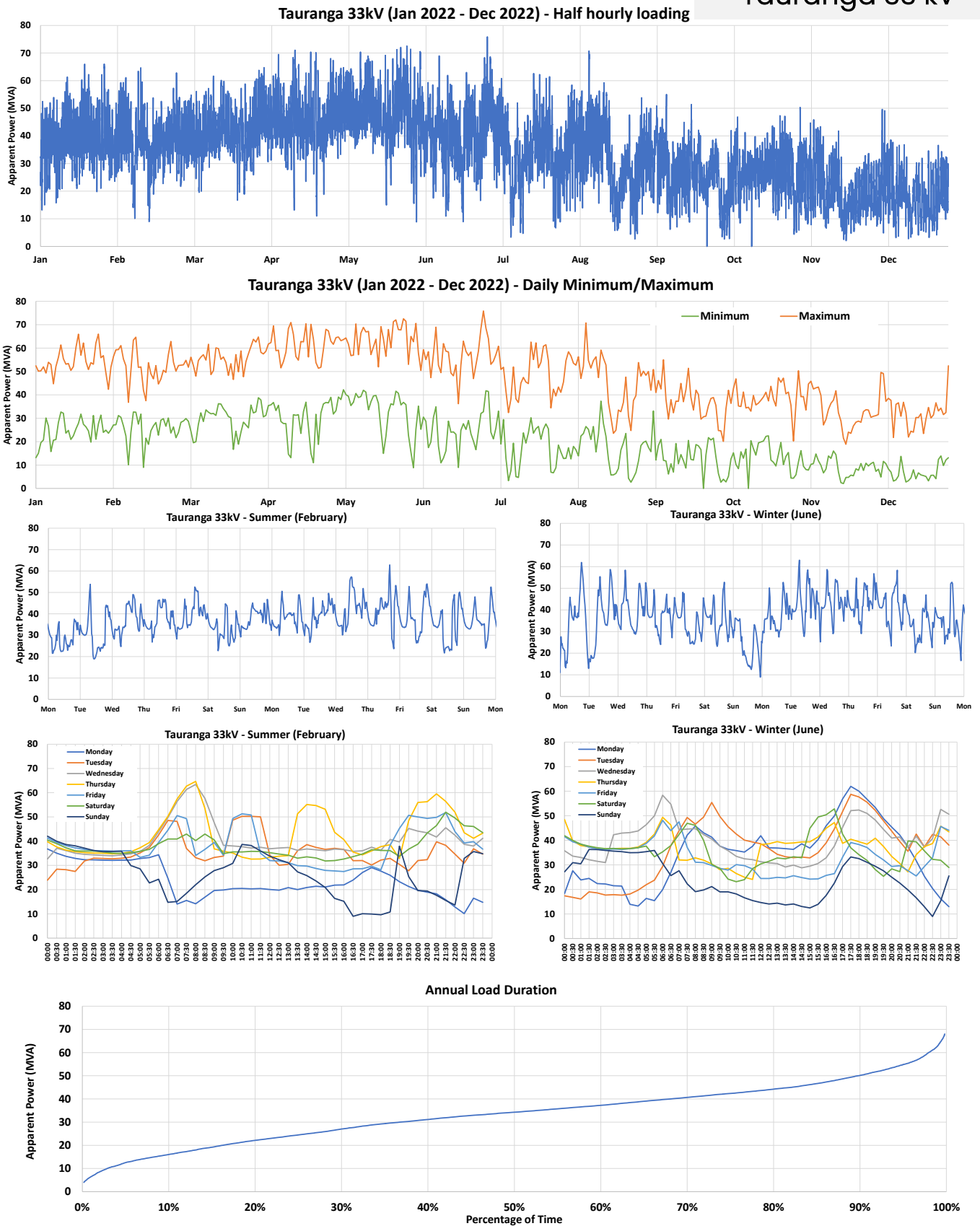
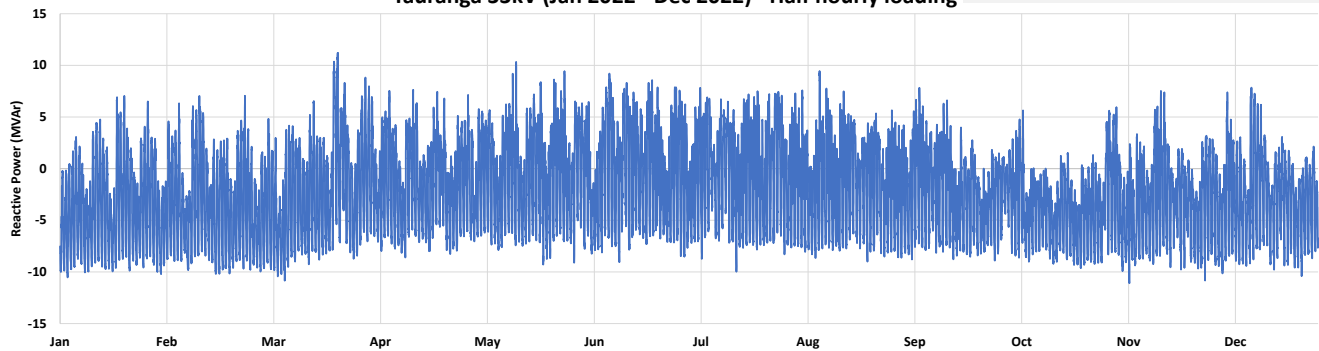


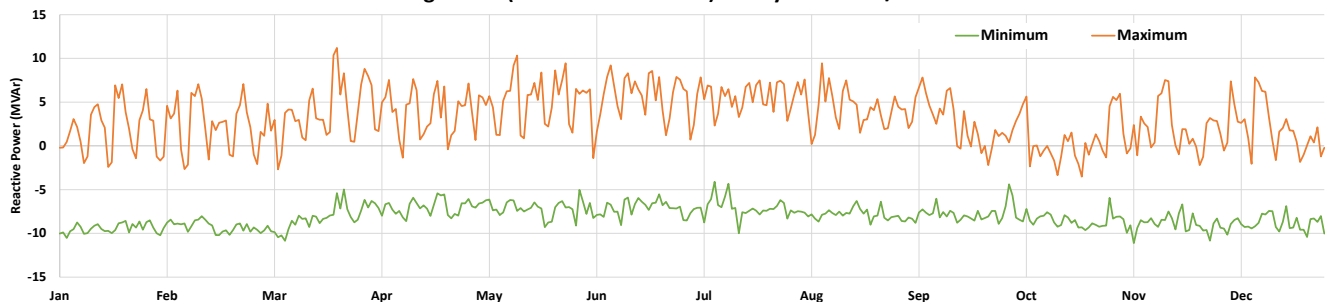
Figure 11 Tauranga 33 kV: Apparent power (MVA) load characteristics.

Tauranga 33 kV MVar

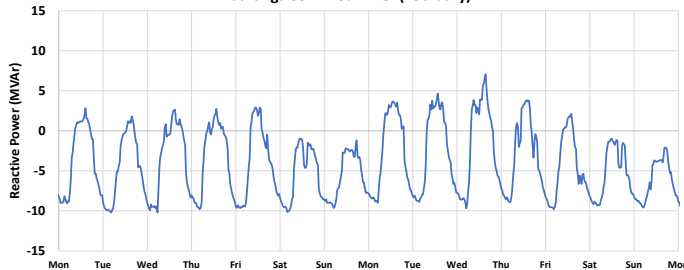
Tauranga 33kV (Jan 2022 - Dec 2022) - Half hourly loading



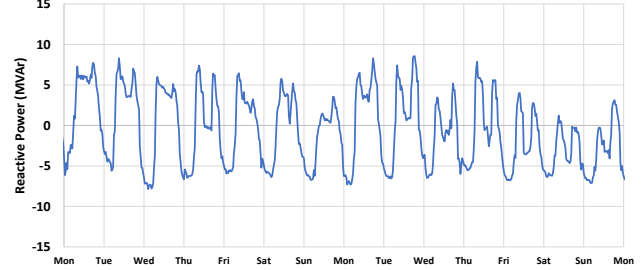
Tauranga 33kV (Jan 2022 - Dec 2022) - Daily Minimum/Maximum



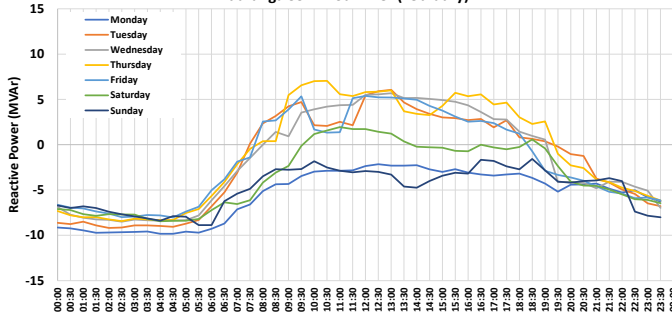
Tauranga 33kV - Summer (February)



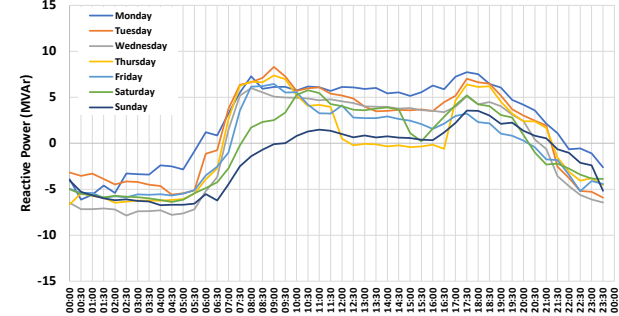
Tauranga 33kV - Winter (June)



Tauranga 33kV - Summer (February)



Tauranga 33kV - Winter (June)



Annual Load Duration

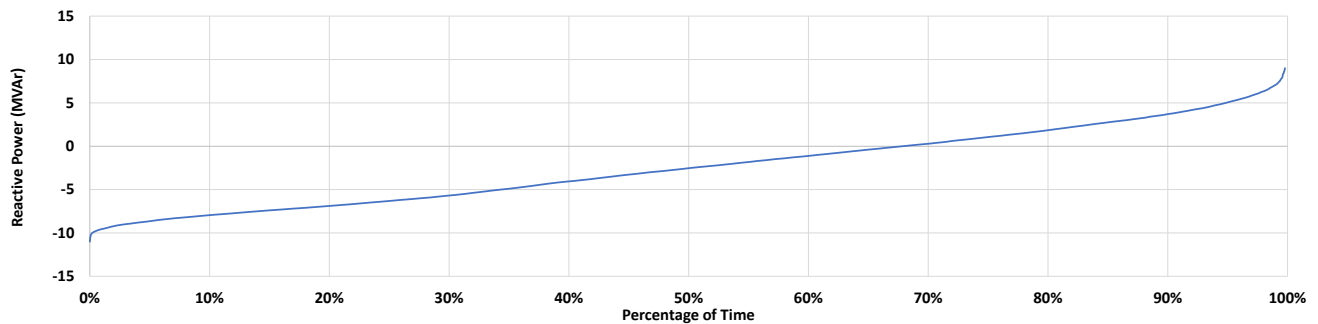


Figure 12 Tauranga 33 kV: Reactive power (MVar) load characteristics.

Kaitimako MVA

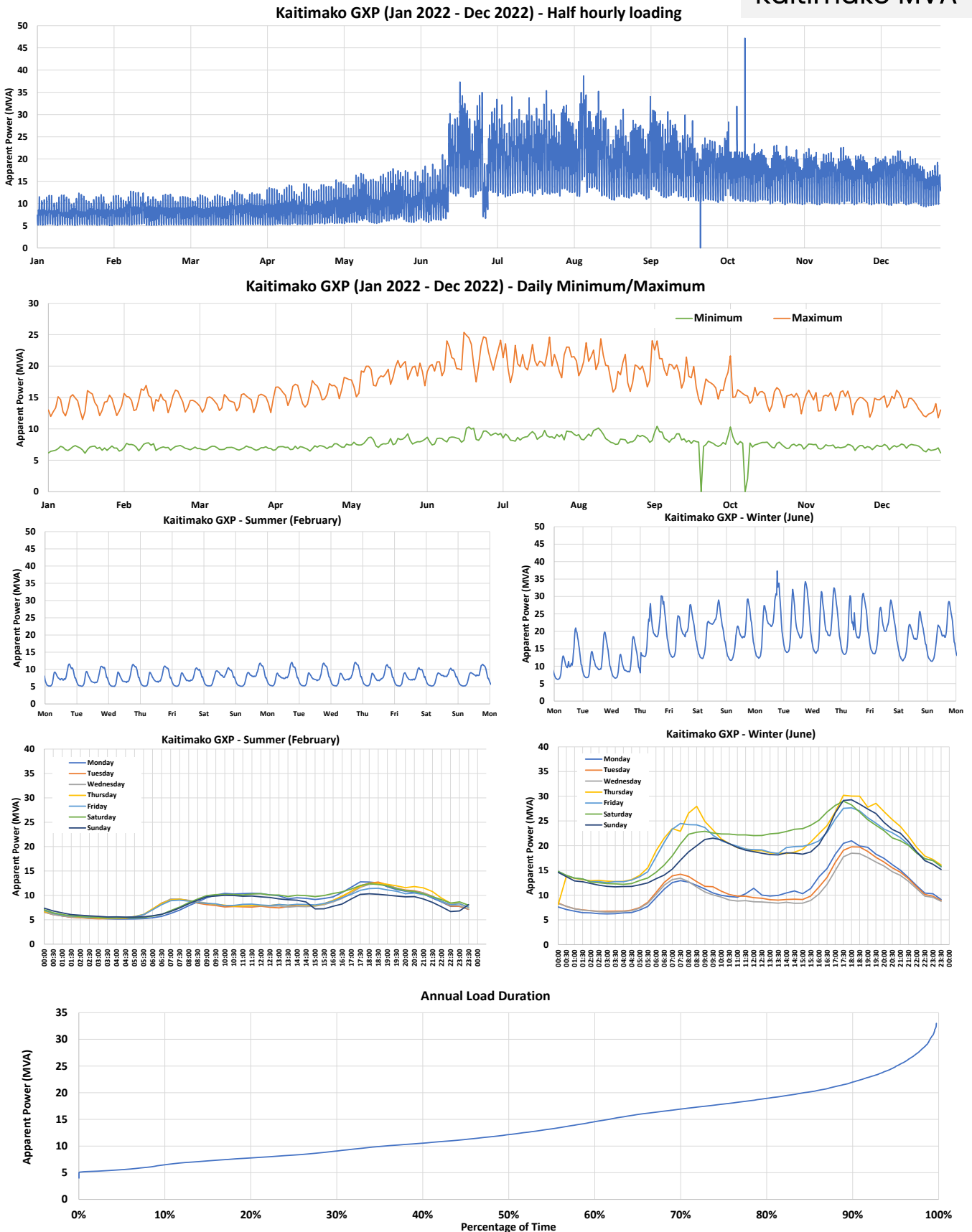


Figure 13 Kaitimako: Apparent power (MVA) load characteristics.

Kaitimako

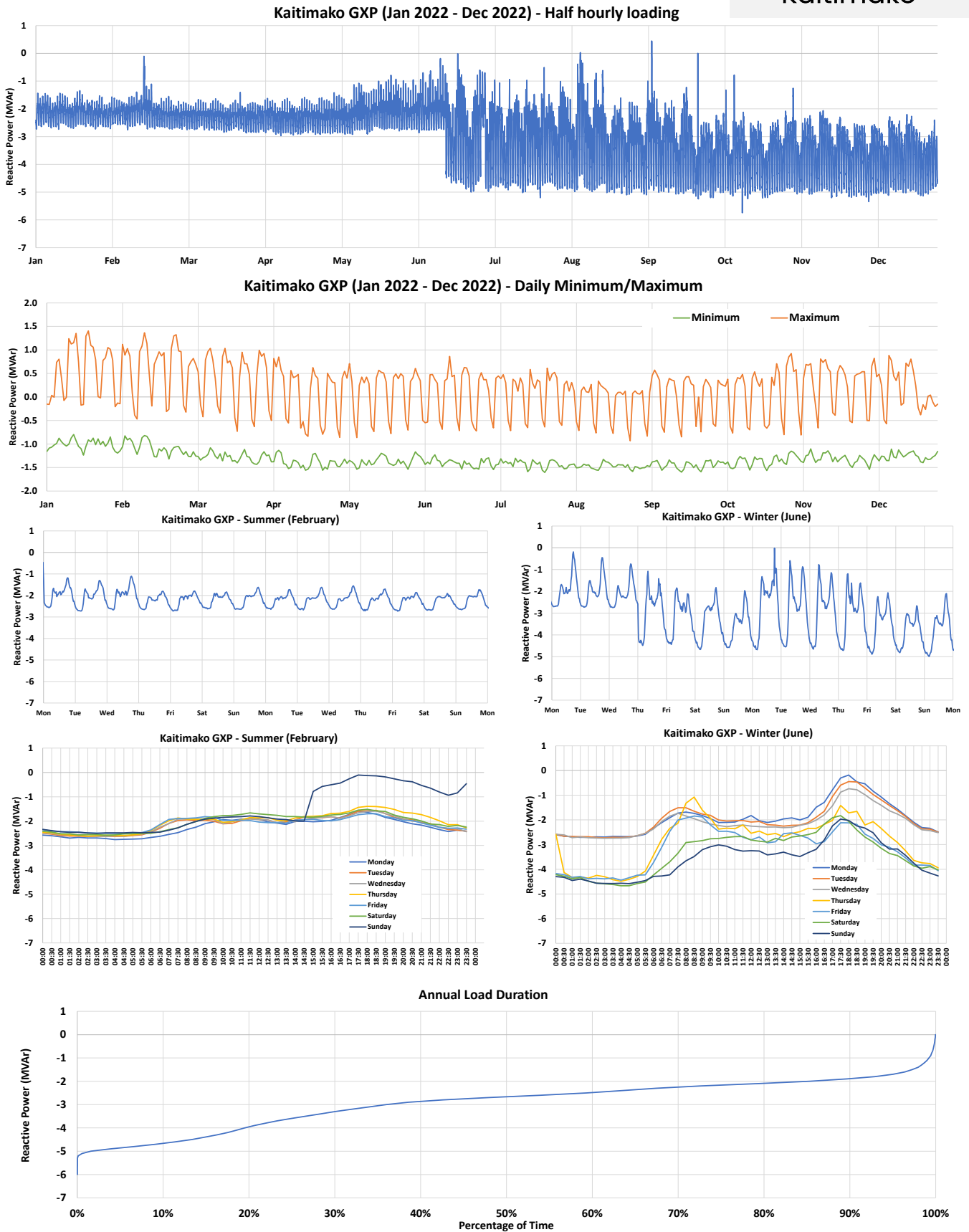


Figure 14 Kaitimako: Reactive power (MVar) load characteristics.

Mt Maunganui

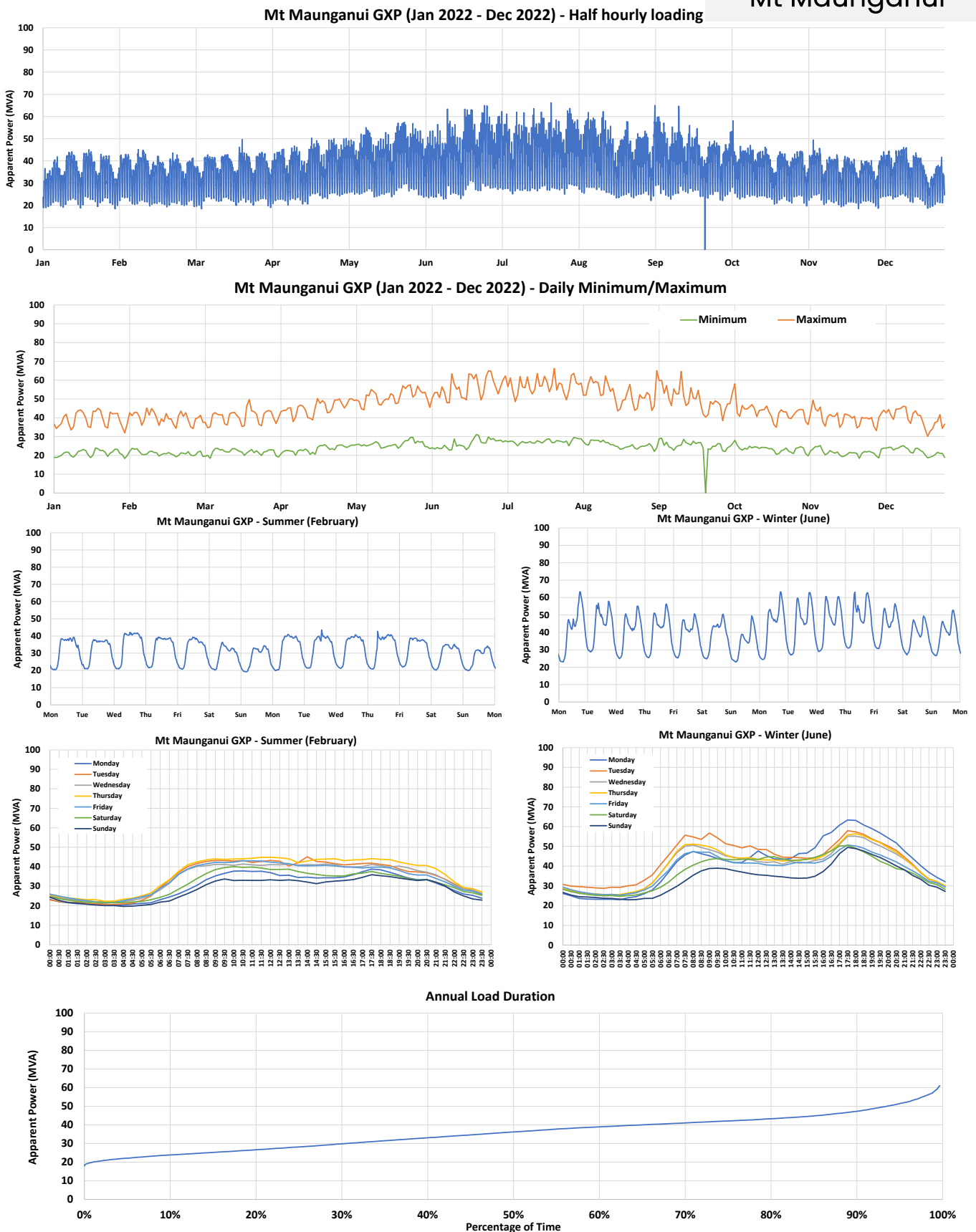


Figure 15 Mt Maunganui: Apparent power (MVA) load characteristics.

Mt Maunganui

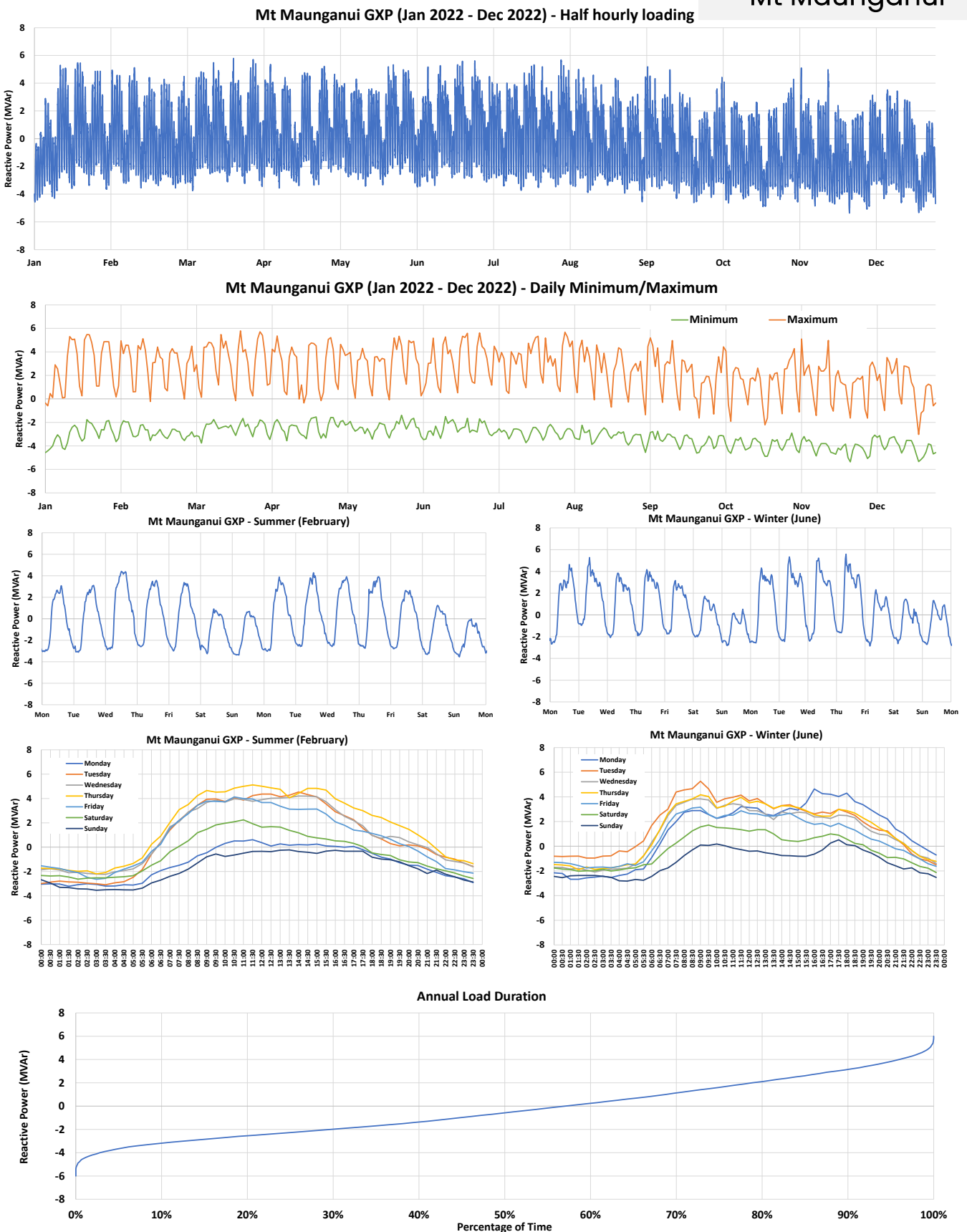


Figure 16 Mt Maunganui: Reactive power (MVar) load characteristics.

Te Matai

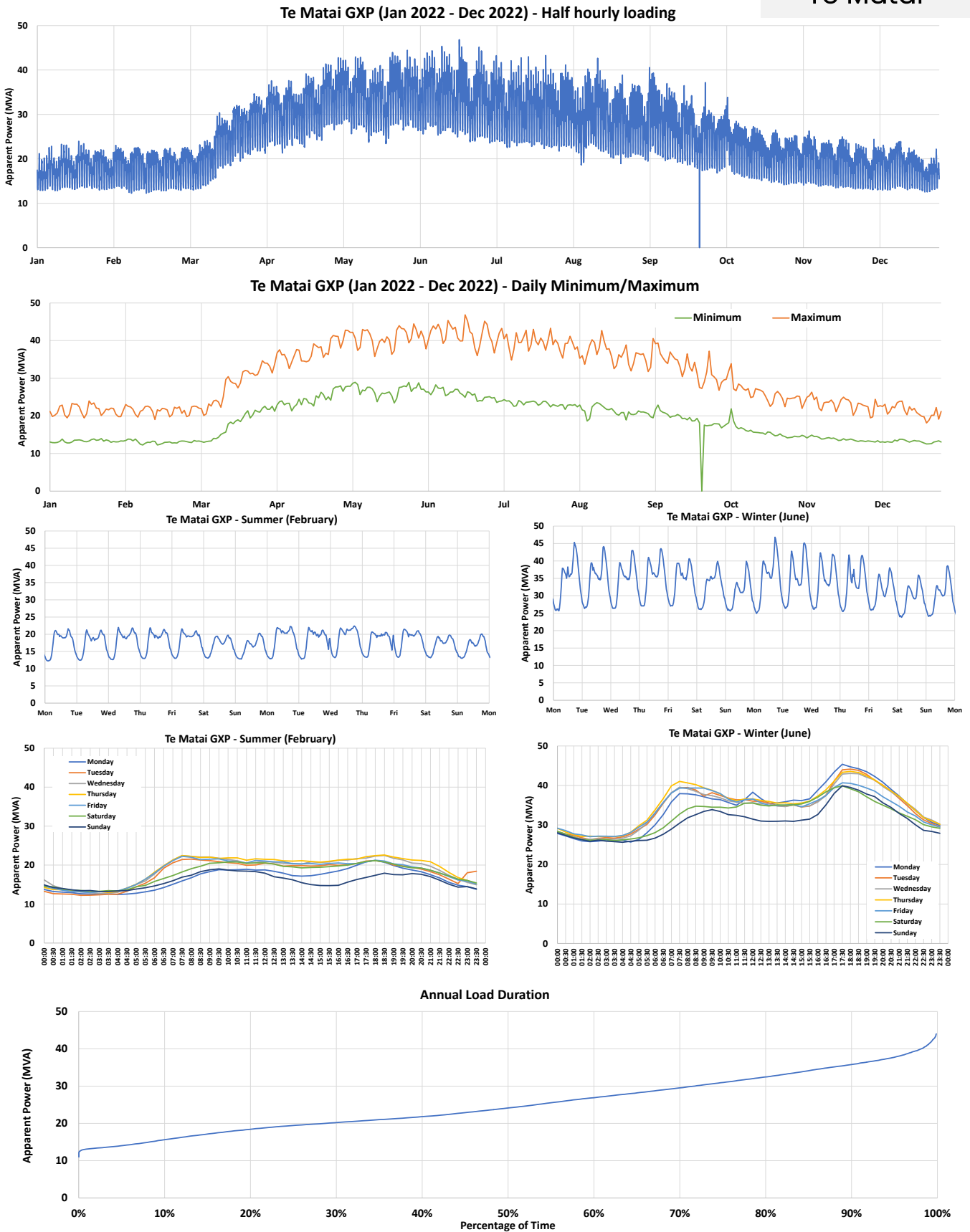


Figure 17 Te Matai: Apparent power (MVA) load characteristics.

Te Matai MVar

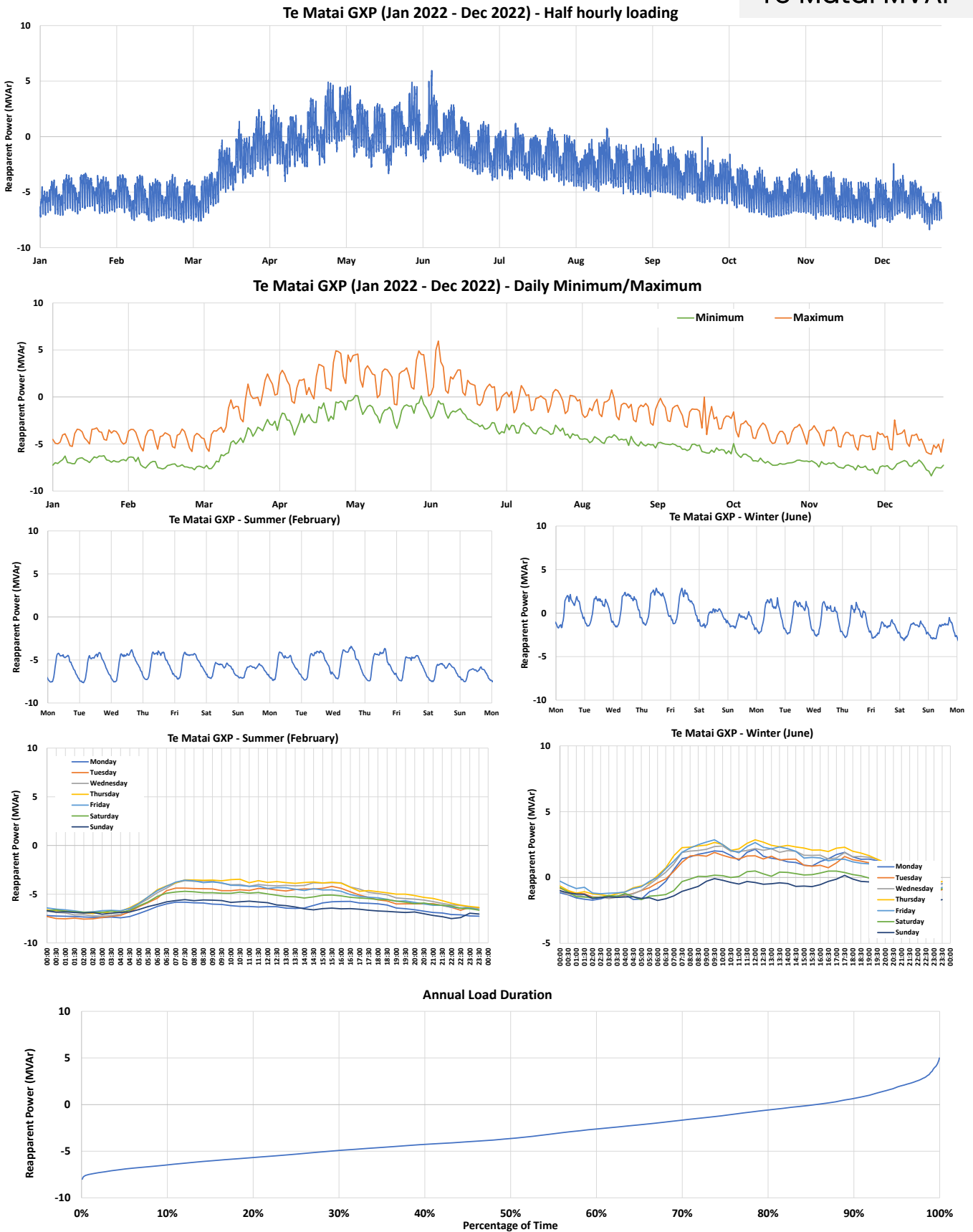


Figure 18 Te Matai: Reactive power (MVar) load characteristics.

Rotorua 11 kV MVA

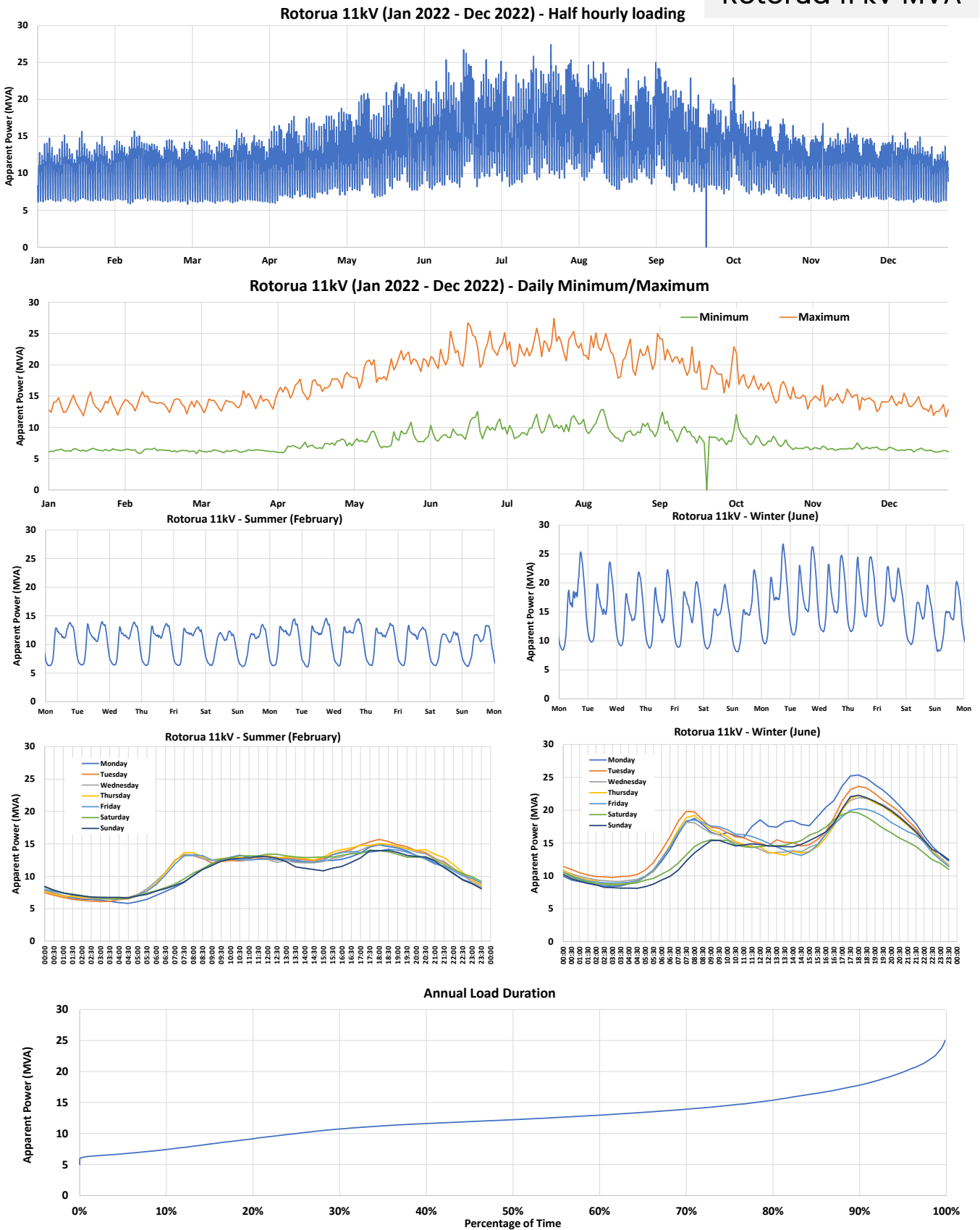
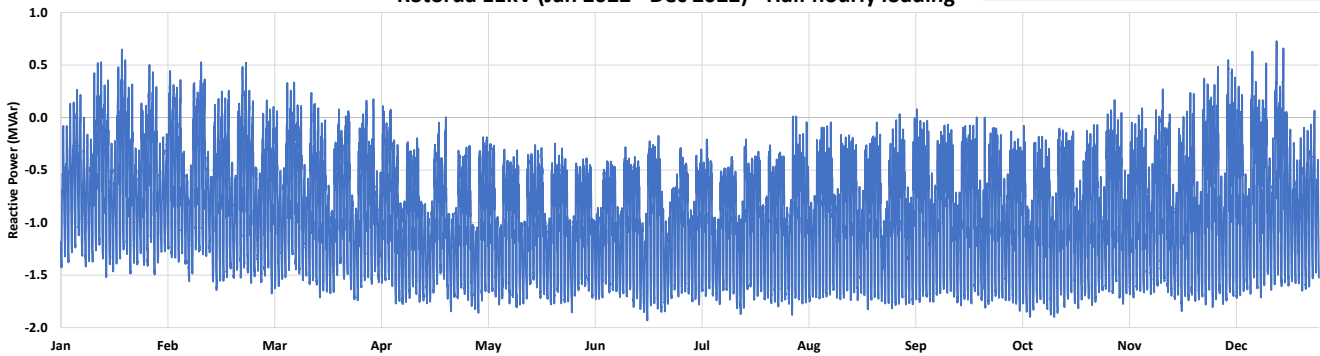


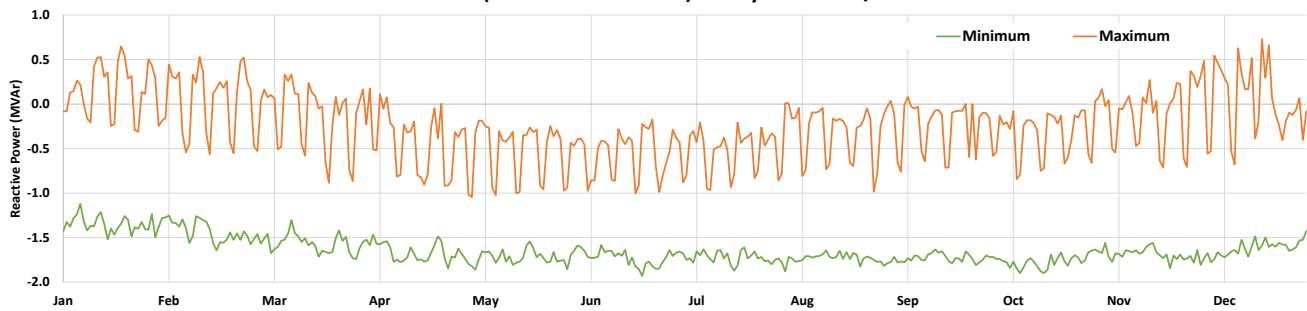
Figure 19 Rotorua 11 kV: Apparent power (MVA) load characteristics.

Rotorua 11 kV

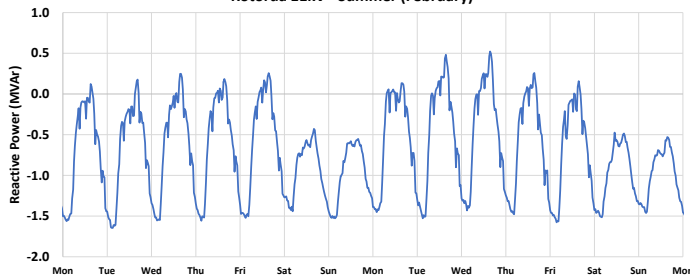
Rotorua 11kV (Jan 2022 - Dec 2022) - Half hourly loading



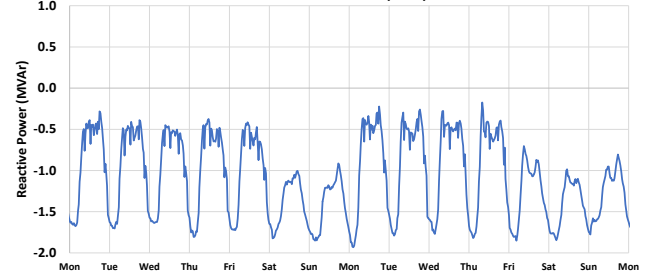
Rotorua 11kV (Jan 2022 - Dec 2022) - Daily Minimum/Maximum



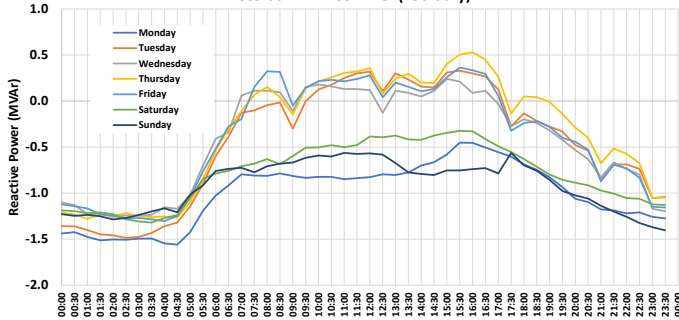
Rotorua 11kV - Summer (February)



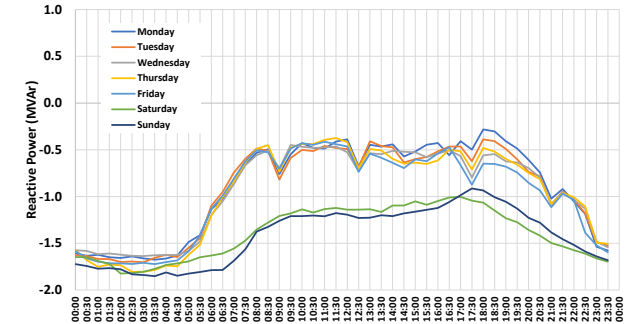
Rotorua 11kV - Winter (June)



Rotorua 11kV - Summer (February)



Rotorua 11kV - Winter (June)



Annual Load Duration

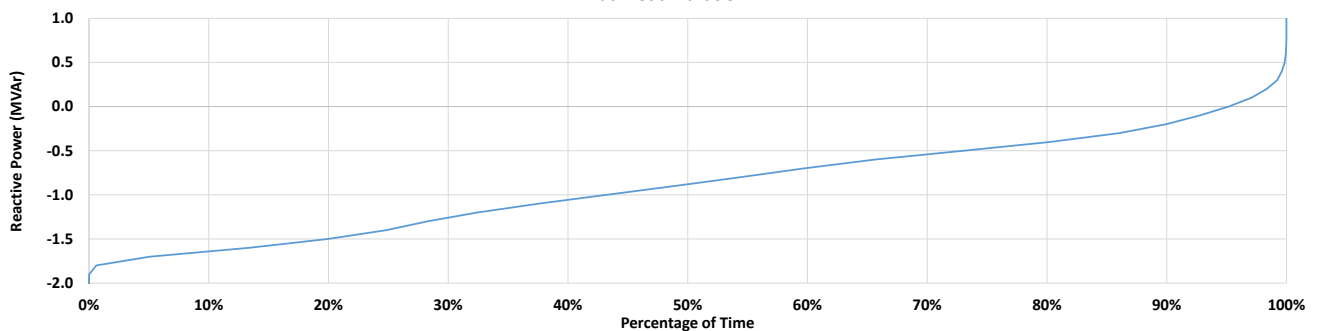


Figure 20 Rotorua 11 kV: Reactive power (MVar) load characteristics.

Rotorua 33 kV

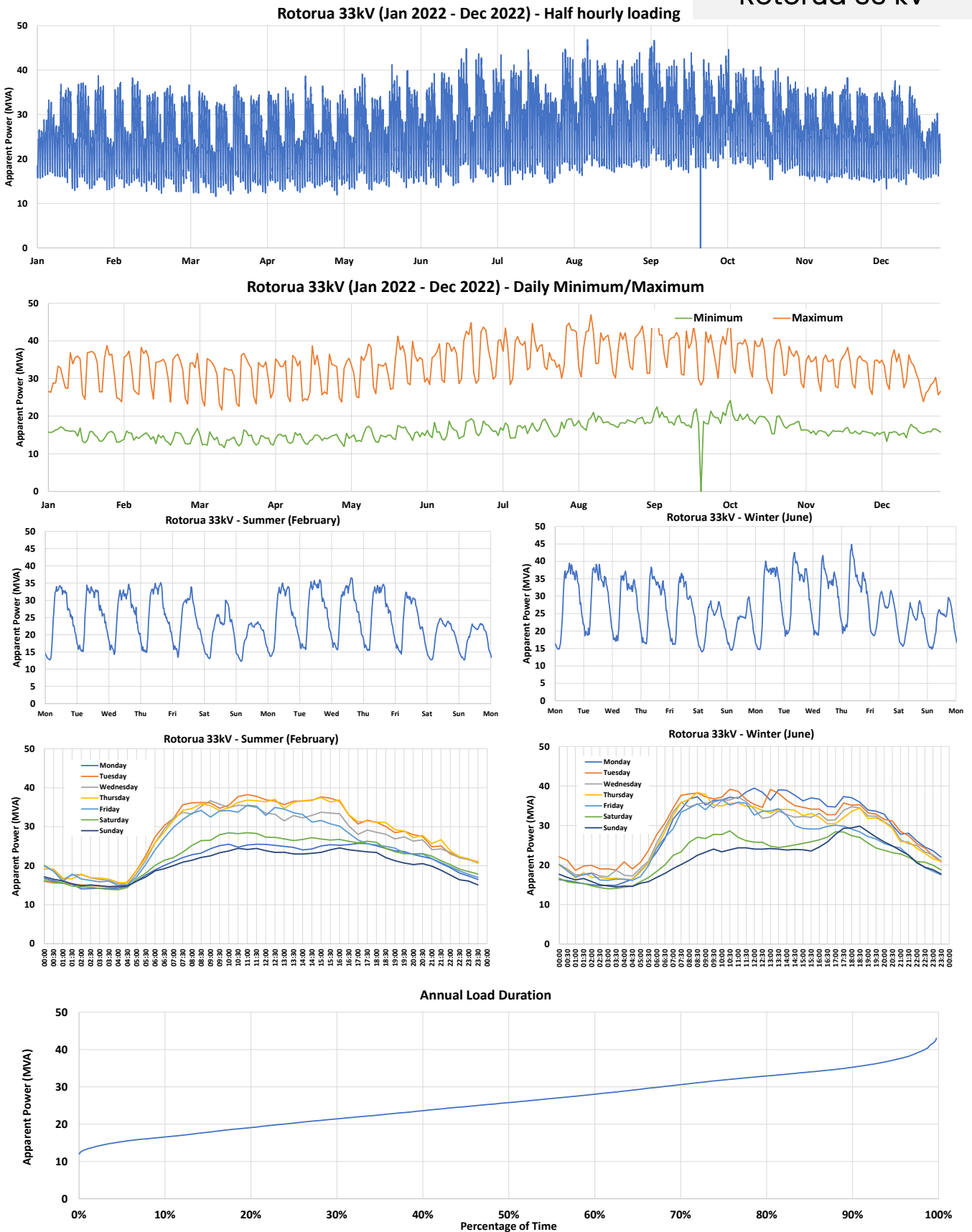


Figure 21 Rotorua 33 kV: Apparent power (MVA) load characteristics.

Rotorua 33 kV

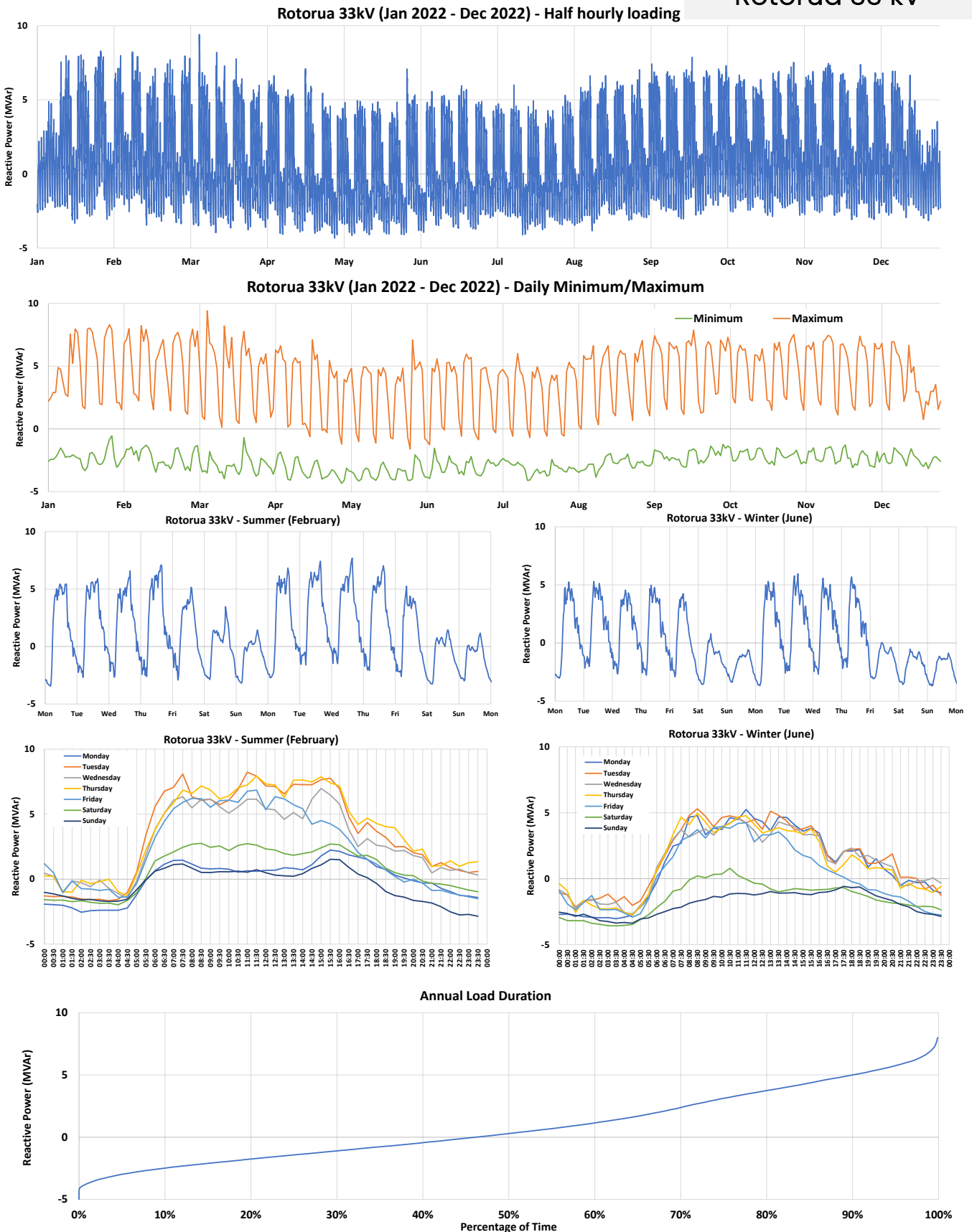


Figure 22 Rotorua 33 kV: Reactive power (MVar) load characteristics.

Owhata MVA

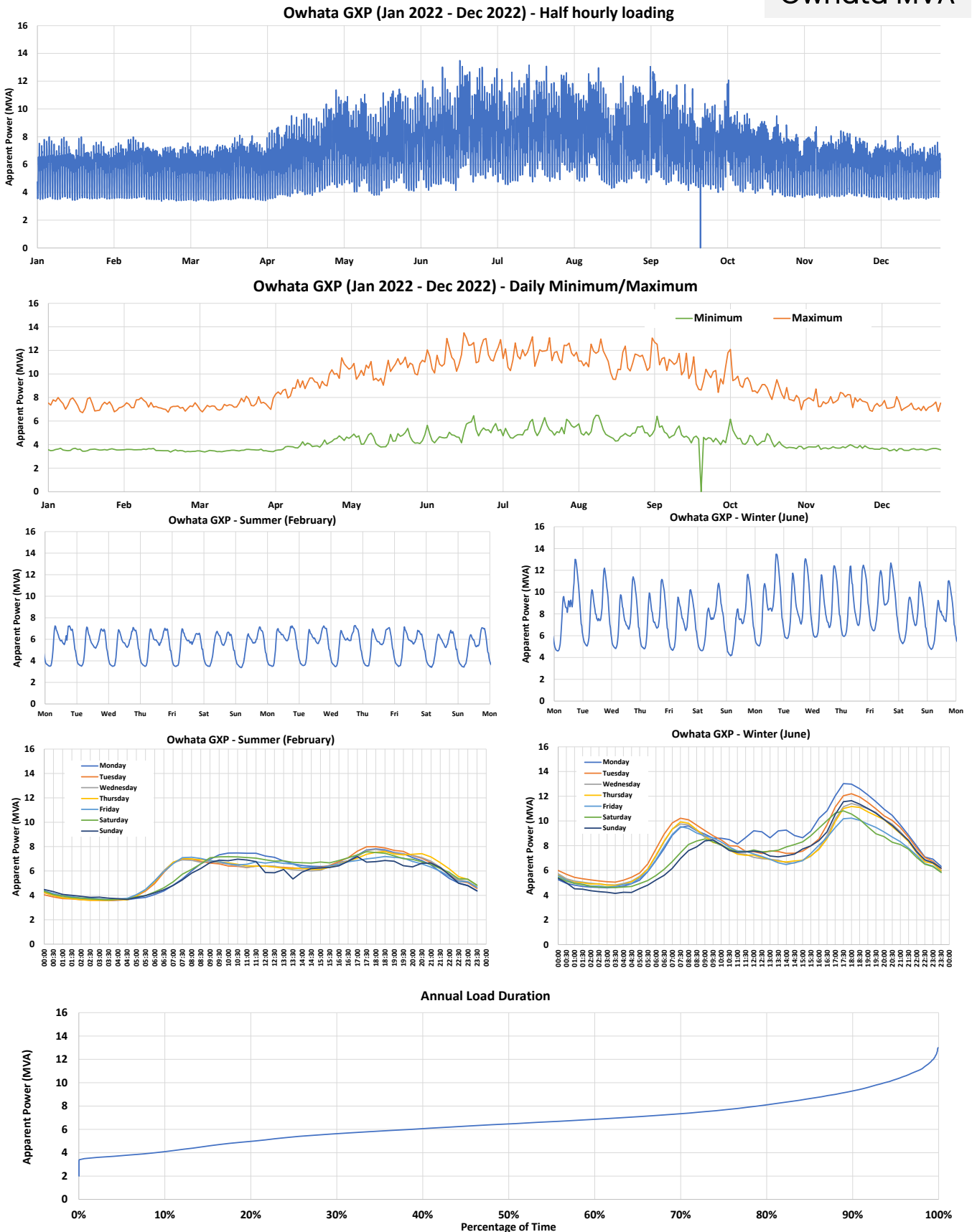


Figure 23 Owhata: Apparent power (MVA) load characteristics.

Owhata MVar

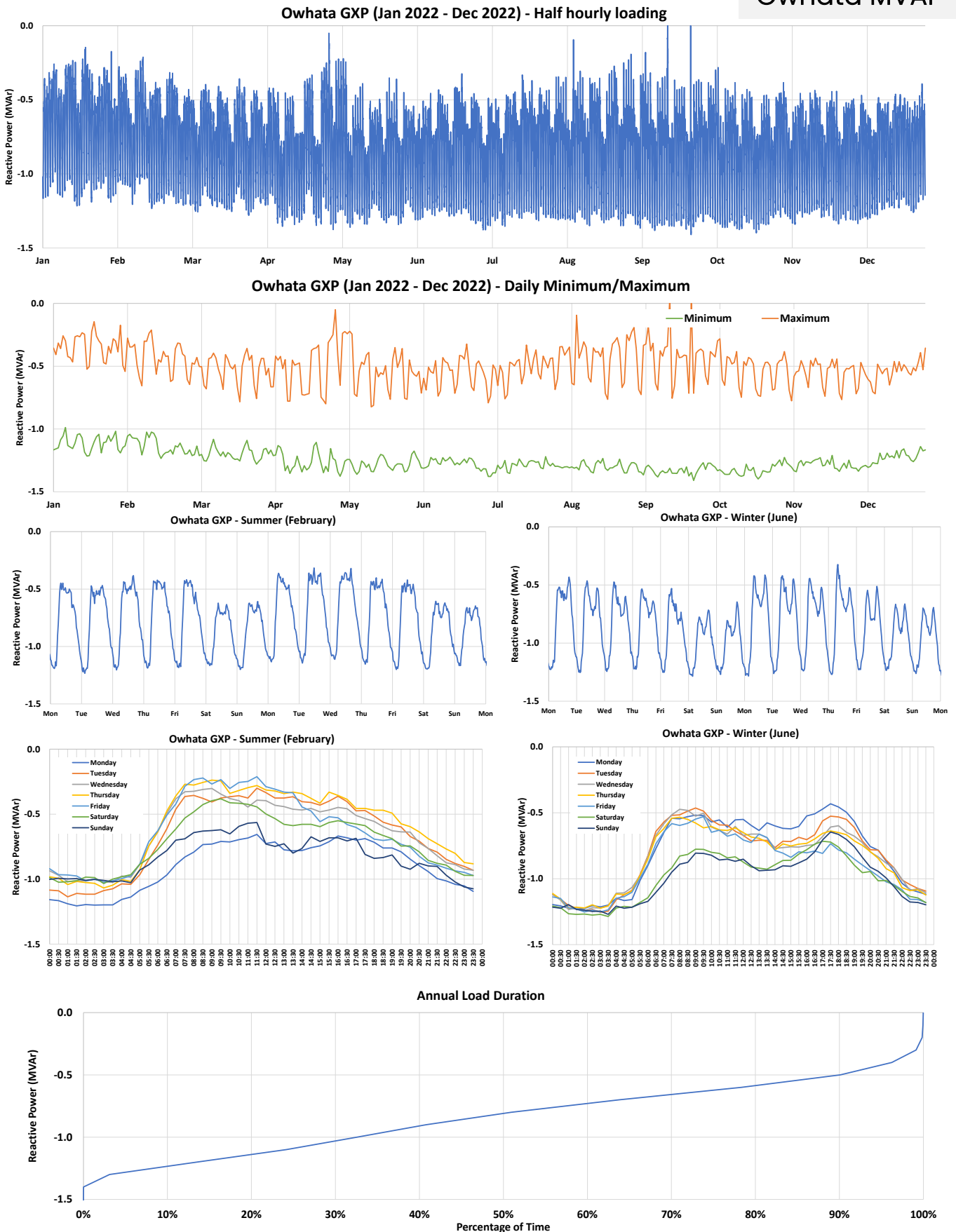


Figure 24 Owhata: Reactive power (MVar) load characteristics.

Takurenga

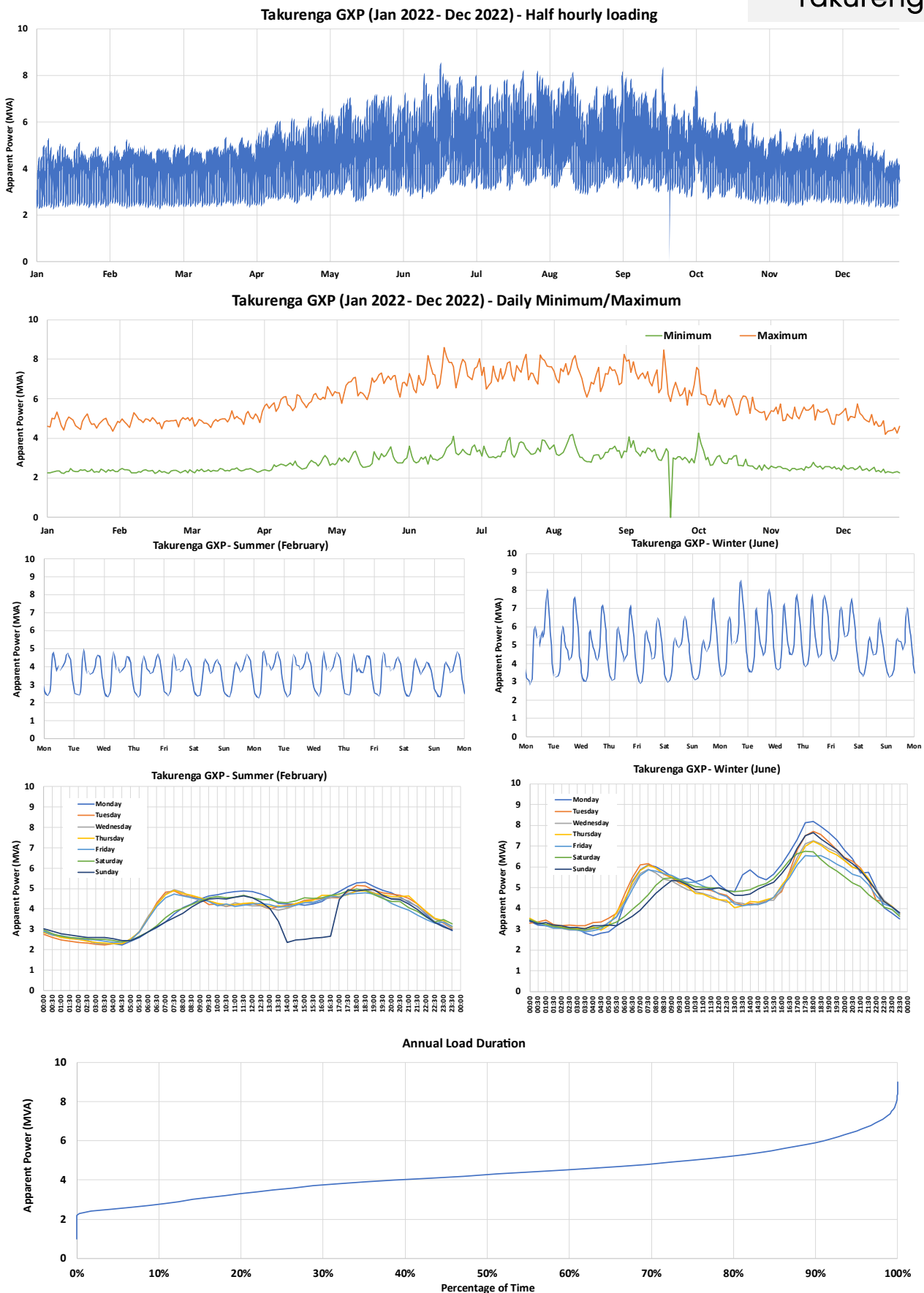


Figure 25 Takurenga: Apparent power (MVA) load characteristics.

Takurenga MVar

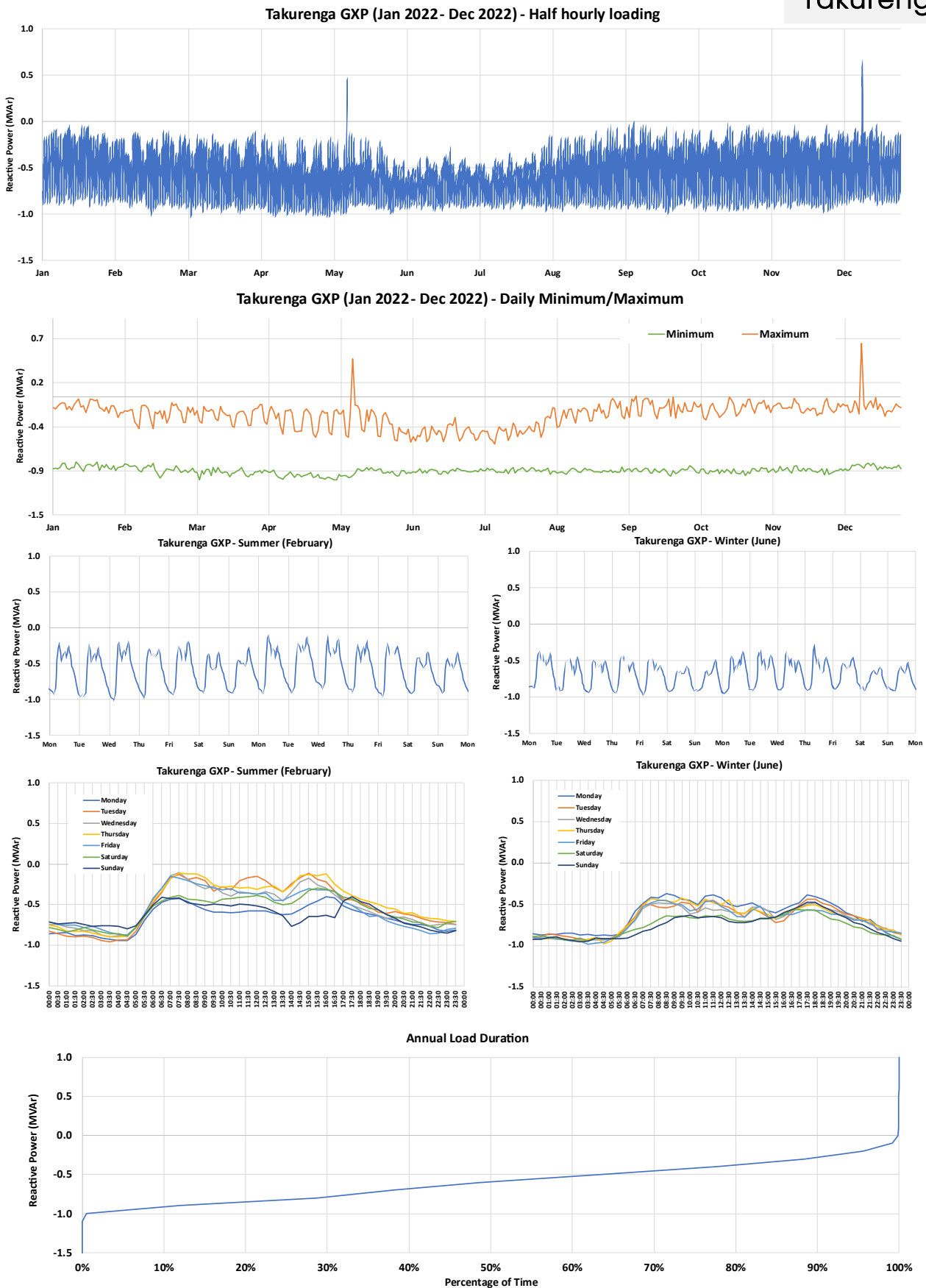


Figure 26 Takurenga: Reactive power (MVar) load characteristics.

3. Zone Substations

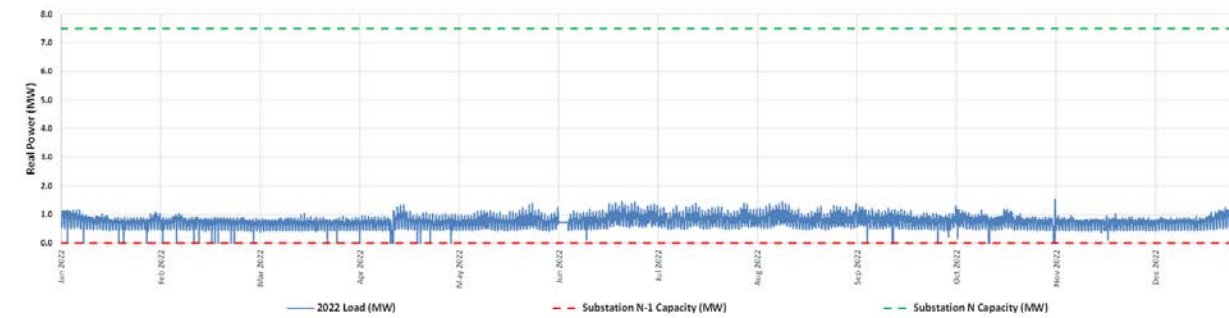
1.1 Horizon Networks

The characteristics of the zone substation **real power loadings** within Horizon Network's network are shown in the following:

- Figure 27. Te Kaha 33/11kV zone substation: Real power (MW) load characteristics
- Figure 28. Station Rd 33/11kV zone substation: Real power (MW) load characteristics
- Figure 29. Plains 33/11kV zone substation: Real power (MW) load characteristics
- Figure 30. Ohope 33/11kV zone substation: Real power (MW) load characteristics
- Figure 31. Kopeopeo 33/11kV zone substation: Real power (MW) load characteristics
- Figure 32. East Bank 33/11kV zone substation: Real power (MW) load characteristics
- Figure 33. Kaingaroa 33/11kV zone substation: Real power (MW) load characteristics
- Figure 34. Galatea 33/11kV zone substation: Real power (MW) load characteristics

Te Kaha MW

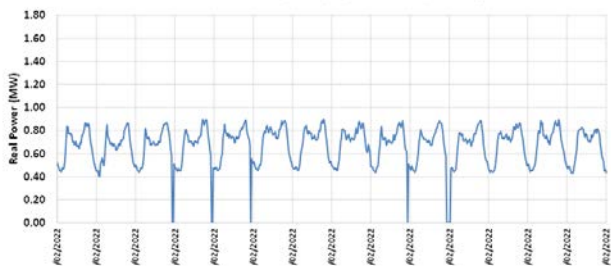
Te Kaha Zone Substation (2022 year) - Half hourly loading



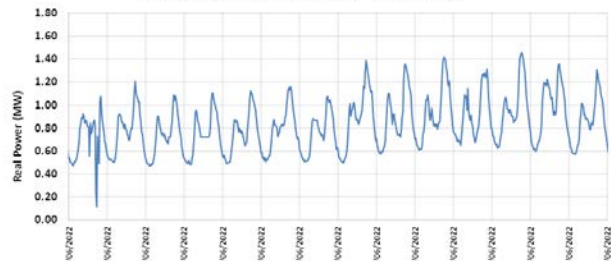
Te Kaha Zone Substation (2022 year) - Daily Maximum/Minimum



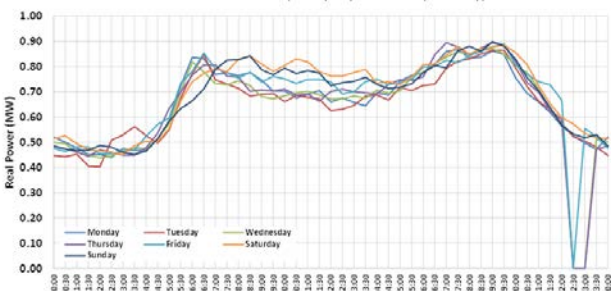
Te Kaha Zone Substation (2022 year) - Summer (February)



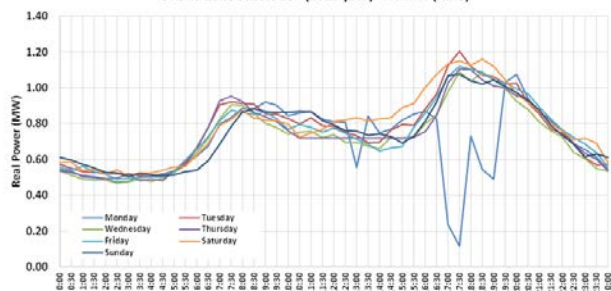
Te Kaha Zone Substation (2022 year) - Winter (June)



Te Kaha Zone Substation (2022 year) - Summer (February)



Te Kaha Zone Substation (2022 year) - Winter (June)



Te Kaha Zone Substation (2022 year) - Load Duration Curve

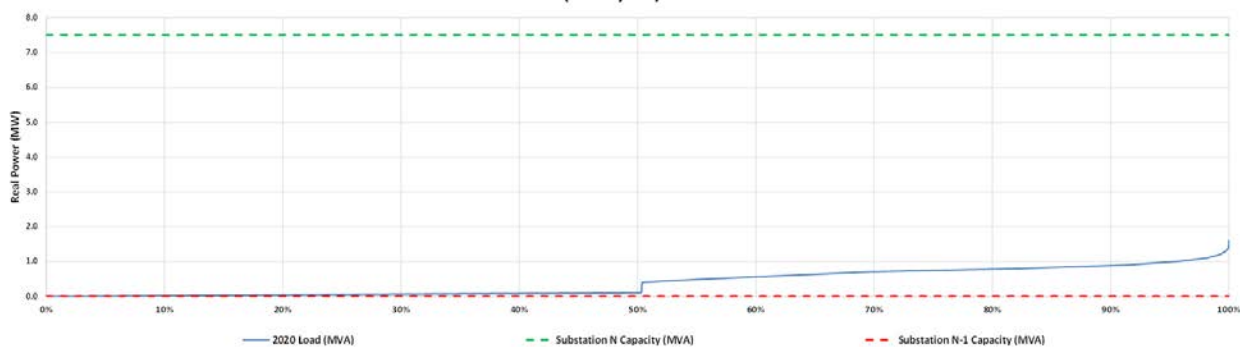
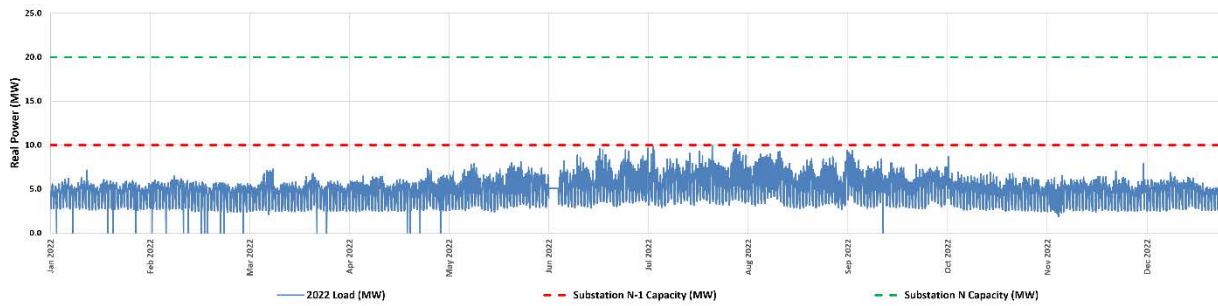


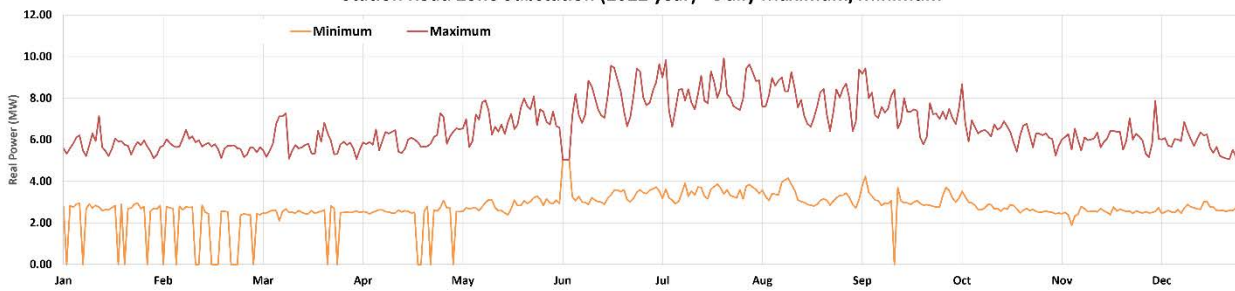
Figure 27. Te Kaha 33/11kV zone substation: Real power (MW) load characteristics

Station Road MW

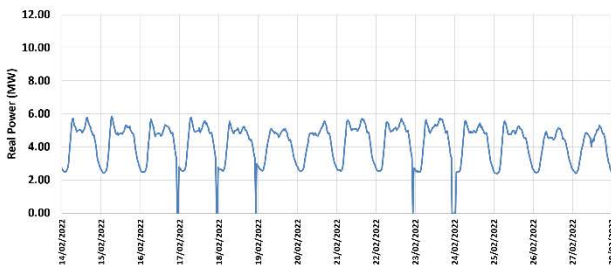
Station Road Zone Substation (2022 year) - Half hourly loading



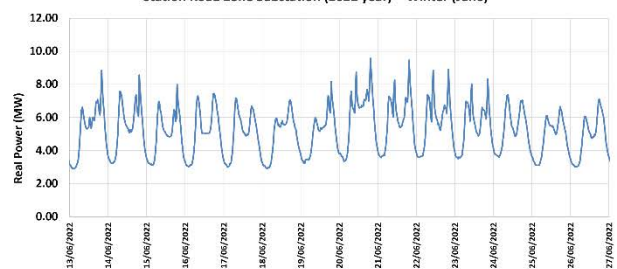
Station Road Zone Substation (2022 year) - Daily Maximum/Minimum



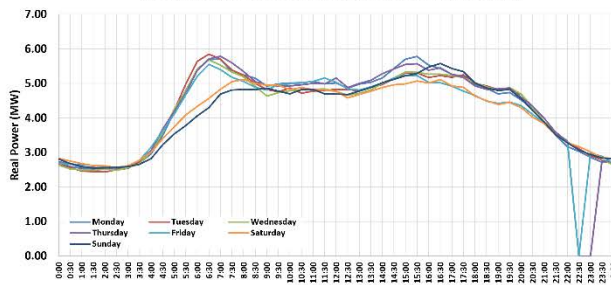
Station Road Zone Substation (2022 year) - Summer (February)



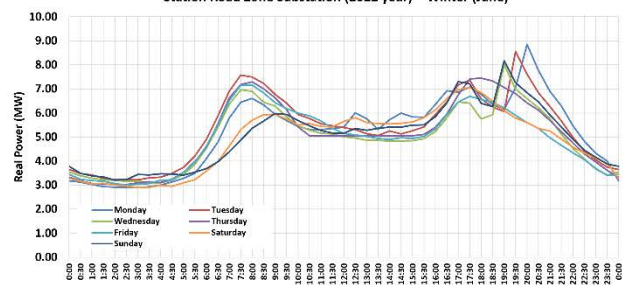
Station Road Zone Substation (2022 year) - Winter (June)



Station Road Zone Substation (2022 year) - Summer (February)



Station Road Zone Substation (2022 year) - Winter (June)



Station Road Zone Substation (2022 year) - Load Duration Curve

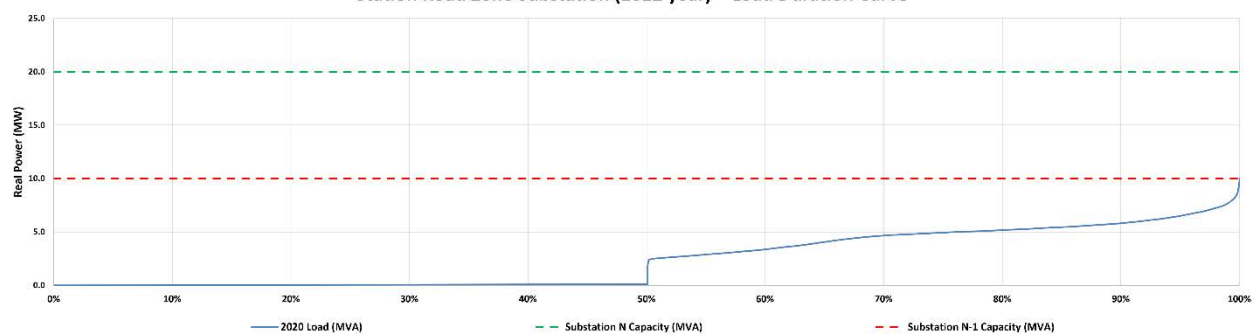
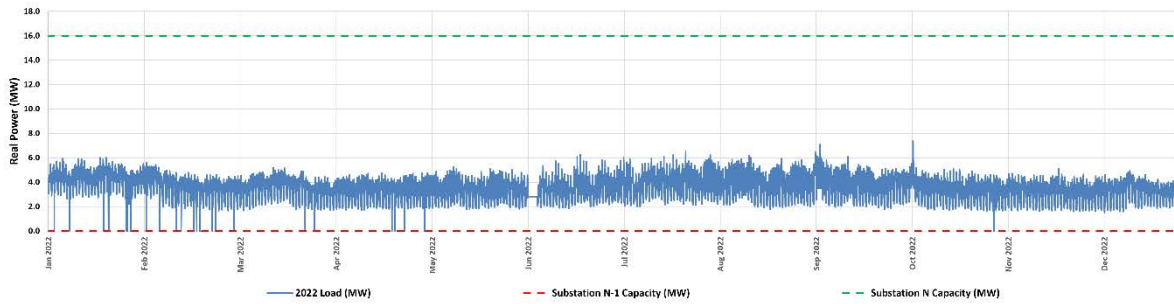


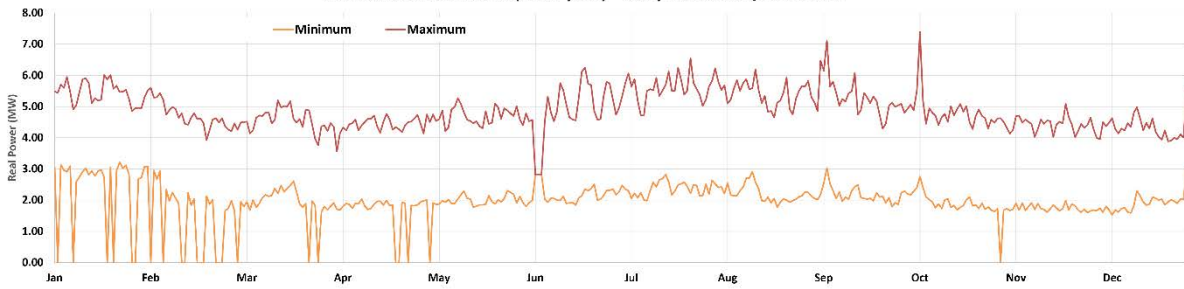
Figure 28. Station Rd 33/11kV zone substation: Real power (MW) load characteristics

Plains MW

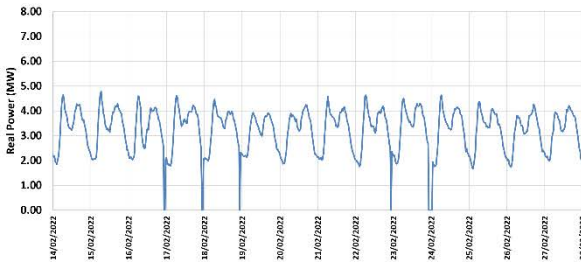
Plains Zone Substation (2022 year) - Half hourly loading



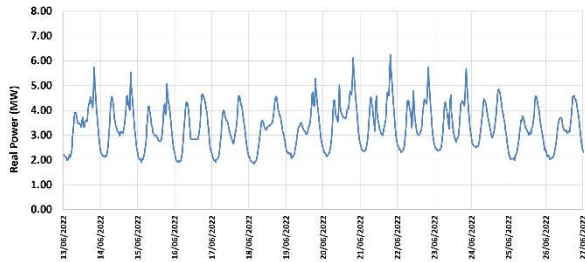
Plains Zone Substation (2022 year) - Daily Maximum/Minimum



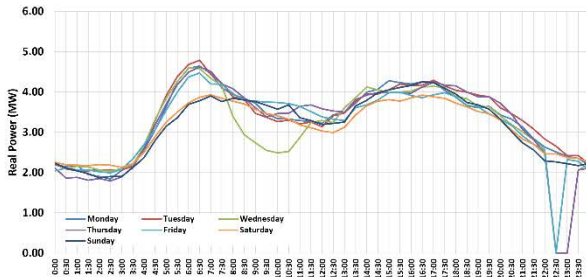
Plains Zone Substation (2022 year) - Summer (February)



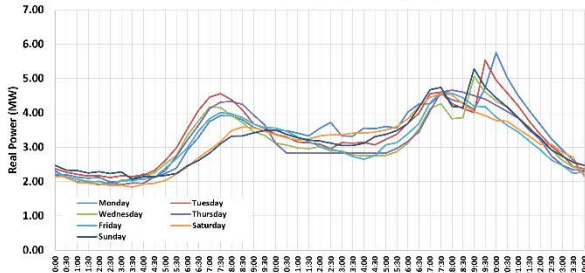
Plains Zone Substation (2022 year) - Winter (June)



Plains Zone Substation (2022 year) - Summer (February)



Plains Zone Substation (2022 year) - Winter (June)



Plains Zone Substation (2022 year) - Load Duration Curve

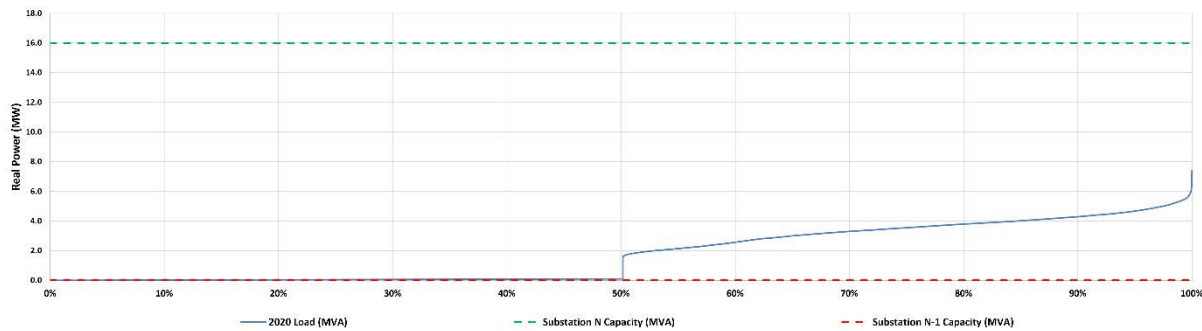
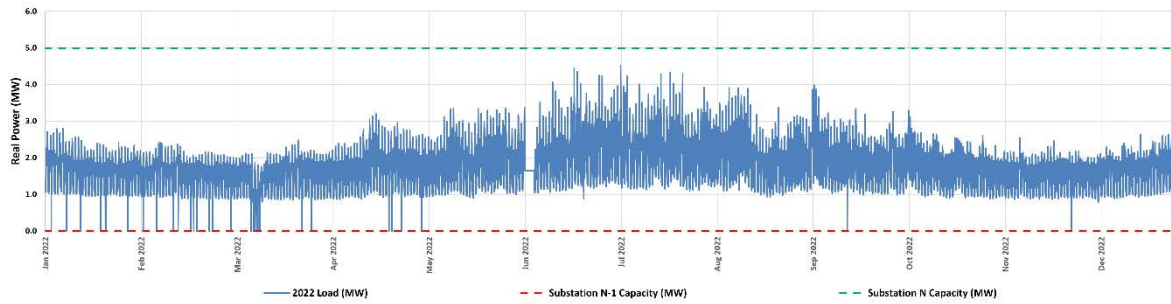


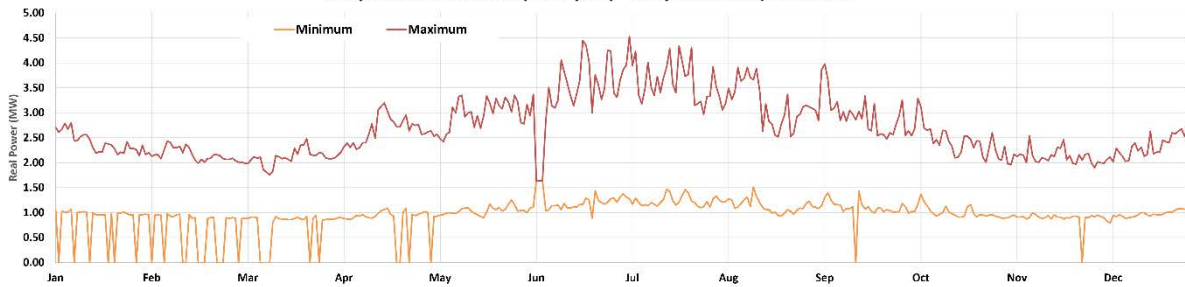
Figure 29. Plains 33/11kV zone substation: Real power (MW) load characteristics

Ohope MW

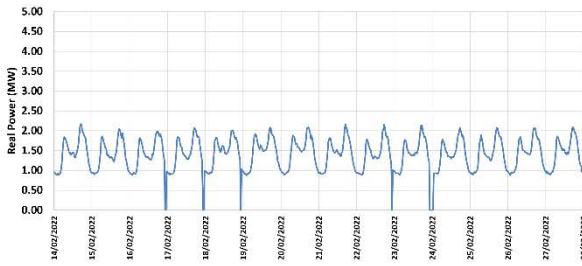
Ohope Zone Substation (2022 year) - Half hourly loading



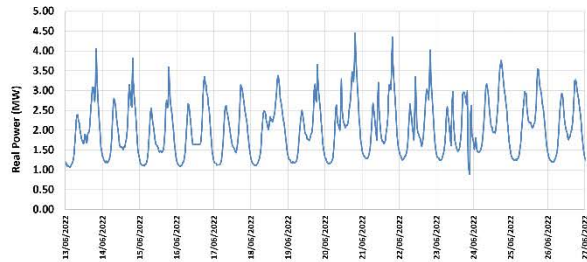
Ohope Zone Substation (2022 year) - Daily Maximum/Minimum



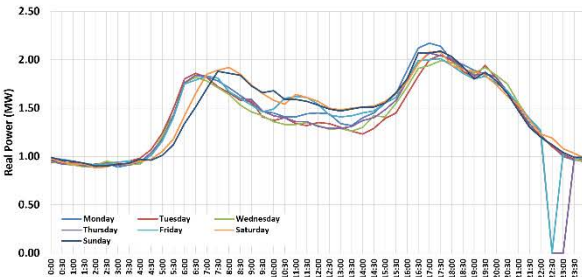
Ohope Zone Substation (2022 year) - Summer (February)



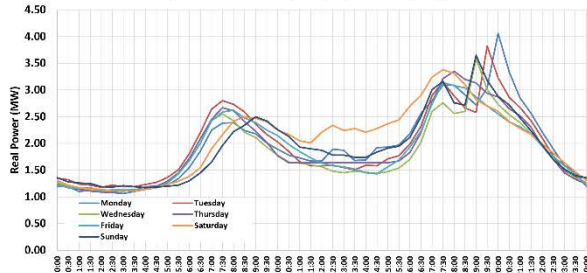
Ohope Zone Substation (2022 year) - Winter (June)



Ohope Zone Substation (2022 year) - Summer (February)



Ohope Zone Substation (2022 year) - Winter (June)



Ohope Zone Substation (2022 year) - Load Duration Curve

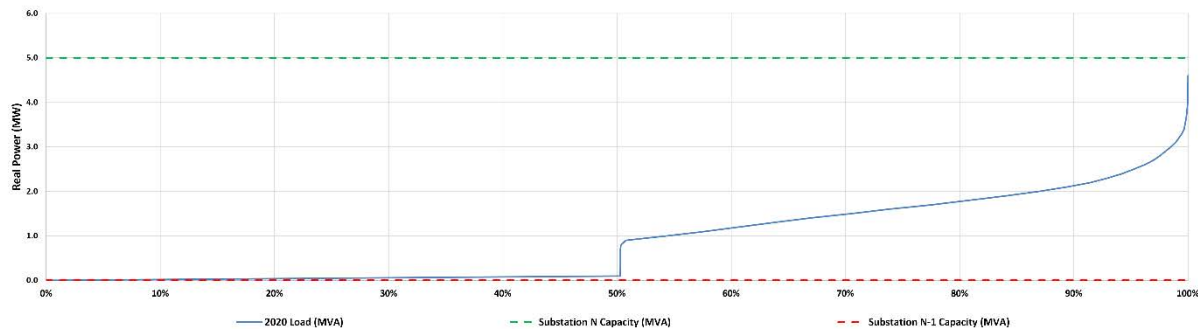
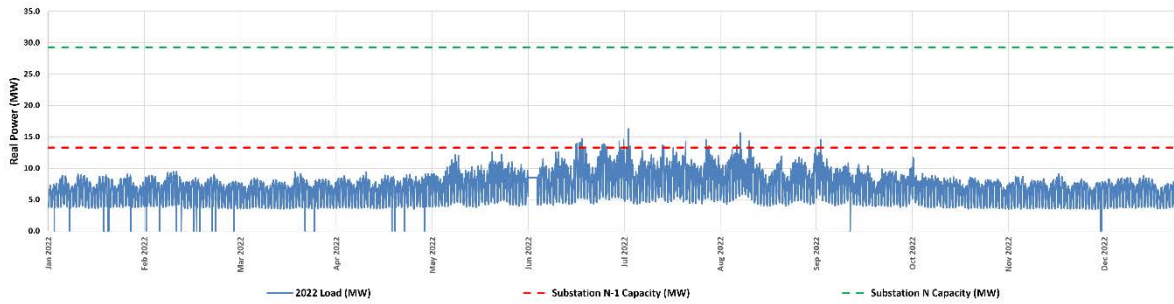


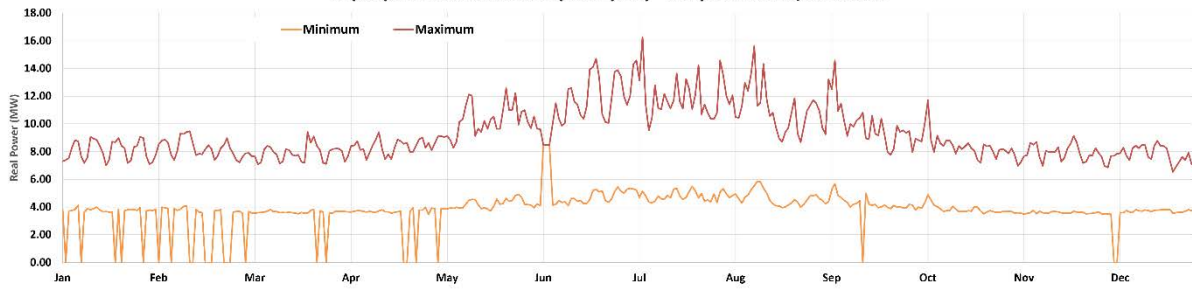
Figure 30. Ohope 33/11kV zone substation: Real power (MW) load characteristics

Kopeopeo MW

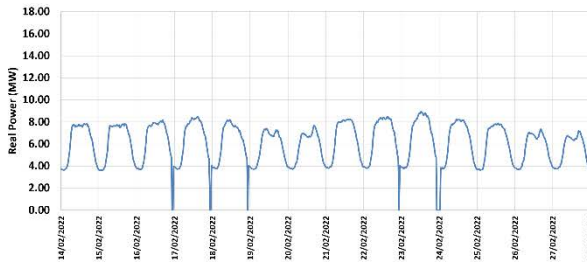
Kopeopeo Zone Substation (2022 year) - Half hourly loading



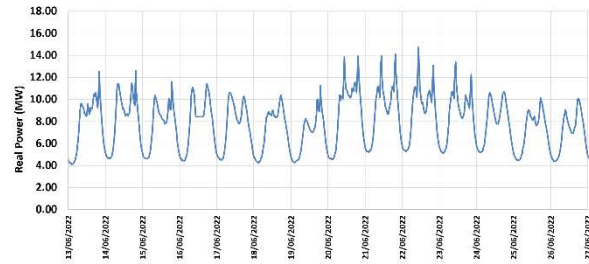
Kopeopeo Zone Substation (2022 year) - Daily Maximum/Minimum



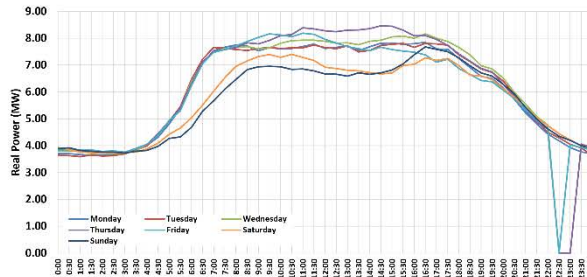
Kopeopeo Zone Substation (2022 year) - Summer (February)



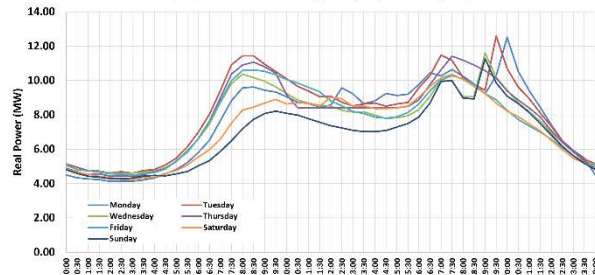
Kopeopeo Zone Substation (2022 year) - Winter (June)



Kopeopeo Zone Substation (2022 year) - Summer (February)



Kopeopeo Zone Substation (2022 year) - Winter (June)



Kopeopeo Zone Substation (2022 year) - Load Duration Curve

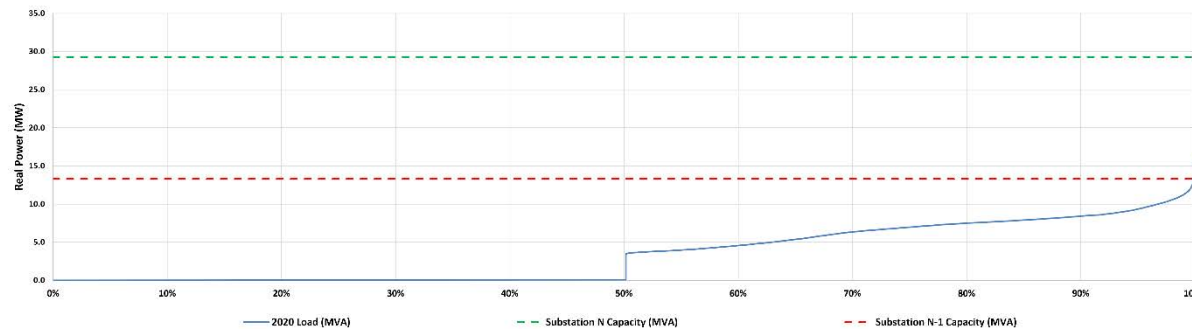
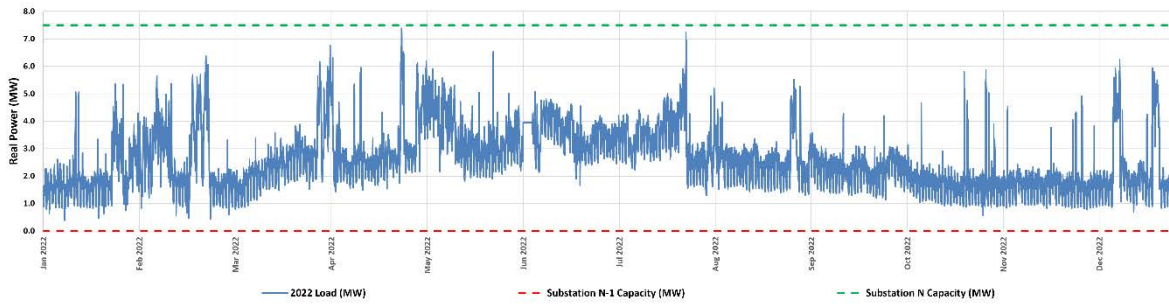


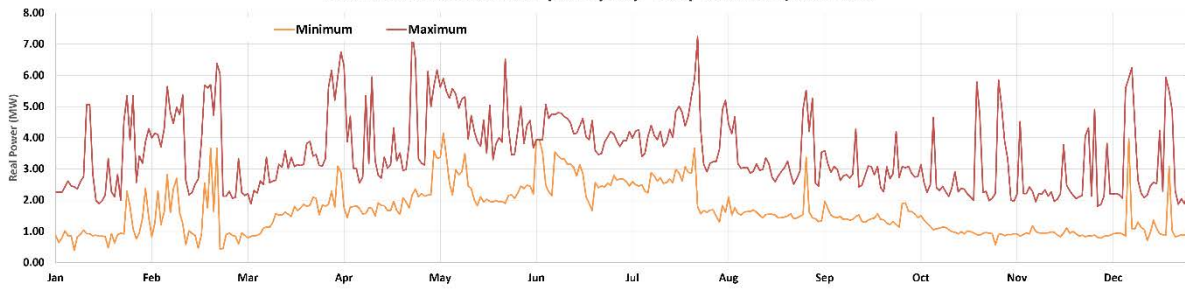
Figure 31. Kopeopeo 33/11kV zone substation: Real power (MW) load characteristics

East Bank MW

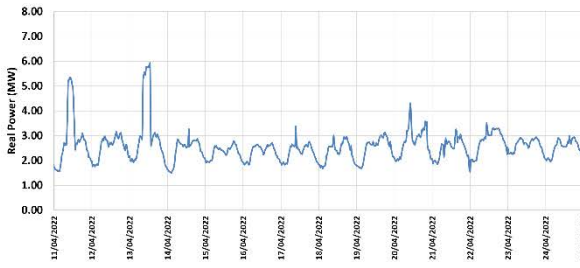
East Bank Zone Substation (2022 year) - Half hourly loading



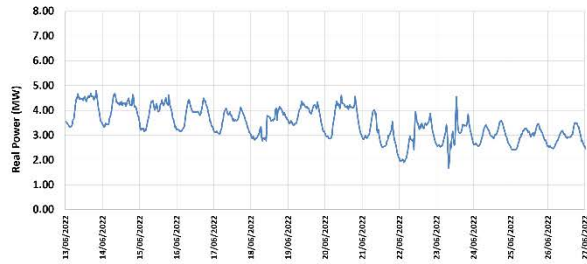
East Bank Zone Substation (2022 year) - Daily Maximum/Minimum



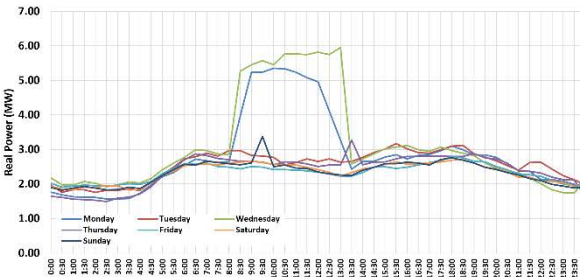
East Bank Zone Substation (2022 year) - Summer (April)



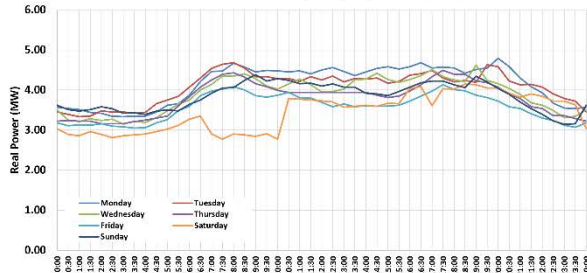
East Bank Zone Substation (2022 year) - Winter (June)



East Bank Zone Substation (2022 year) - Summer (April)



East Bank Zone Substation (2022 year) - Winter (June)



East Bank Zone Substation (2022 year) - Load Duration Curve

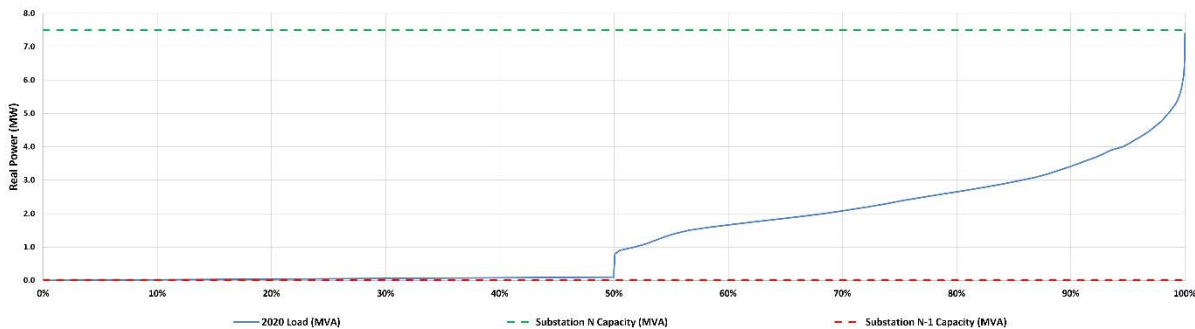
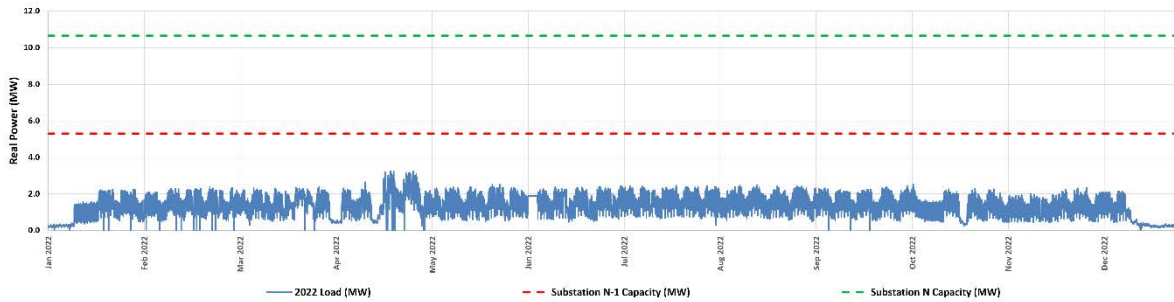


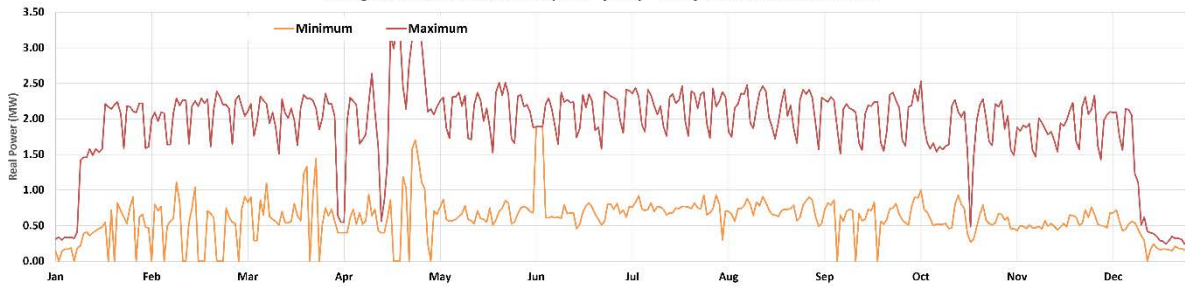
Figure 32. East Bank 33/11kV zone substation: Real power (MW) load characteristics

Kaingaroa MW

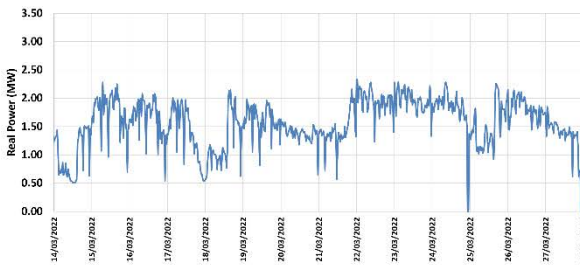
Kaingaroa Zone Substation (2022 year) - Half hourly loading



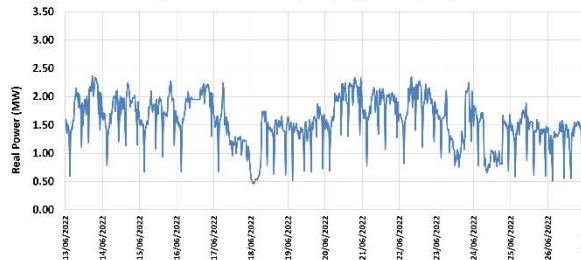
Kaingaroa Zone Substation (2022 year) - Daily Maximum/Minimum



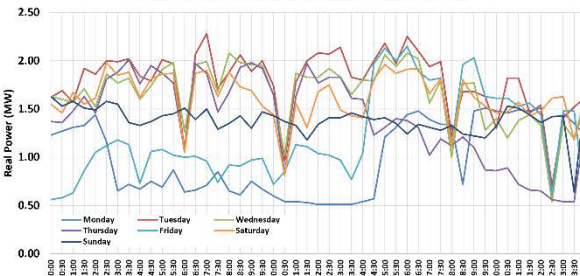
Kaingaroa Zone Substation (2022 year) - Summer (March)



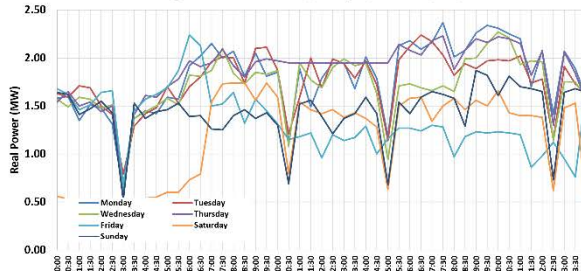
Kaingaroa Zone Substation (2022 year) - Winter (June)



Kaingaroa Zone Substation (2022 year) - Summer (March)



Kaingaroa Zone Substation (2022 year) - Winter (June)



Kaingaroa Zone Substation (2022 year) - Load Duration Curve

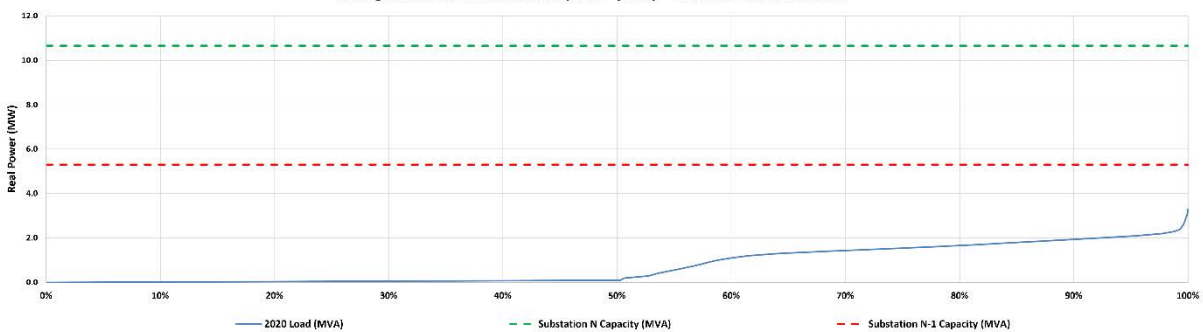
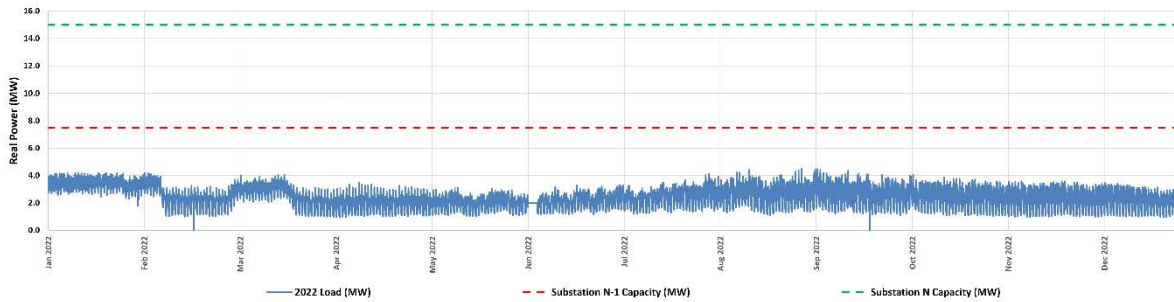


Figure 33. Kaingaroa 33/11kV zone substation: Real power (MW) load characteristics

Galatea MW

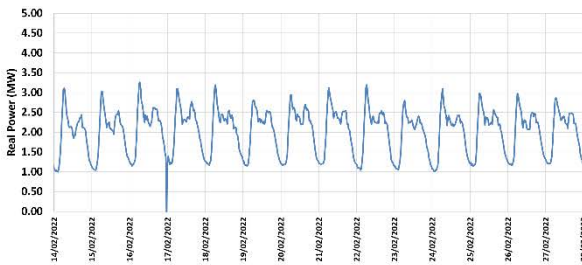
Galatea Zone Substation (2022 year) - Half hourly loading



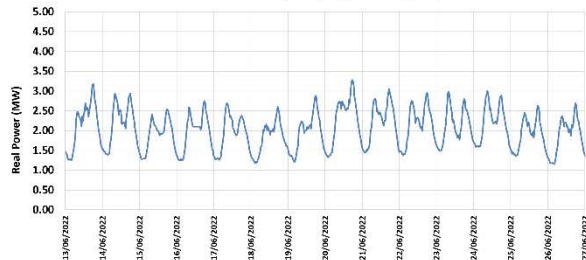
Galatea Zone Substation (2022 year) - Daily Maximum/Minimum



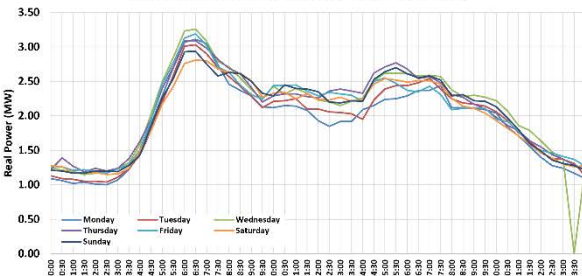
Galatea Zone Substation (2022 year) - Summer (February)



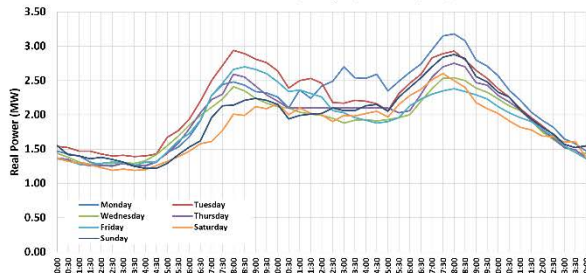
Galatea Zone Substation (2022 year) - Winter (June)



Galatea Zone Substation (2022 year) - Summer (February)



Galatea Zone Substation (2022 year) - Winter (June)



Galatea Zone Substation (2022 year) - Load Duration Curve

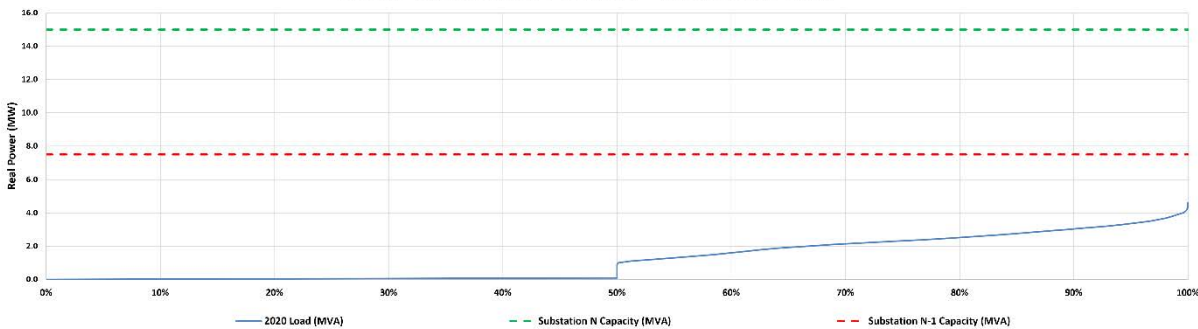


Figure 34. Galatea 33/11kV zone substation: Real power (MW) load characteristics

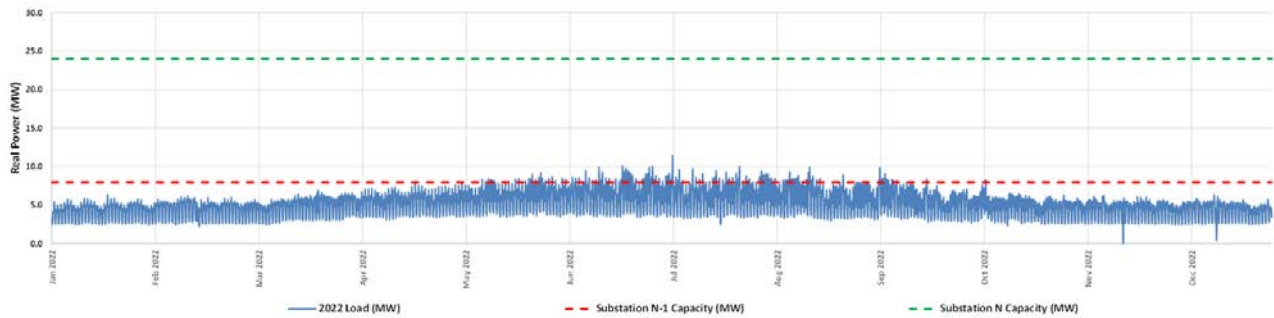
1.2 Powerco (East Region)

The characteristics of the zone substation **real power loadings** within Powerco's network are shown in the following:

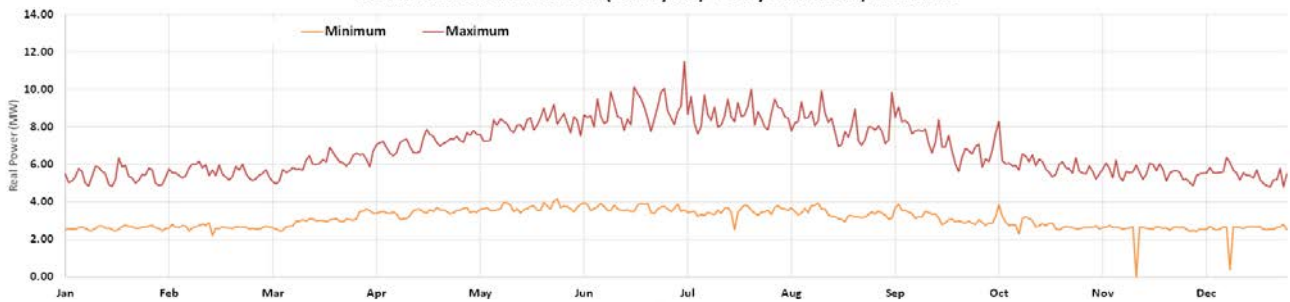
- Figure 35. Bethlehem 33/11kV zone substation: Real power (MW) load characteristics.
- Figure 36. Waihi Road 33/11kV zone substation: Real power (MW) load characteristics.
- Figure 37. Hamilton Street 33/11kV zone substation: Real power (MW) load characteristics.
- Figure 38. Sulphur Point 33/11kV zone substation: Real power (MW) load characteristics.
- Figure 39. Otumoetai 33/11kV zone substation: Real power (MW) load characteristics.
- Figure 40. Matua 33/11kV zone substation: Real power (MW) load characteristics.
- Figure 41. Omokoroa 33/11kV zone substation: Real power (MW) load characteristics.
- Figure 42. Aongatete 33/11kV zone substation: Real power (MW) load characteristics.
- Figure 43. Katikati 33/11kV zone substation: Real power (MW) load characteristics.
- Figure 44. Kauri Point 33/11kV zone substation: Real power (MW) load characteristics.
- Figure 45. Welcome Bay 33/11kV zone substation: Real power (MW) load characteristics.
- Figure 46. Pyes Pa 33/11kV zone substation: Real power (MW) load characteristics.
- Figure 47. Papamoa 33/11kV zone substation: Real power (MW) load characteristics.
- Figure 48. Matapihi 33/11kV zone substation: Real power (MW) load characteristics.
- Figure 49. Omanu 33/11kV zone substation: Real power (MW) load characteristics.
- Figure 50. Te Maunga 33/11kV zone substation: Real power (MW) load characteristics.
- Figure 51. Triton 33/11kV zone substation: Real power (MW) load characteristics.
- Figure 52. Wairakei 33/11kV zone substation: Real power (MW) load characteristics.
- Figure 53. Te Puke 33/11kV zone substation: Real power (MW) load characteristics.
- Figure 54. Atauroa 33/11kV zone substation: Real power (MW) load characteristics.
- Figure 55. Paengaroa 33/11kV zone substation: Real power (MW) load characteristics.
- Figure 56. Pongakawa 33/11kV zone substation: Real power (MW) load characteristics.

Bethlehem MW

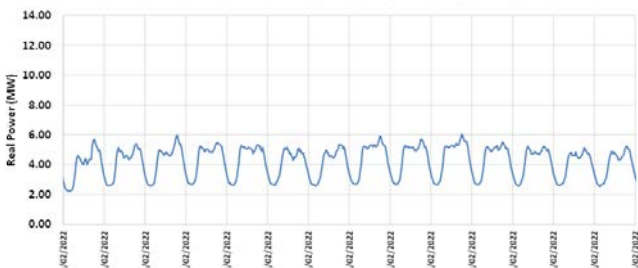
Bethlehem Zone Substation (2022 year) - Half hourly loading



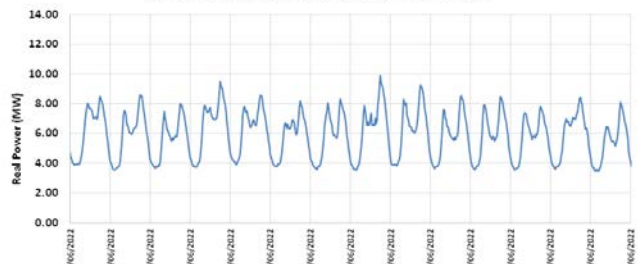
Bethlehem Zone Substation (2022 year) - Daily Maximum/Minimum



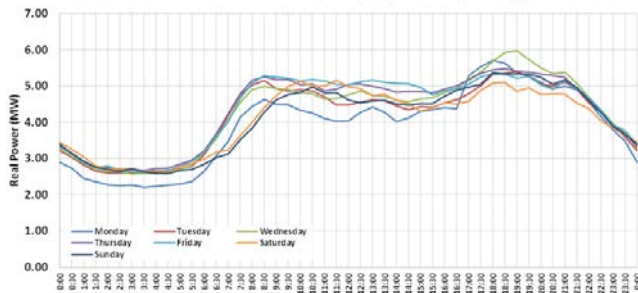
Bethlehem Zone Substation (2022 year) - Summer (February)



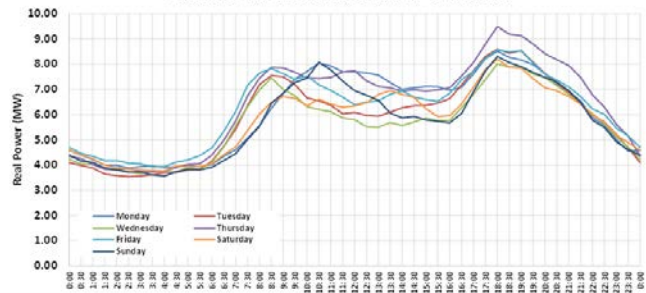
Bethlehem Zone Substation (2022 year) - Winter (June)



Bethlehem Zone Substation (2022 year) - Summer (February)



Bethlehem Zone Substation (2022 year) - Winter (June)



Bethlehem Zone Substation (2022 year) - Load Duration Curve

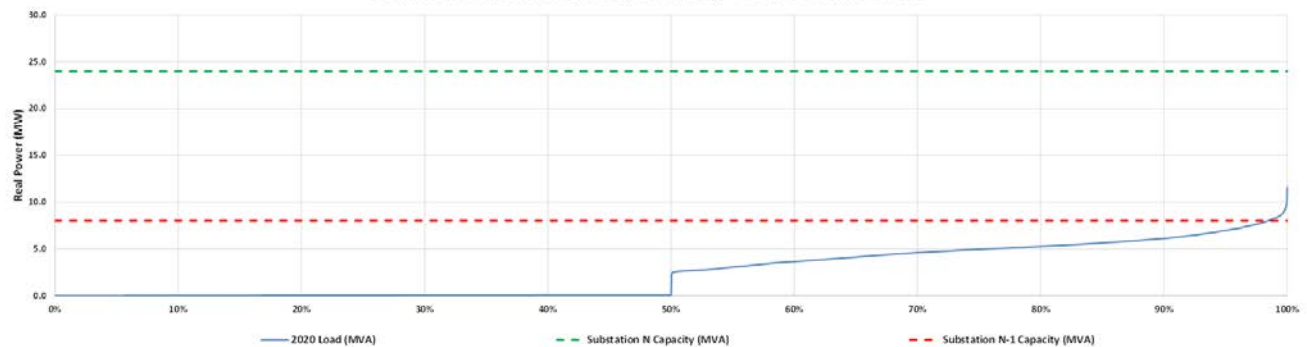
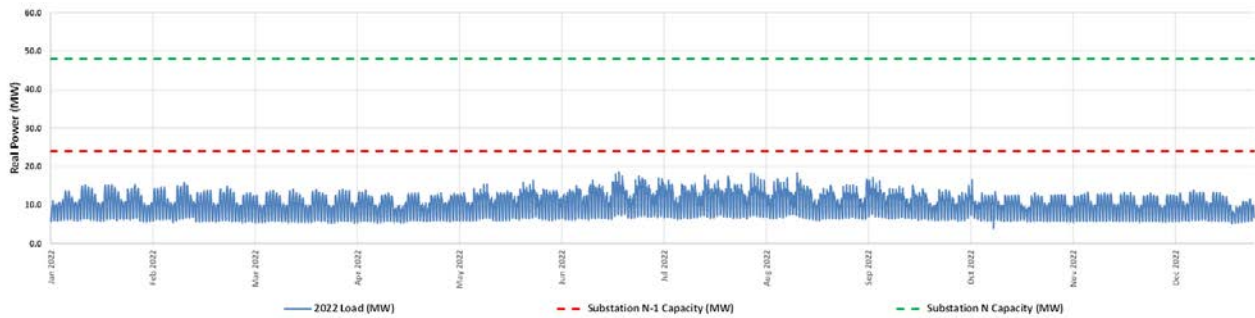


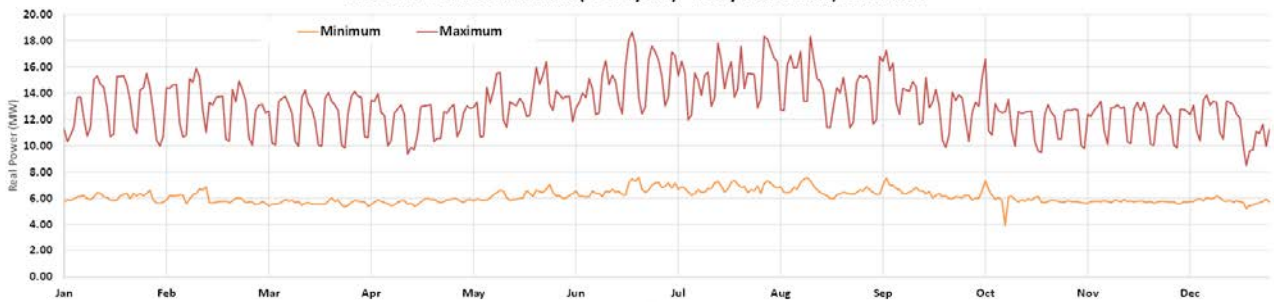
Figure 35. Bethlehem 33/11kV zone substation: Real power (MW) load characteristics.

Waihi Road MW

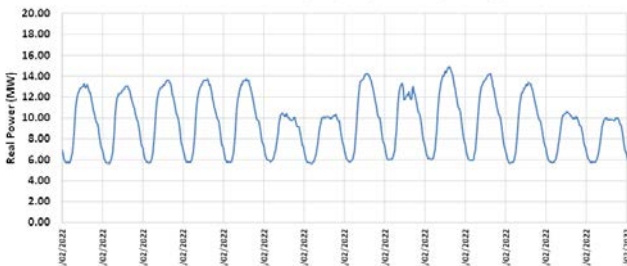
Waihi Rd Zone Substation (2022 year) - Half hourly loading



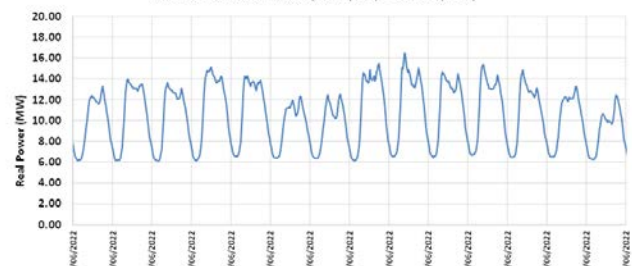
Waihi Rd Zone Substation (2022 year) - Daily Maximum/Minimum



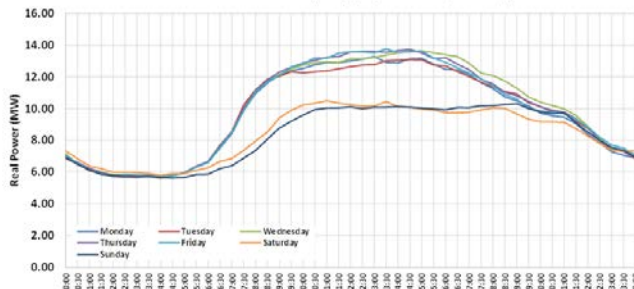
Waihi Rd Zone Substation (2022 year) - Summer (February)



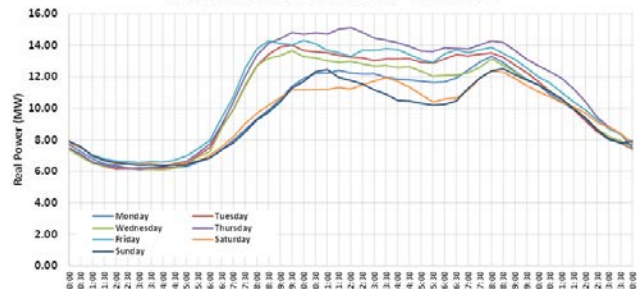
Waihi Rd Zone Substation (2022 year) - Winter (June)



Waihi Rd Zone Substation (2022 year) - Summer (February)



Waihi Rd Zone Substation (2022 year) - Winter (June)



Waihi Rd Zone Substation (2022 year) - Load Duration Curve

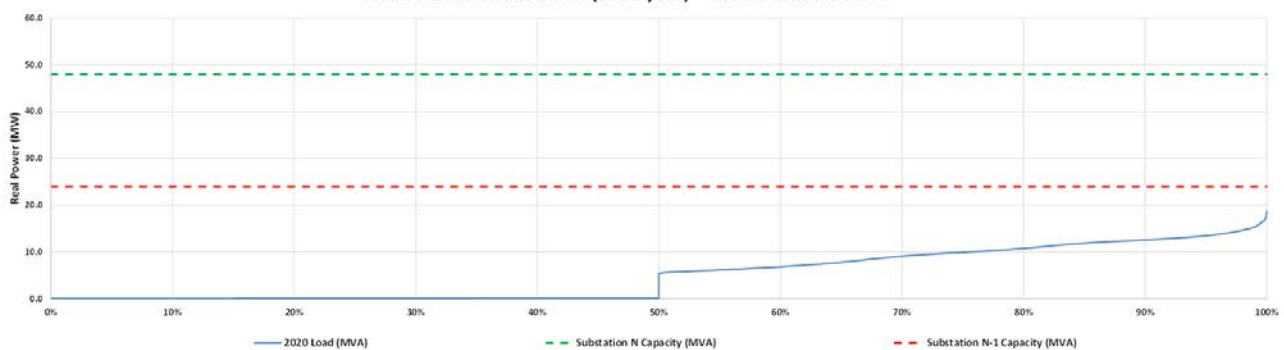
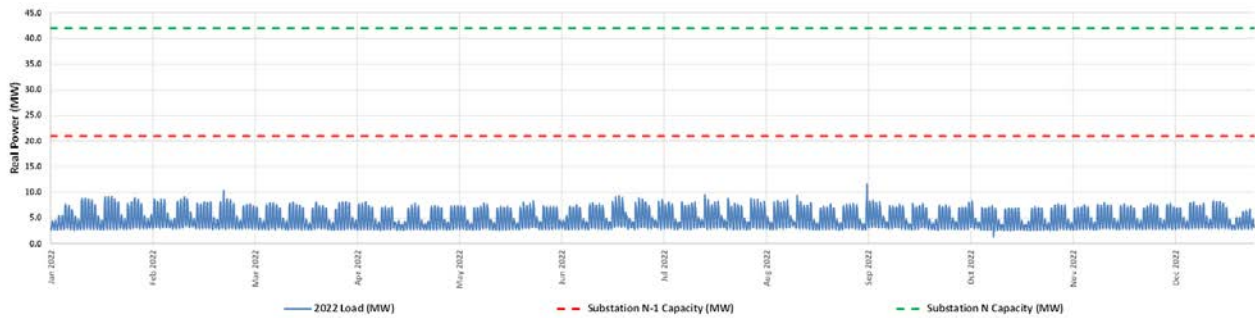


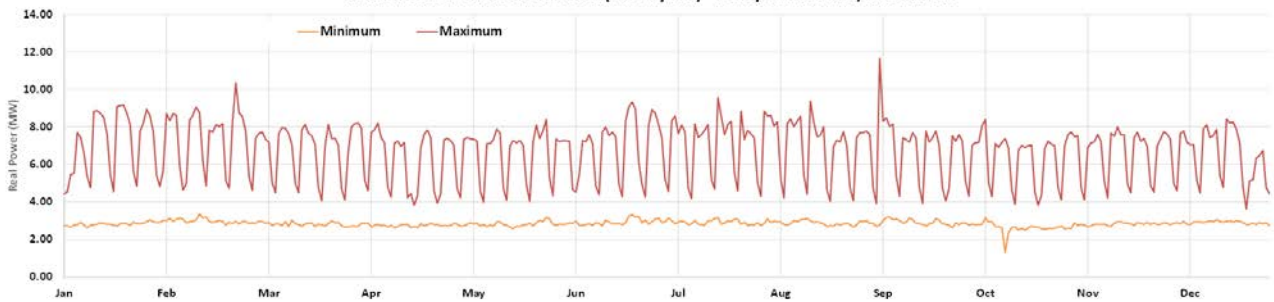
Figure 36. Waihi Road 33/11kV zone substation: Real power (MW) load characteristics.

Hamilton Street MW

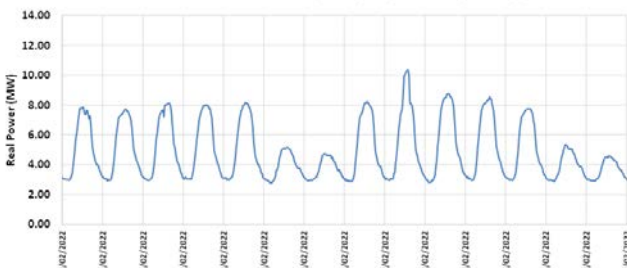
Hamilton St Zone Substation (2022 year) - Half hourly loading



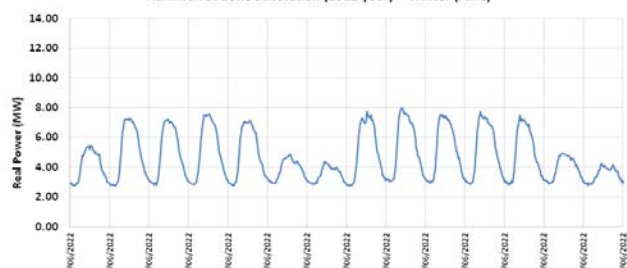
Hamilton St Zone Substation (2022 year) - Daily Maximum/Minimum



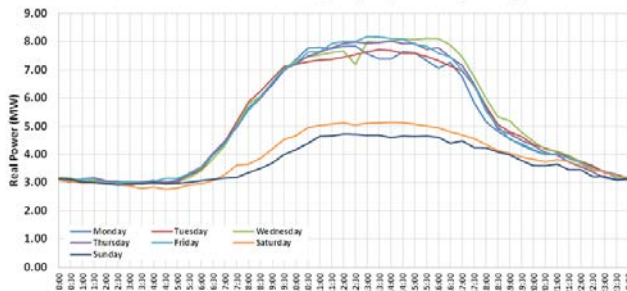
Hamilton St Zone Substation (2022 year) - Summer (February)



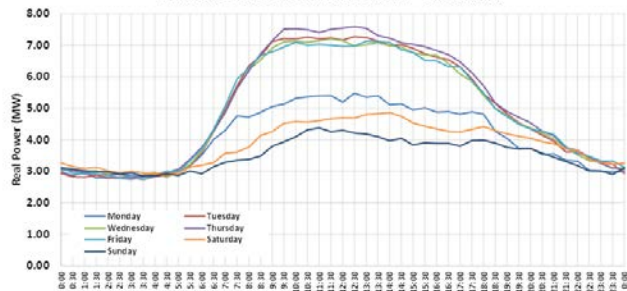
Hamilton St Zone Substation (2022 year) - Winter (June)



Hamilton St Zone Substation (2022 year) - Summer (February)



Hamilton St Zone Substation (2022 year) - Winter (June)



Hamilton St Zone Substation (2022 year) - Load Duration Curve

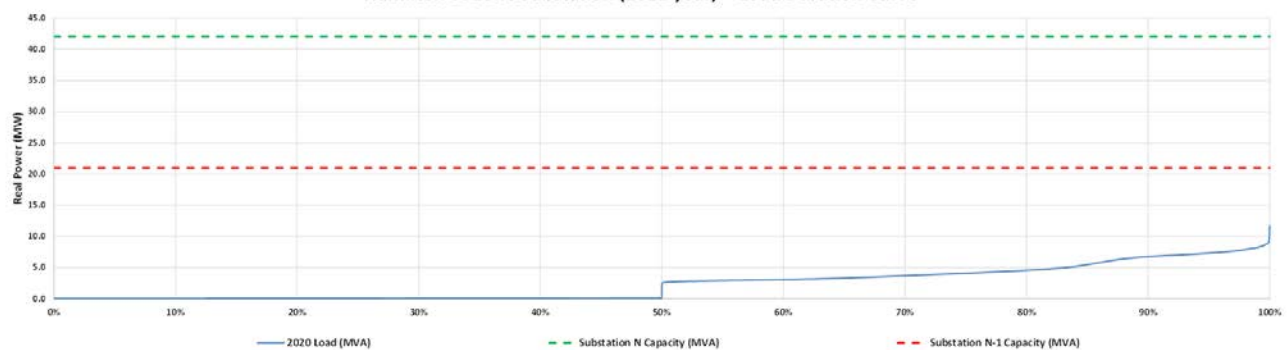
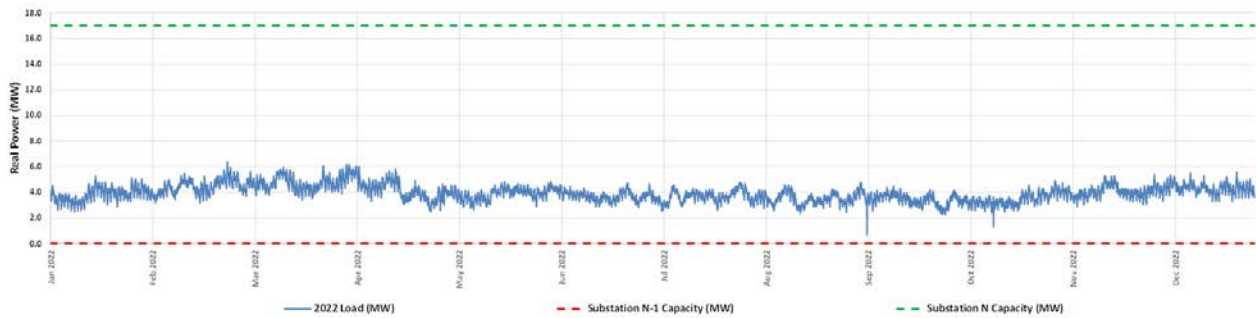


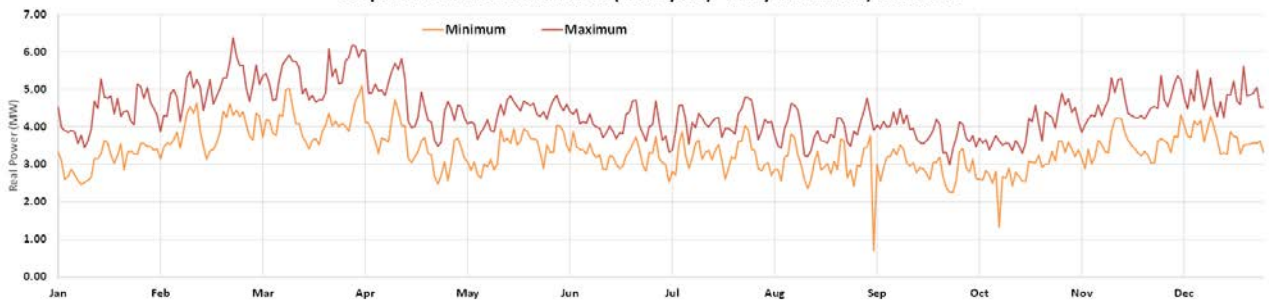
Figure 37. Hamilton Street 33/11kV zone substation: Real power (MW) load characteristics.

Sulphur Point MW

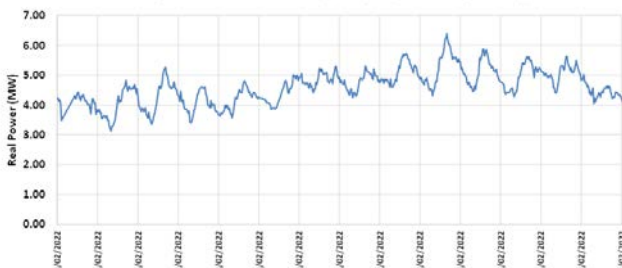
Sulphur Point Zone Substation (2022 year) - Half hourly loading



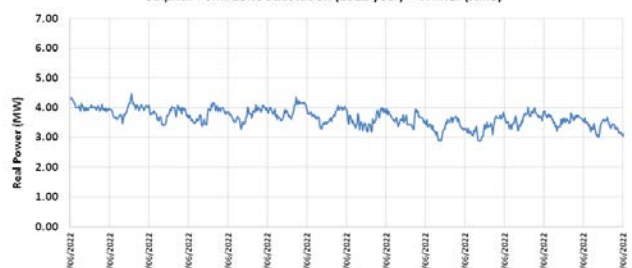
Sulphur Point Zone Substation (2022 year) - Daily Maximum/Minimum



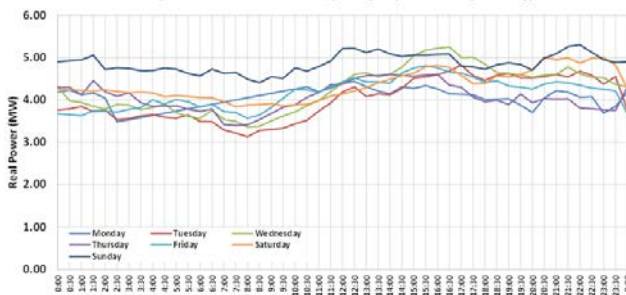
Sulphur Point Zone Substation (2022 year) - Summer (February)



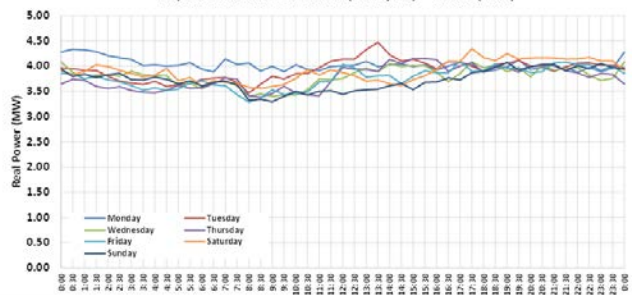
Sulphur Point Zone Substation (2022 year) - Winter (June)



Sulphur Point Zone Substation (2022 year) - Summer (February)



Sulphur Point Zone Substation (2022 year) - Winter (June)



Sulphur Point Zone Substation (2022 year) - Load Duration Curve

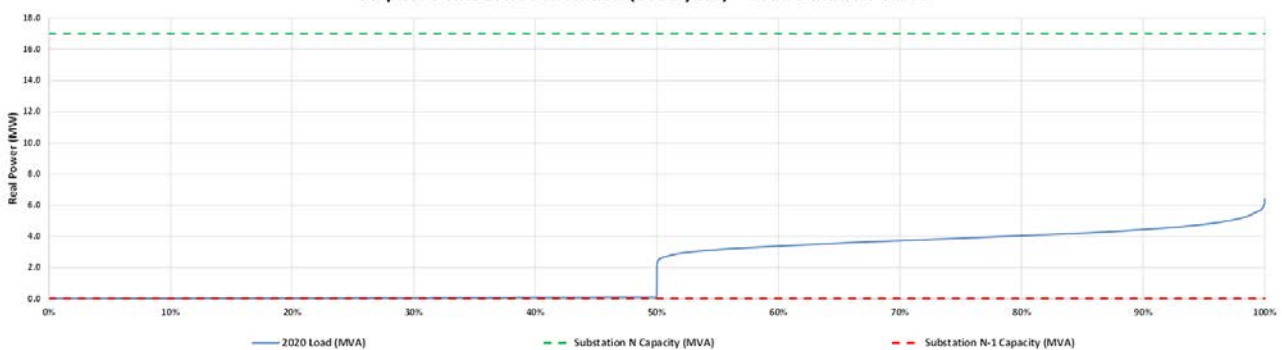
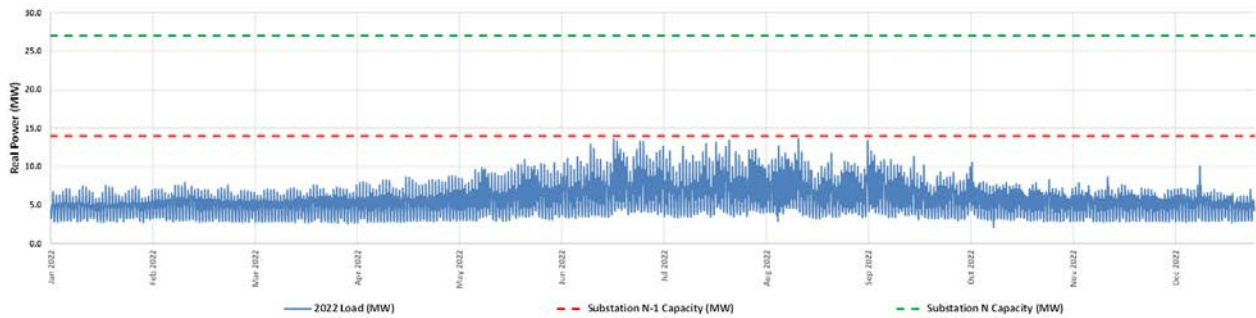


Figure 38. Sulphur Point 33/11kV zone substation: Real power (MW) load characteristics.

Otumoetai MW

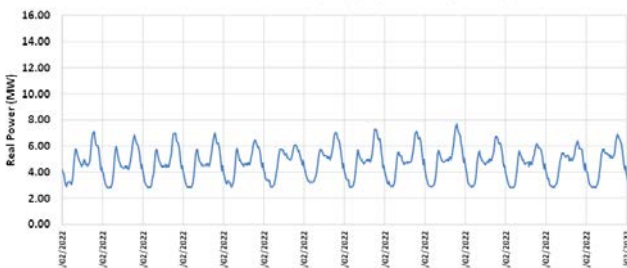
Otumoetai Zone Substation (2022 year) - Half hourly loading



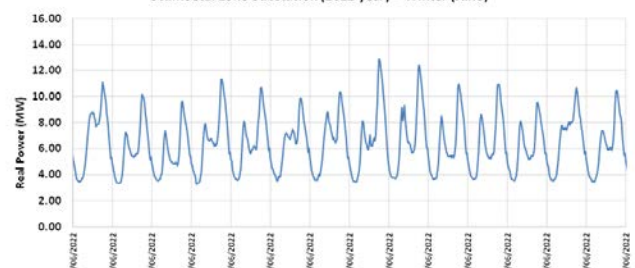
Otumoetai Zone Substation (2022 year) - Daily Maximum/Minimum



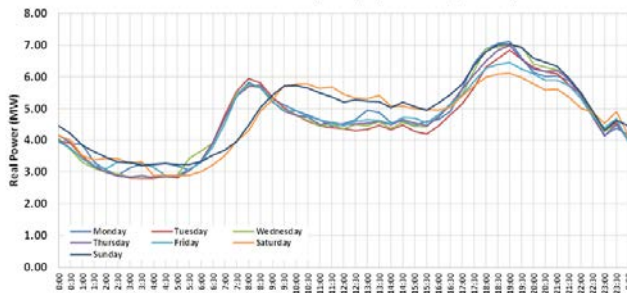
Otumoetai Zone Substation (2022 year) - Summer (February)



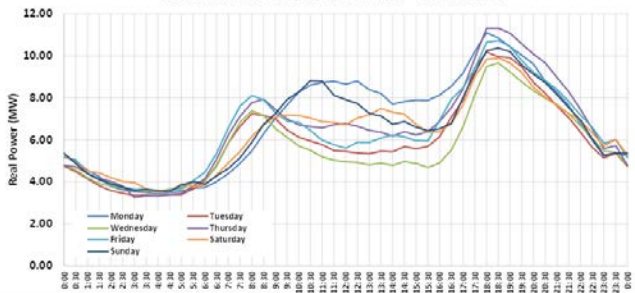
Otumoetai Zone Substation (2022 year) - Winter (June)



Otumoetai Zone Substation (2022 year) - Summer (February)



Otumoetai Zone Substation (2022 year) - Winter (June)



Otumoetai Zone Substation (2022 year) - Load Duration Curve

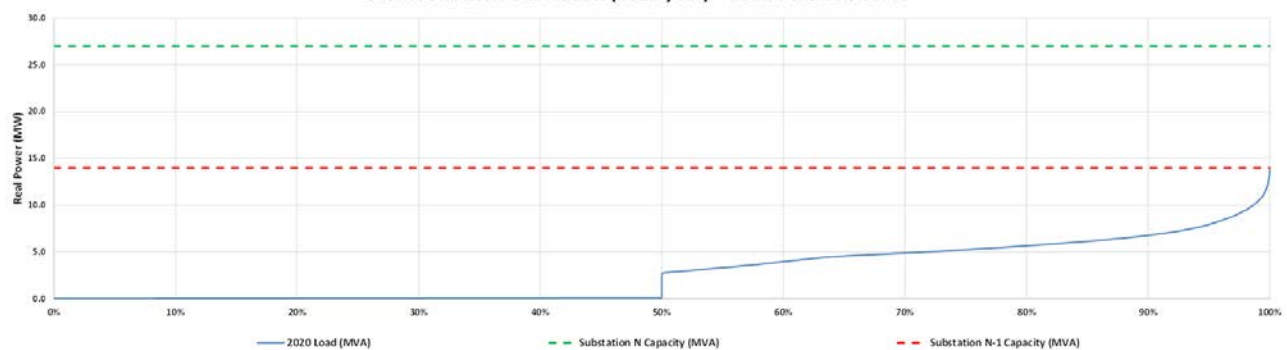
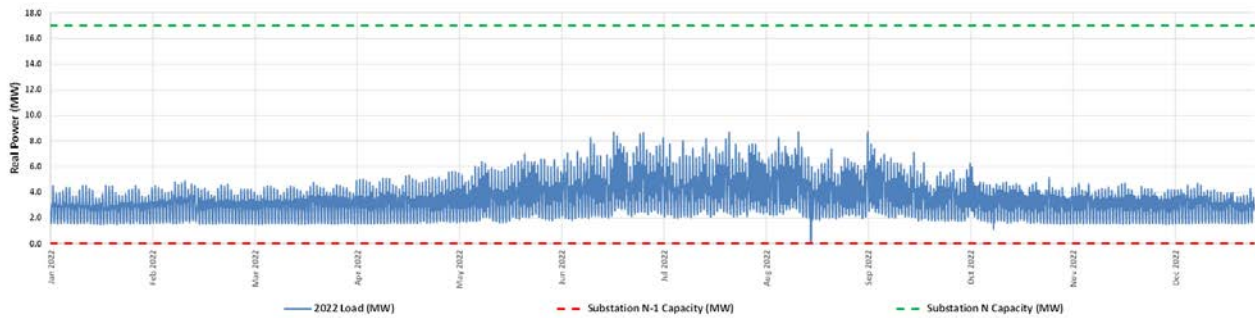


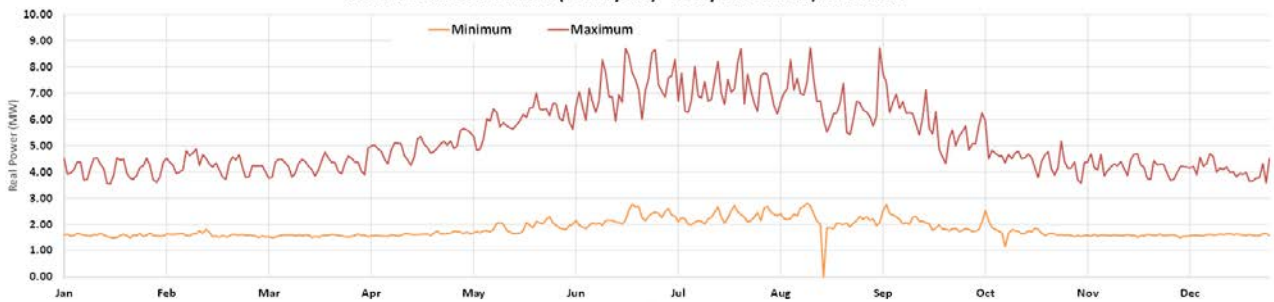
Figure 39. Otumoetai 33/11kV zone substation: Real power (MW) load characteristics.

Matua MW

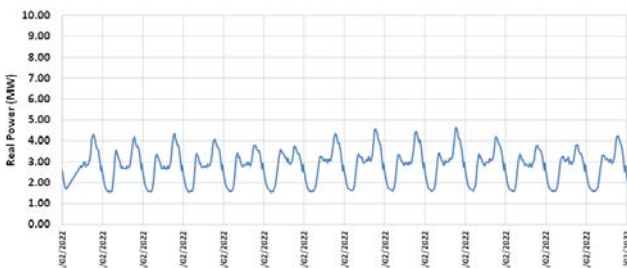
Matua Zone Substation (2022 year) - Half hourly loading



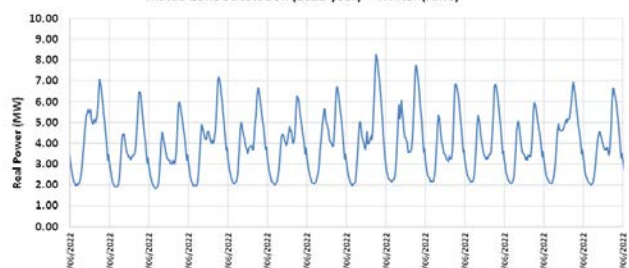
Matua Zone Substation (2022 year) - Daily Maximum/Minimum



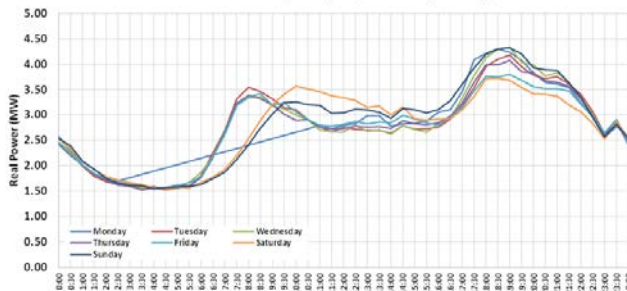
Matua Zone Substation (2022 year) - Summer (February)



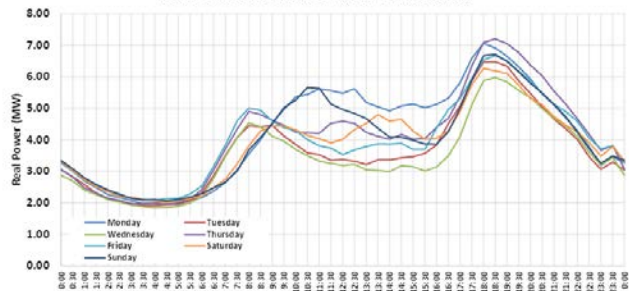
Matua Zone Substation (2022 year) - Winter (June)



Matua Zone Substation (2022 year) - Summer (February)



Matua Zone Substation (2022 year) - Winter (June)



Matua Zone Substation (2022 year) - Load Duration Curve

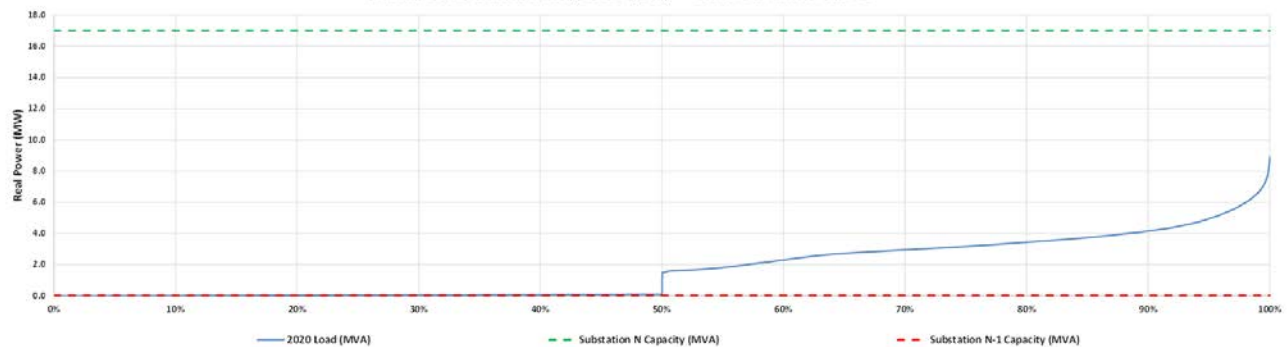
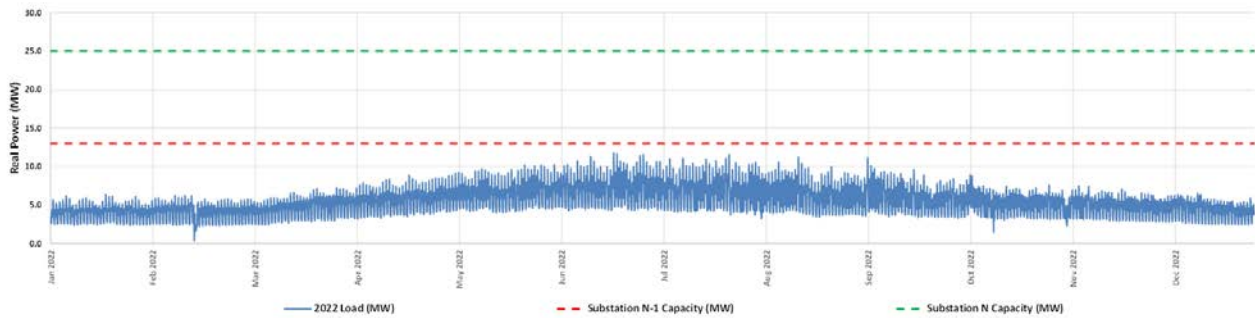


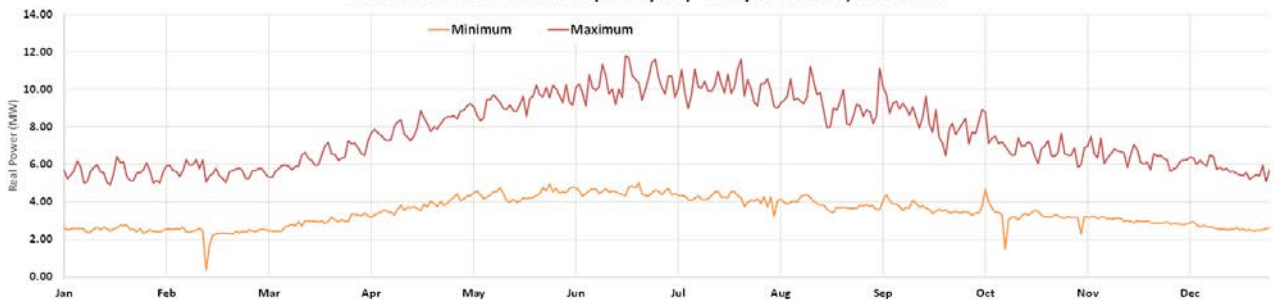
Figure 40. Matua 33/11kV zone substation: Real power (MW) load characteristics.

Omokoroa MW

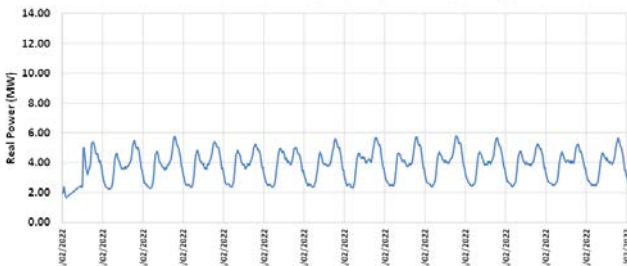
Omokoroa Zone Substation (2022 year) - Half hourly loading



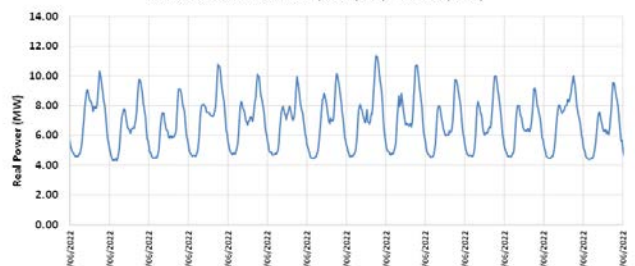
Omokoroa Zone Substation (2022 year) - Daily Maximum/Minimum



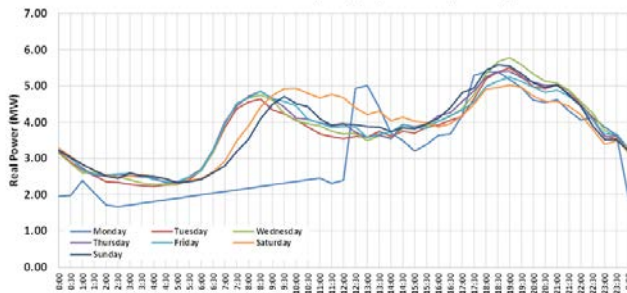
Omokoroa Zone Substation (2022 year) - Summer (February)



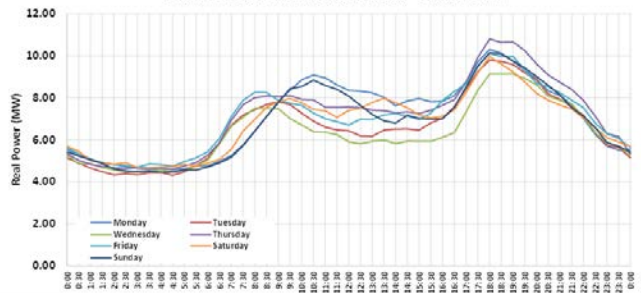
Omokoroa Zone Substation (2022 year) - Winter (June)



Omokoroa Zone Substation (2022 year) - Summer (February)



Omokoroa Zone Substation (2022 year) - Winter (June)



Omokoroa Zone Substation (2022 year) - Load Duration Curve

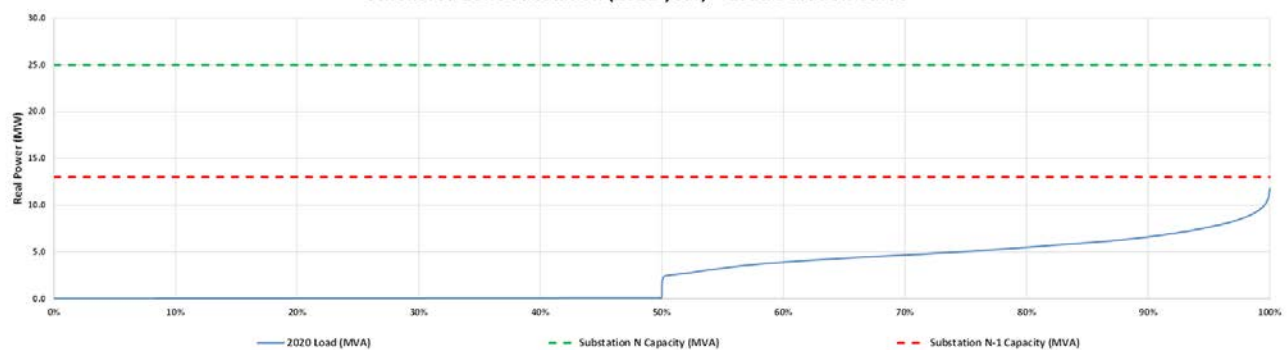
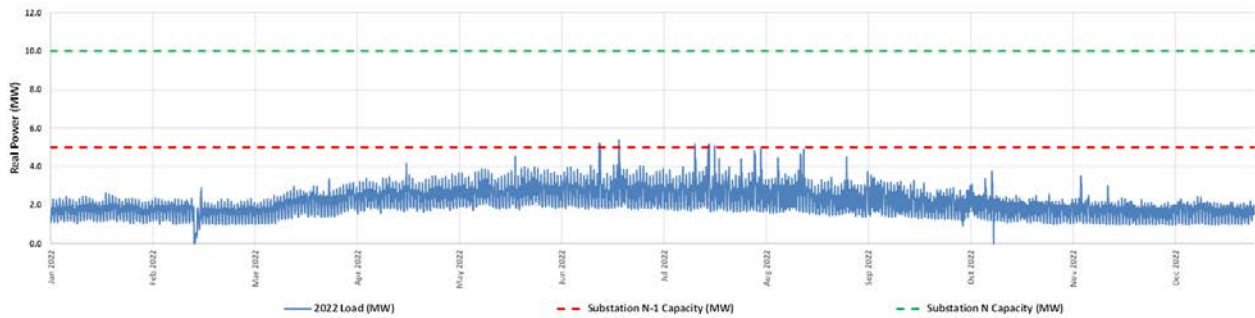


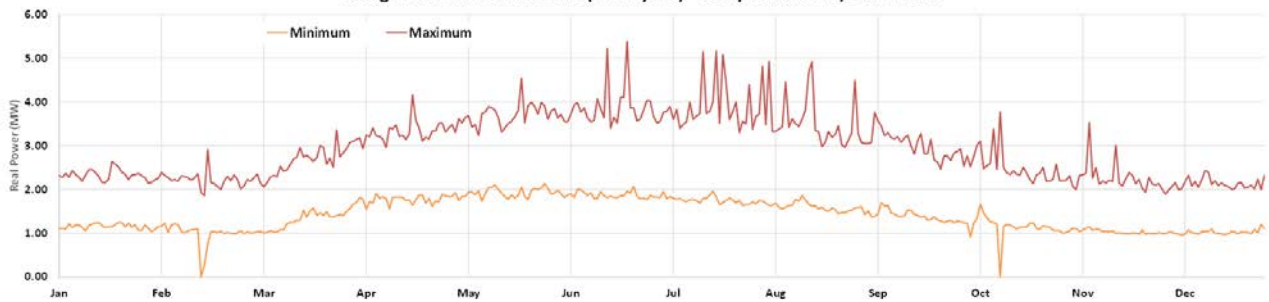
Figure 41. Omokoroa 33/11kV zone substation: Real power (MW) load characteristics.

Aongatete MW

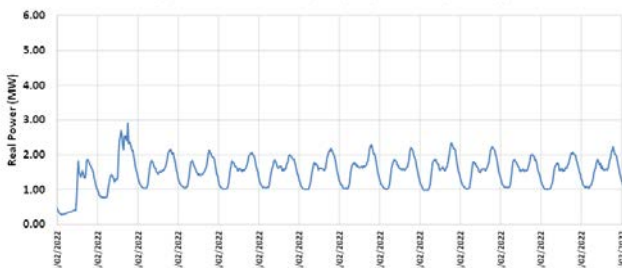
Aongatete Zone Substation (2022 year) - Half hourly loading



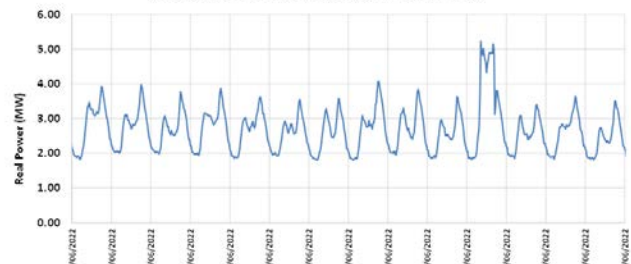
Aongatete Zone Substation (2022 year) - Daily Maximum/Minimum



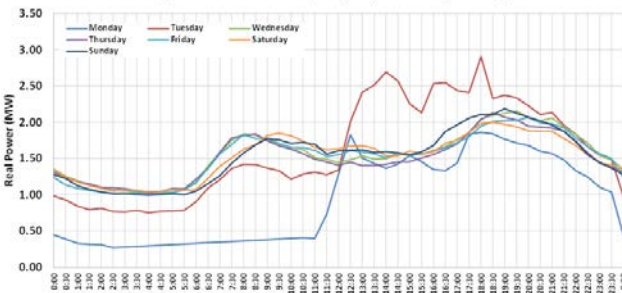
Aongatete Zone Substation (2022 year) - Summer (February)



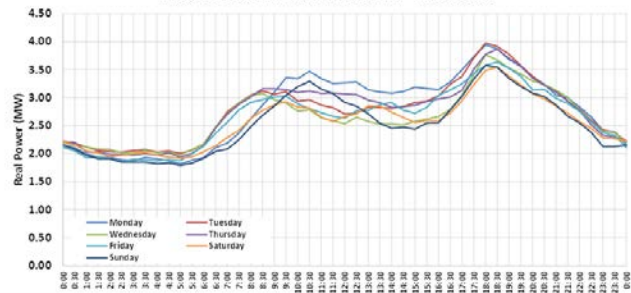
Aongatete Zone Substation (2022 year) - Winter (June)



Aongatete Zone Substation (2022 year) - Summer (February)



Aongatete Zone Substation (2022 year) - Winter (June)



Aongatete Zone Substation (2022 year) - Load Duration Curve

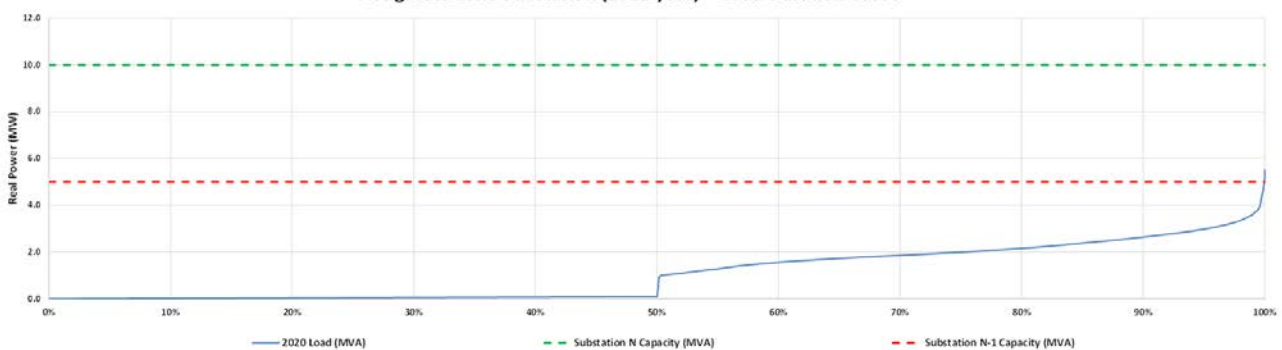
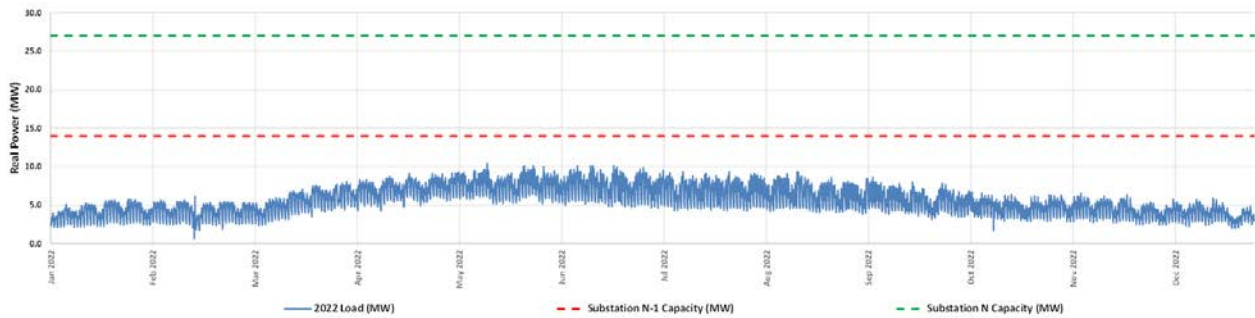


Figure 42. Aongatete 33/11kV zone substation: Real power (MW) load characteristics.

Katikati MW

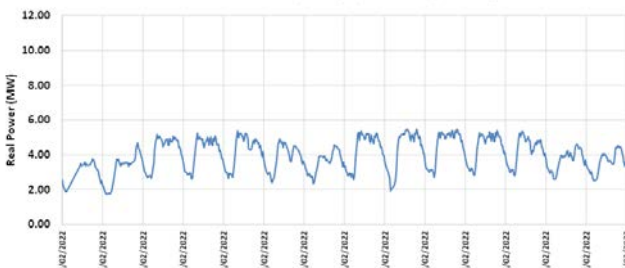
Katikati Zone Substation (2022 year) - Half hourly loading



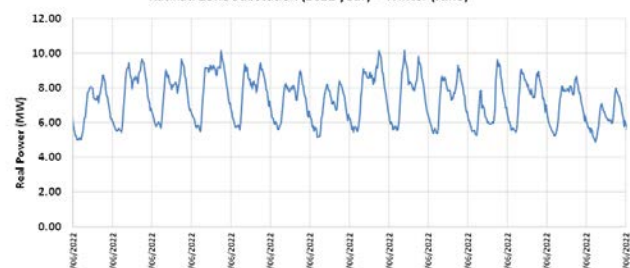
Katikati Zone Substation (2022 year) - Daily Maximum/Minimum



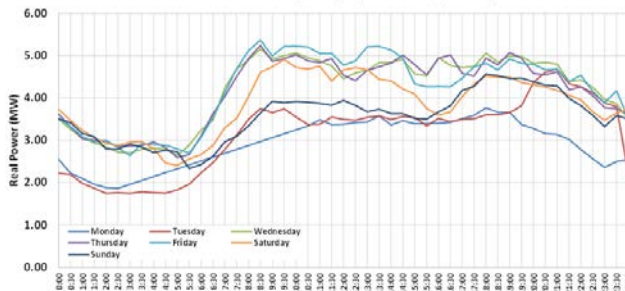
Katikati Zone Substation (2022 year) - Summer (February)



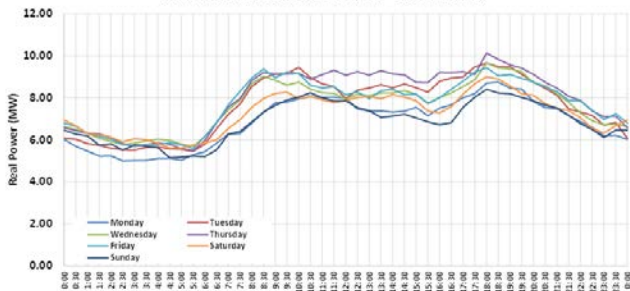
Katikati Zone Substation (2022 year) - Winter (June)



Katikati Zone Substation (2022 year) - Summer (February)



Katikati Zone Substation (2022 year) - Winter (June)



Katikati Zone Substation (2022 year) - Load Duration Curve

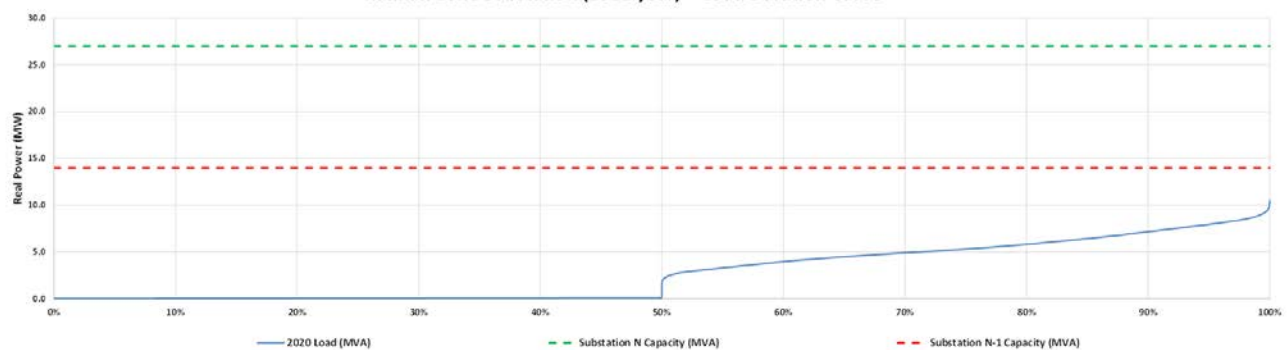
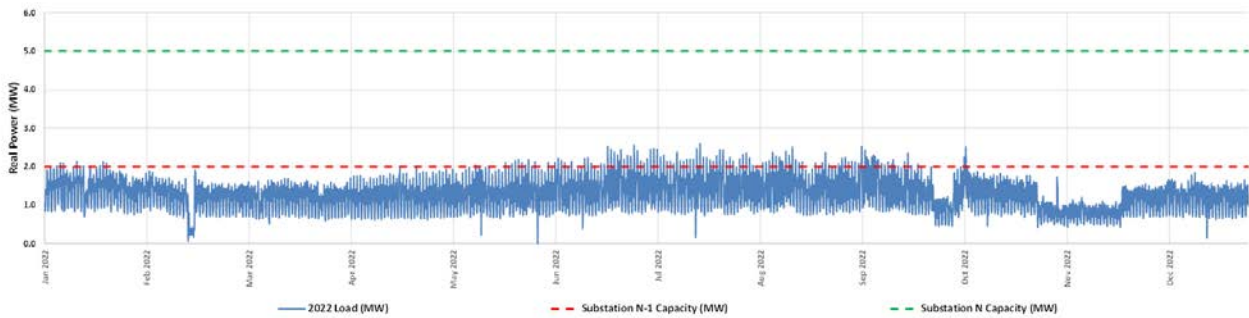


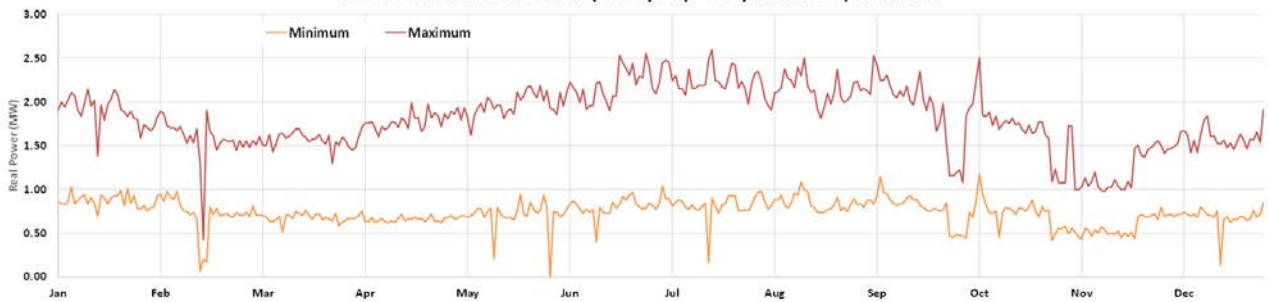
Figure 43. Katikati 33/11kV zone substation: Real power (MW) load characteristics.

Kauri Point MW

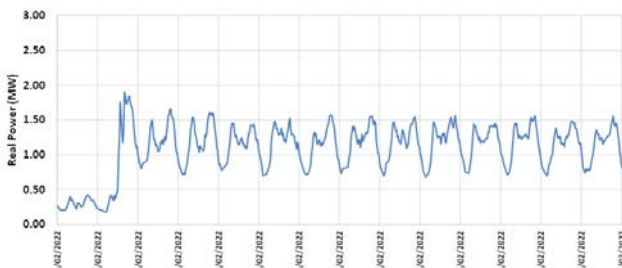
Kauri Point Zone Substation (2022 year) - Half hourly loading



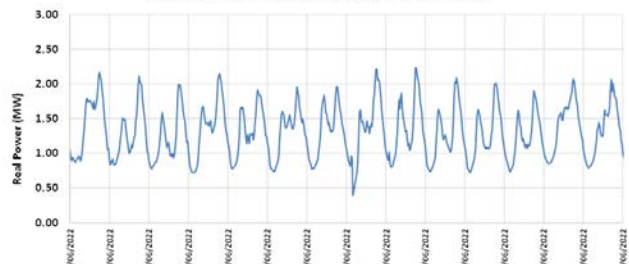
Kauri Point Zone Substation (2022 year) - Daily Maximum/Minimum



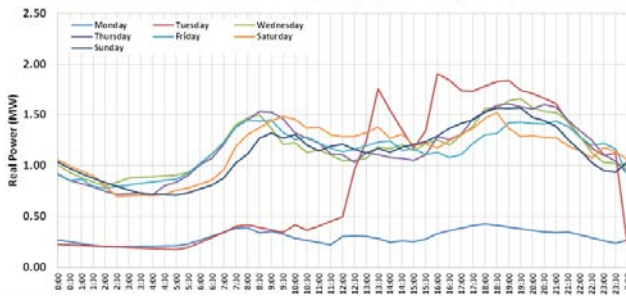
Kauri Point Zone Substation (2022 year) - Summer (February)



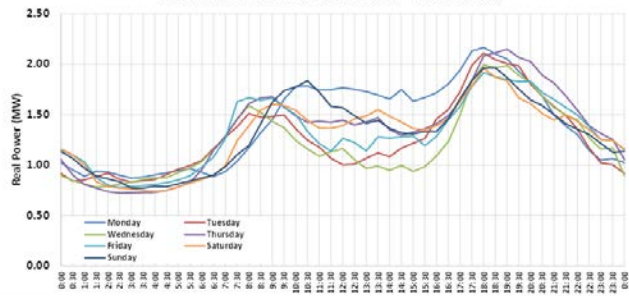
Kauri Point Zone Substation (2022 year) - Winter (June)



Kauri Point Zone Substation (2022 year) - Summer (February)



Kauri Point Zone Substation (2022 year) - Winter (June)



Kauri Point Zone Substation (2022 year) - Load Duration Curve

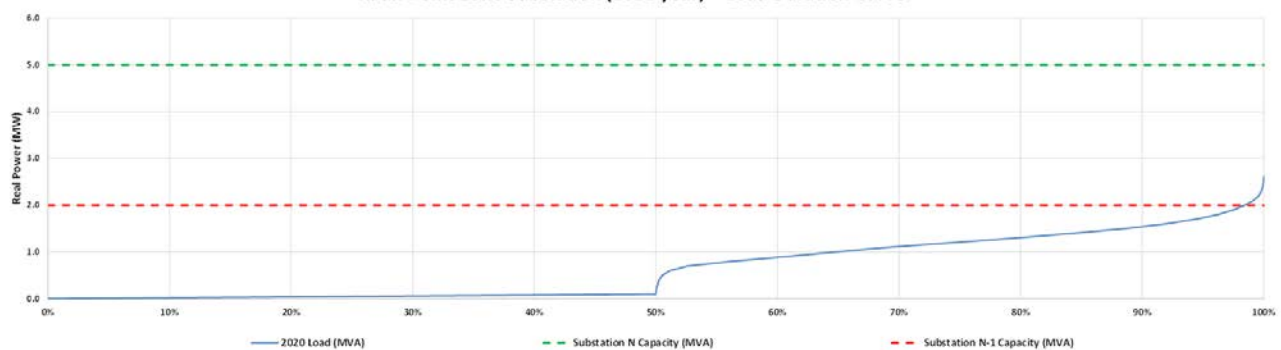
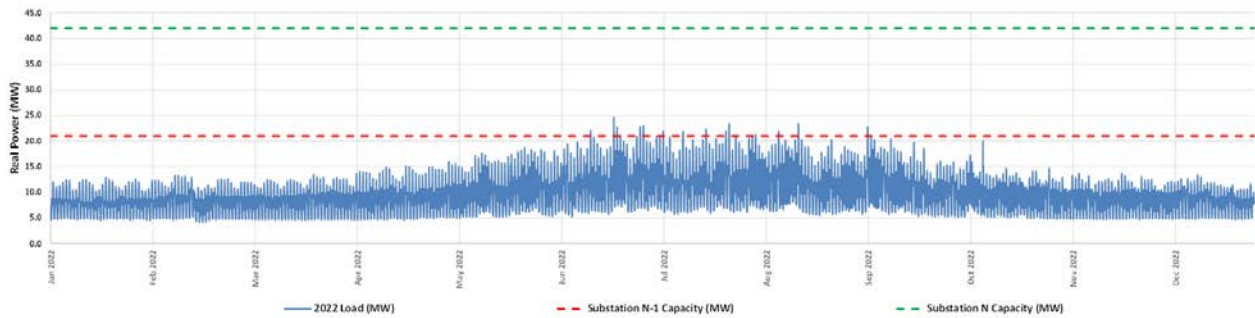


Figure 44. Kauri Point 33/11kV zone substation: Real power (MW) load characteristics.

Welcome Bay MW

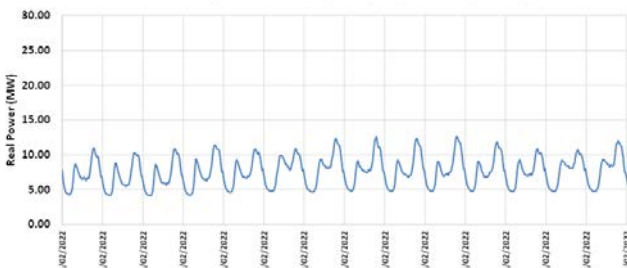
Welcome Bay Zone Substation (2022 year) - Half hourly loading



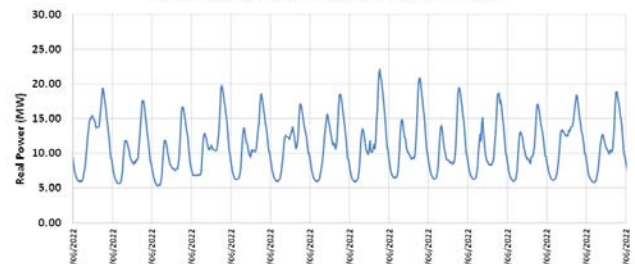
Welcome Bay Zone Substation (2022 year) - Daily Maximum/Minimum



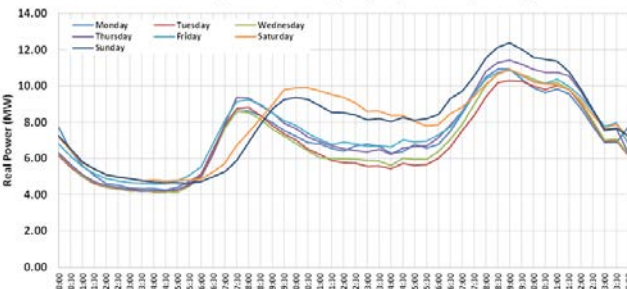
Welcome Bay Zone Substation (2022 year) - Summer (February)



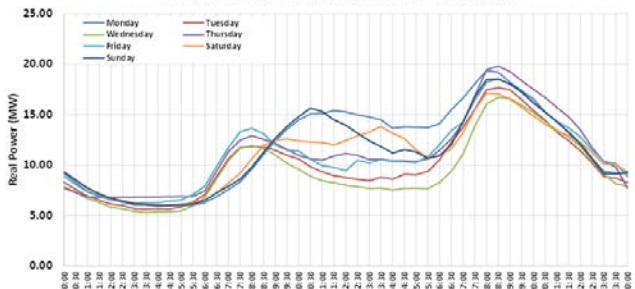
Welcome Bay Zone Substation (2022 year) - Winter (June)



Welcome Bay Zone Substation (2022 year) - Summer (February)



Welcome Bay Zone Substation (2022 year) - Winter (June)



Welcome Bay Zone Substation (2022 year) - Load Duration Curve

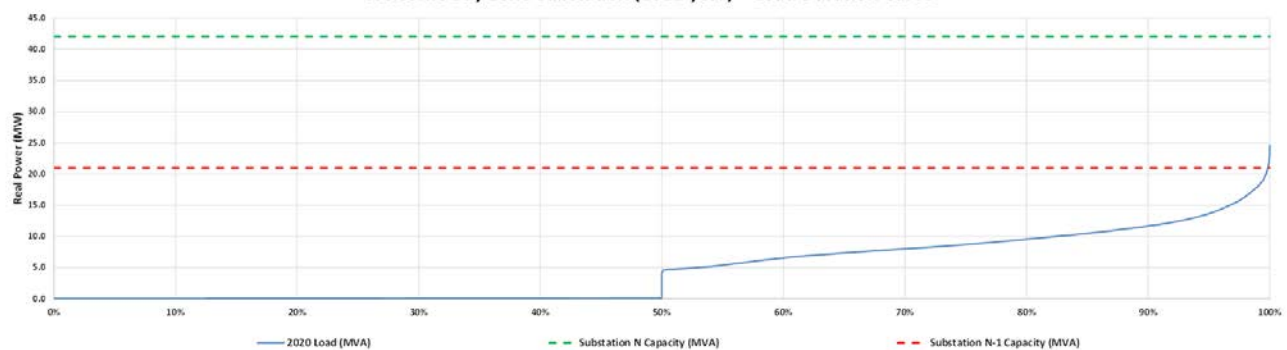
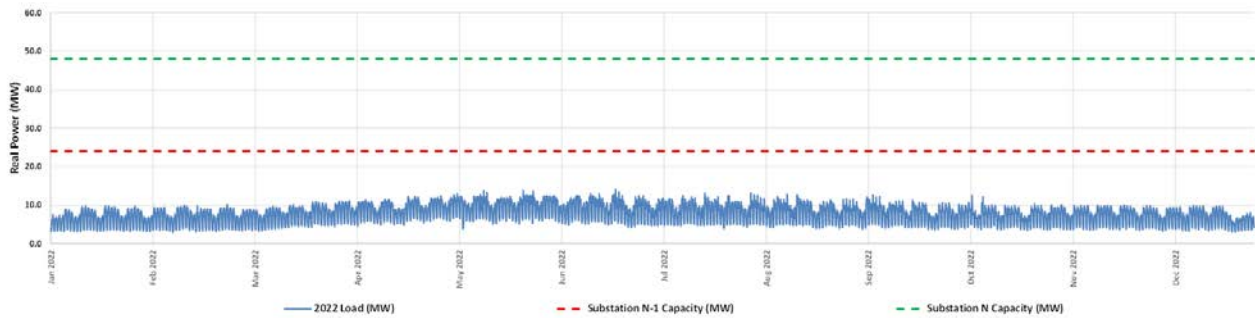


Figure 45. Welcome Bay 33/11kV zone substation: Real power (MW) load characteristics.

Pyes Pa MW

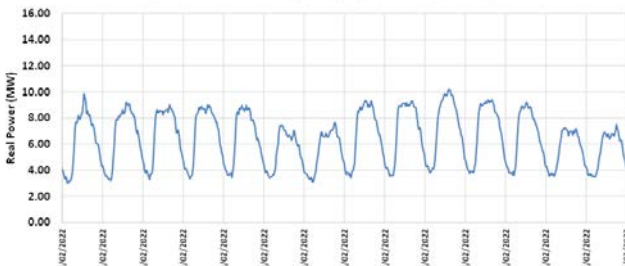
Pyes Pa Zone Substation (2022 year) - Half hourly loading



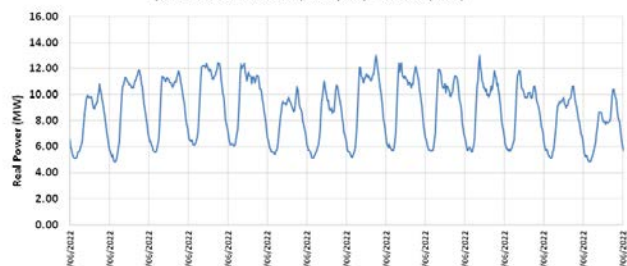
Pyes Pa Zone Substation (2022 year) - Daily Maximum/Minimum



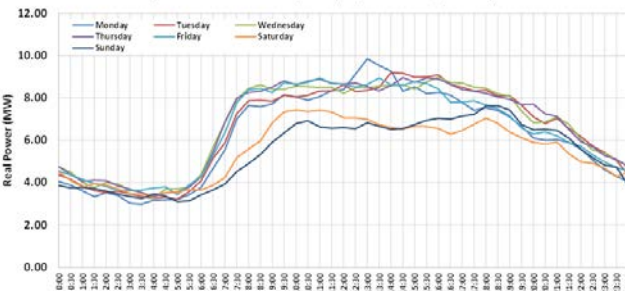
Pyes Pa Zone Substation (2022 year) - Summer (February)



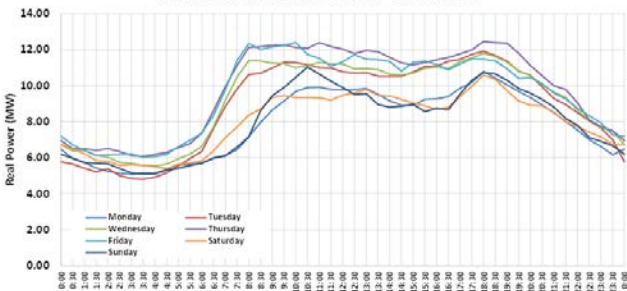
Pyes Pa Zone Substation (2022 year) - Winter (June)



Pyes Pa Zone Substation (2022 year) - Summer (February)



Pyes Pa Zone Substation (2022 year) - Winter (June)



Pyes Pa Zone Substation (2022 year) - Load Duration Curve

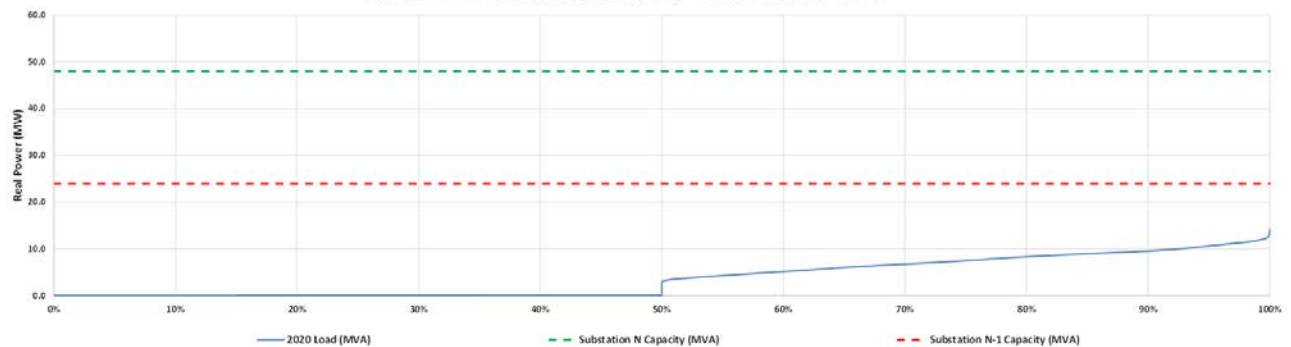
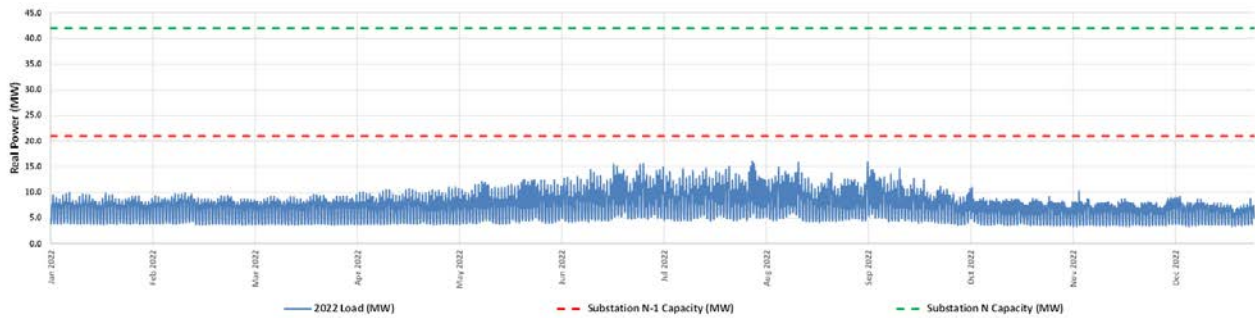


Figure 46. Pyes Pa 33/11kV zone substation: Real power (MW) load characteristics.

Papamoa MW

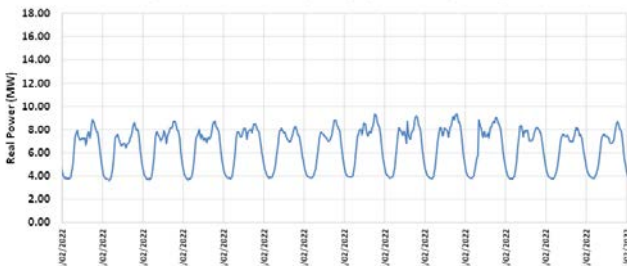
Papamoa Zone Substation (2022 year) - Half hourly loading



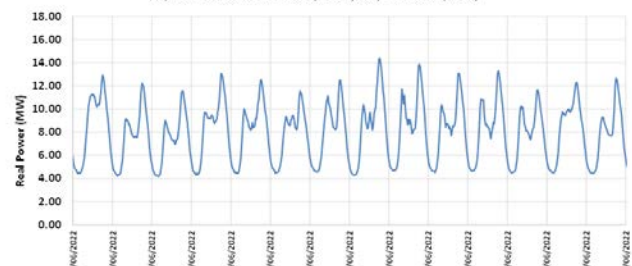
Papamoa Zone Substation (2022 year) - Daily Maximum/Minimum



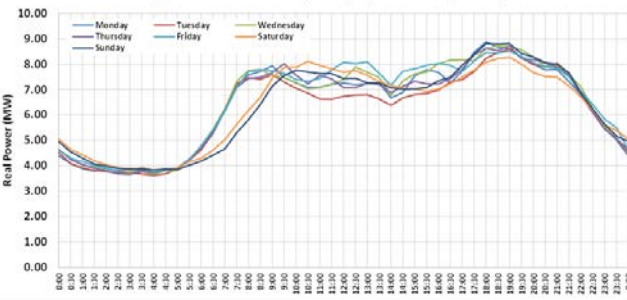
Papamoa Zone Substation (2022 year) - Summer (February)



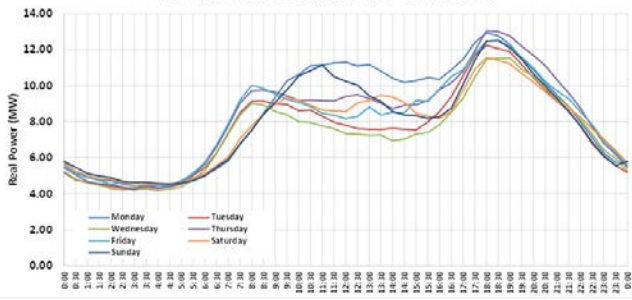
Papamoa Zone Substation (2022 year) - Winter (June)



Papamoa Zone Substation (2022 year) - Summer (February)



Papamoa Zone Substation (2022 year) - Winter (June)



Papamoa Zone Substation (2022 year) - Load Duration Curve

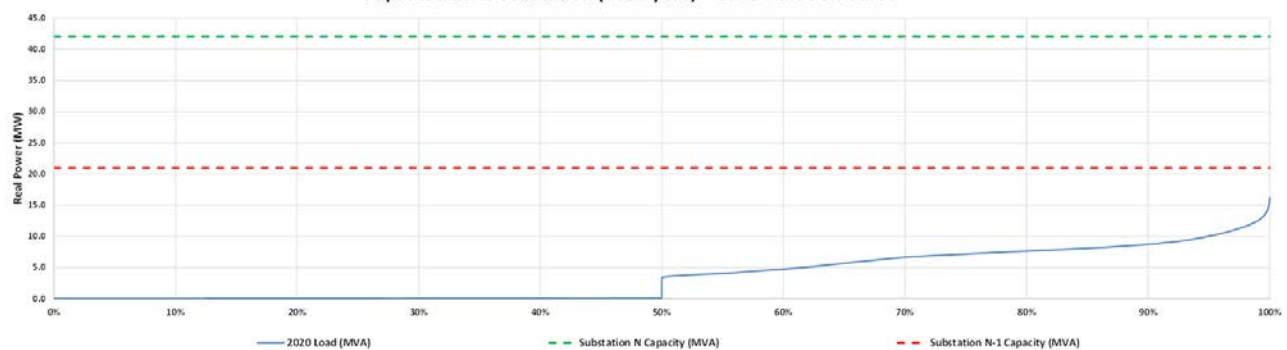
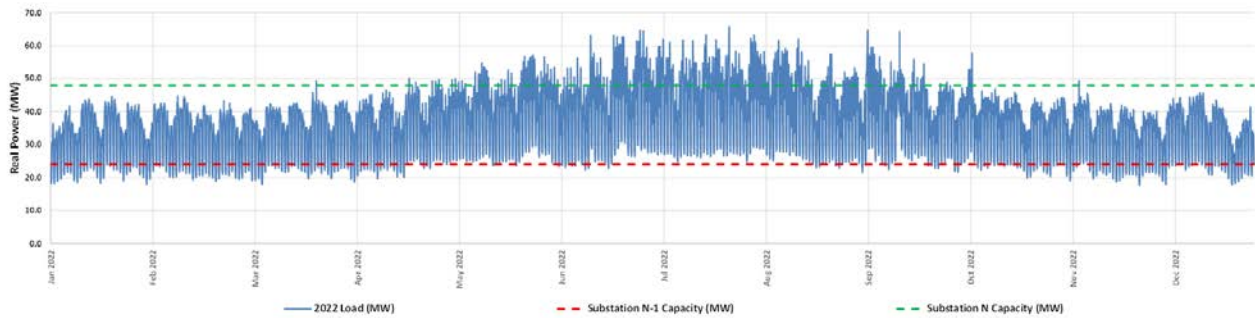


Figure 47. Papamoa 33/11kV zone substation: Real power (MW) load characteristics.

Matapihi MW

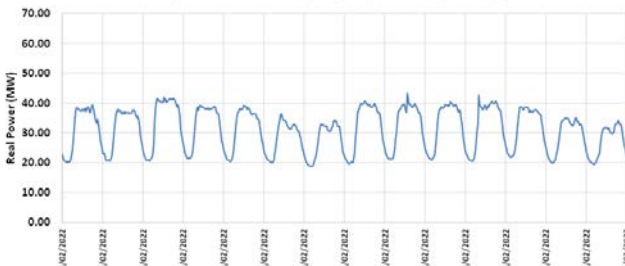
Matapihi Zone Substation (2022 year) - Half hourly loading



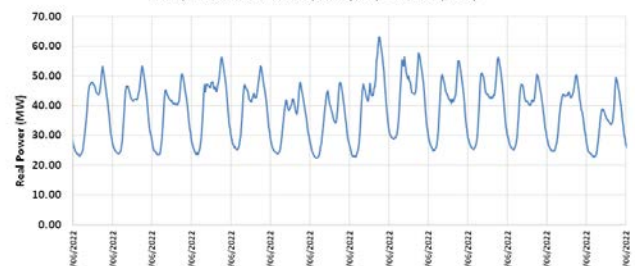
Matapihi Zone Substation (2022 year) - Daily Maximum/Minimum



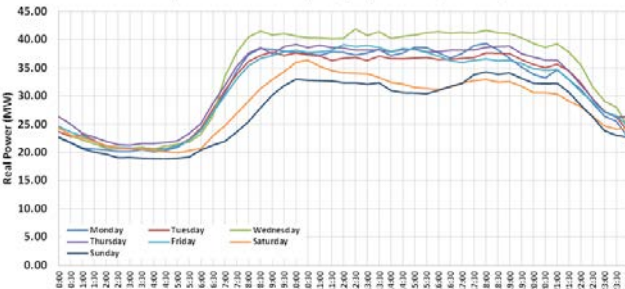
Matapihi Zone Substation (2022 year) - Summer (February)



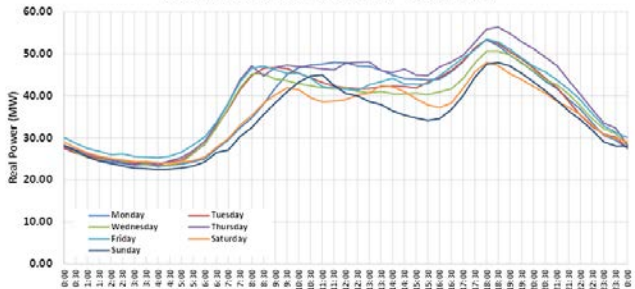
Matapihi Zone Substation (2022 year) - Winter (June)



Matapihi Zone Substation (2022 year) - Summer (February)



Matapihi Zone Substation (2022 year) - Winter (June)



Matapihi Zone Substation (2022 year) - Load Duration Curve

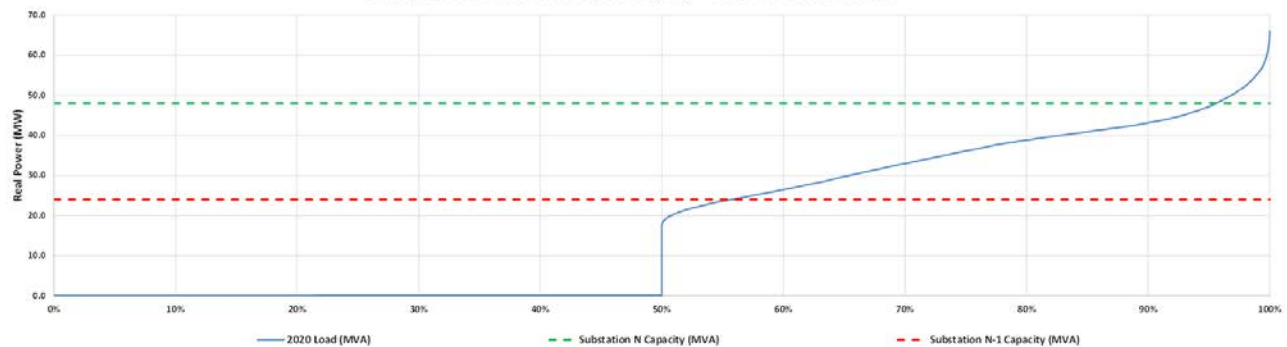
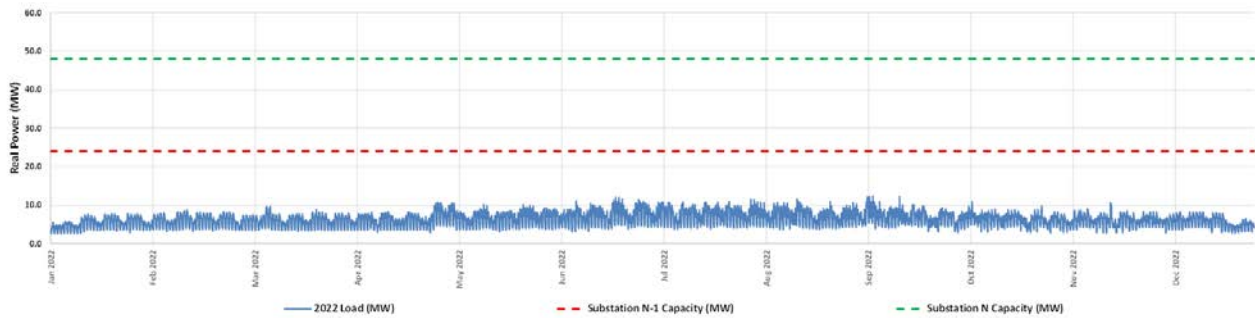


Figure 48. Matapihi 33/11kV zone substation: Real power (MW) load characteristics.

Omanu MW

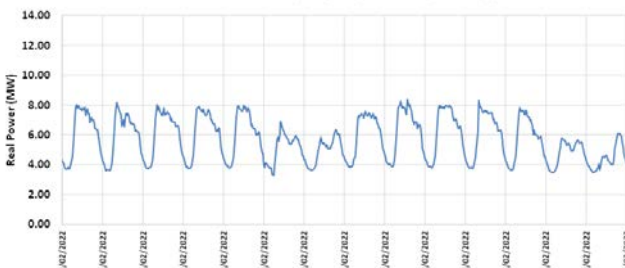
Omanu Zone Substation (2022 year) - Half hourly loading



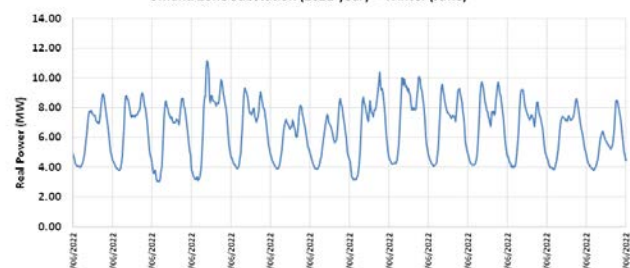
Omanu Zone Substation (2022 year) - Daily Maximum/Minimum



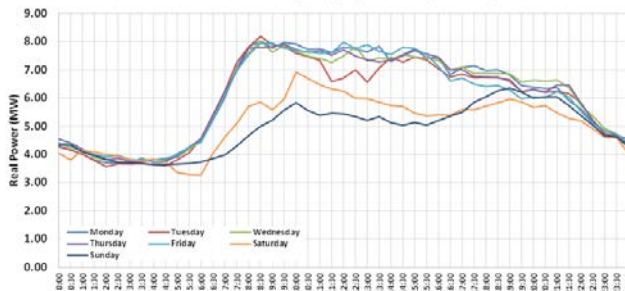
Omanu Zone Substation (2022 year) - Summer (February)



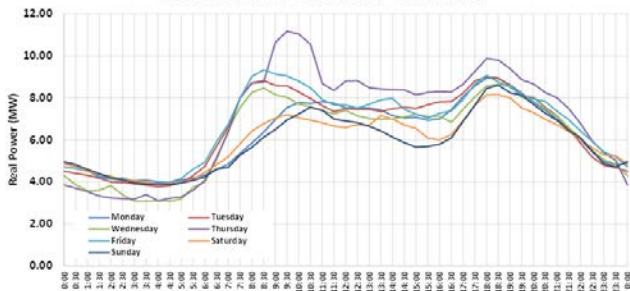
Omanu Zone Substation (2022 year) - Winter (June)



Omanu Zone Substation (2022 year) - Summer (February)



Omanu Zone Substation (2022 year) - Winter (June)



Omanu Zone Substation (2022 year) - Load Duration Curve

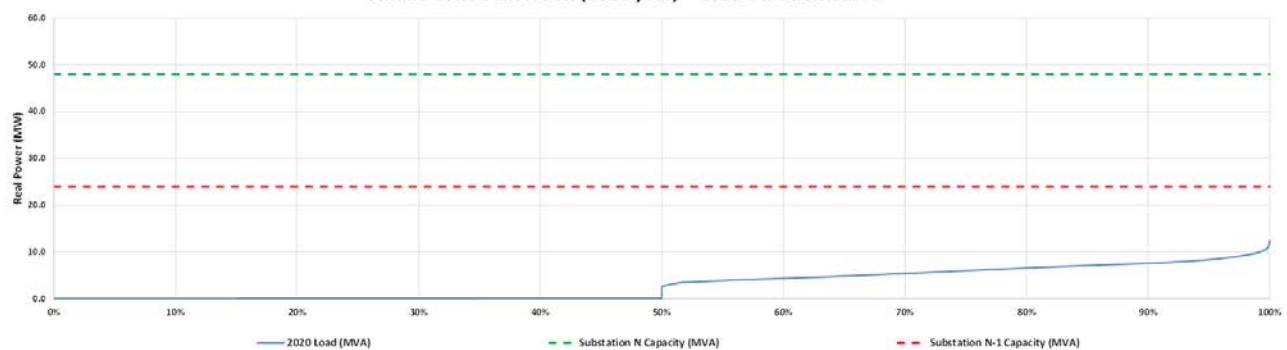
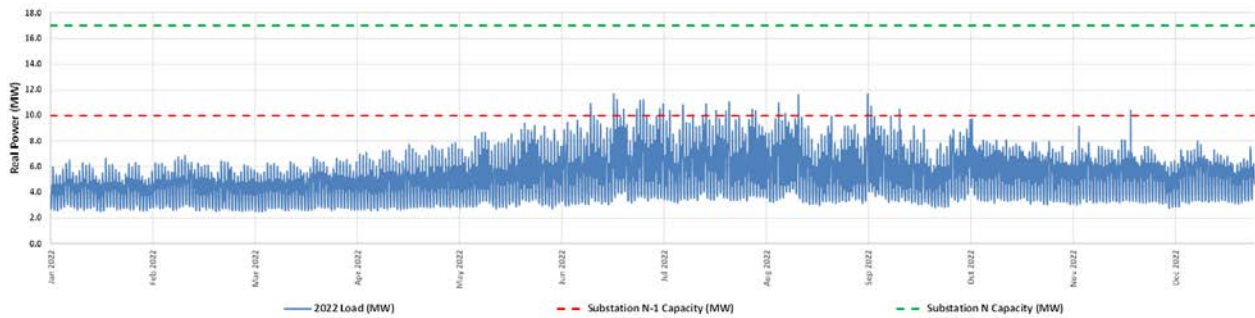


Figure 49. Omanu 33/11kV zone substation: Real power (MW) load characteristics.

Te Maunga MW

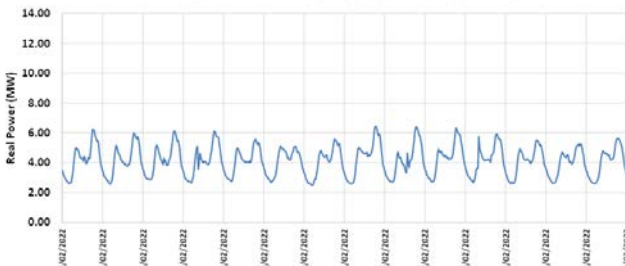
Te Maunga Zone Substation (2022 year) - Half hourly loading



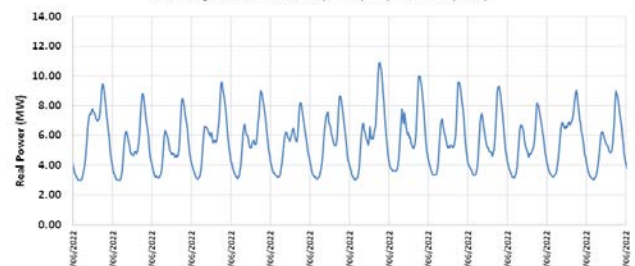
Te Maunga Zone Substation (2022 year) - Daily Maximum/Minimum



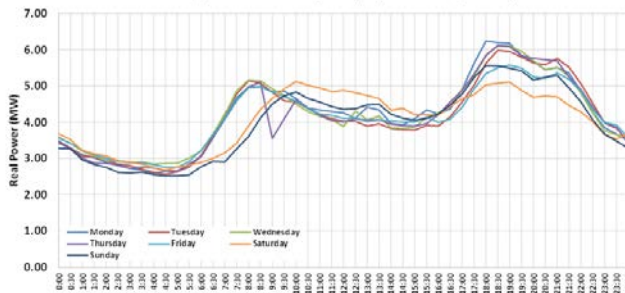
Te Maunga Zone Substation (2022 year) - Summer (February)



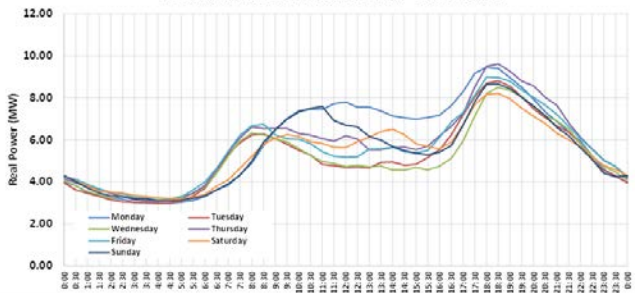
Te Maunga Zone Substation (2022 year) - Winter (June)



Te Maunga Zone Substation (2022 year) - Summer (February)



Te Maunga Zone Substation (2022 year) - Winter (June)



Te Maunga Zone Substation (2022 year) - Load Duration Curve

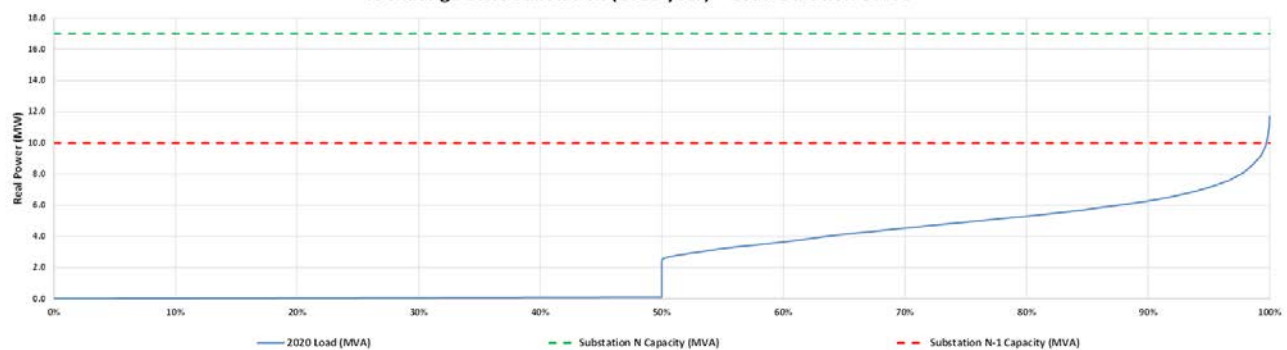
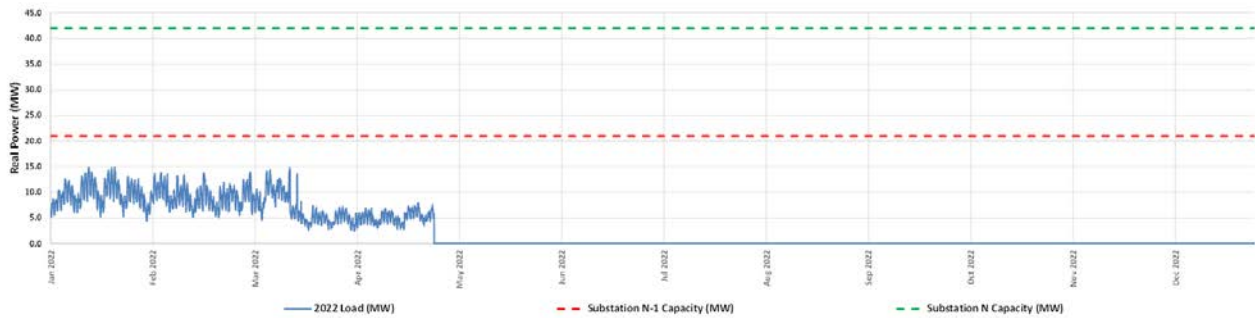


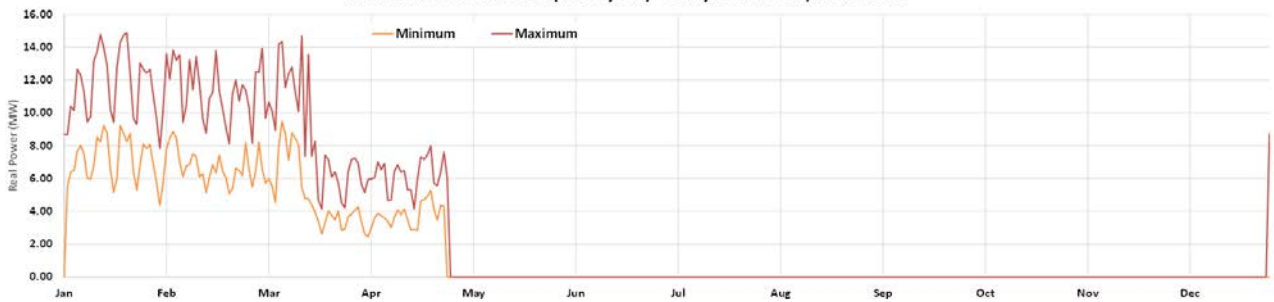
Figure 50. Te Maunga 33/11kV zone substation: Real power (MW) load characteristics.

Triton MW

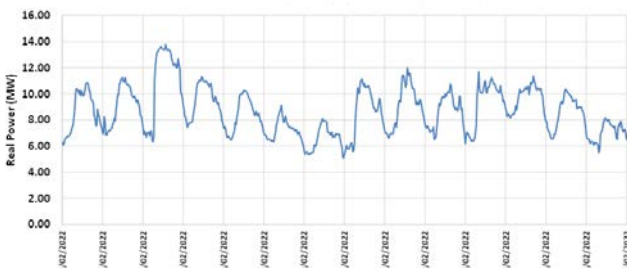
Triton Zone Substation (2022 year) - Half hourly loading



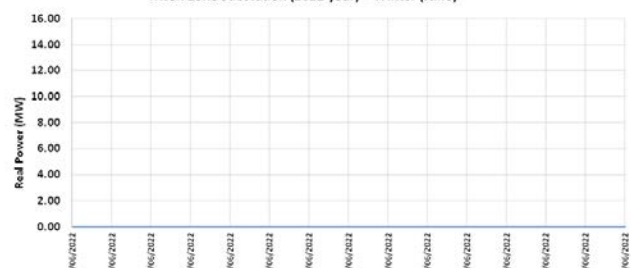
Triton Zone Substation (2022 year) - Daily Maximum/Minimum



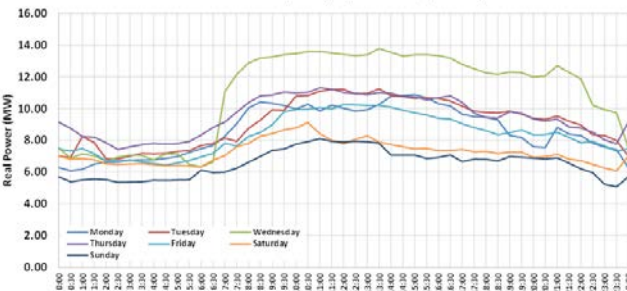
Triton Zone Substation (2022 year) - Summer (February)



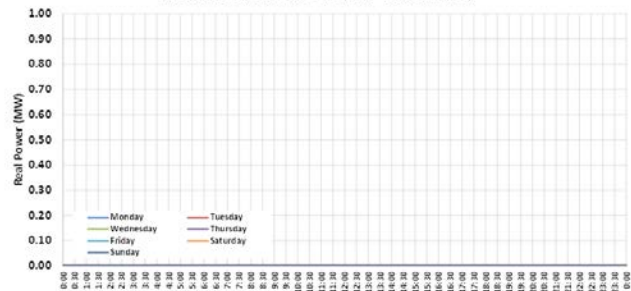
Triton Zone Substation (2022 year) - Winter (June)



Triton Zone Substation (2022 year) - Summer (February)



Triton Zone Substation (2022 year) - Winter (June)



Triton Zone Substation (2022 year) - Load Duration Curve

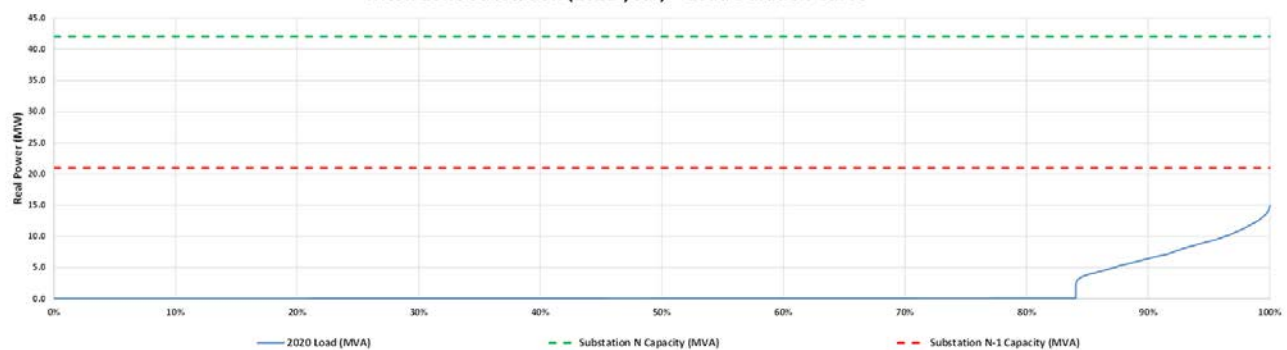
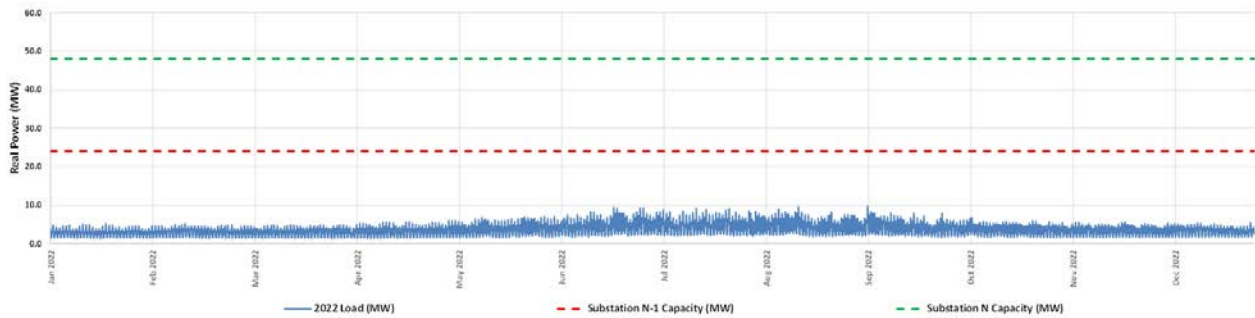


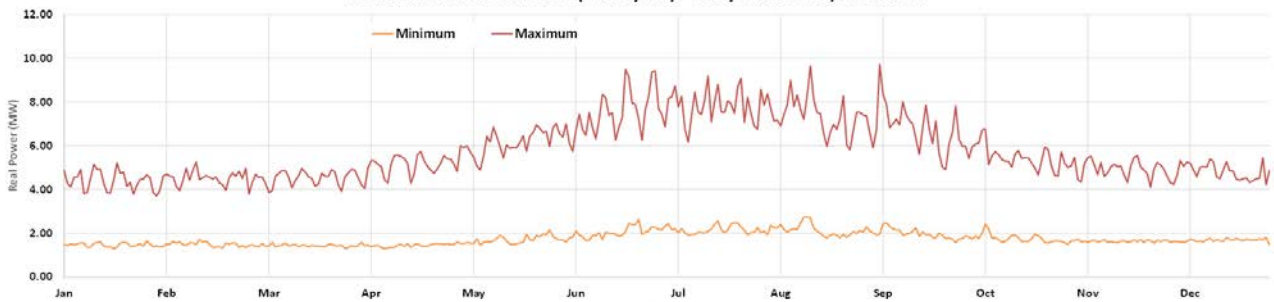
Figure 51. Triton 33/11kV zone substation: Real power (MW) load characteristics.

Wairakei MW

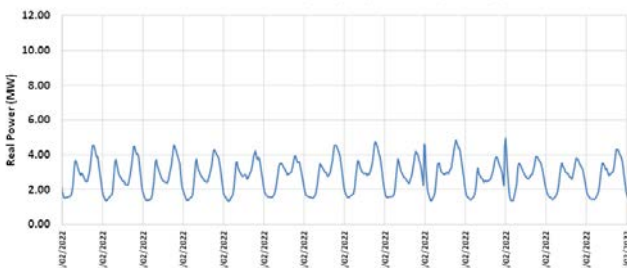
Wairakei Zone Substation (2022 year) - Half hourly loading



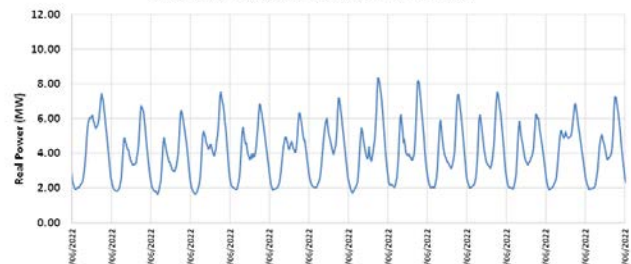
Wairakei Zone Substation (2022 year) - Daily Maximum/Minimum



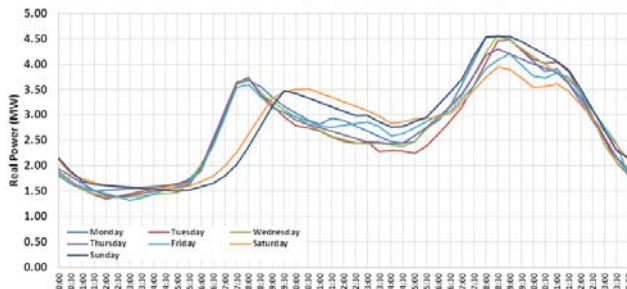
Wairakei Zone Substation (2022 year) - Summer (February)



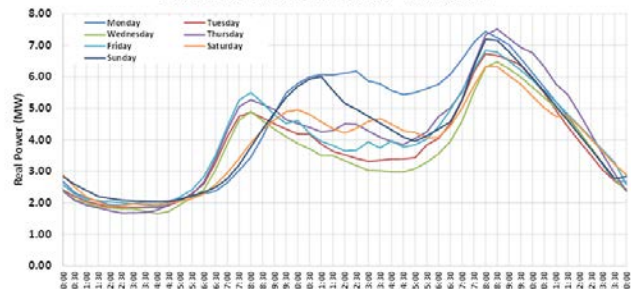
Wairakei Zone Substation (2022 year) - Winter (June)



Wairakei Zone Substation (2022 year) - Summer (February)



Wairakei Zone Substation (2022 year) - Winter (June)



Wairakei Zone Substation (2022 year) - Load Duration Curve

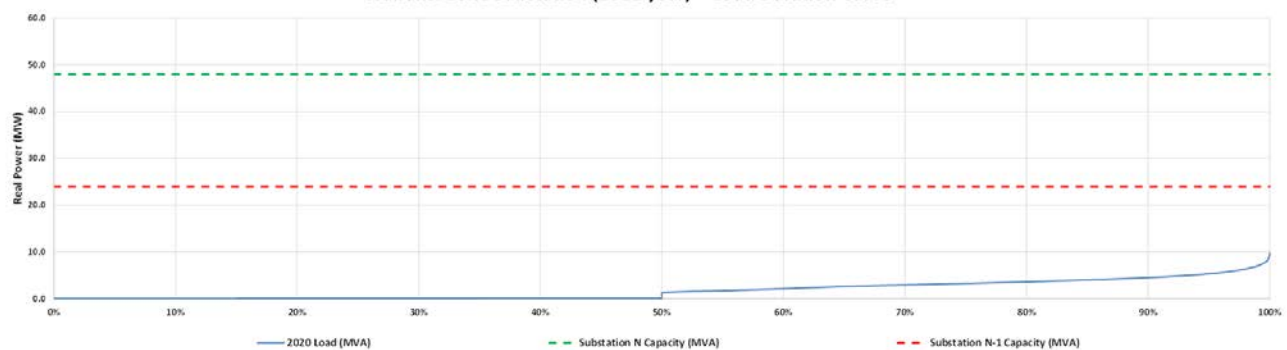
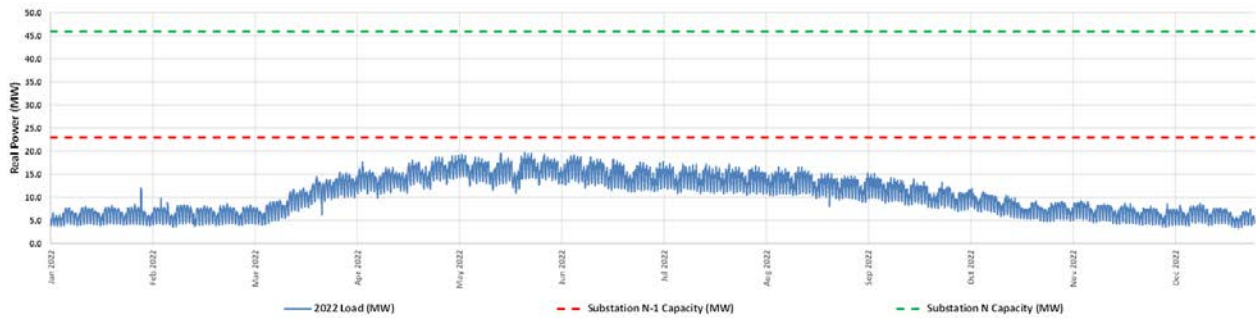


Figure 52. Wairakei 33/11kV zone substation: Real power (MW) load characteristics.

Te Puke MW

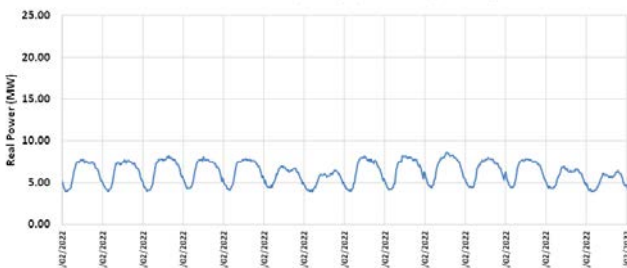
Te Puke Zone Substation (2022 year) - Half hourly loading



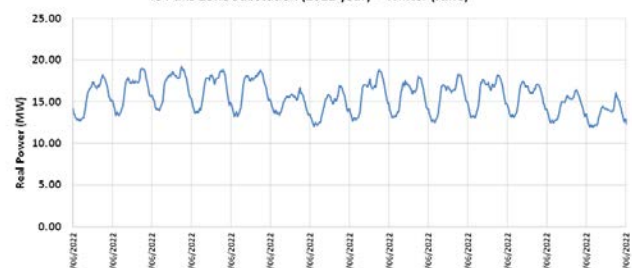
Te Puke Zone Substation (2022 year) - Daily Maximum/Minimum



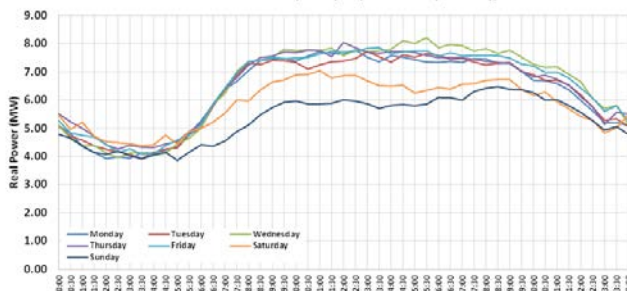
Te Puke Zone Substation (2022 year) - Summer (February)



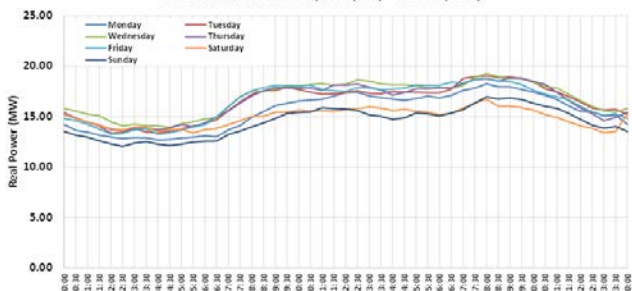
Te Puke Zone Substation (2022 year) - Winter (June)



Te Puke Zone Substation (2022 year) - Summer (February)



Te Puke Zone Substation (2022 year) - Winter (June)



Te Puke Zone Substation (2022 year) - Load Duration Curve

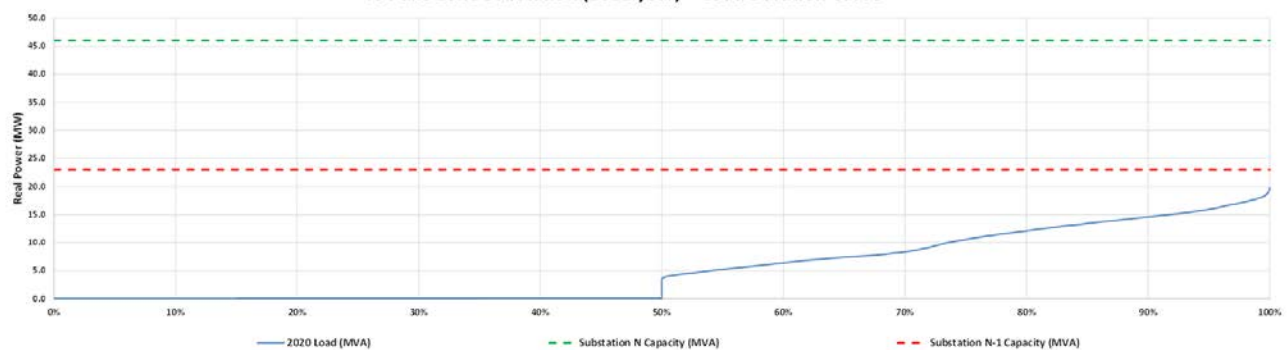
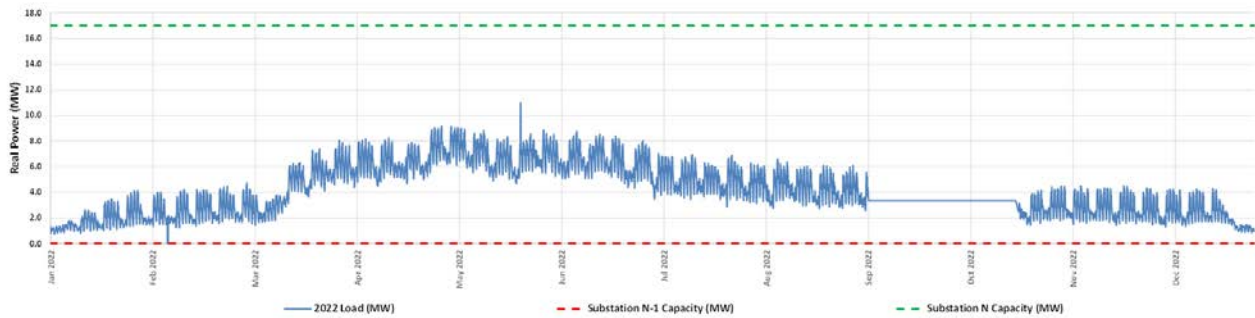


Figure 53. Te Puke 33/11kV zone substation: Real power (MW) load characteristics.

Atauroa MW

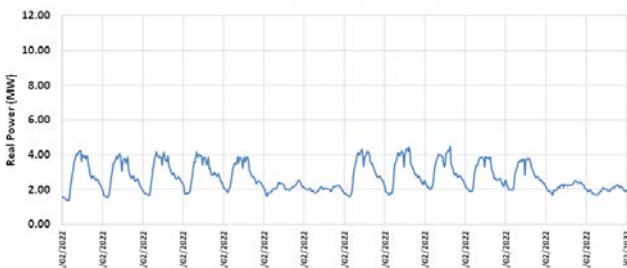
Atauroa Zone Substation (2022 year) - Half hourly loading



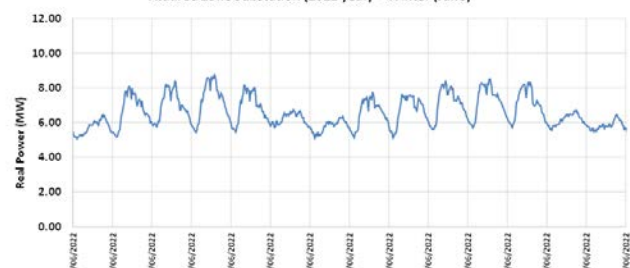
Atauroa Zone Substation (2022 year) - Daily Maximum/Minimum



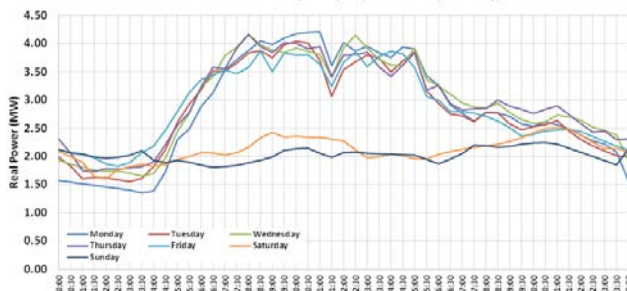
Atauroa Zone Substation (2022 year) - Summer (February)



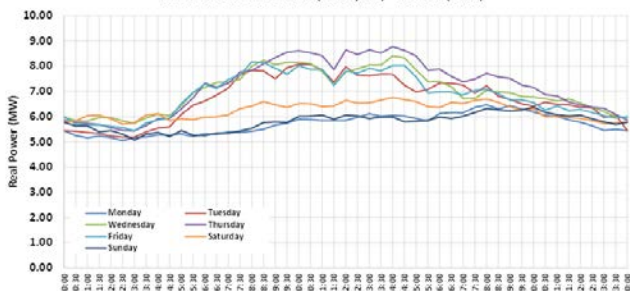
Atauroa Zone Substation (2022 year) - Winter (June)



Atauroa Zone Substation (2022 year) - Summer (February)



Atauroa Zone Substation (2022 year) - Winter (June)



Atauroa Zone Substation (2022 year) - Load Duration Curve

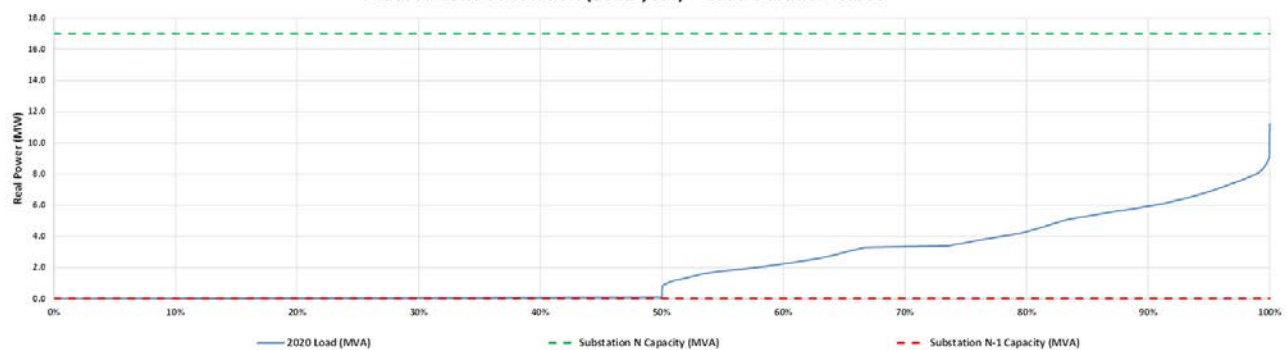
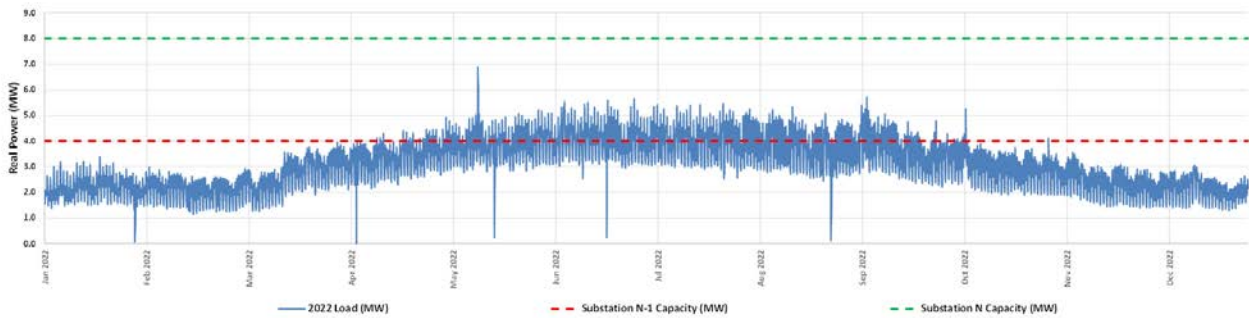


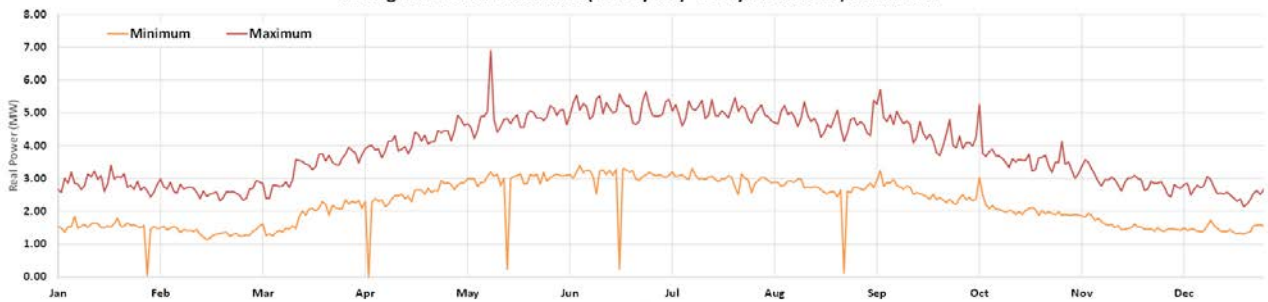
Figure 54. Atauroa 33/11kV zone substation: Real power (MW) load characteristics.

Paengaroa MW

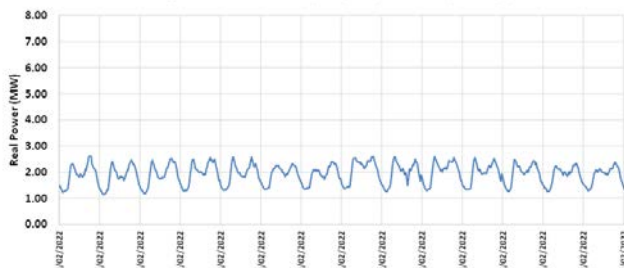
Paengaroa Zone Substation (2022 year) - Half hourly loading



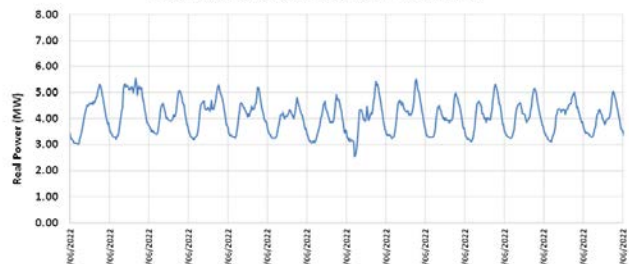
Paengaroa Zone Substation (2022 year) - Daily Maximum/Minimum



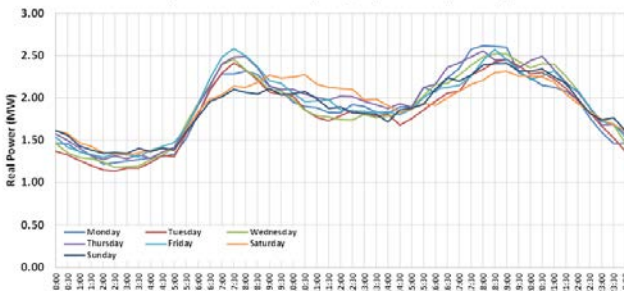
Paengaroa Zone Substation (2022 year) - Summer (February)



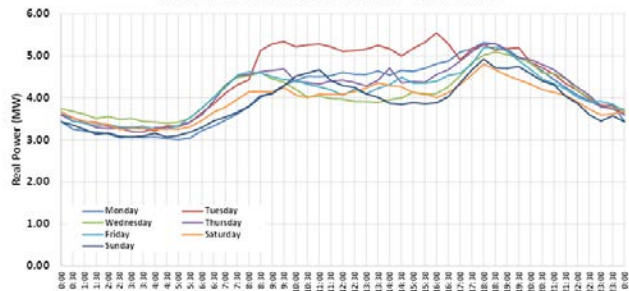
Paengaroa Zone Substation (2022 year) - Winter (June)



Paengaroa Zone Substation (2022 year) - Summer (February)



Paengaroa Zone Substation (2022 year) - Winter (June)



Paengaroa Zone Substation (2022 year) - Load Duration Curve

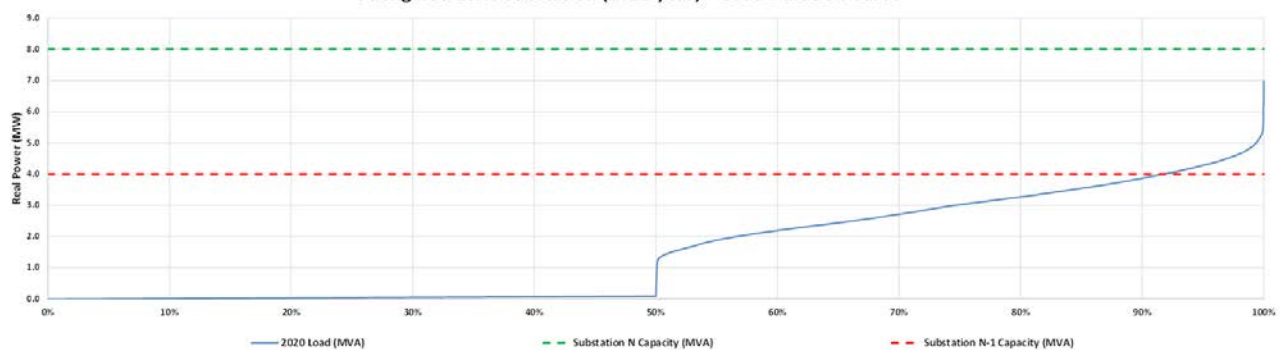
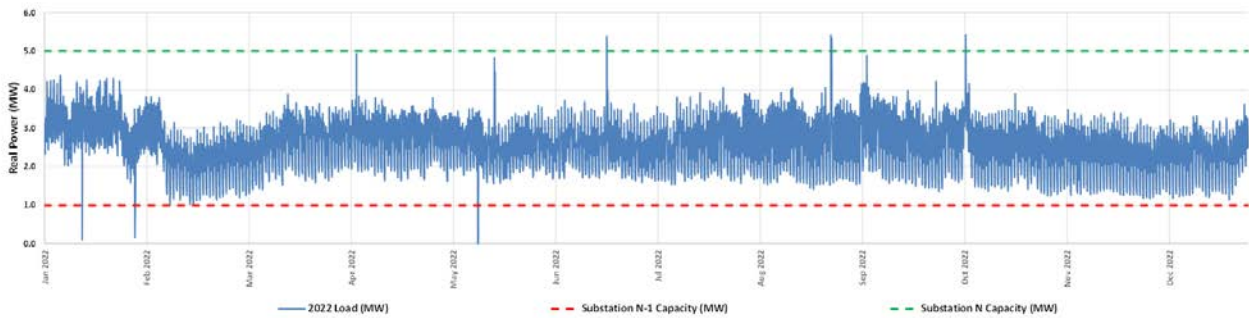


Figure 55. Paengaroa 33/11kV zone substation: Real power (MW) load characteristics.

Pongakawa MW

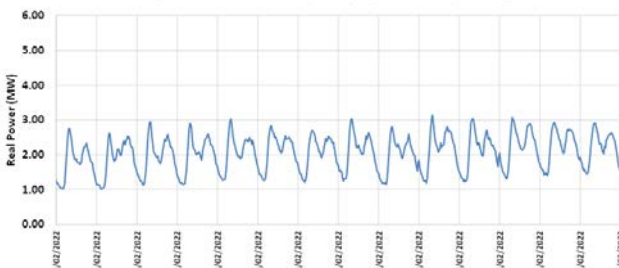
Pongakawa Zone Substation (2022 year) - Half hourly loading



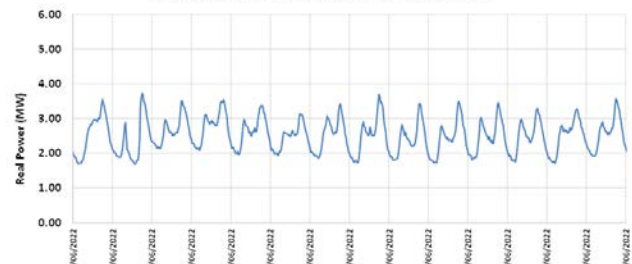
Pongakawa Zone Substation (2022 year) - Daily Maximum/Minimum



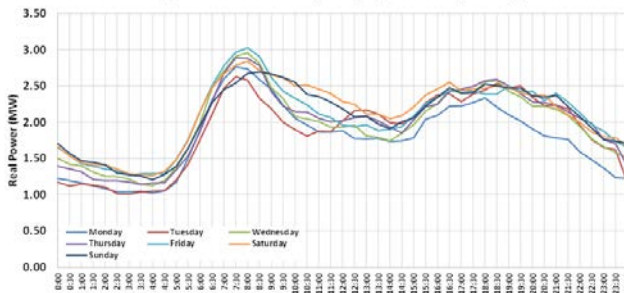
Pongakawa Zone Substation (2022 year) - Summer (February)



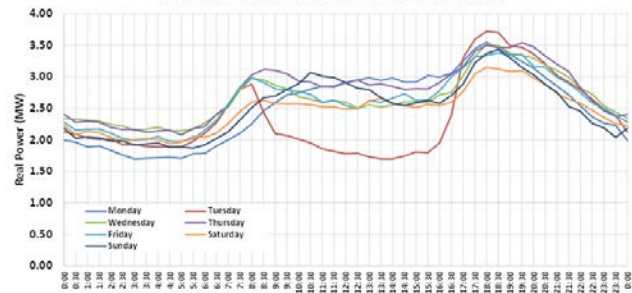
Pongakawa Zone Substation (2022 year) - Winter (June)



Pongakawa Zone Substation (2022 year) - Summer (February)



Pongakawa Zone Substation (2022 year) - Winter (June)



Pongakawa Zone Substation (2022 year) - Load Duration Curve

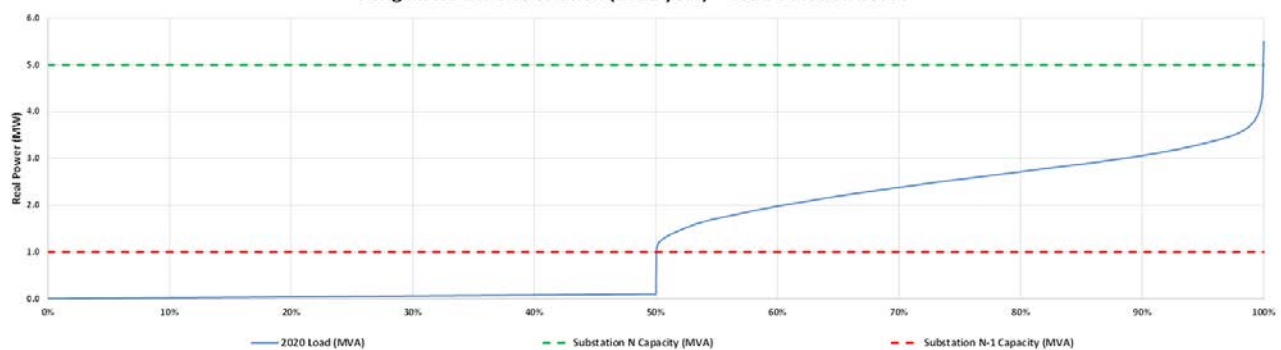


Figure 56. Pongakawa 33/11kV zone substation: Real power (MW) load characteristics.

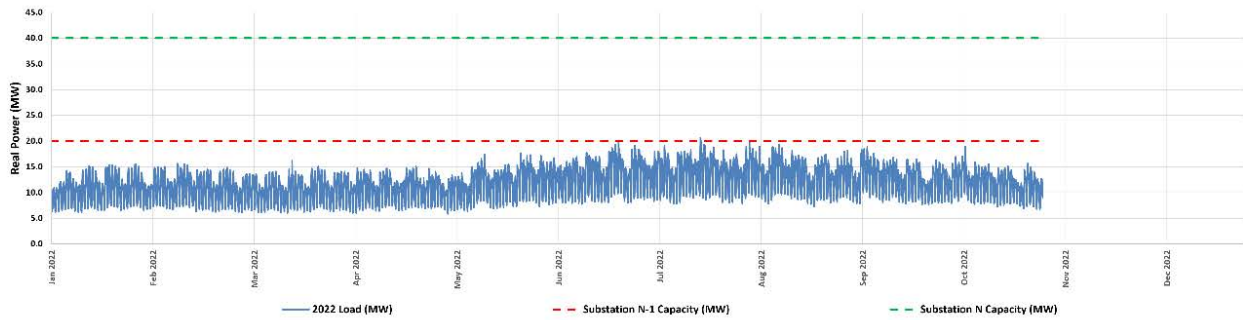
1.3 Unison (Rotorua Region)

The characteristics of the zone substation **real power loadings** within Unison's network are shown in the following:

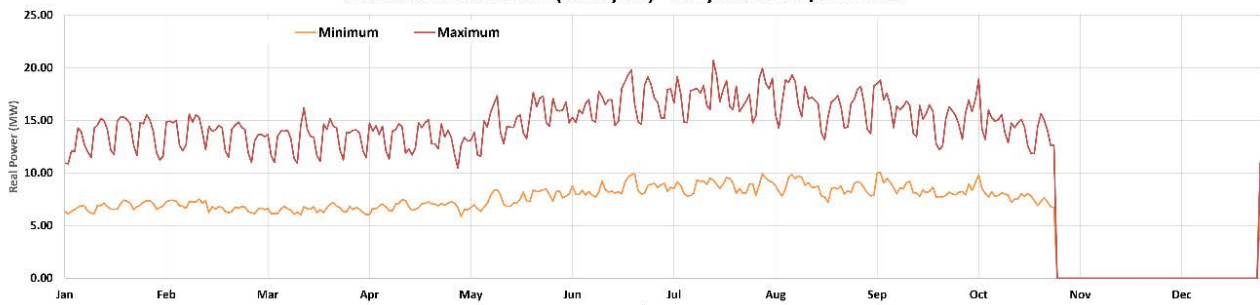
- Figure 57. Arawa 33/11kV zone substation: Real power (MW) load characteristics.
- Figure 58. Atiamuri 33/11kV zone substation: Real power (MW) load characteristics.
- Figure 59. Biak Street 33/11kV zone substation: Real power (MW) load characteristics.
- Figure 60. Fernleaf 33/11kV zone substation: Real power (MW) load characteristic.
- Figure 61. Rainbow 33/11kV zone substation: Real power (MW) load characteristics.
- Figure 62. Waipa 33/11kV zone substation: Real power (MW) load characteristics.

Arawa MW

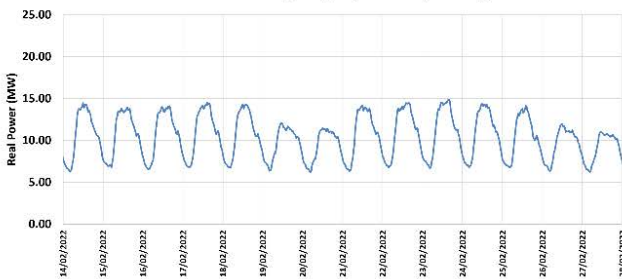
Arawa Zone Substation (2022 year) - Half hourly loading



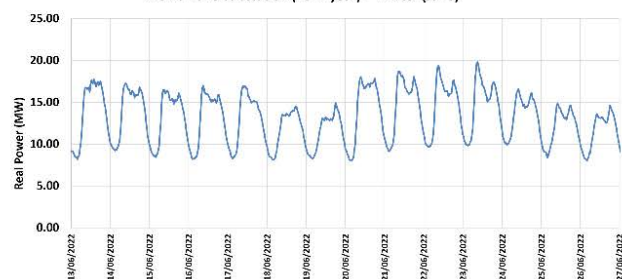
Arawa Zone Substation (2022 year) - Daily Maximum/Minimum



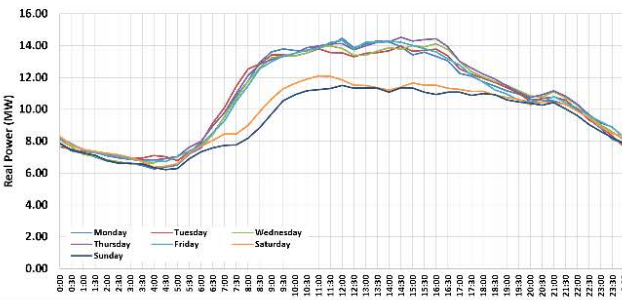
Arawa Zone Substation (2022 year) - Summer (February)



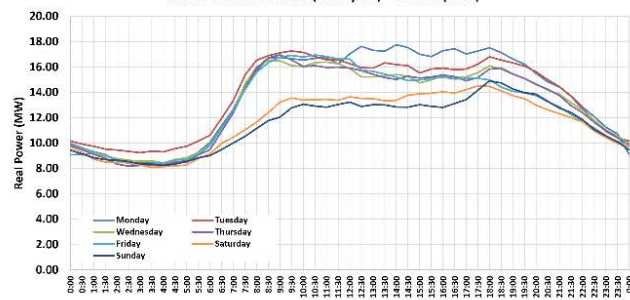
Arawa Zone Substation (2022 year) - Winter (June)



Arawa Zone Substation (2022 year) - Summer (February)



Arawa Zone Substation (2022 year) - Winter (June)



Arawa Zone Substation (2022 year) - Load Duration Curve

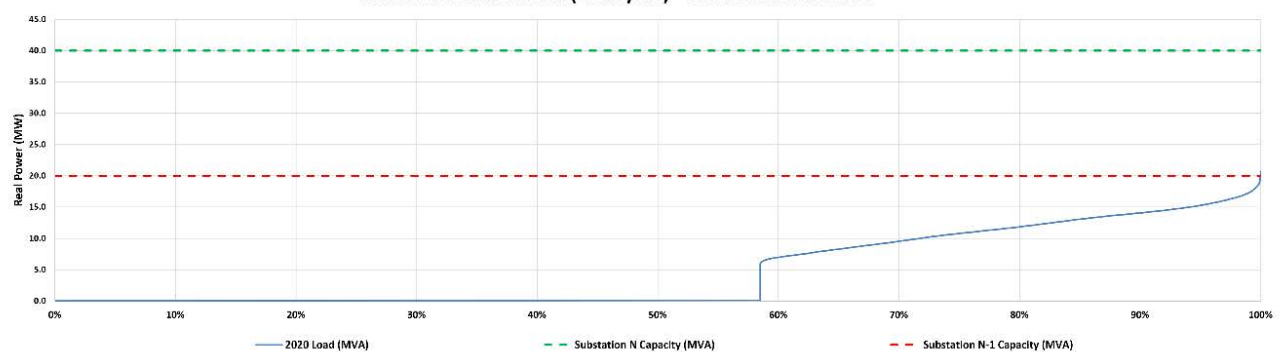
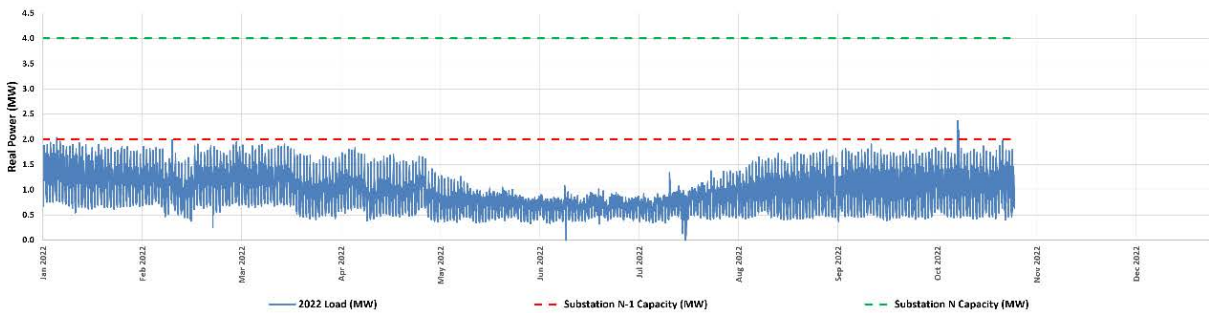


Figure 57. Arawa 33/11kV zone substation: Real power (MW) load characteristics.

Atiamuri MW

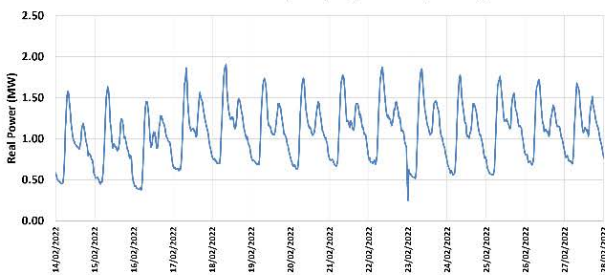
Atiamuri Zone Substation (2022 year) - Half hourly loading



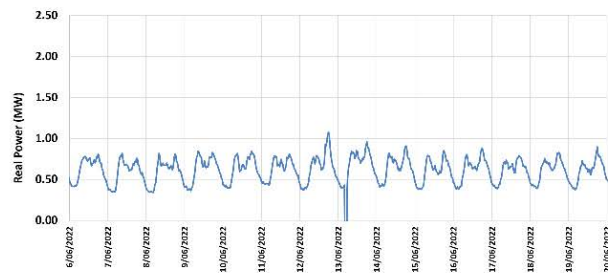
Atiamuri Zone Substation (2022 year) - Daily Maximum/Minimum



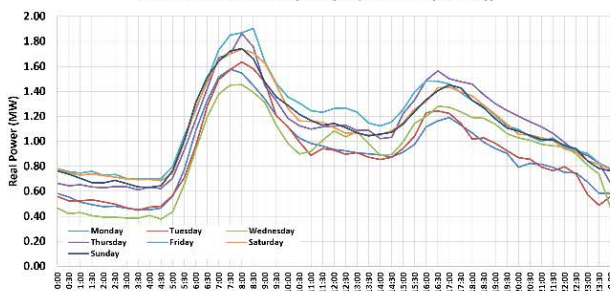
Atiamuri Zone Substation (2022 year) - Summer (February)



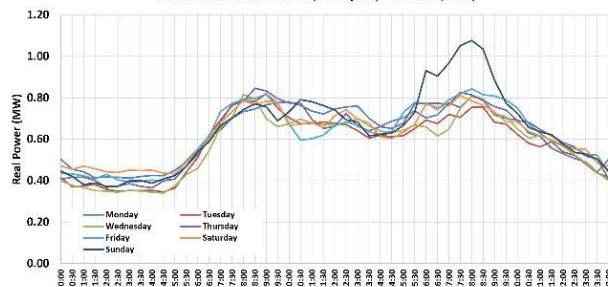
Atiamuri Zone Substation (2022 year) - Winter (June)



Atiamuri Zone Substation (2022 year) - Summer (February)



Atiamuri Zone Substation (2022 year) - Winter (June)



Atiamuri Zone Substation (2022 year) - Load Duration Curve

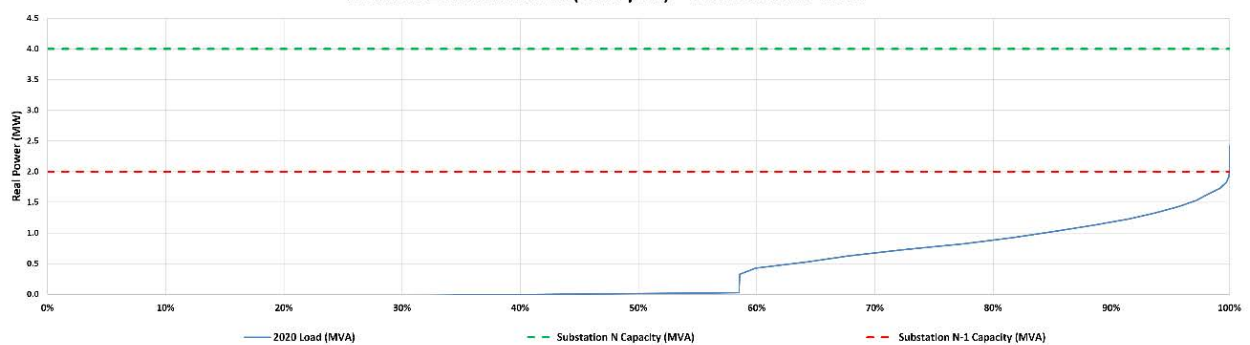


Figure 58. Atiamuri 33/11kV zone substation: Real power (MW) load characteristics.

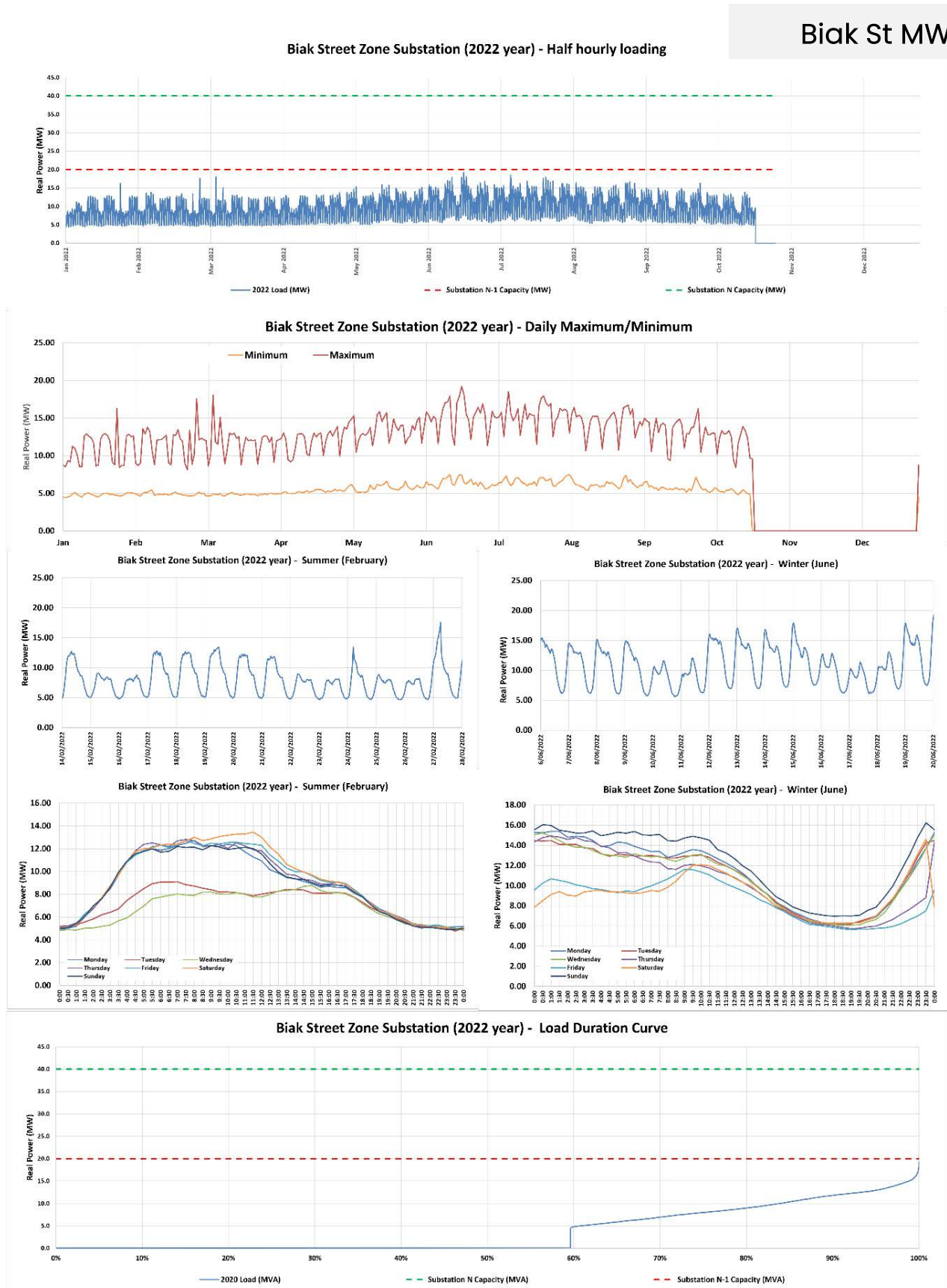
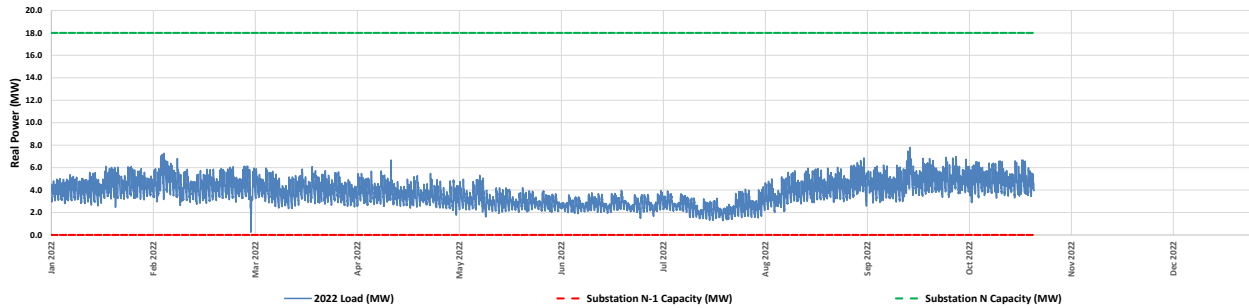


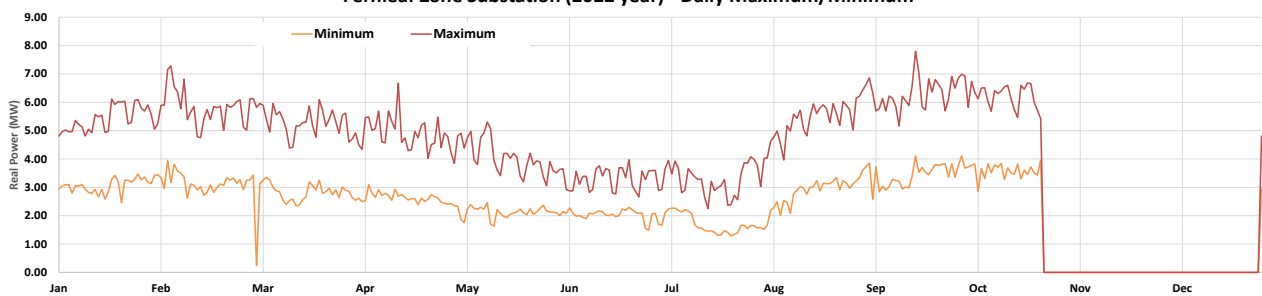
Figure 59. Biak Street 33/11kV zone substation: Real power (MW) load characteristics.

Fernleaf MW

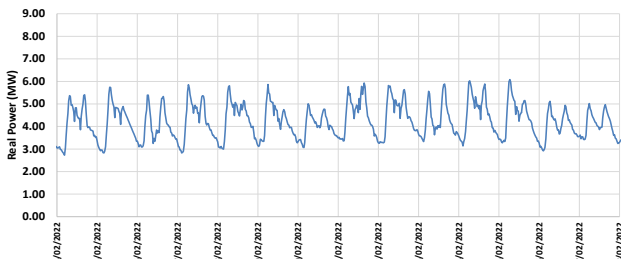
Fernleaf Zone Substation (2022 year) - Half hourly loading



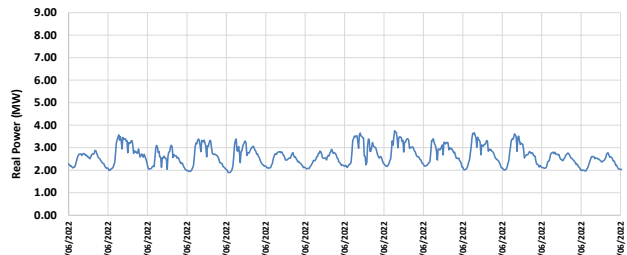
Fernleaf Zone Substation (2022 year) - Daily Maximum/Minimum



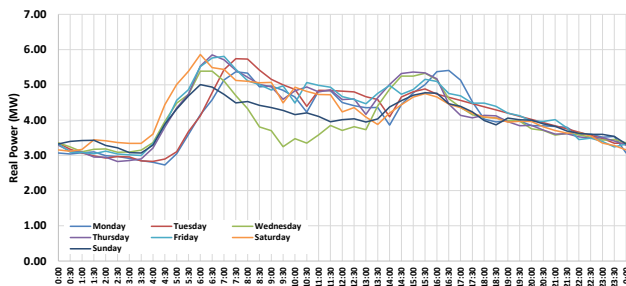
Fernleaf Zone Substation (2022 year) - Summer (February)



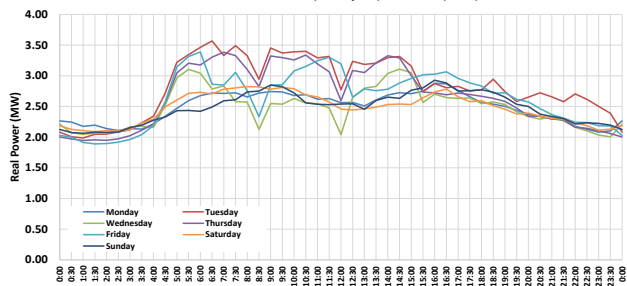
Fernleaf Zone Substation (2022 year) - Winter (June)



Fernleaf Zone Substation (2022 year) - Summer (February)



Fernleaf Zone Substation (2022 year) - Winter (June)



Fernleaf Zone Substation (2022 year) - Load Duration Curve

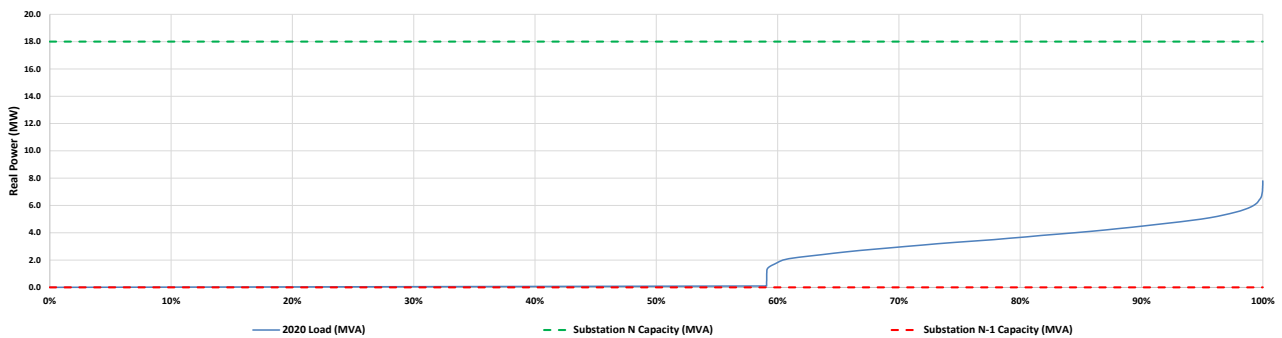
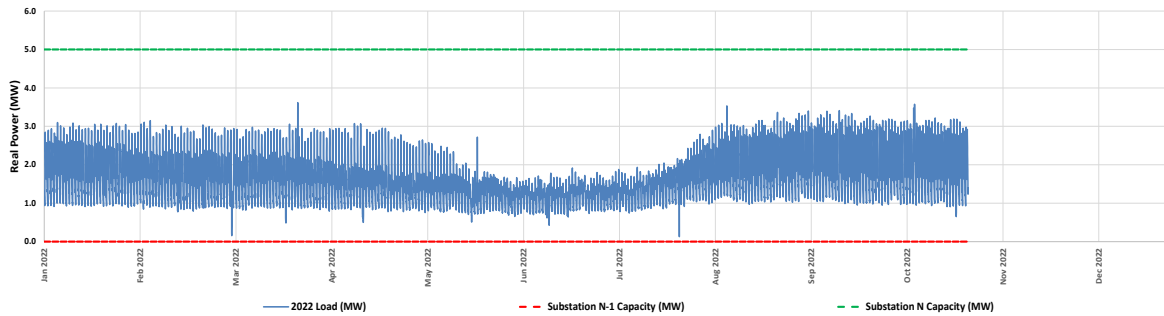


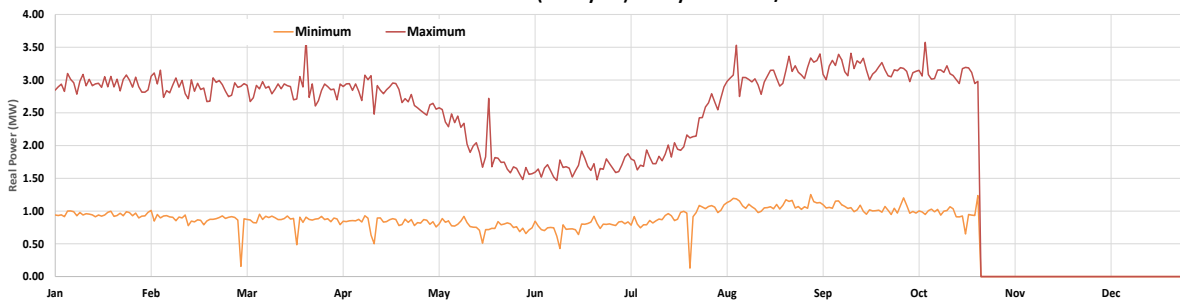
Figure 60. Fernleaf 33/11kV zone substation: Real power (MW) load characteristic.

Rainbow MW

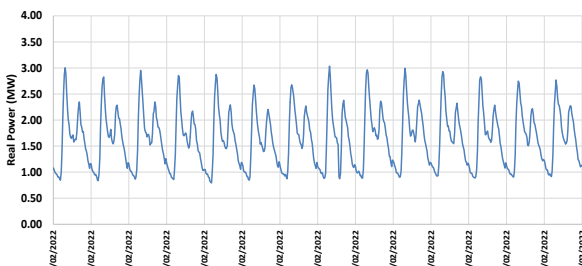
Rainbow Zone Substation (2022 year) - Half hourly loading



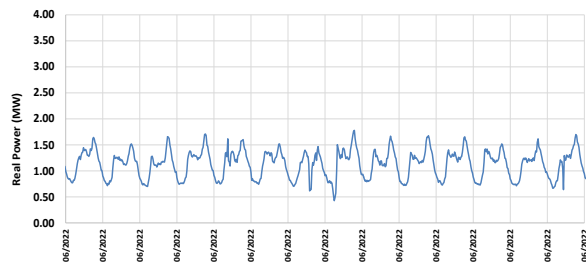
Rainbow Zone Substation (2022 year) - Daily Maximum/Minimum



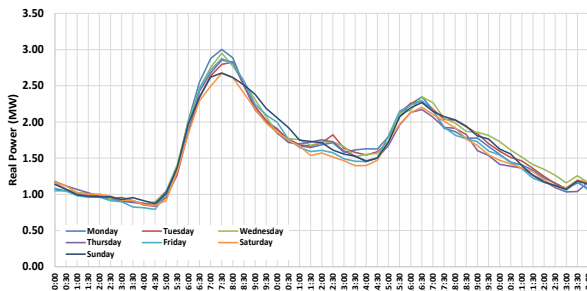
Rainbow Zone Substation (2022 year) - Summer (February)



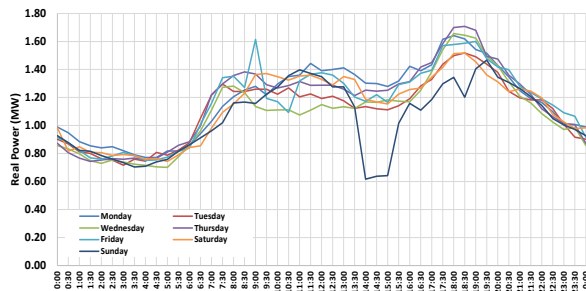
Rainbow Zone Substation (2022 year) - Winter (June)



Rainbow Zone Substation (2022 year) - Summer (February)



Rainbow Zone Substation (2022 year) - Winter (June)



Rainbow Zone Substation (2022 year) - Load Duration Curve

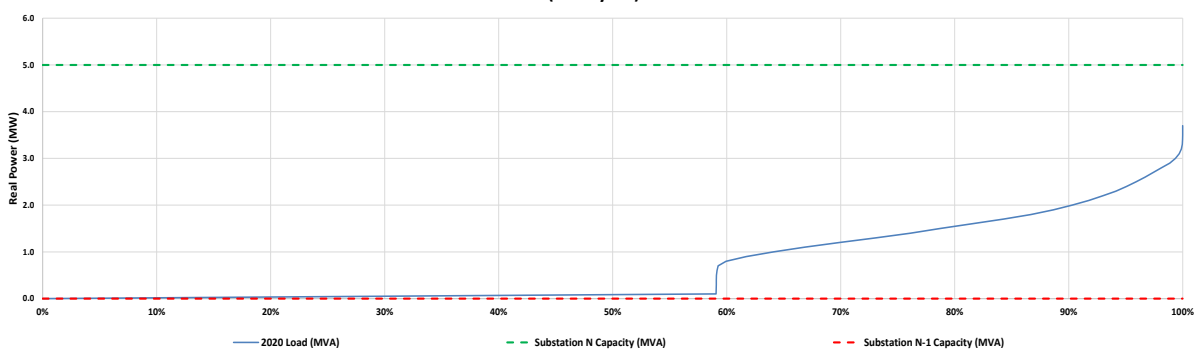
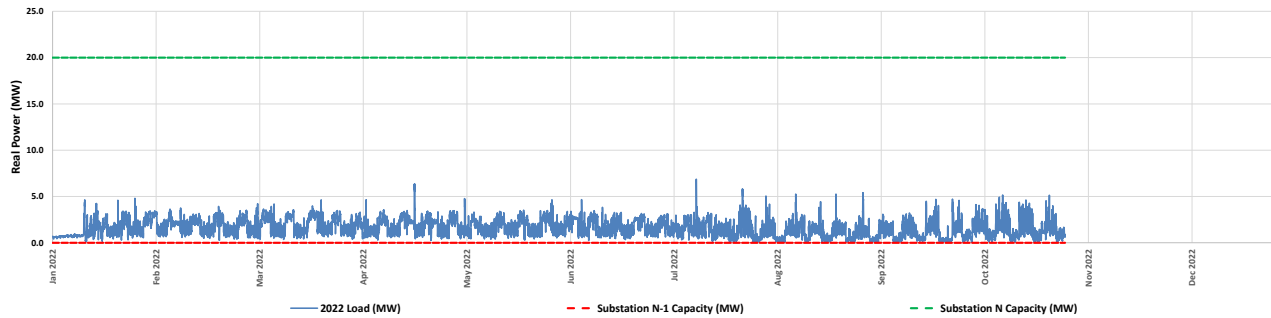


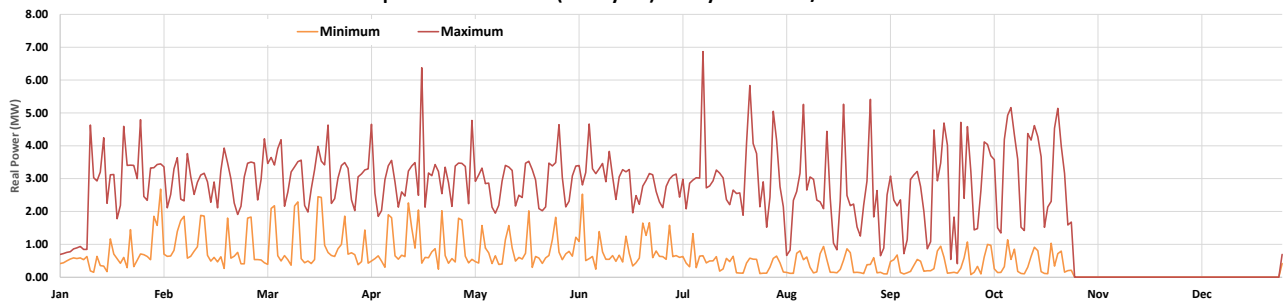
Figure 61. Rainbow 33/11kV zone substation: Real power (MW) load characteristics.

Waipa MW

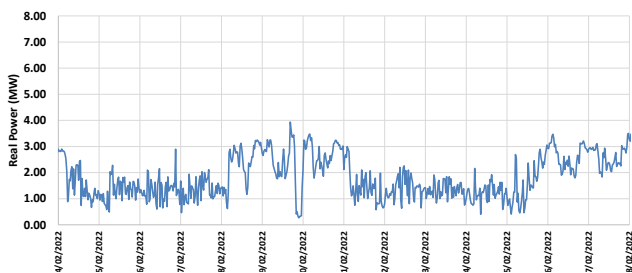
Waipa Zone Substation (2022 year) - Half hourly loading



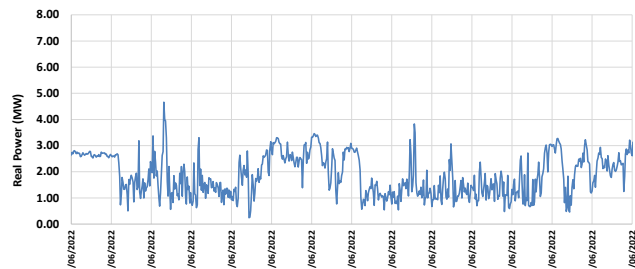
Waipa Zone Substation (2022 year) - Daily Maximum/Minimum



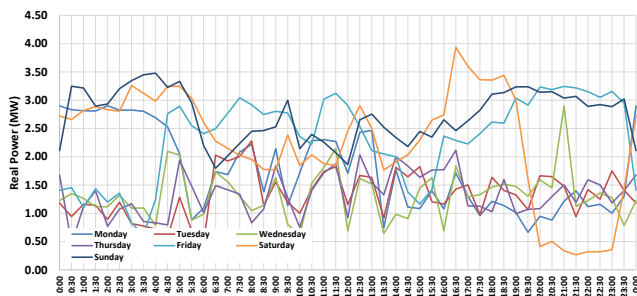
Waipa Zone Substation (2022 year) - Summer (February)



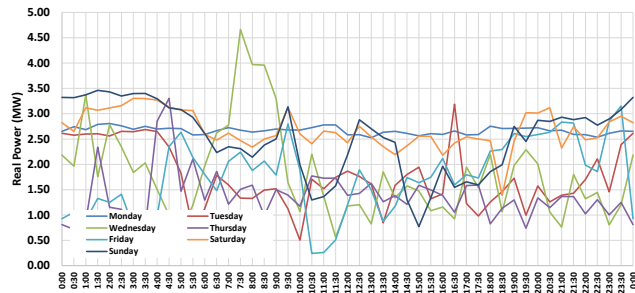
Waipa Zone Substation (2022 year) - Winter (June)



Waipa Zone Substation (2022 year) - Summer (February)



Waipa Zone Substation (2022 year) - Winter (June)



Waipa Zone Substation (2022 year) - Load Duration Curve

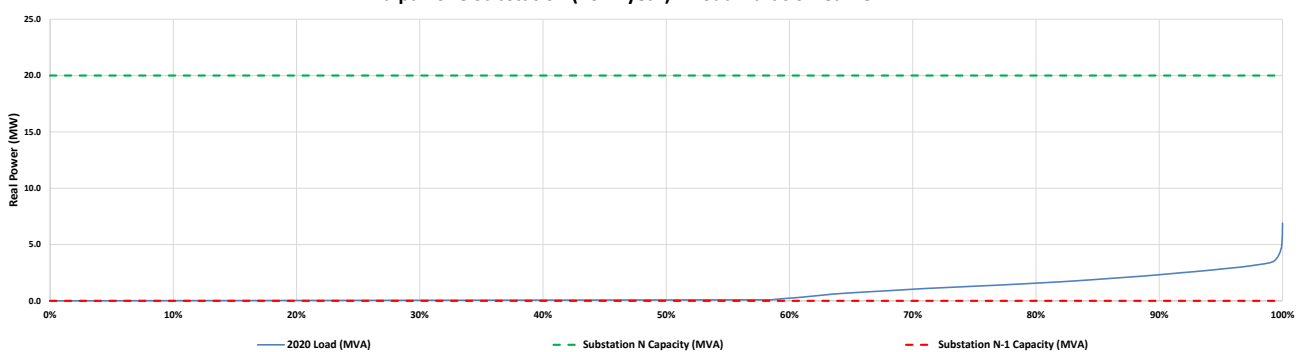


Figure 62. Waipa 33/11kV zone substation: Real power (MW) load characteristics.