



Manawatū–Whanganui Network

Supplementary Information – Substation Load Characteristics

EECA

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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 Manawatū-Whanganui region. This document supplements the main report titled “*Manawatū-Whanganui – 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. Transmission/GXP Substations

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

- **Brunswick GXP**
 - Figure 1. Brunswick: Apparent power (MVA) load characteristics.
 - Figure 2. Brunswick: Reactive power (MVar) load characteristics.
- **Bunnythorpe GXP**
 - Figure 3. Bunnythorpe: Apparent power (MVA) load characteristics.
 - Figure 4. Bunnythorpe: Reactive power (MVar) load characteristics.
- **Dannevirke GXP**
 - Figure 5. Dannevirke: Apparent power (MVA) load characteristics.
 - Figure 6. Dannevirke: Reactive power (MVar) load characteristics.
- **Linton GXP**
 - Figure 7. Linton: Apparent power (MVA) load characteristics.
 - Figure 8. Linton: Reactive power (MVar) load characteristics.
- **Mangahao GXP**
 - Figure 9. Mangahao: Apparent power (MVA) load characteristics.
 - Figure 10. Mangahao: Reactive power (MVar) load characteristics.
- **Mangamaire GXP**
 - Figure 11. Mangamaire: Apparent power (MVA) load characteristics.
 - Figure 12. Mangamaire: Reactive power (MVar) load characteristics.
- **Marton GXP**
 - Figure 13. Marton: Apparent power (MVA) load characteristics.
 - Figure 14. Marton: Reactive power (MVar) load characteristics.
- **Mataroa GXP**
 - Figure 15. Mataroa: Apparent power (MVA) load characteristics.
 - Figure 16. Mataroa: Reactive power (MVar) load characteristics.
- **National Park GXP**
 - Figure 17. National Park: Apparent power (MVA) load characteristics.
 - Figure 18. National Park: Reactive power (MVar) load characteristics.
- **Ohakune GXP**
 - Figure 19. Ohakune: Apparent power (MVA) load characteristics.
 - Figure 20. Ohakune: Reactive power (MVar) load characteristics.
- **Ongarue GXP**
 - Figure 21. Ongarue: Apparent power (MVA) load characteristics.
 - Figure 22. Ongarue: Reactive power (MVar) load characteristics.
- **Tokaanu GXP**
 - Figure 25. Tokaanu: Apparent power (MVA) load characteristics.
 - Figure 26. Tokaanu: Reactive power (MVar) load characteristics.
- **Whanganui GXP**
 - Figure 27. Whanganui: Apparent power (MVA) load characteristics.
 - Figure 28. Whanganui: Reactive power (MVar) load characteristics.

- **Woodville GXP**
 - Figure 29. Woodville: Apparent power (MVA) load characteristics.
 - Figure 30. Woodville: Reactive power (MVar) load characteristics.

Brunswick MVA

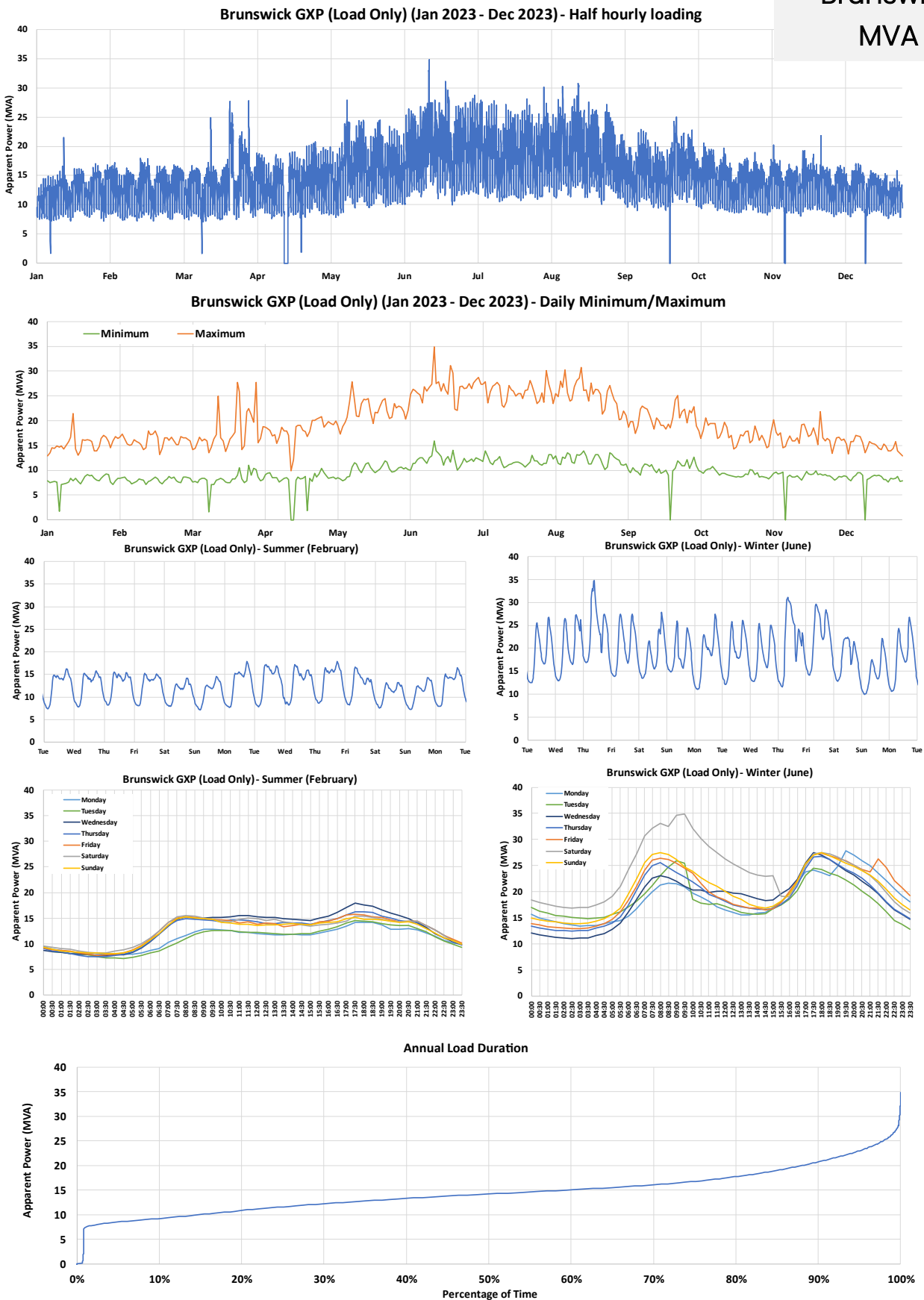


Figure 1. Brunswick: Apparent power (MVA) load characteristics.

Brunswick MVar

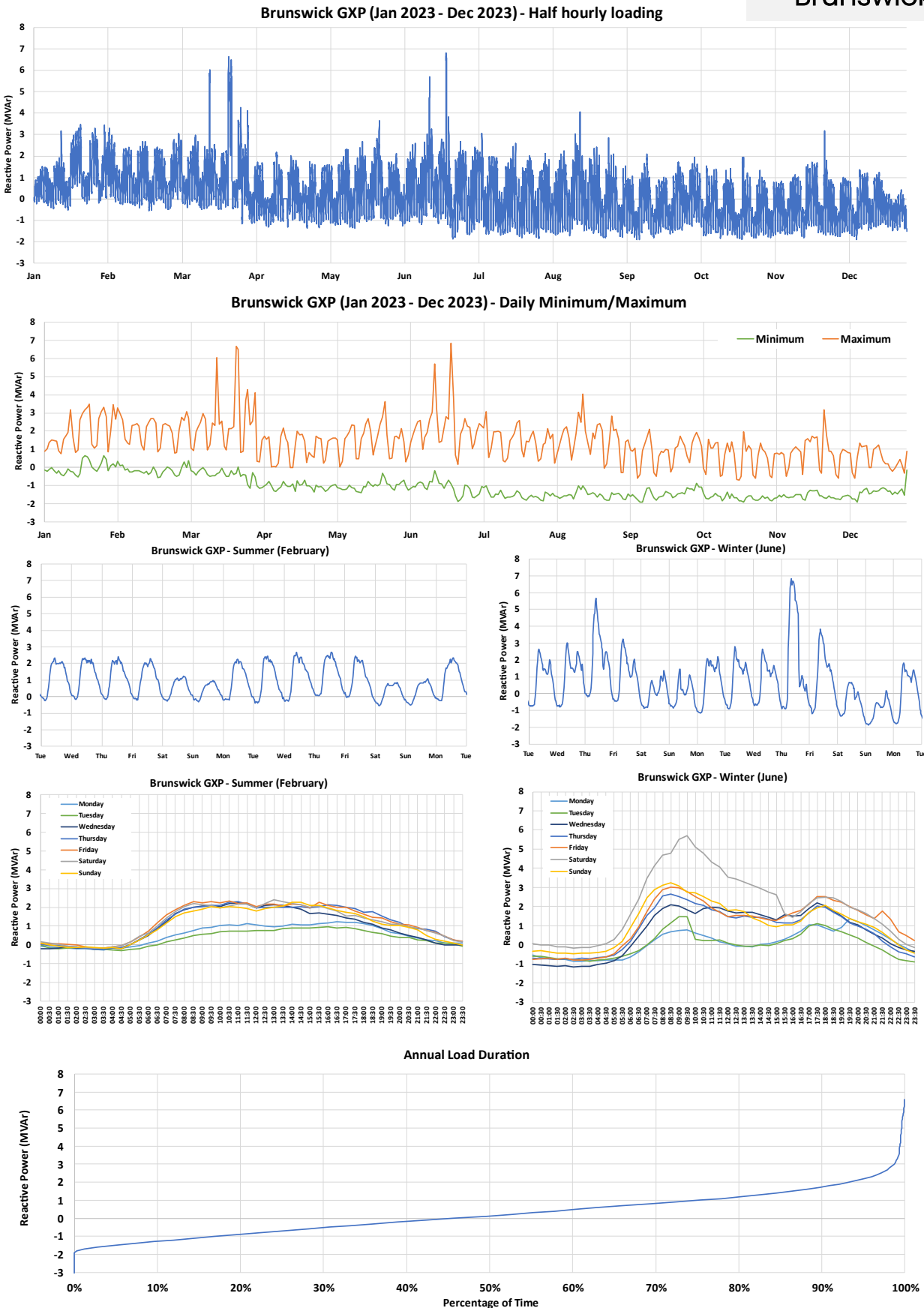


Figure 2. Brunswick: Reactive power (MVar) load characteristics.

Bunnythorpe MVA

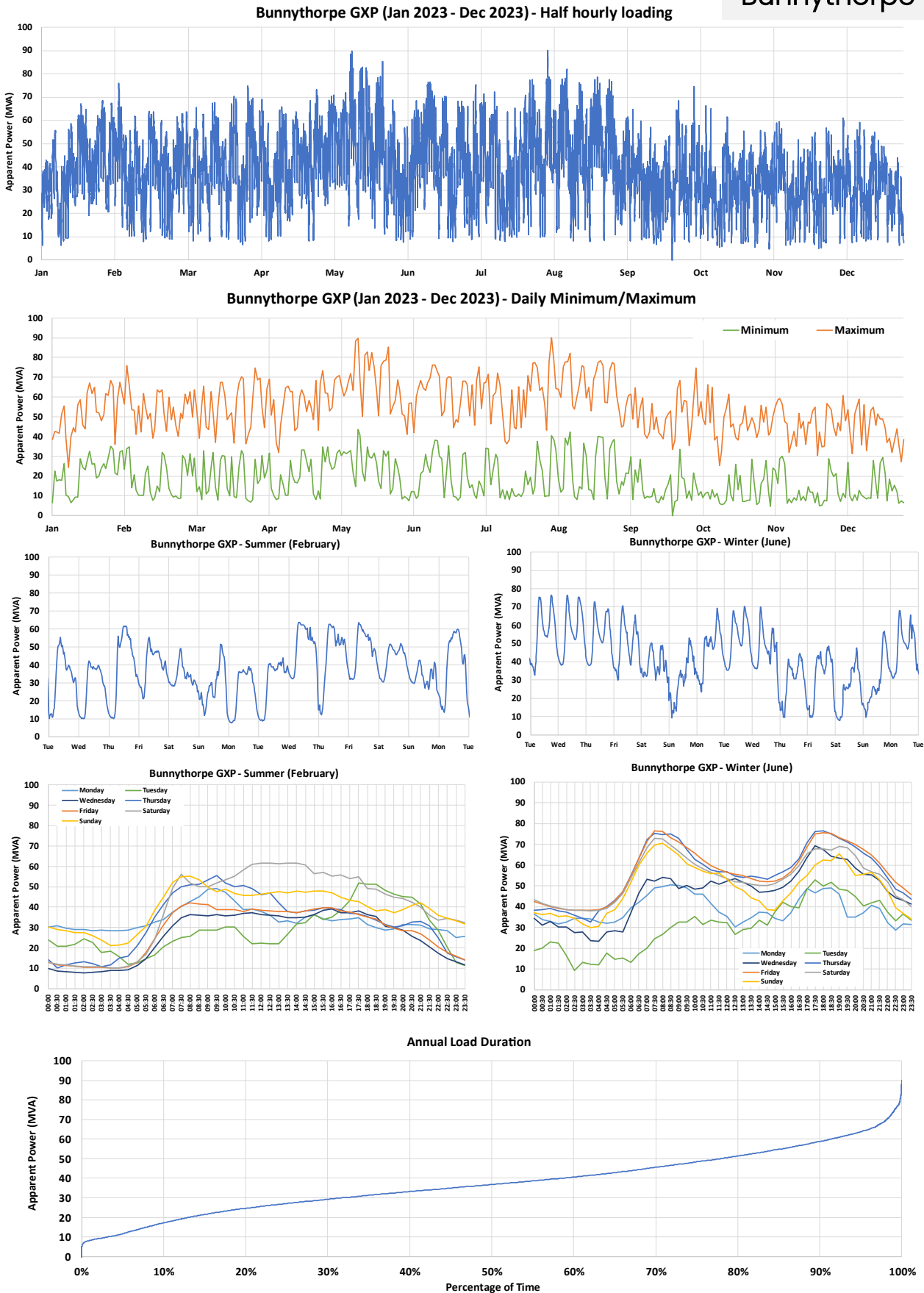


Figure 3. Bunnythorpe: Apparent power (MVA) load characteristics.

Bunnythorpe MVar

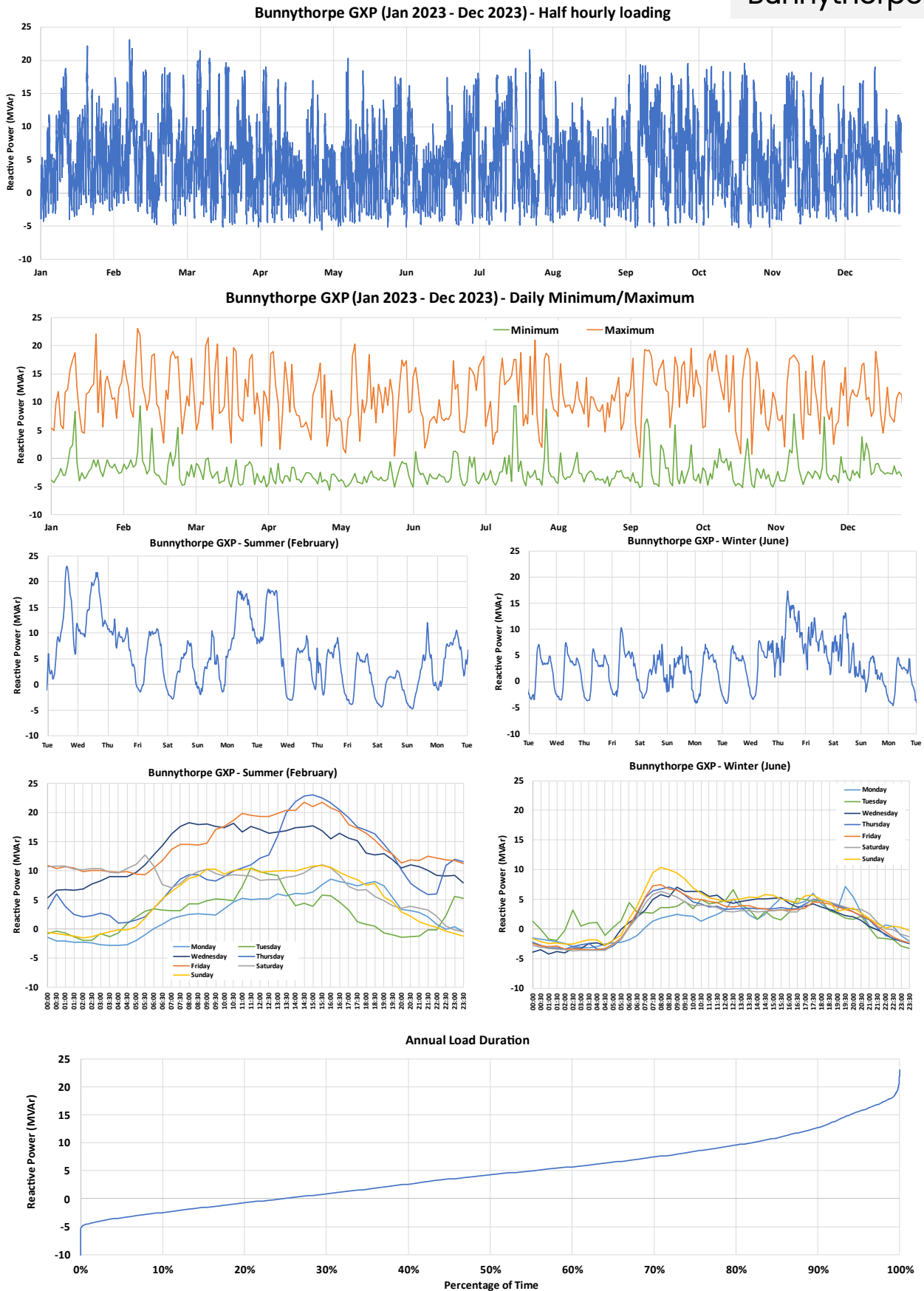


Figure 4. Bunnythorpe: Reactive power (MVar) load characteristics.

Dannevirke MVA

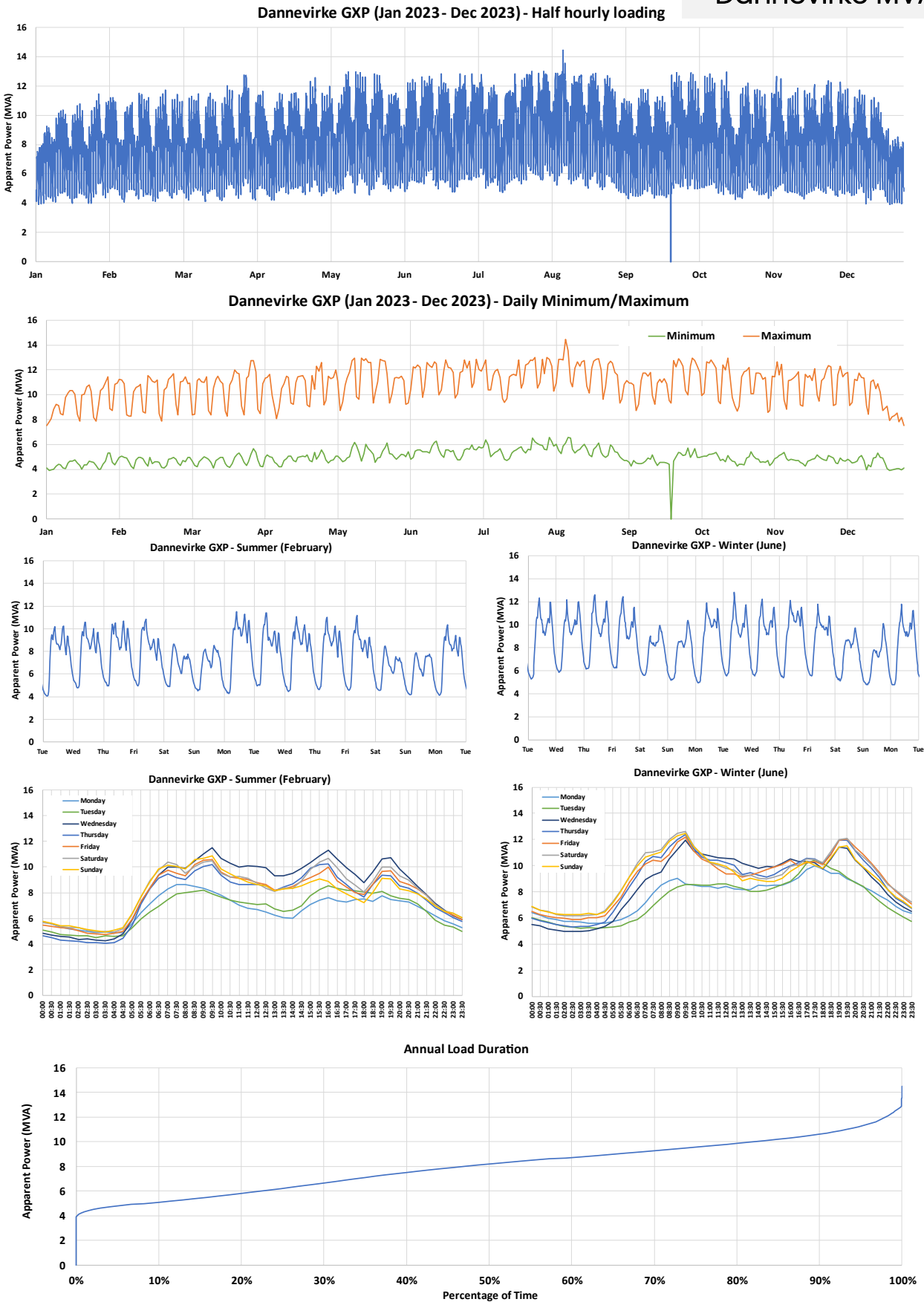


Figure 5. Dannevirke: Apparent power (MVA) load characteristics.

Dannevirke MVar

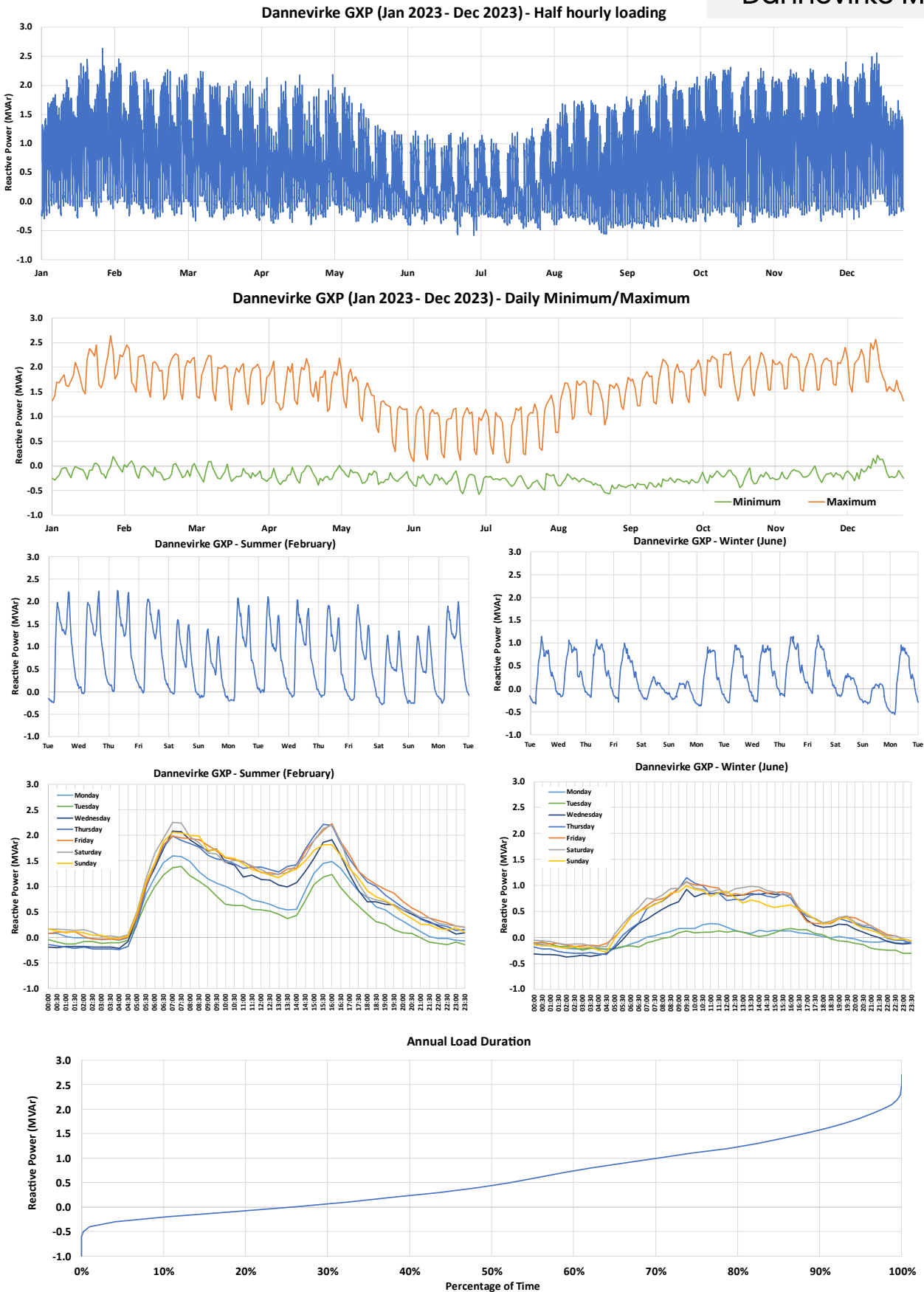


Figure 6. Dannevirke: Reactive power (MVar) load characteristics.

Linton MVA

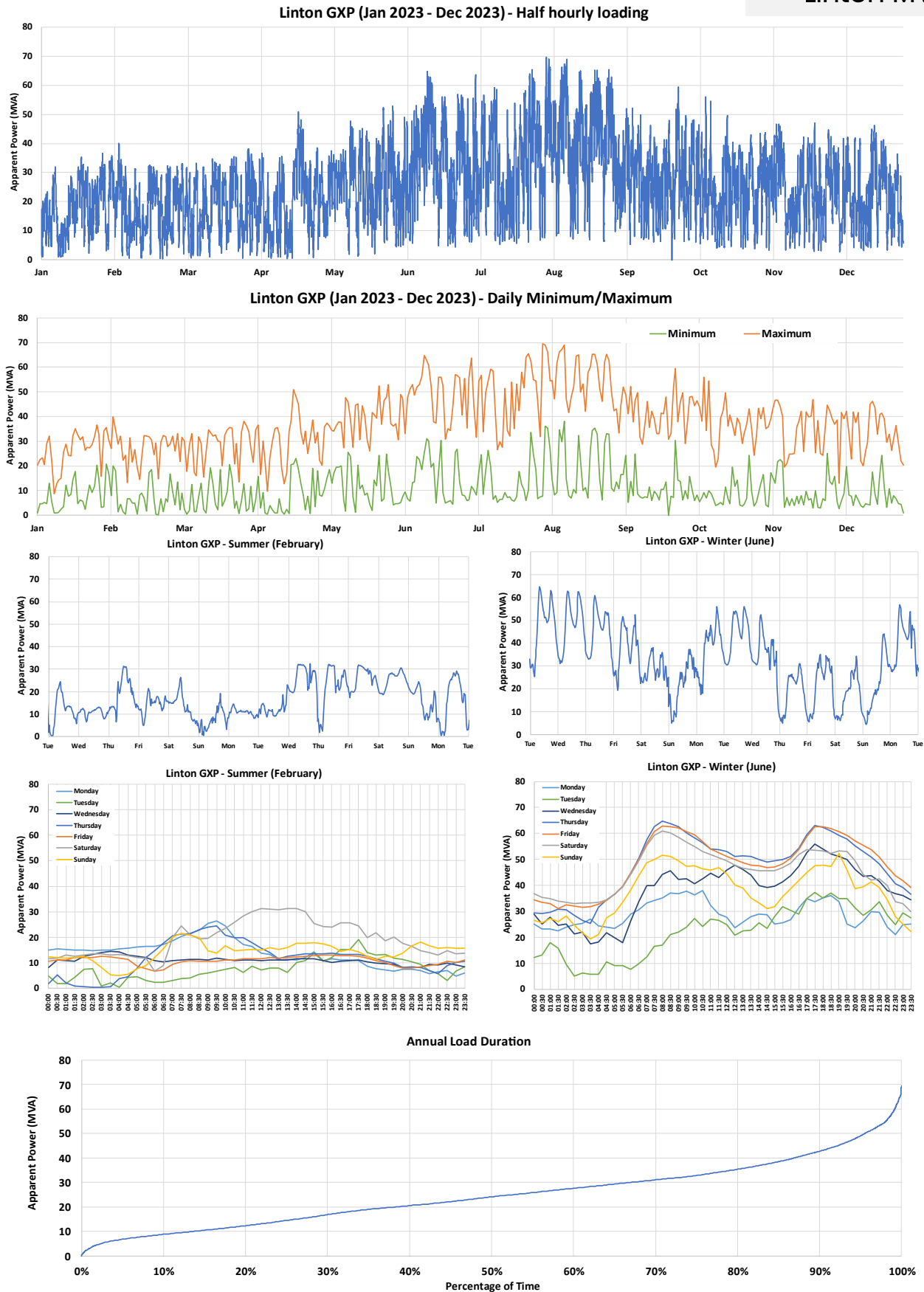


Figure 7. Linton: Apparent power (MVA) load characteristics.

Linton MVar

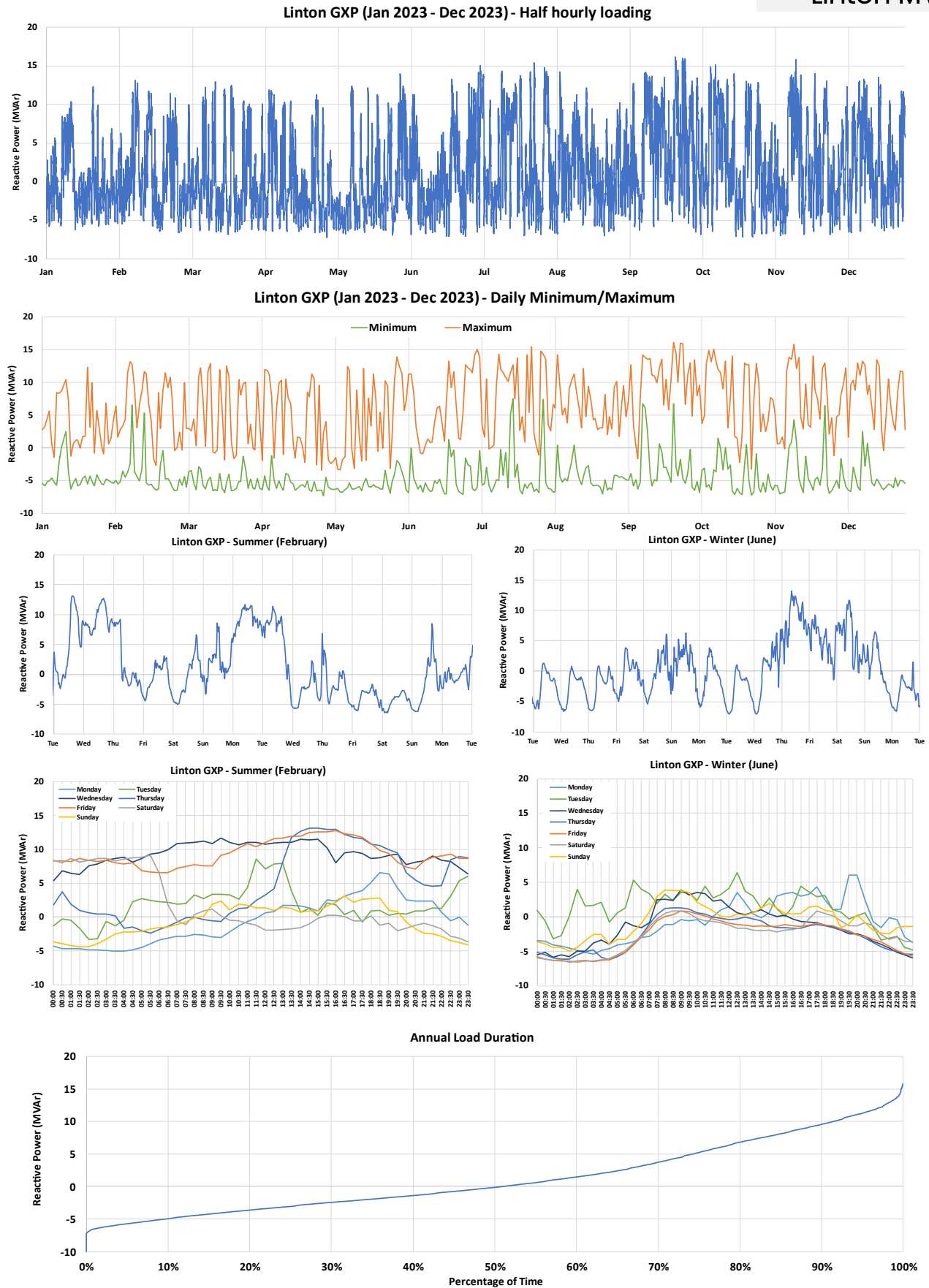


Figure 8. Linton: Reactive power (MVar) load characteristics.

Mangahao MVA

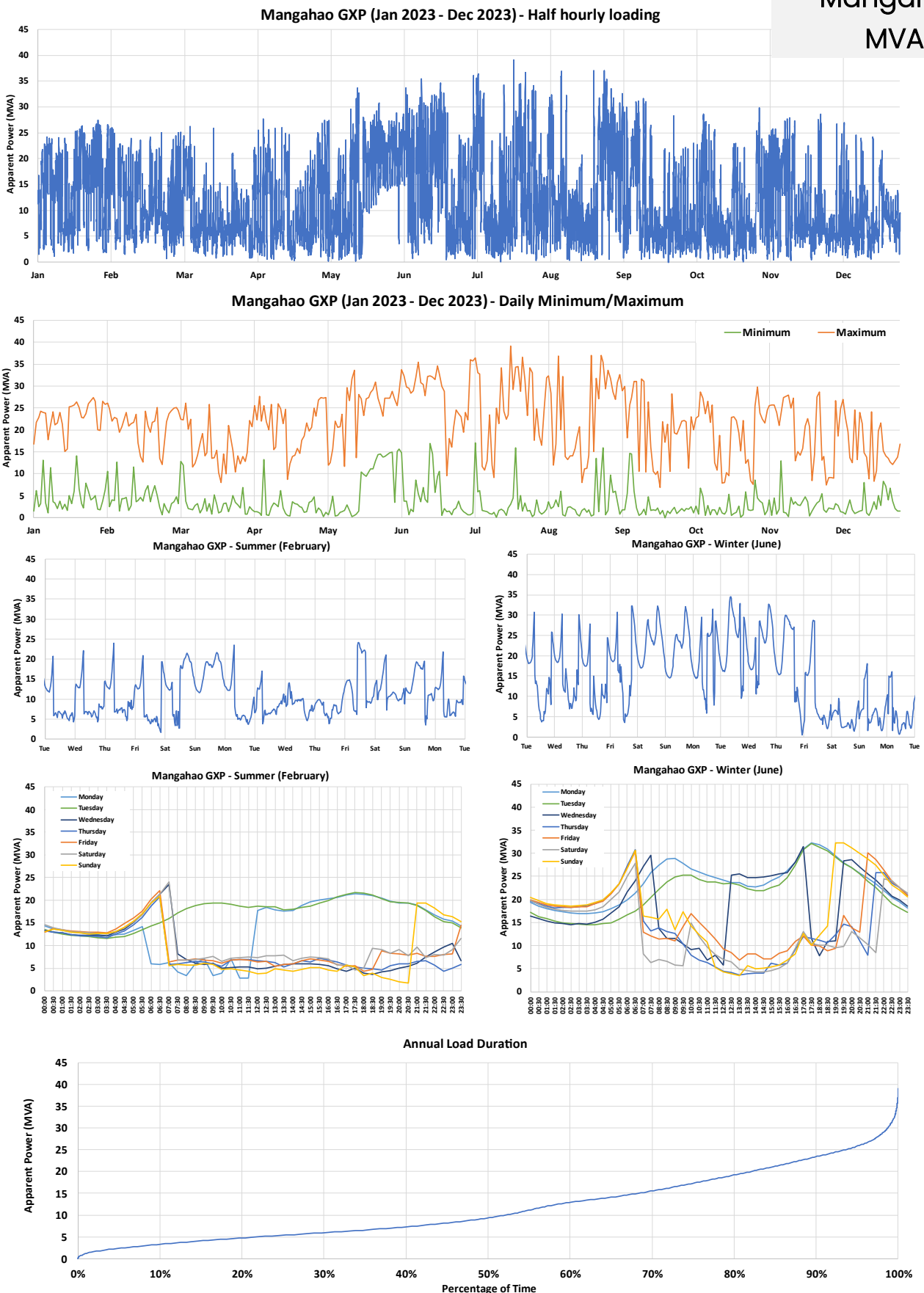


Figure 9. Mangahao: Apparent power (MVA) load characteristics.

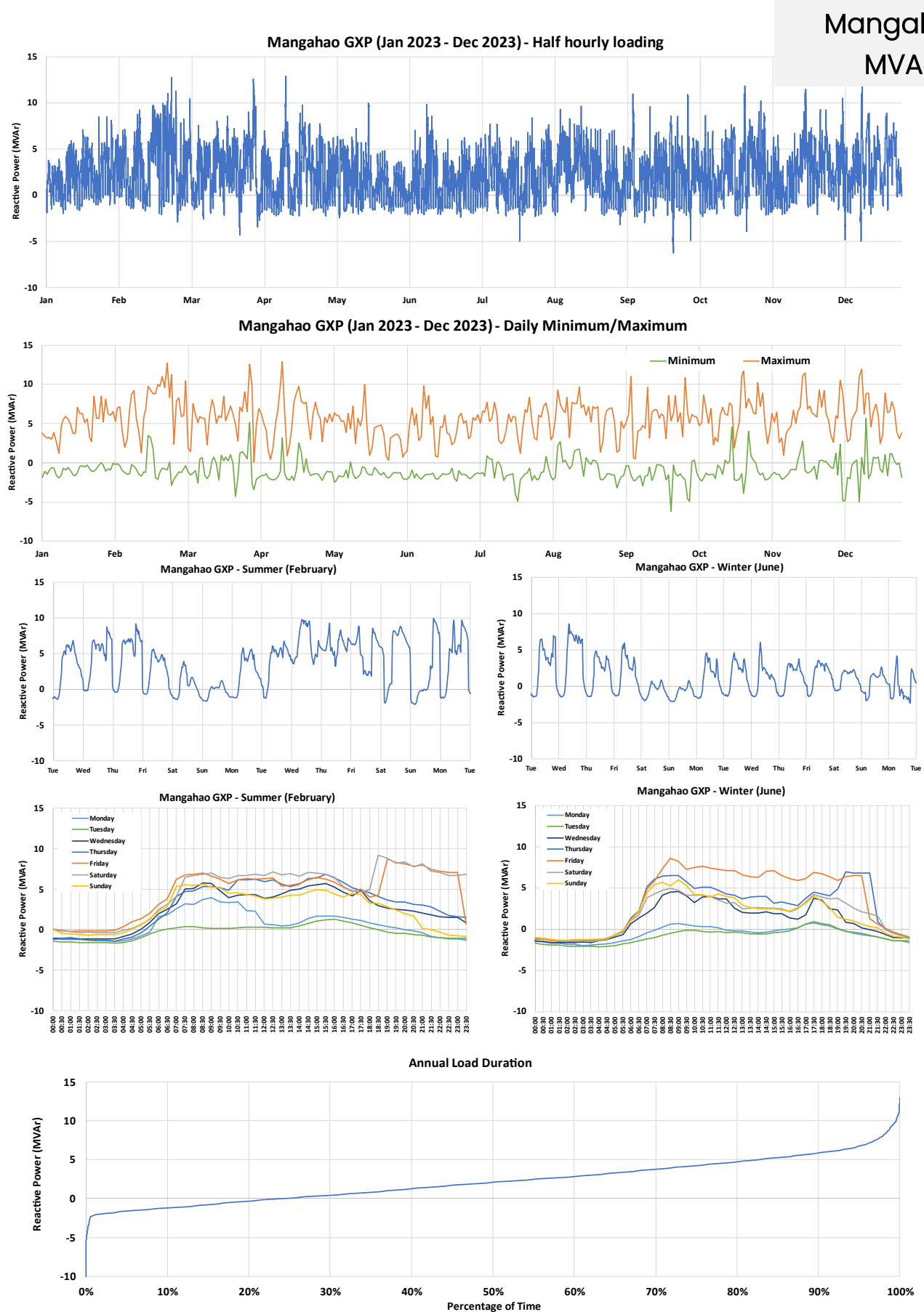


Figure 10. Mangahao: Reactive power (MVar) load characteristics.

Mangamaire MVA

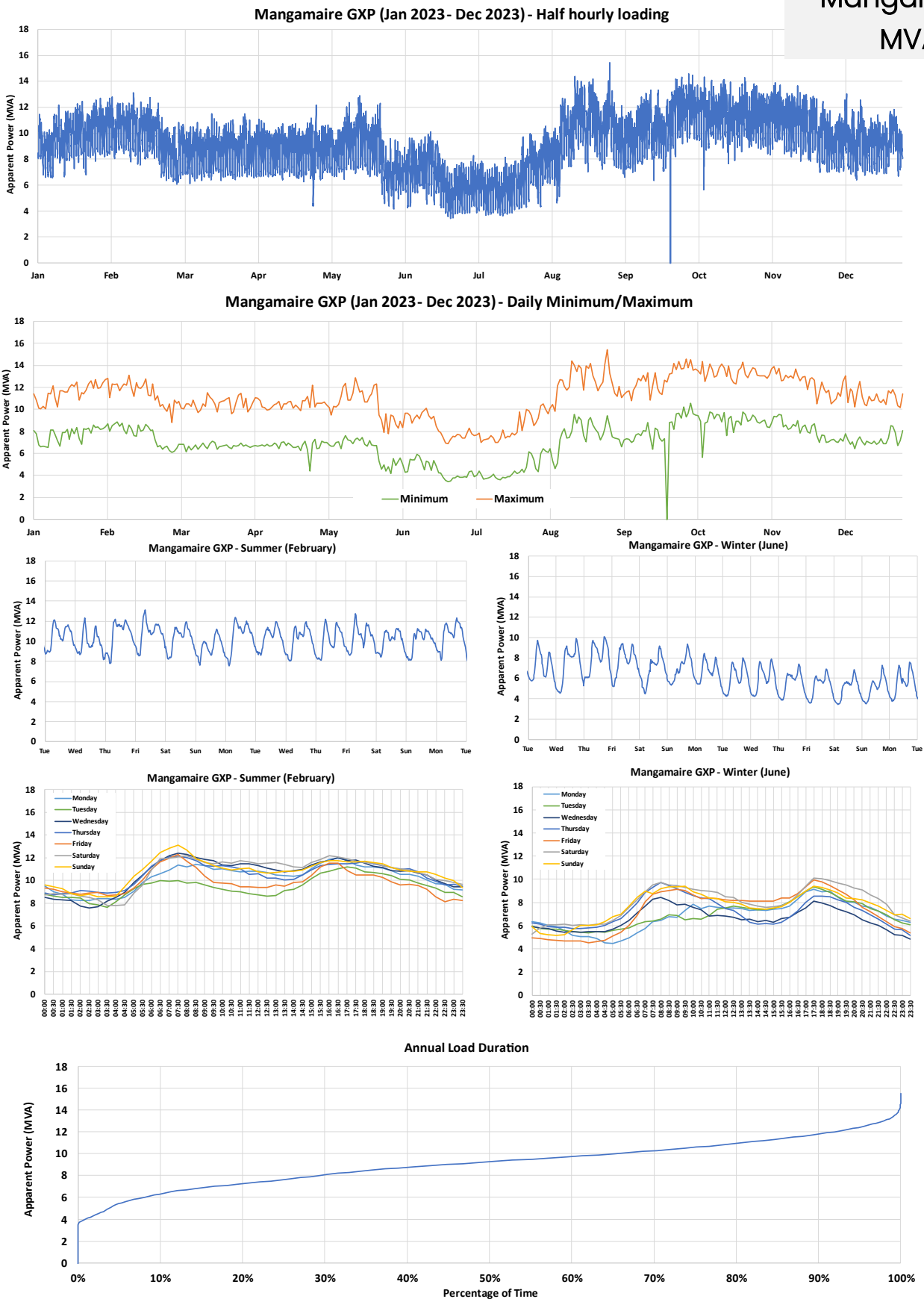


Figure 11. Mangamaire: Apparent power (MVA) load characteristics.

Mangamaire MVar

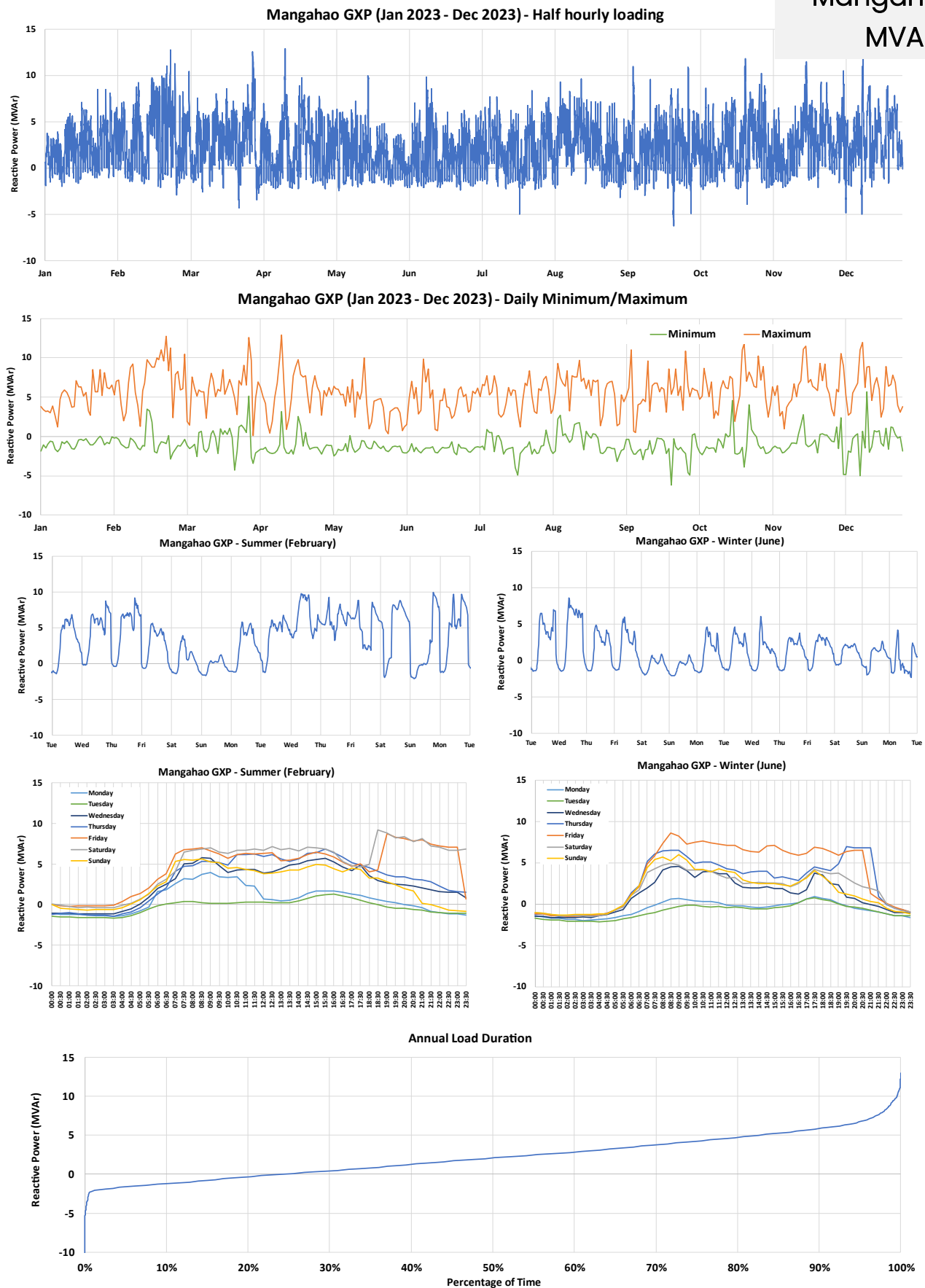


Figure 12. Mangamaire: Reactive power (MVar) load characteristics.

Marton MVA

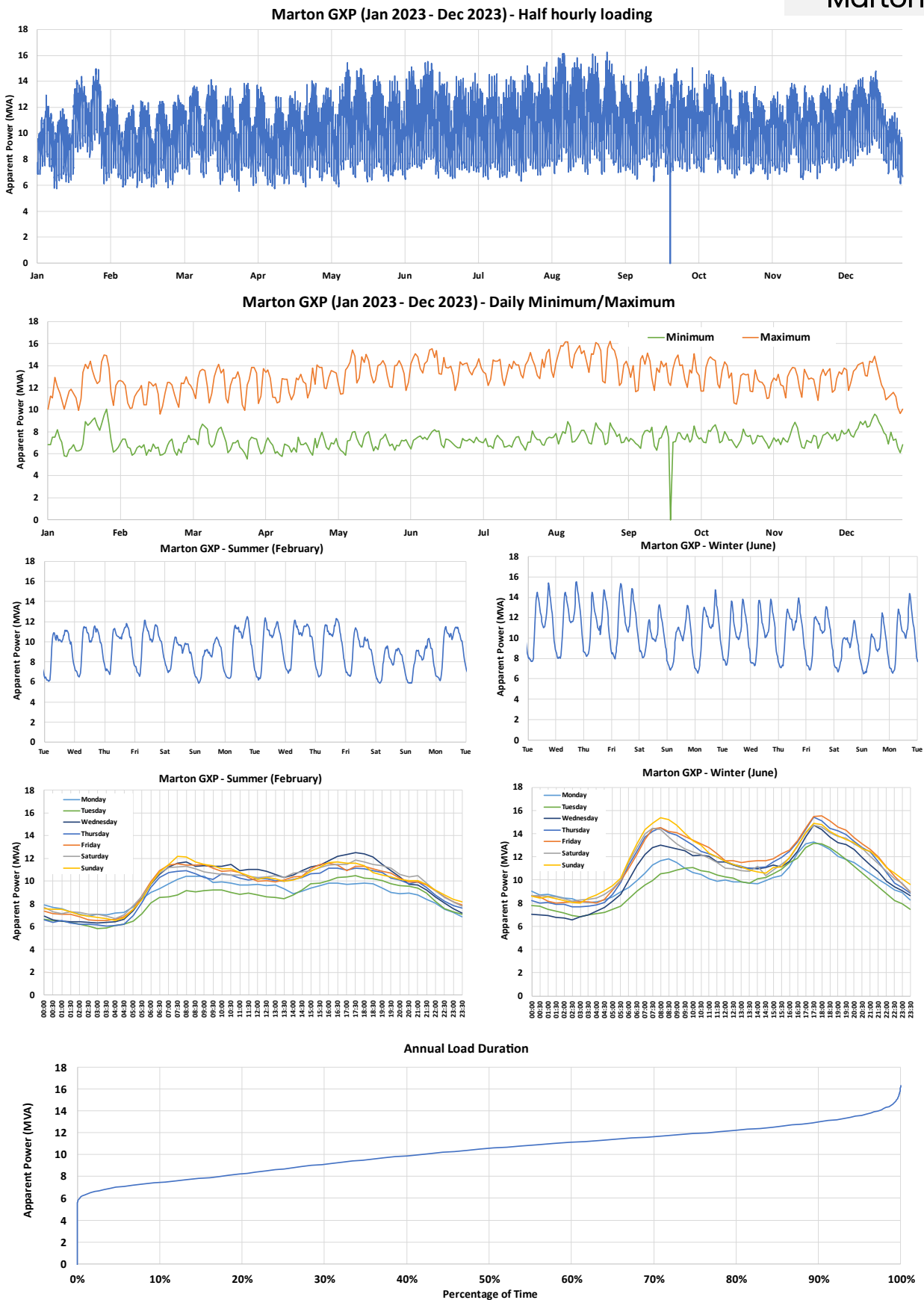


Figure 13. Marton: Apparent power (MVA) load characteristics.

Marton MVar

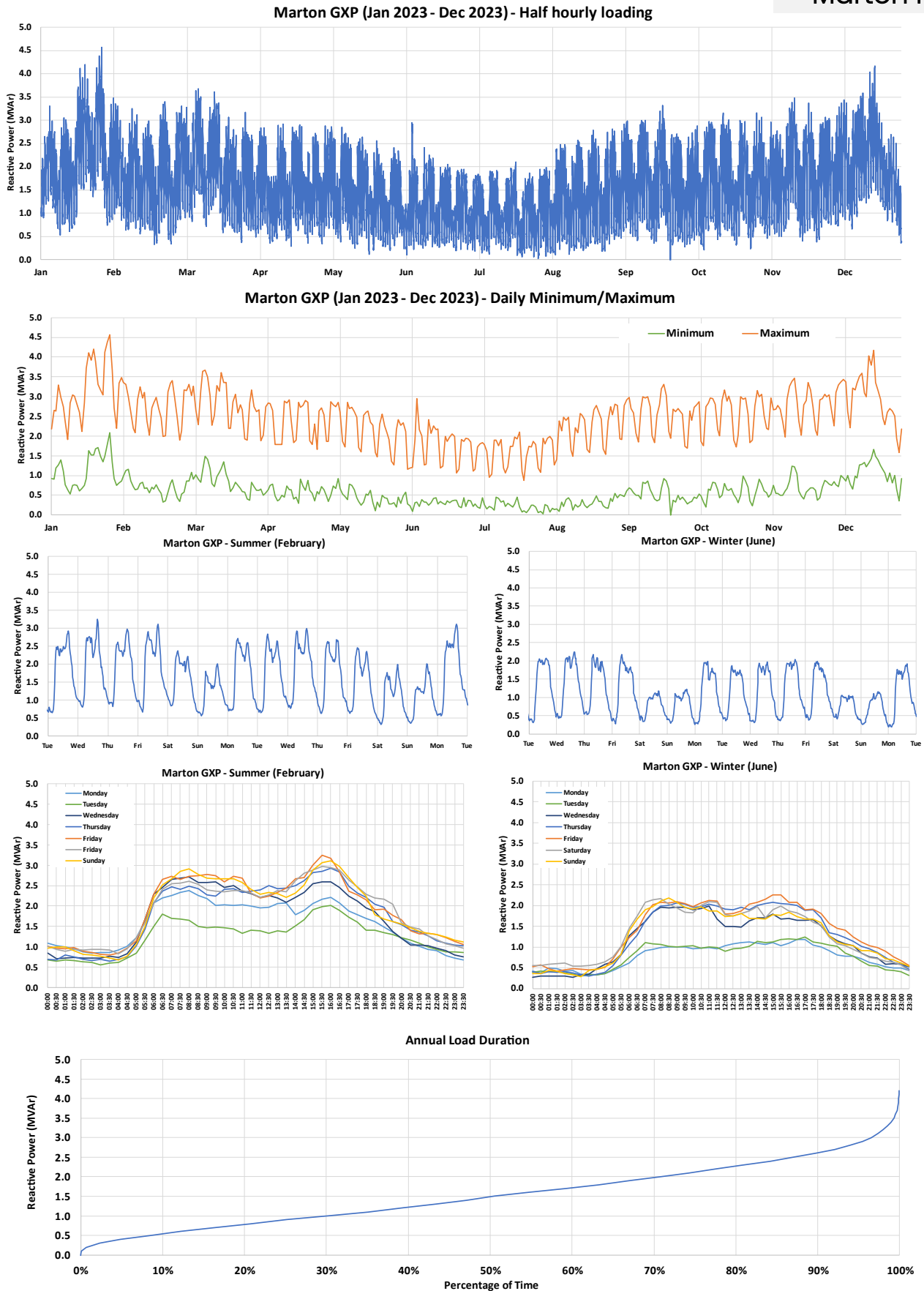


Figure 14. Marton: Reactive power (MVar) load characteristics.

Mataroa MVA

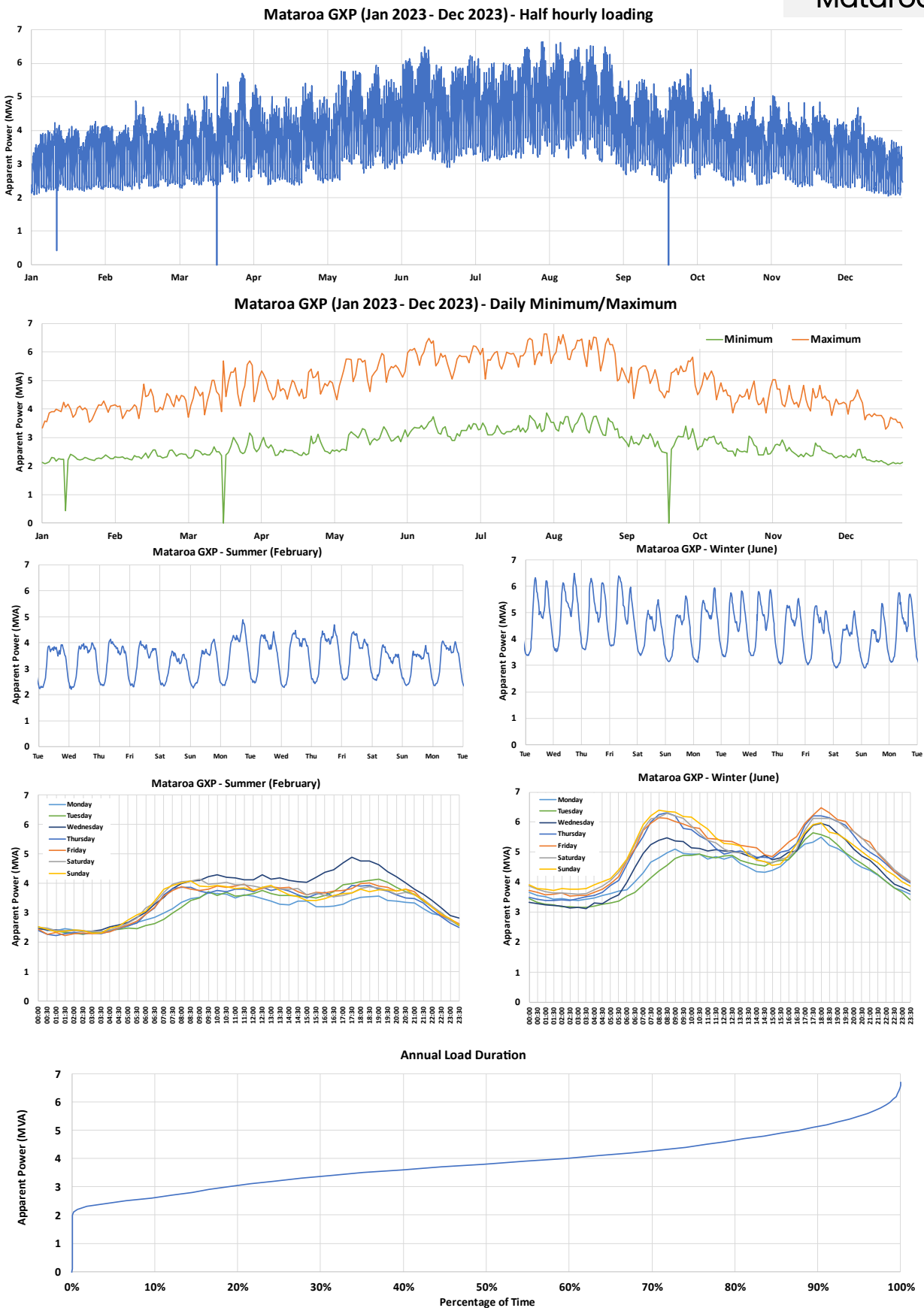


Figure 15. Mataroa: Apparent power (MVA) load characteristics.

Mataroa MVar

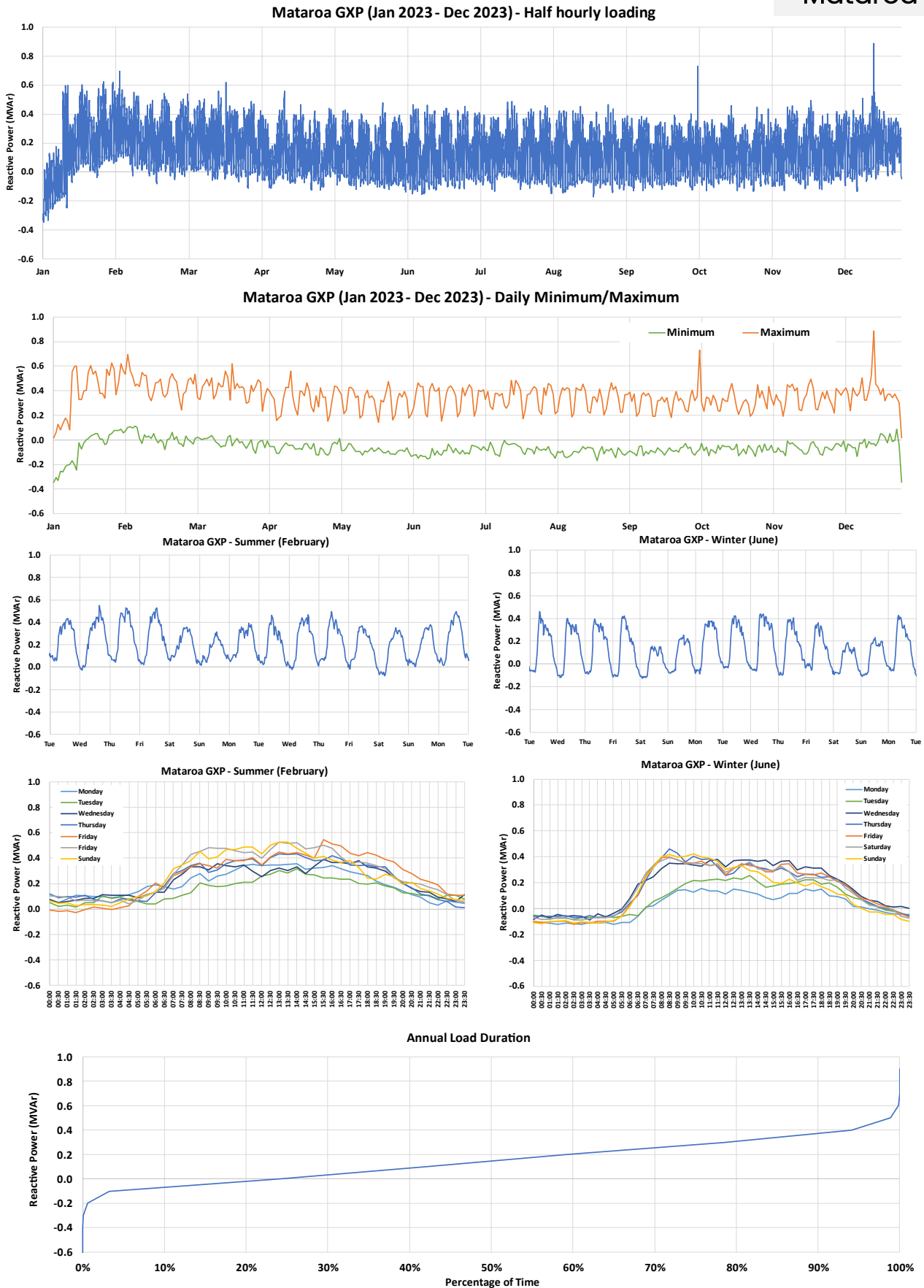


Figure 16. Mataroa: Reactive power (MVar) load characteristics.

National Park MVA

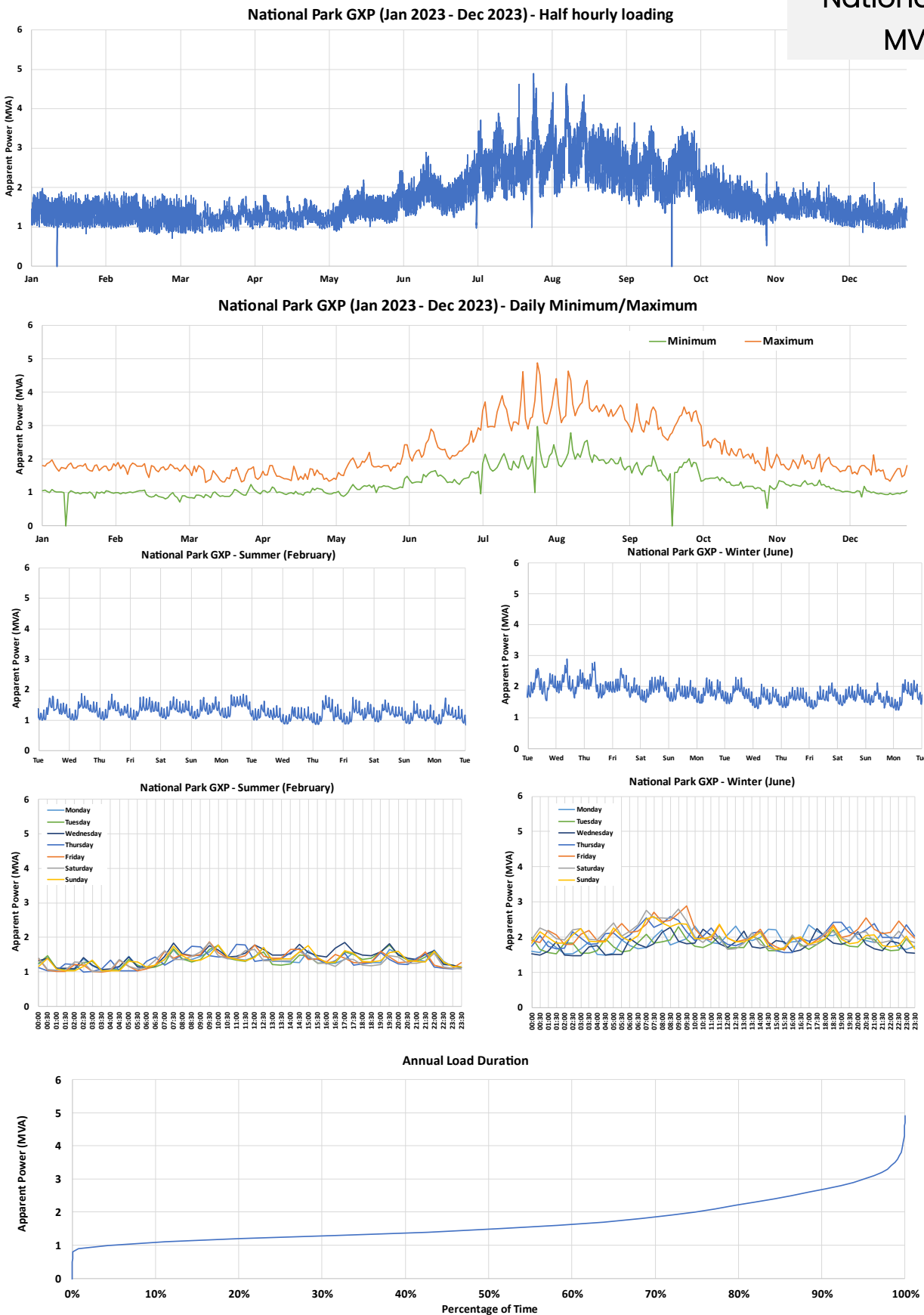


Figure 17. National Park: Apparent power (MVA) load characteristics.

National Park MVar

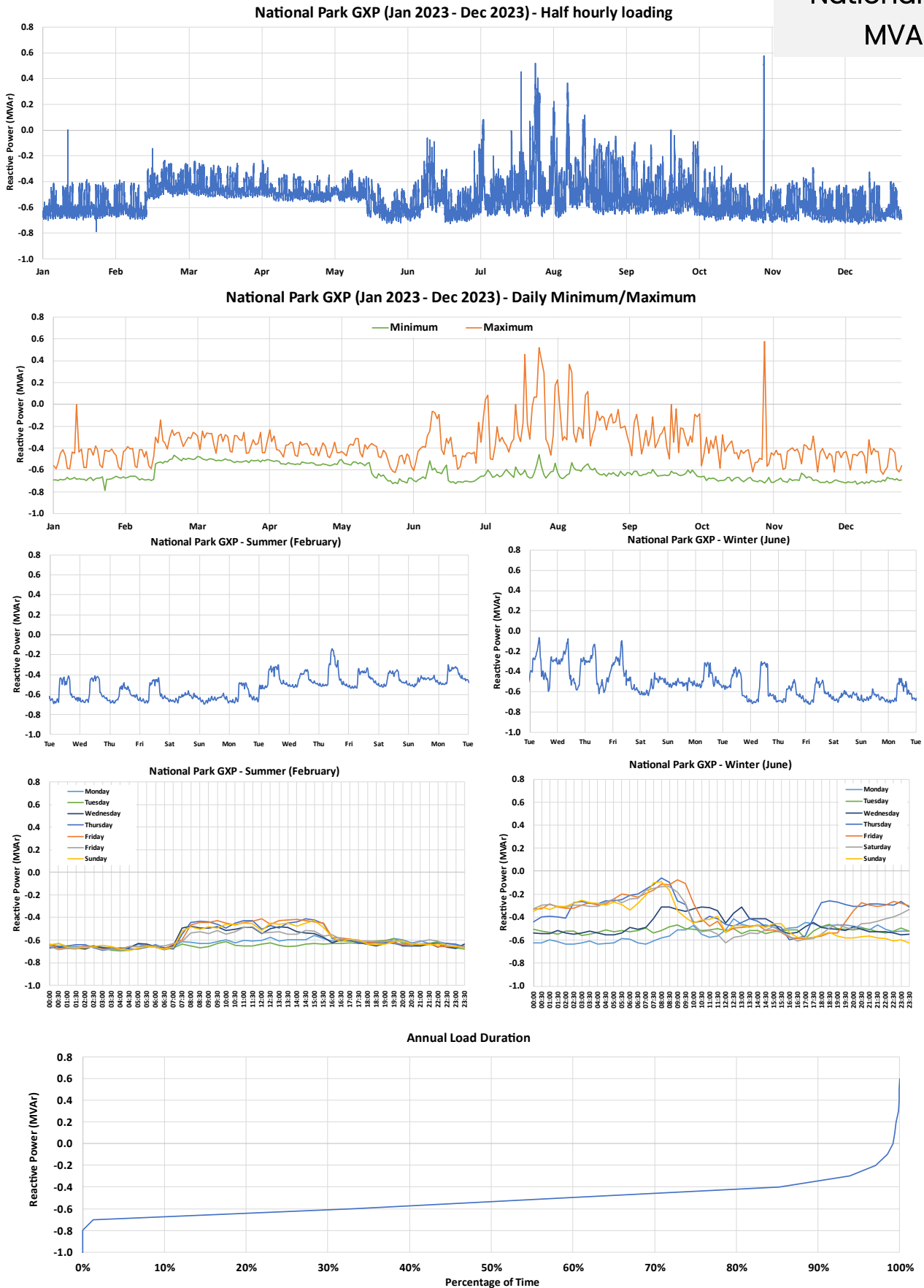


Figure 18. National Park: Reactive power (MVar) load characteristics.

Ohakune MVA

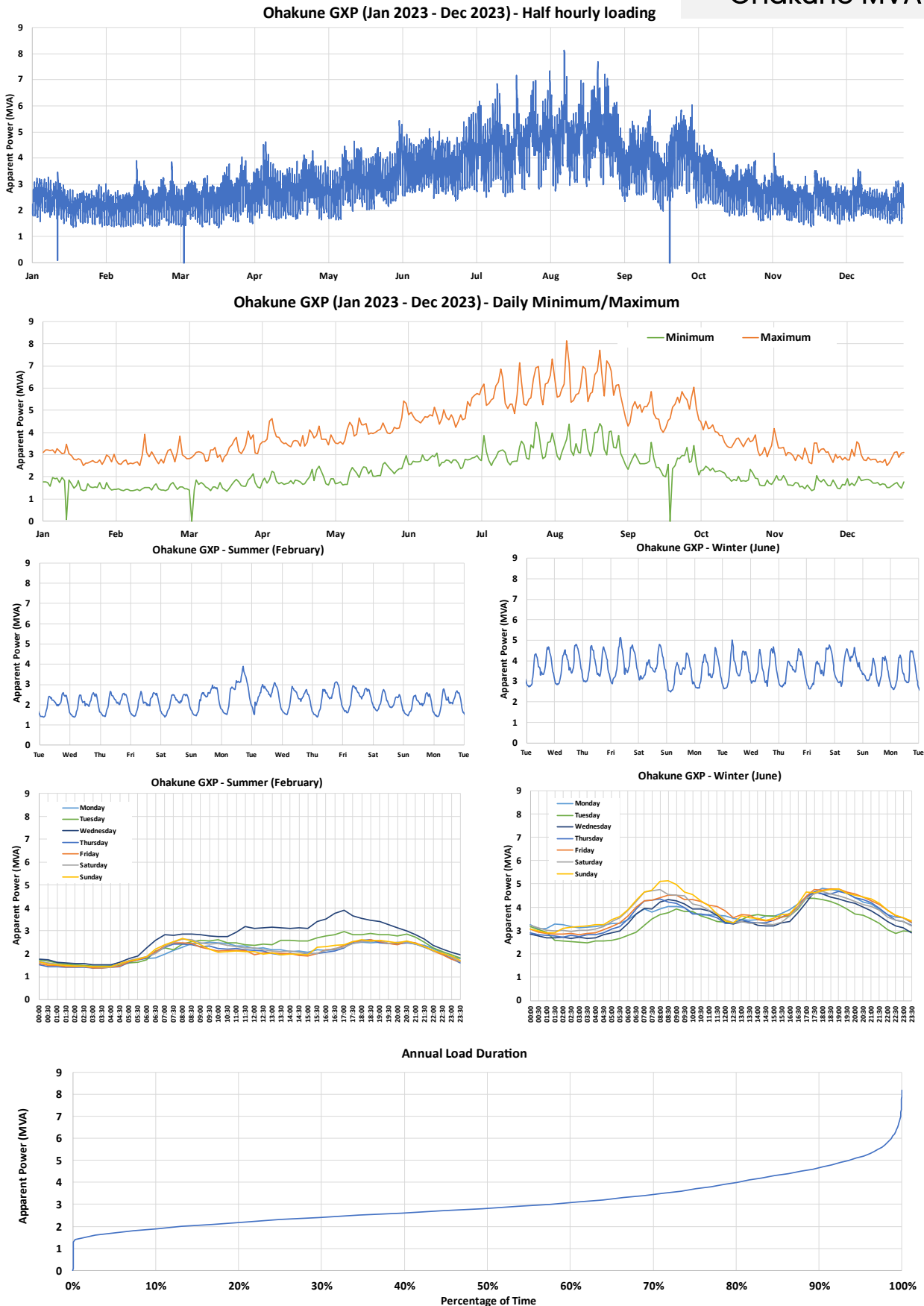


Figure 19. Ohakune: Apparent power (MVA) load characteristics.

Ohakune MVar

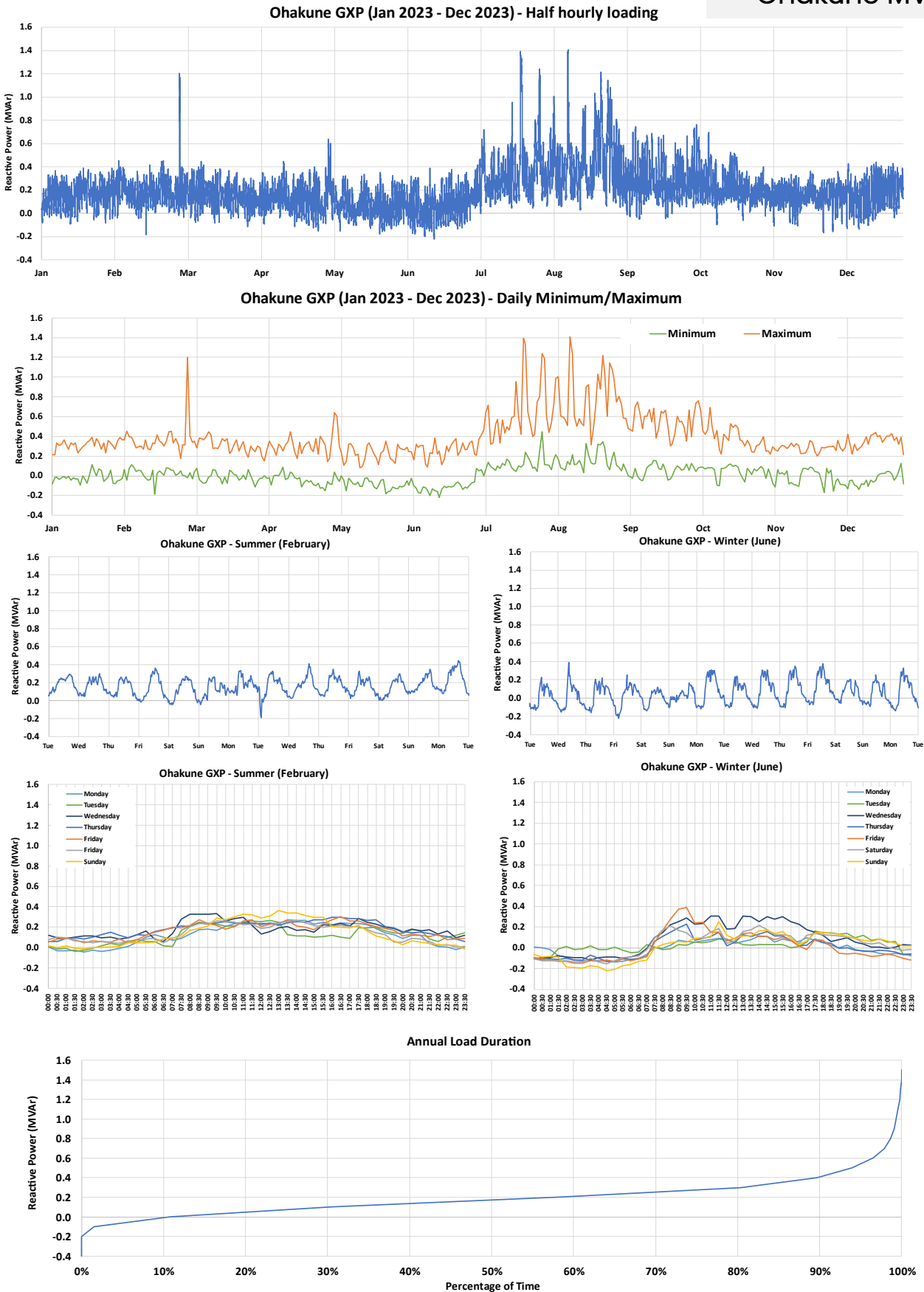


Figure 20. Ohakune: Reactive power (MVar) load characteristics.

Ongarue MVA

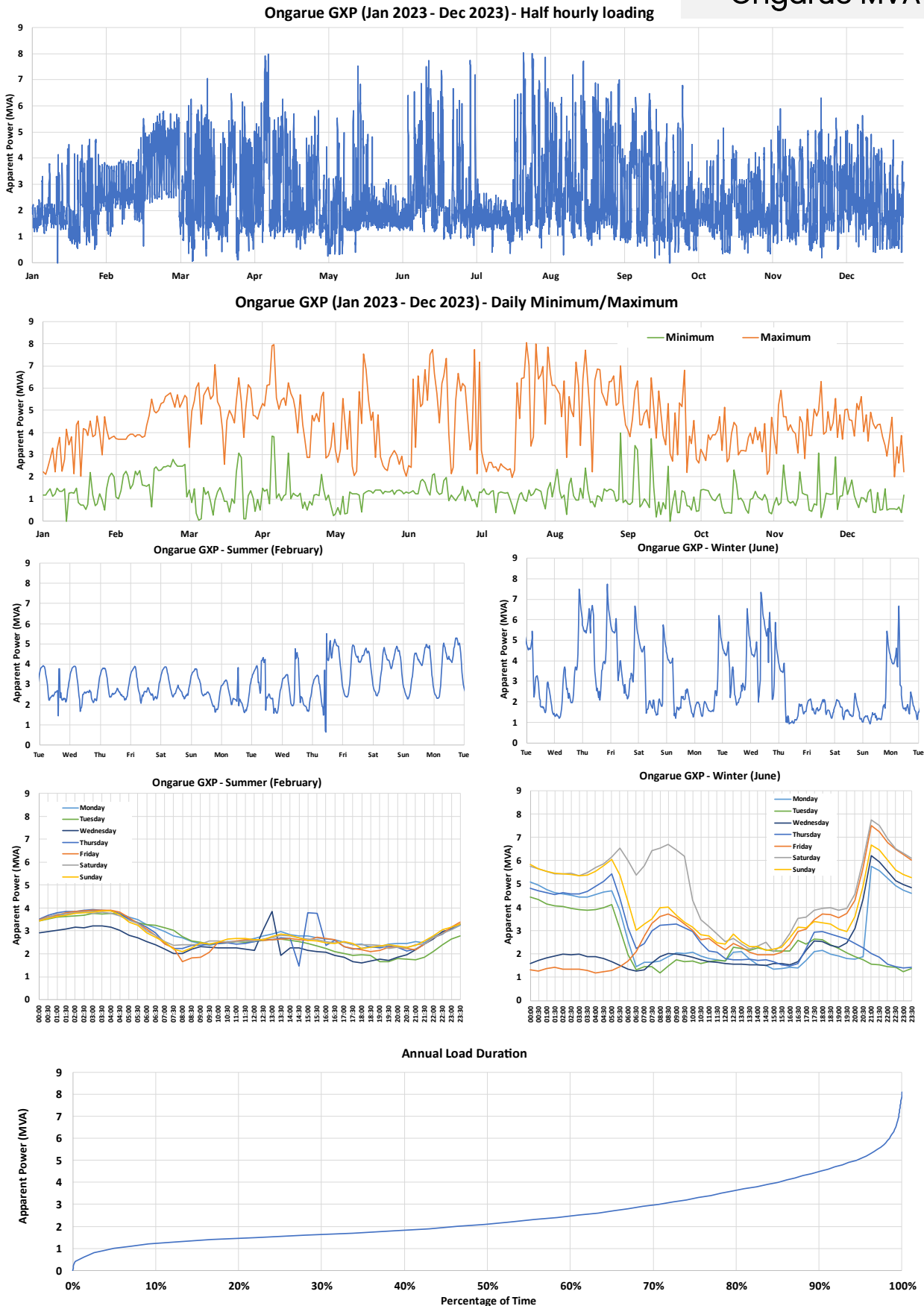


Figure 21. Ongarue: Apparent power (MVA) load characteristics.

Ongarue MVar

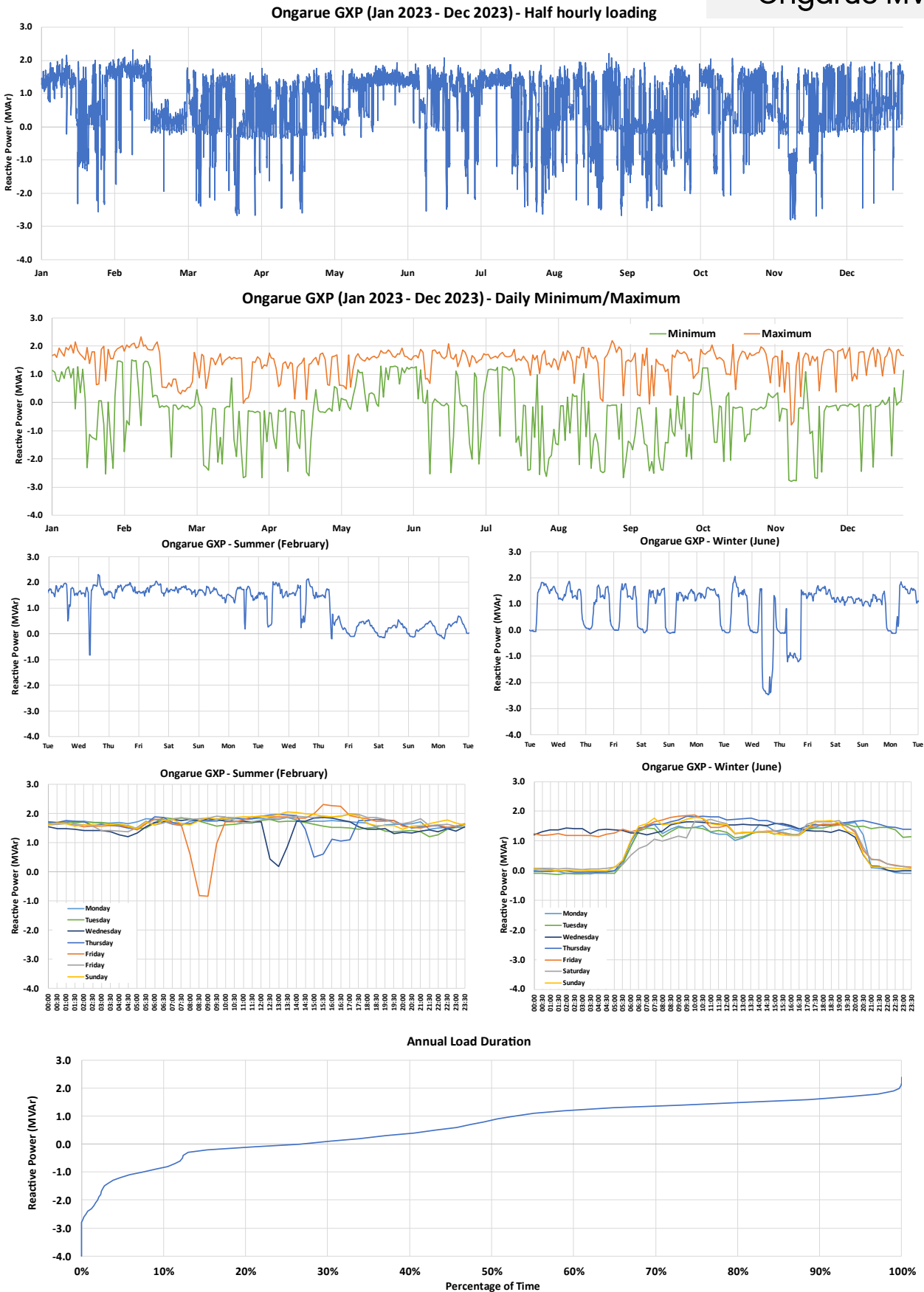


Figure 22. Ongarue: Reactive power (MVar) load characteristics.

Tangiwai 11 kV MVA

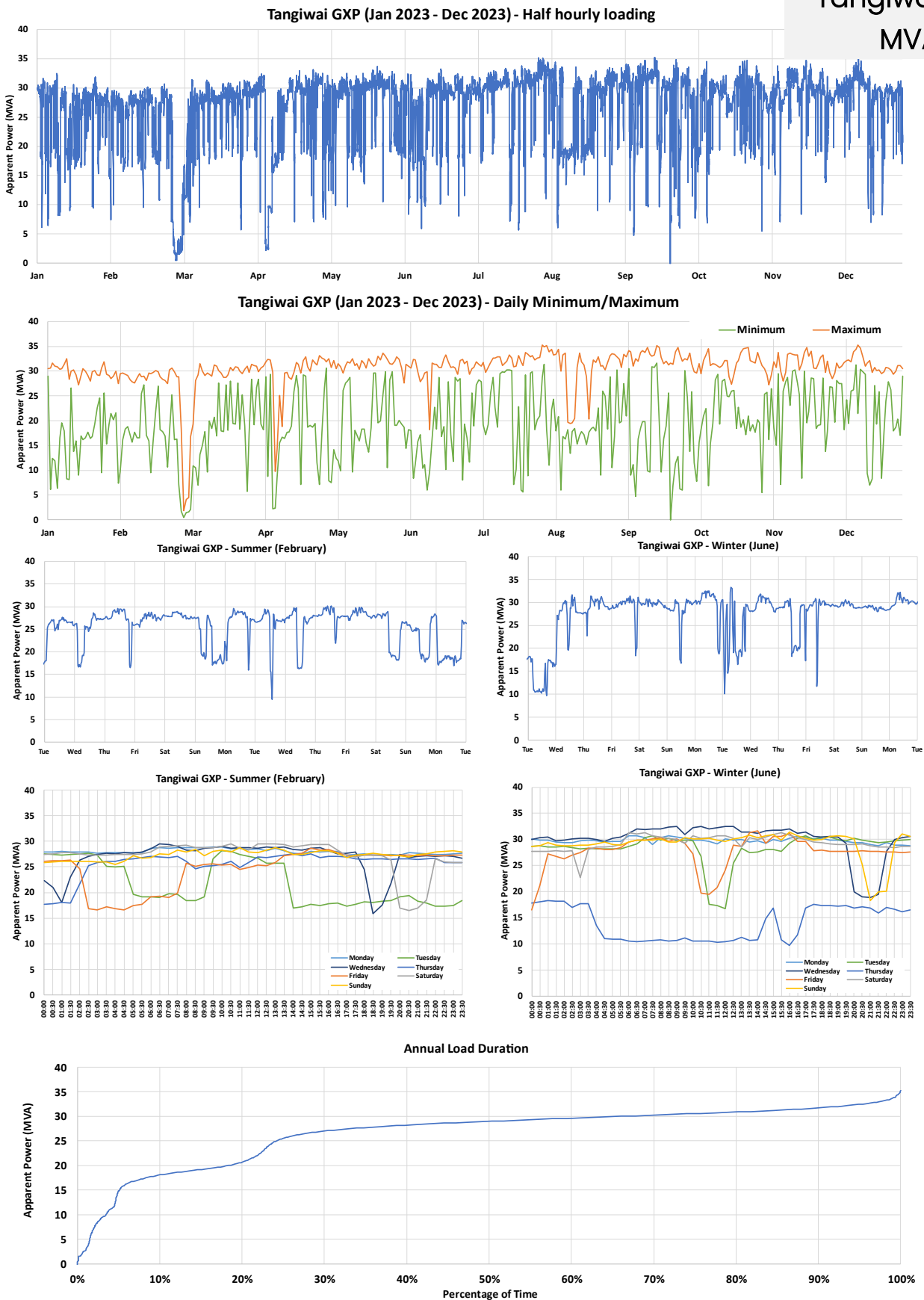


Figure 23. Tangiwai 11 kV: Apparent power (MVA) load characteristics.

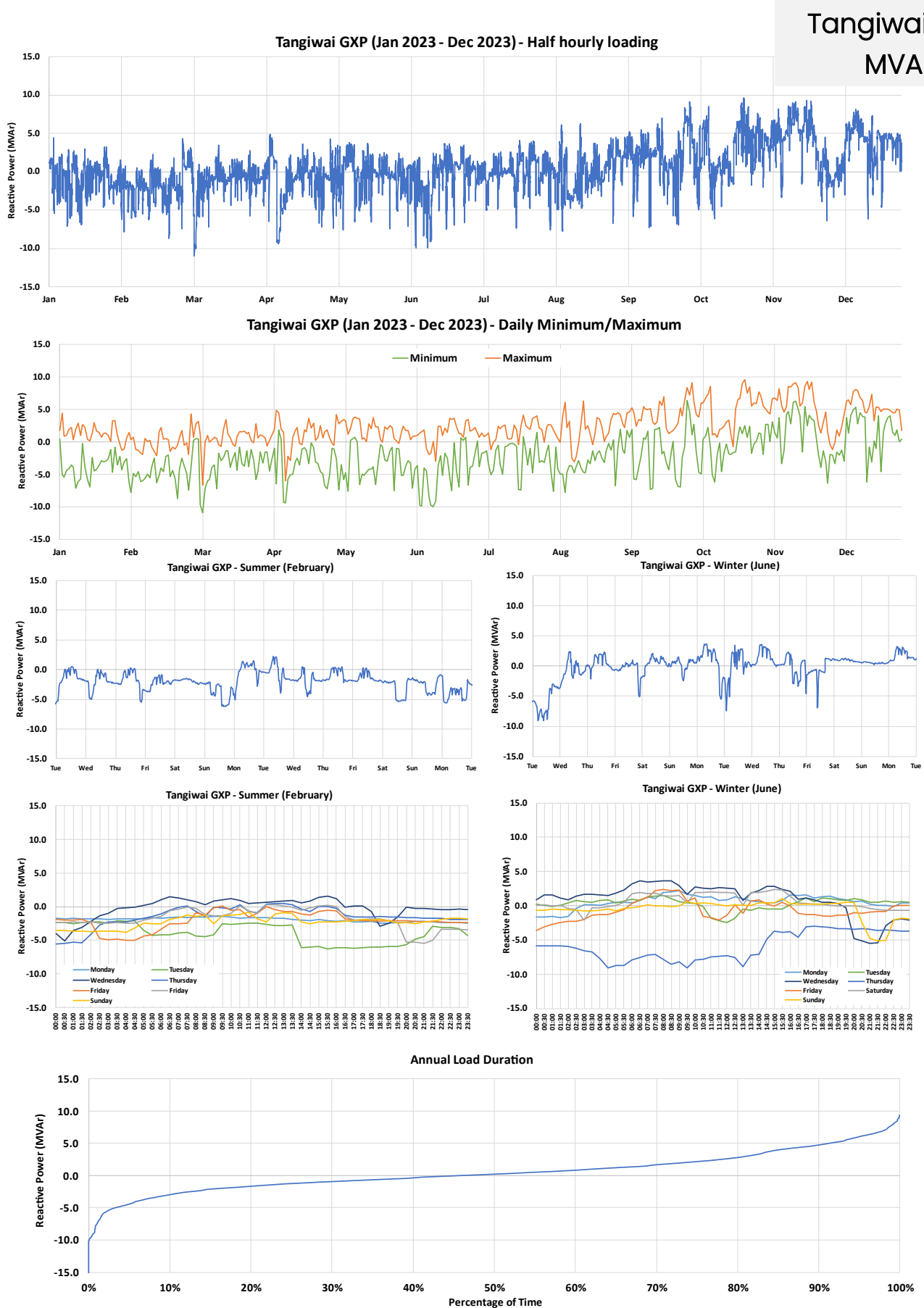


Figure 24. Tangiwai 11 kV: Reactive power (MVar) load characteristics.

Tokaanu MVA

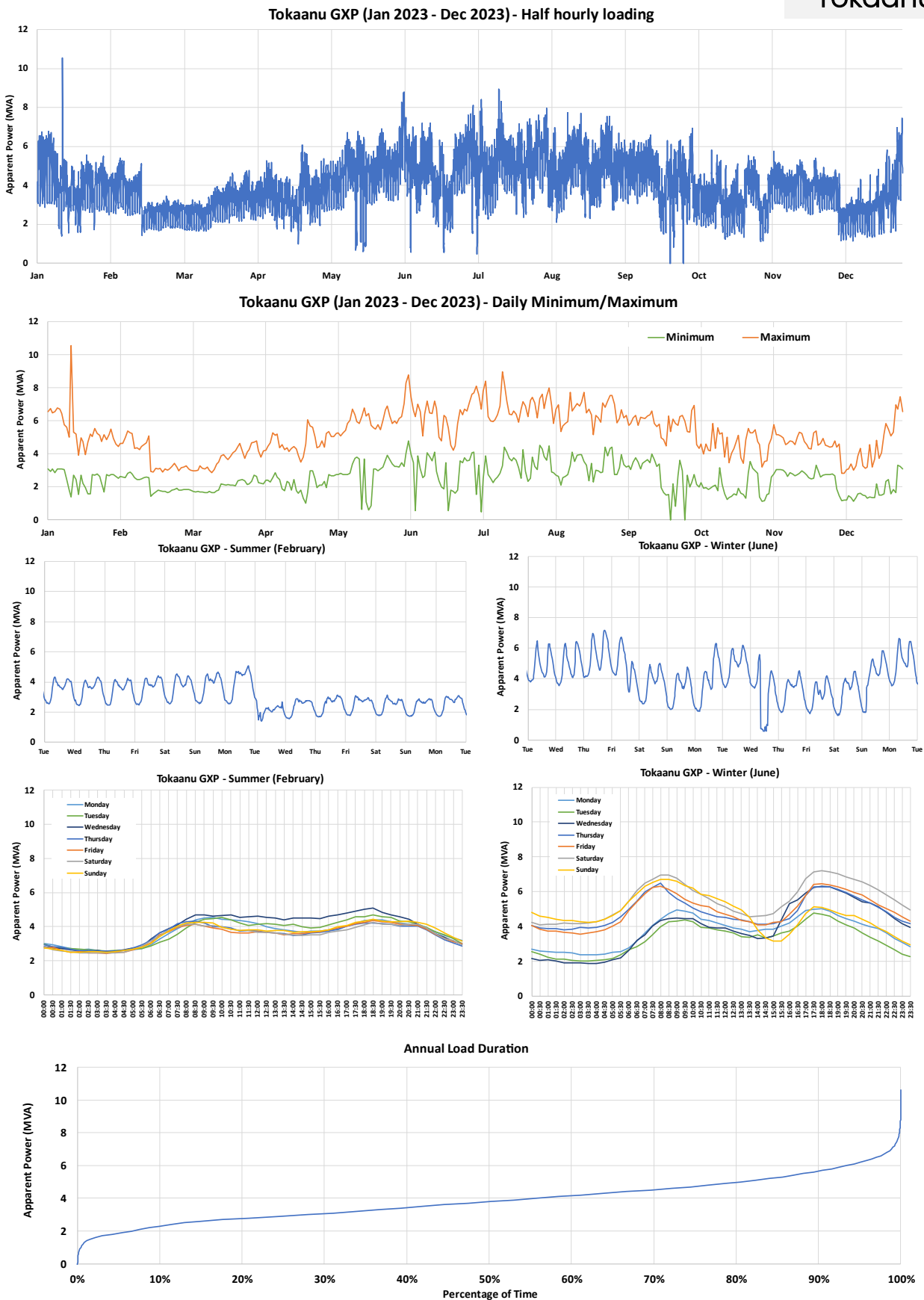


Figure 25. Tokaanu: Apparent power (MVA) load characteristics.

Tokaanu MVar

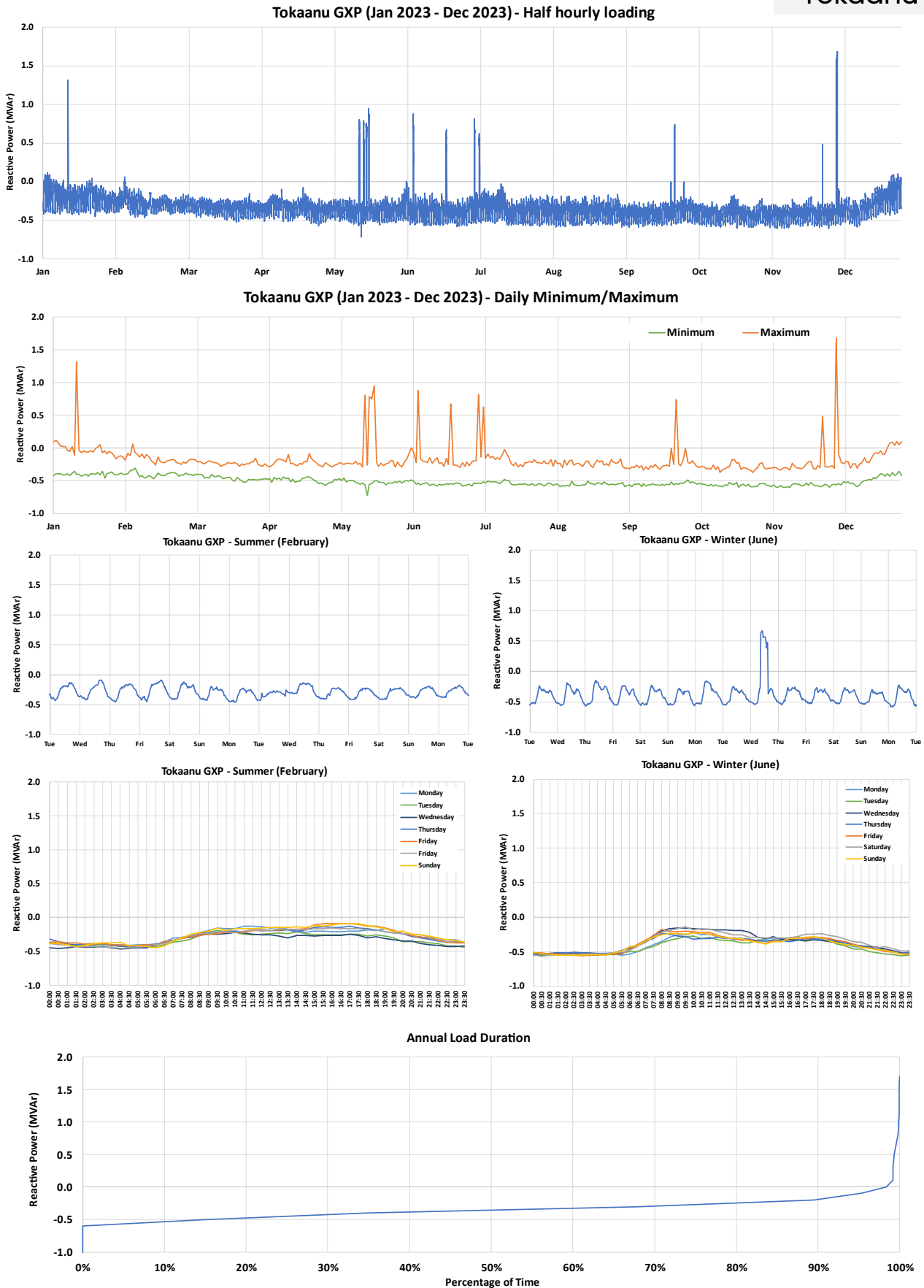


Figure 26. Tokaanu: Reactive power (MVar) load characteristics.

Whanganui MVA

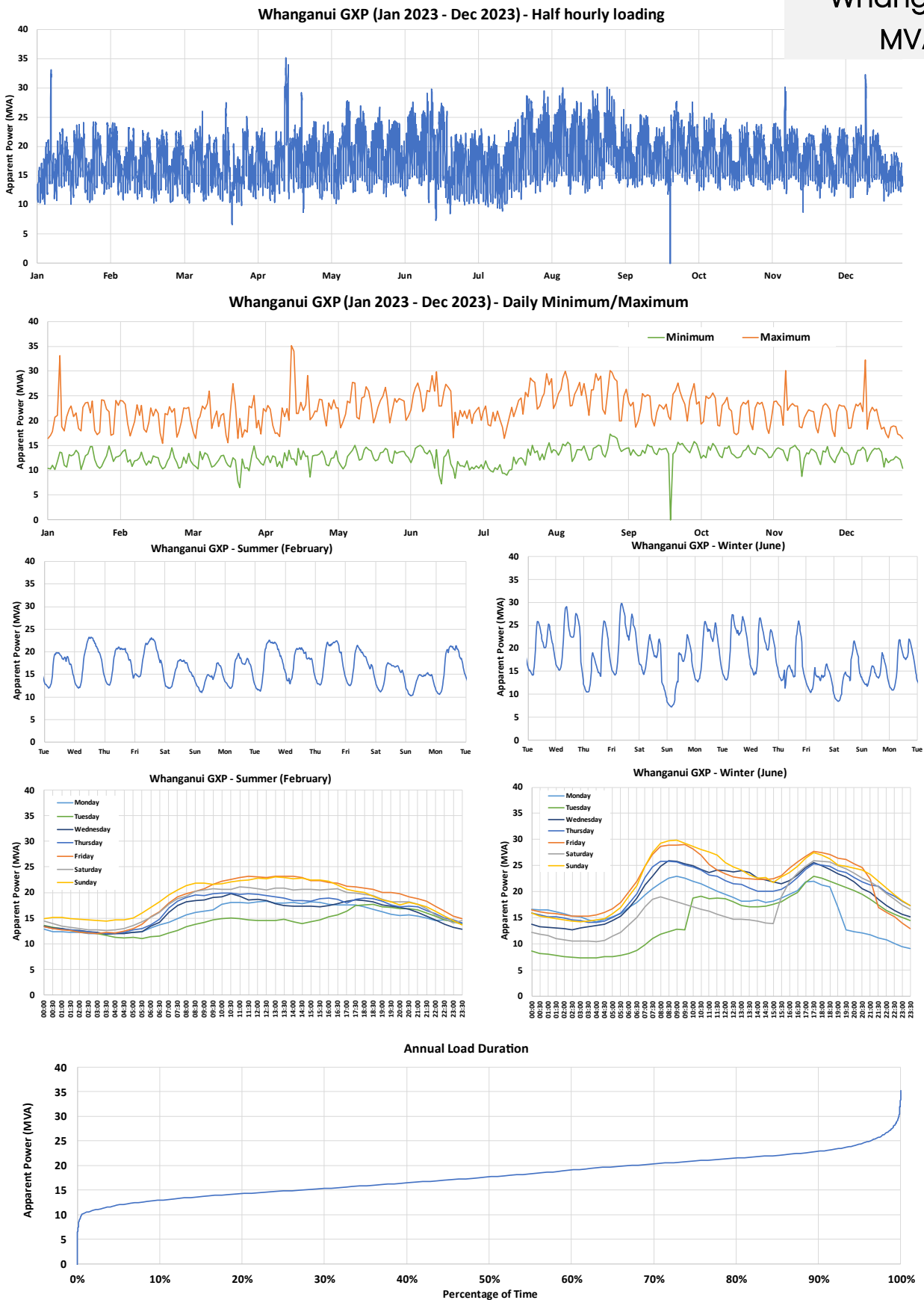


Figure 27. Whanganui: Apparent power (MVA) load characteristics.

Whanganui MVar

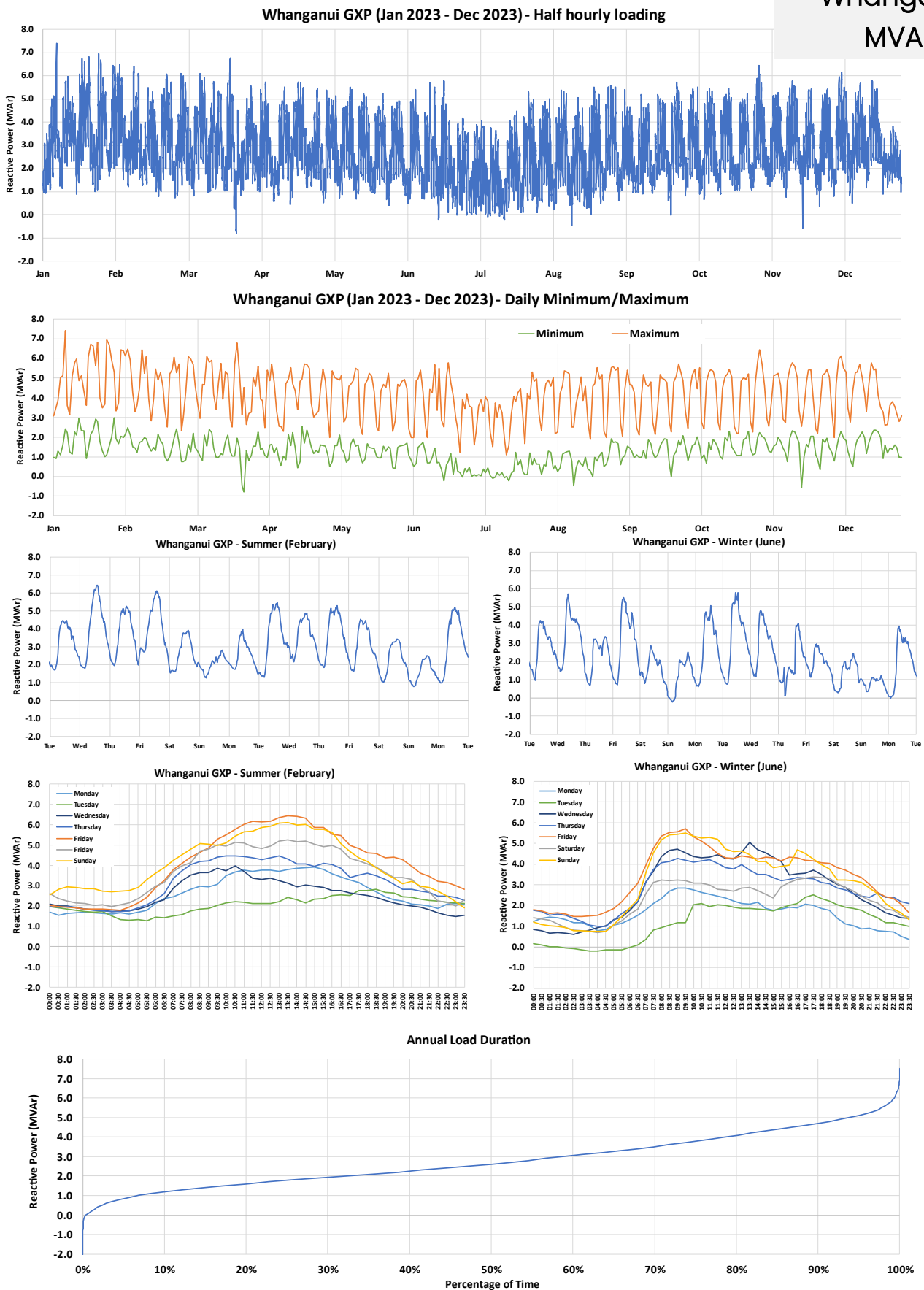


Figure 28. Whanganui: Reactive power (MVar) load characteristics.

Woodville MVA

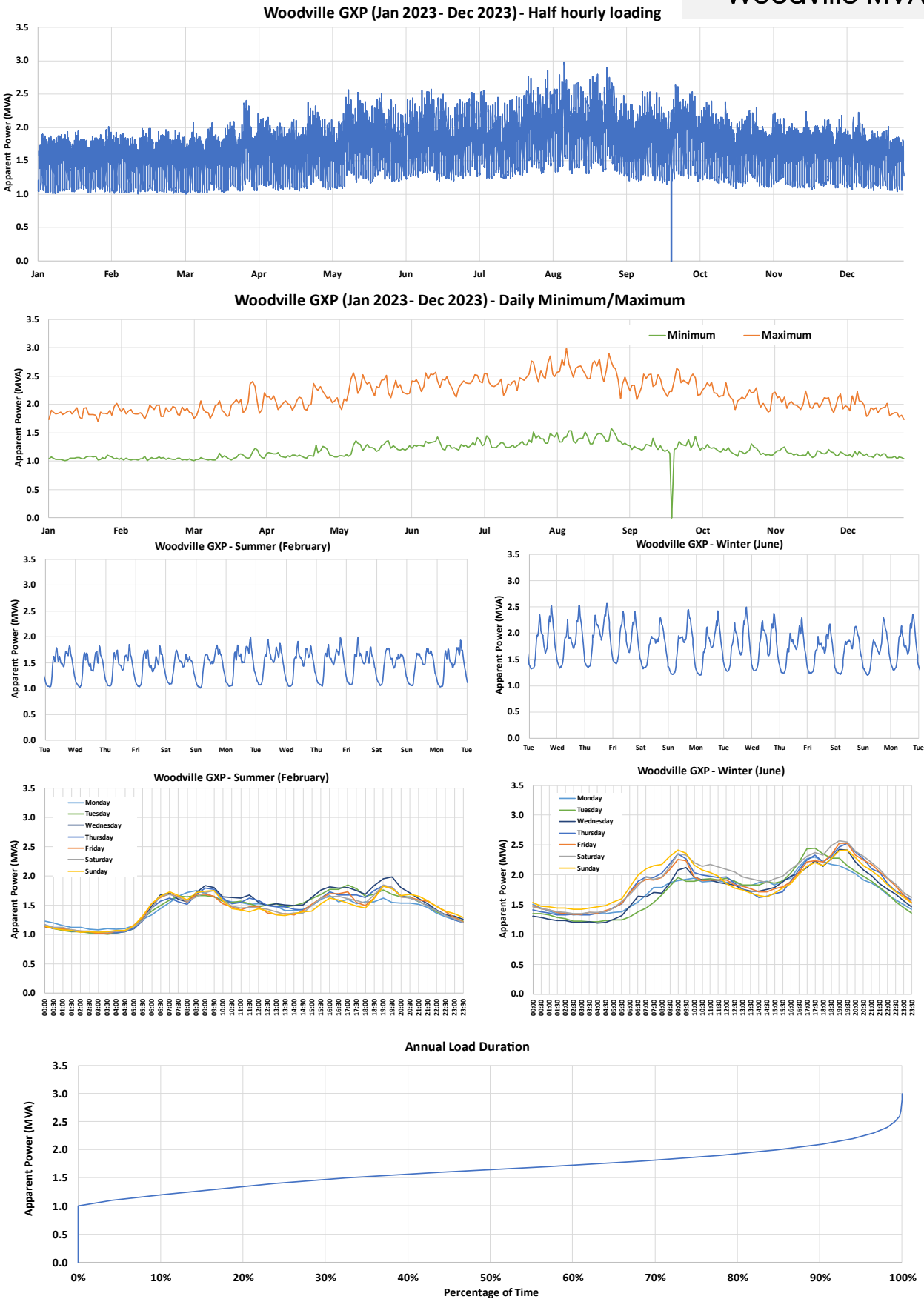


Figure 29. Woodville: Apparent power (MVA) load characteristics.

Woodville MVar

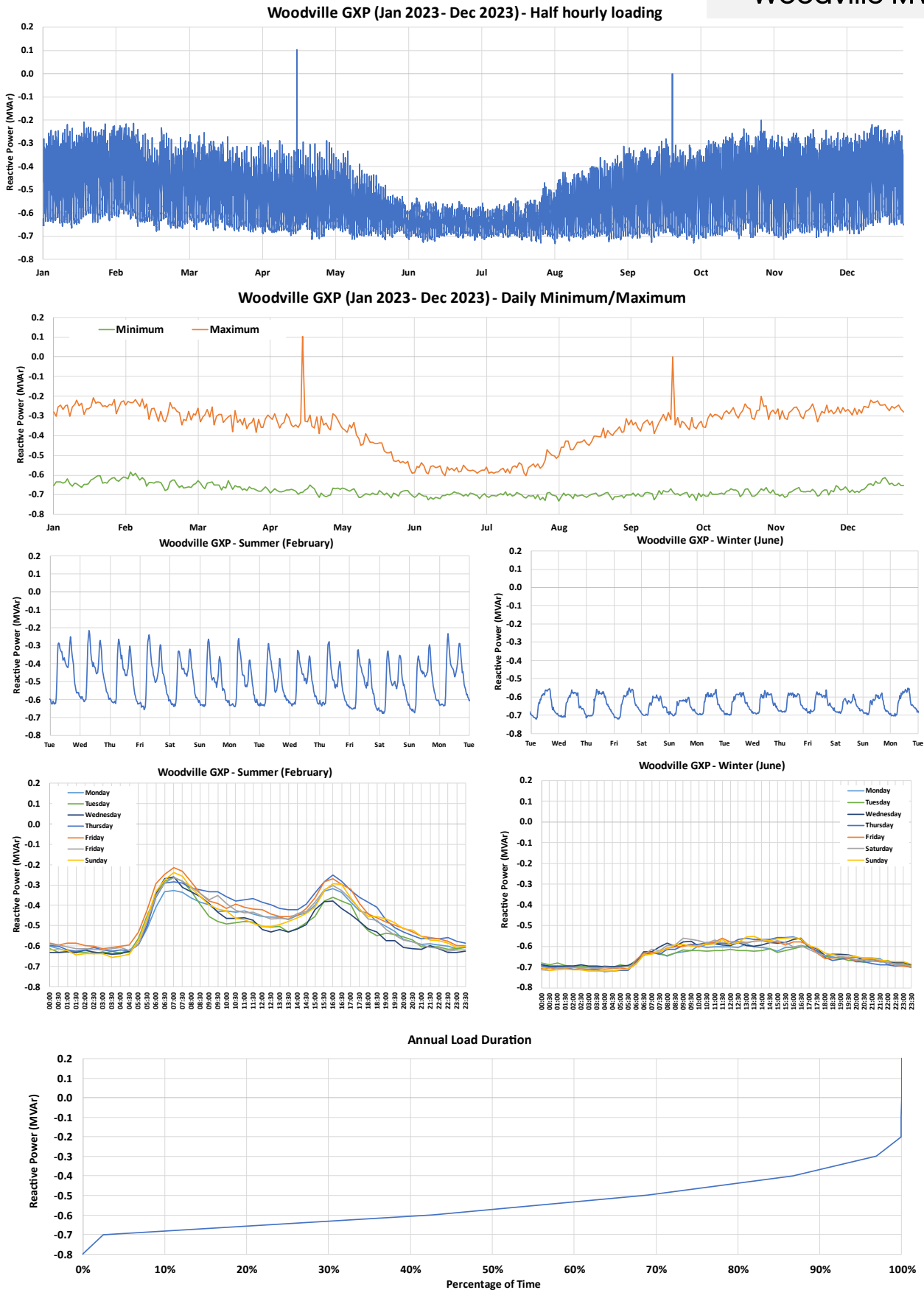


Figure 30. Woodville: Reactive power (MVar) load characteristics.

3. Zone Substations

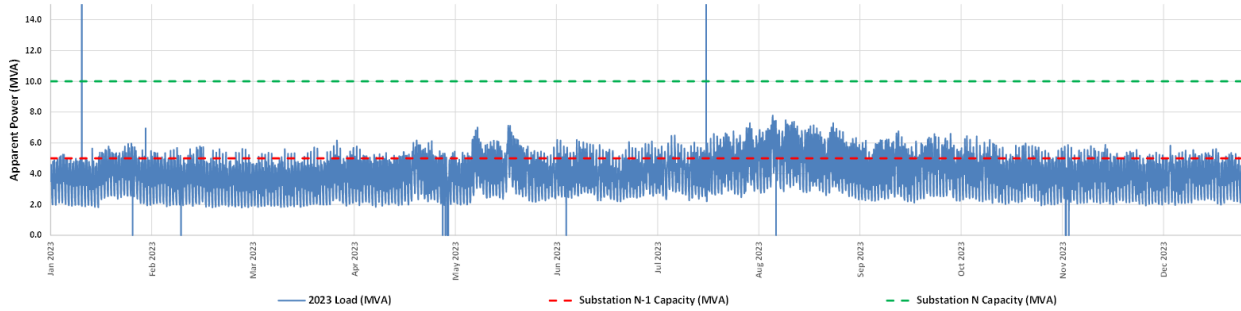
3.1 Electra

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

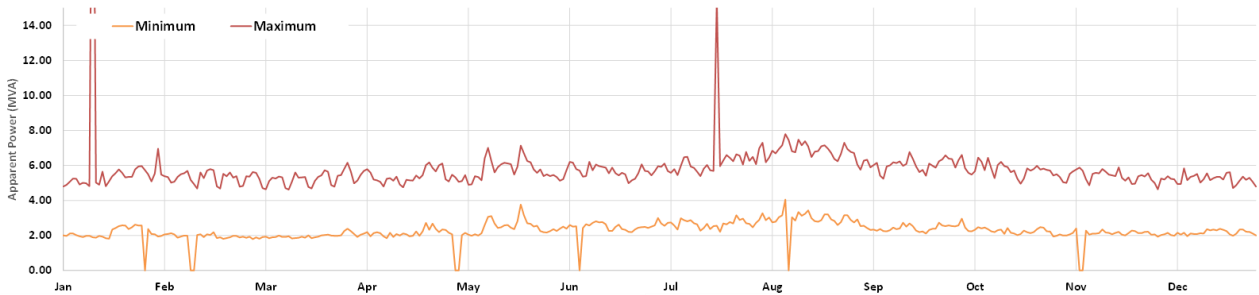
- Figure 31. Shannon 33/11 kV zone substation: Apparent power (MVA) load characteristics.
- Figure 32. Foxton 33/11 kV zone substation: Apparent power (MVA) load characteristics.
- Figure 33. Levin West 33/11 kV zone substation: Apparent power (MVA) load characteristics.
- Figure 34. Levin East 33/11 kV zone substation: Apparent power (MVA) load characteristics.

Shannon MVA

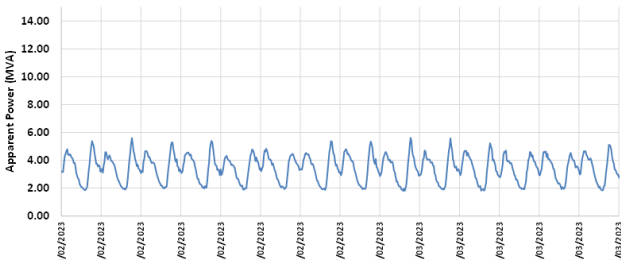
Shannon Zone Substation (2023 year) - Half hourly loading



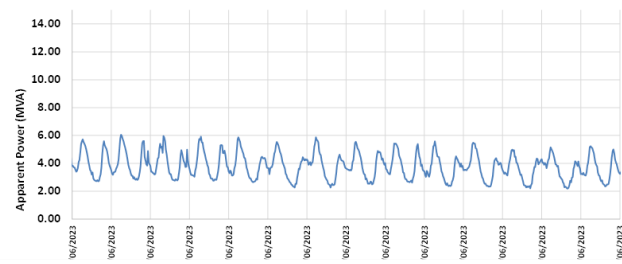
Shannon Zone Substation (2023 year) - Daily Maximum/Minimum



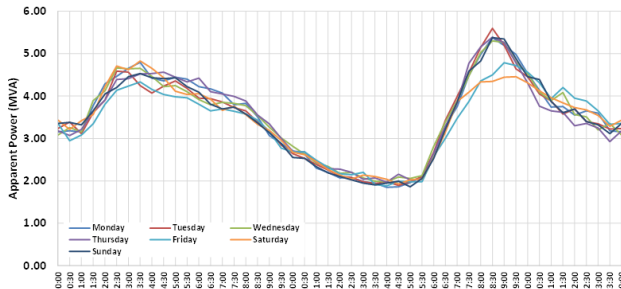
Shannon Zone Substation (2023 year) - Summer (February)



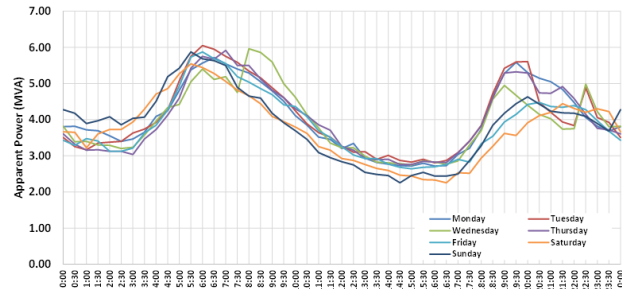
Shannon Zone Substation (2023 year) - Winter (June)



Shannon Zone Substation (2023 year) - Summer (February)



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



Shannon Zone Substation (2023 year) - Load Duration Curve

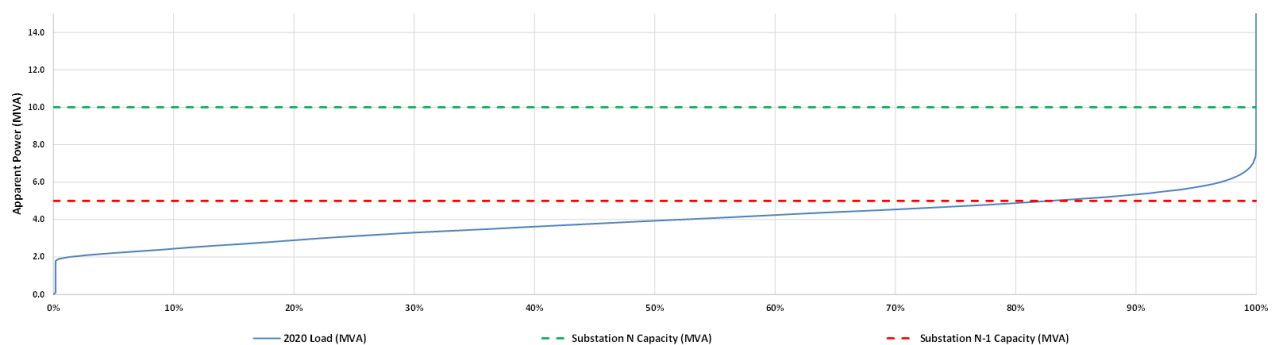
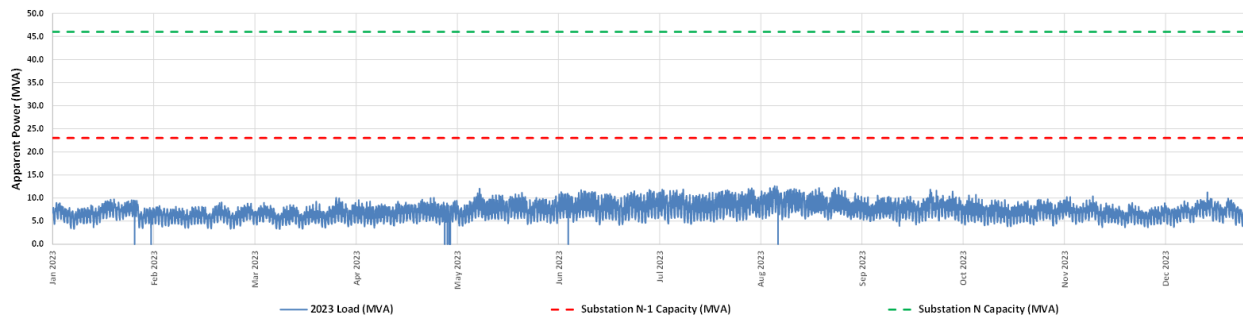


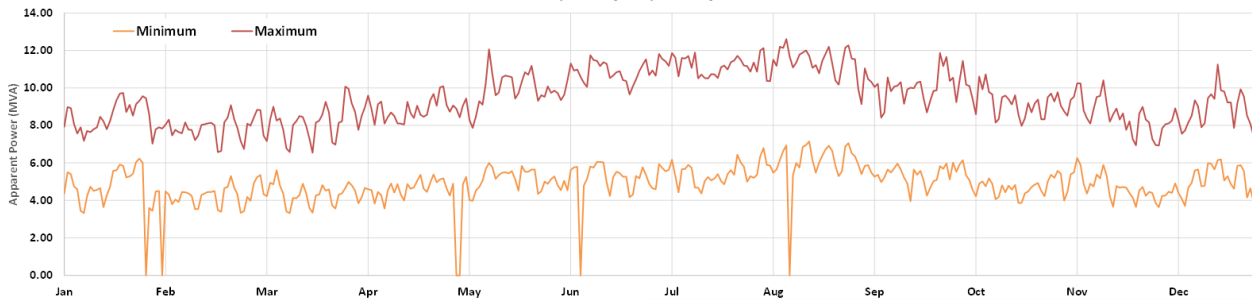
Figure 31. Shannon 33/11 kV zone substation: Apparent power (MVA) load characteristics.

Foxton MVA

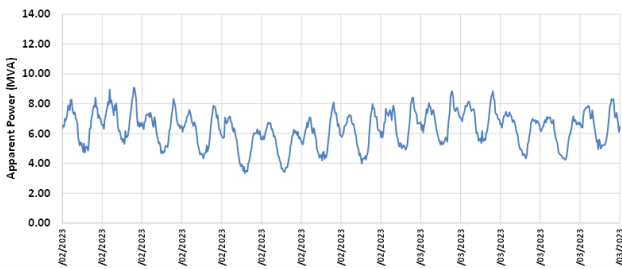
Foxton Zone Substation (2023 year) - Half hourly loading



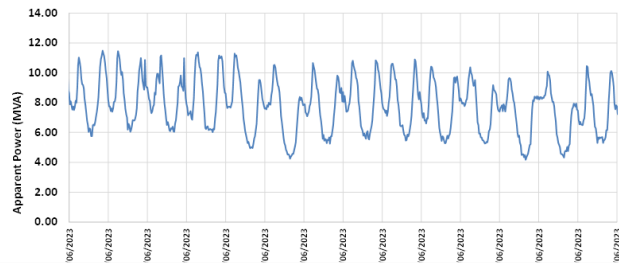
Foxton Zone Substation (2023 year) - Daily Maximum/Minimum



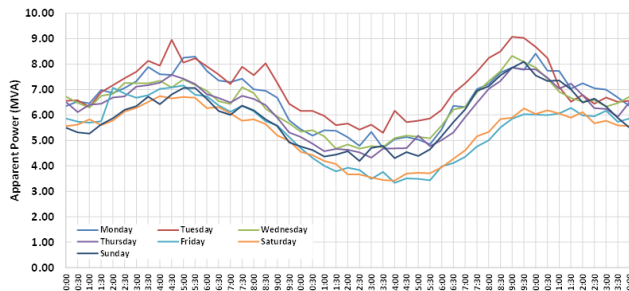
Foxton Zone Substation (2023 year) - Summer (February)



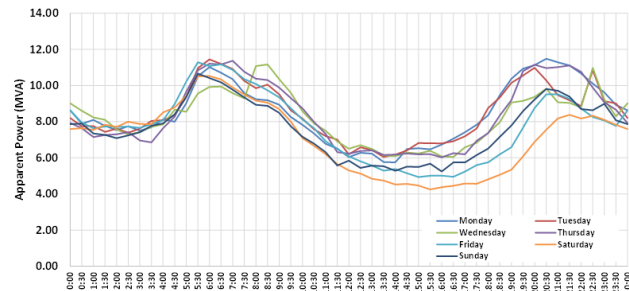
Foxton Zone Substation (2023 year) - Winter (June)



Foxton Zone Substation (2023 year) - Summer (February)



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



Foxton Zone Substation (2023 year) - Load Duration Curve

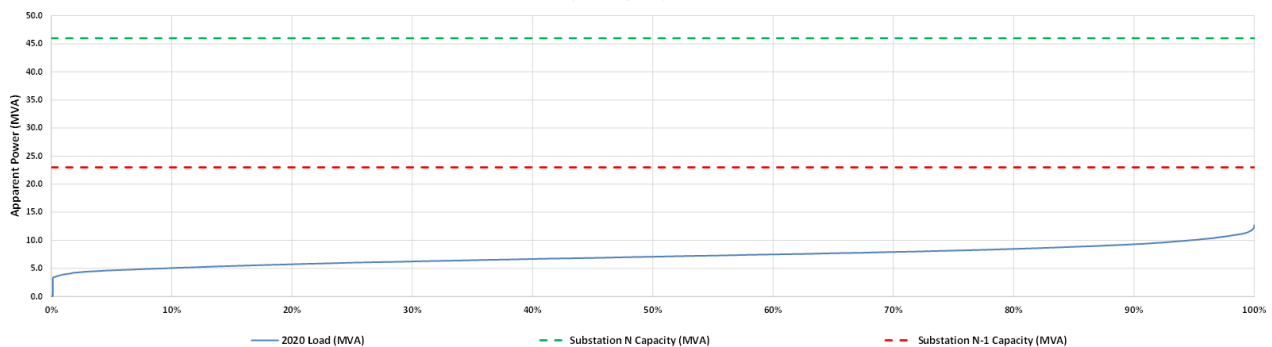
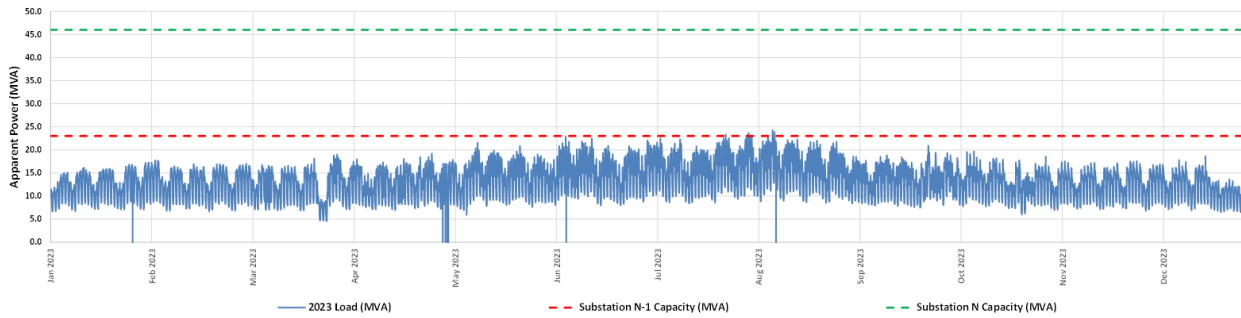


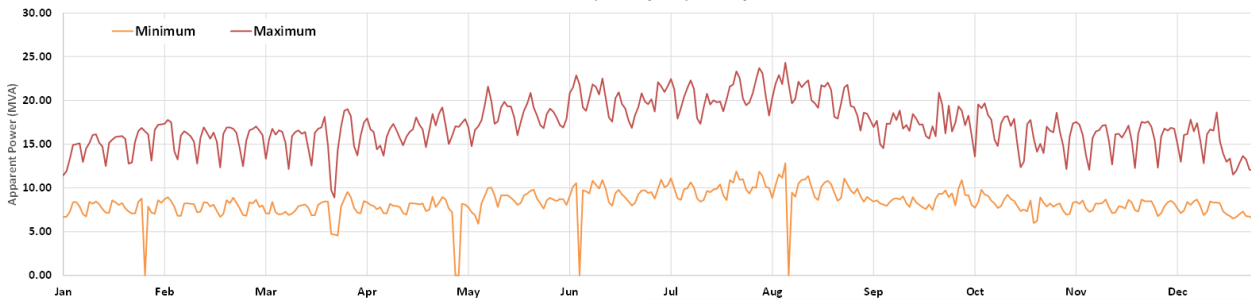
Figure 32. Foxton 33/11 kV zone substation: Apparent power (MVA) load characteristics.

Levin West MVA

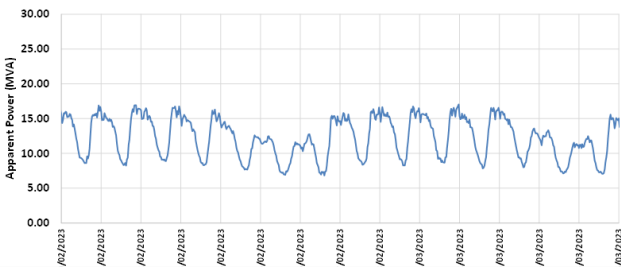
Levin West Zone Substation (2023 year) - Half hourly loading



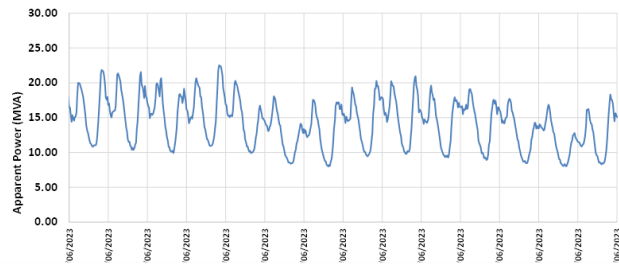
Levin West Zone Substation (2023 year) - Daily Maximum/Minimum



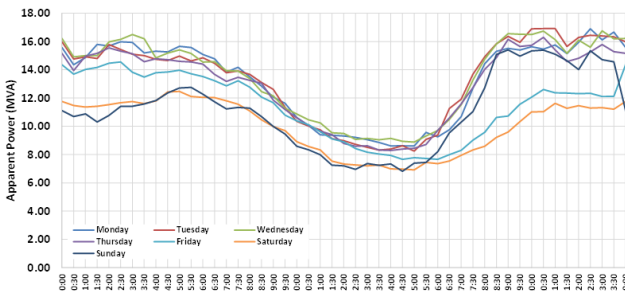
Levin West Zone Substation (2023 year) - Summer (February)



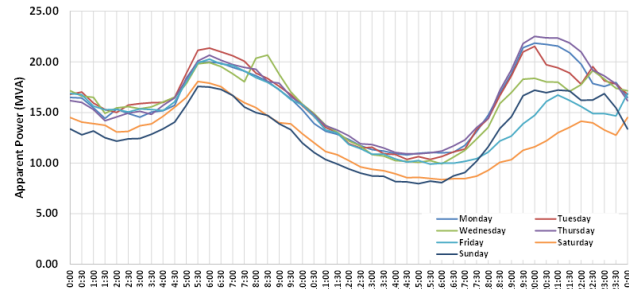
Levin West Zone Substation (2023 year) - Winter (June)



Levin West Zone Substation (2023 year) - Summer (February)



Levin West Zone Substation (2023 year) - Winter (June)



Levin West Zone Substation (2023 year) - Load Duration Curve

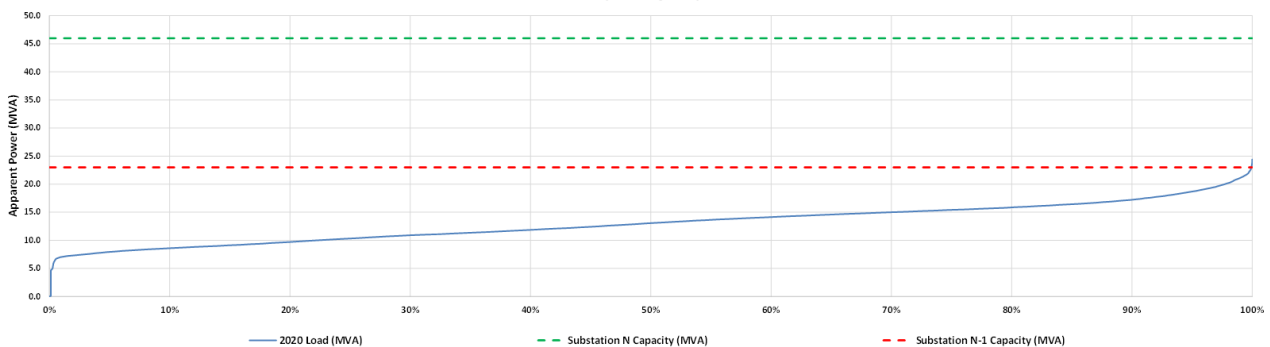
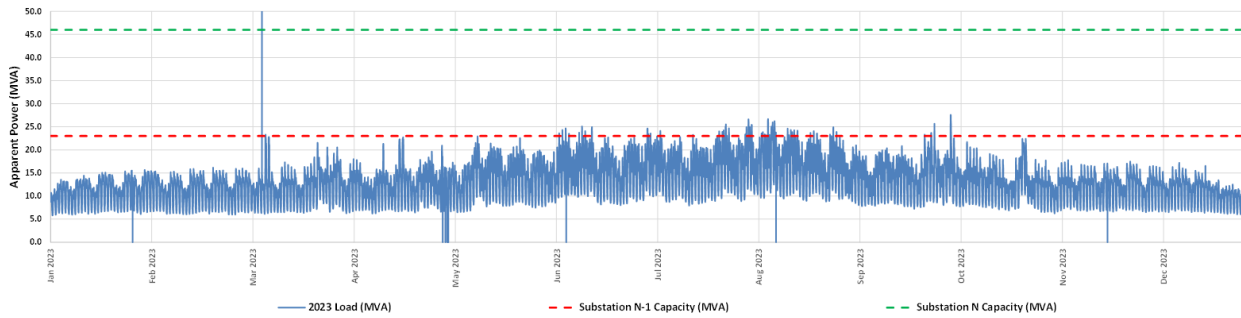


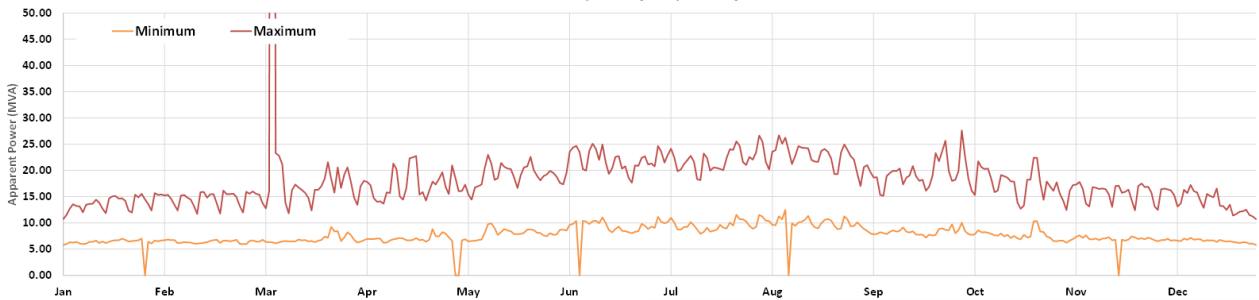
Figure 33. Levin West 33/11 kV zone substation: Apparent power (MVA) load characteristics.

Levin East MVA

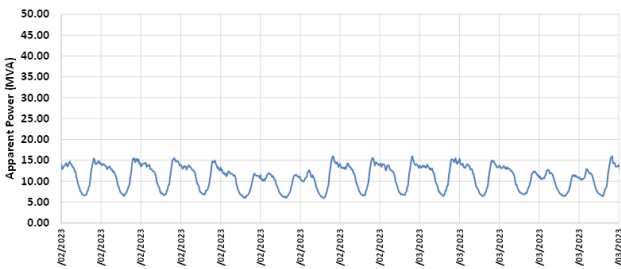
Levin East Zone Substation (2023 year) - Half hourly loading



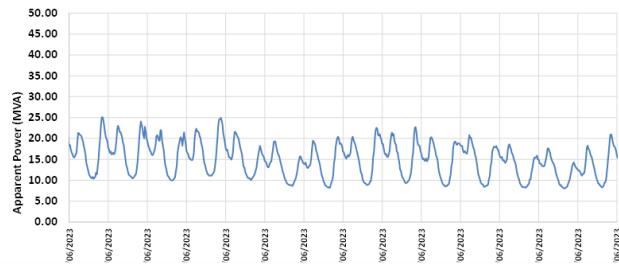
Levin East Zone Substation (2023 year) - Daily Maximum/Minimum



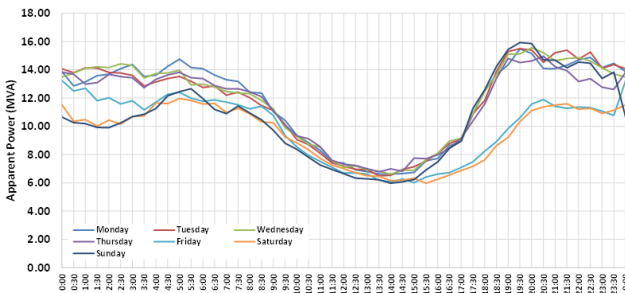
Levin East Zone Substation (2023 year) - Summer (February)



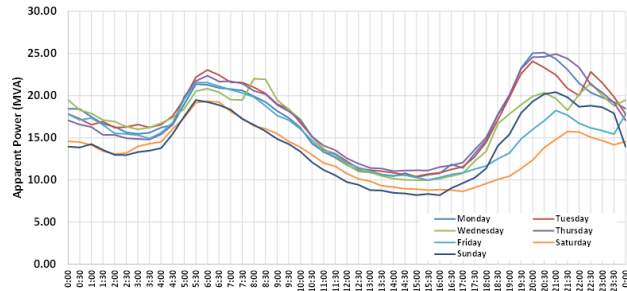
Levin East Zone Substation (2023 year) - Winter (June)



Levin East Zone Substation (2023 year) - Summer (February)



Levin East Zone Substation (2023 year) - Winter (June)



Levin East Zone Substation (2023 year) - Load Duration Curve

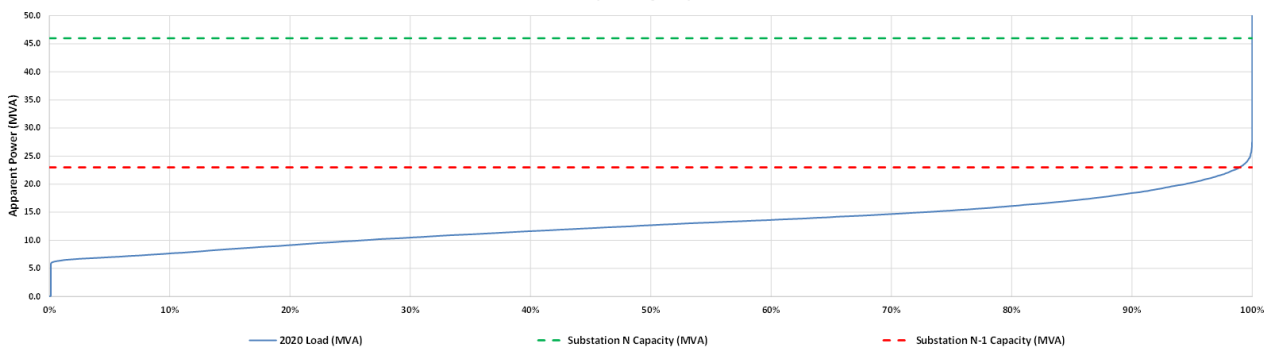


Figure 34. Levin East 33/11 kV zone substation: Apparent power (MVA) load characteristics.

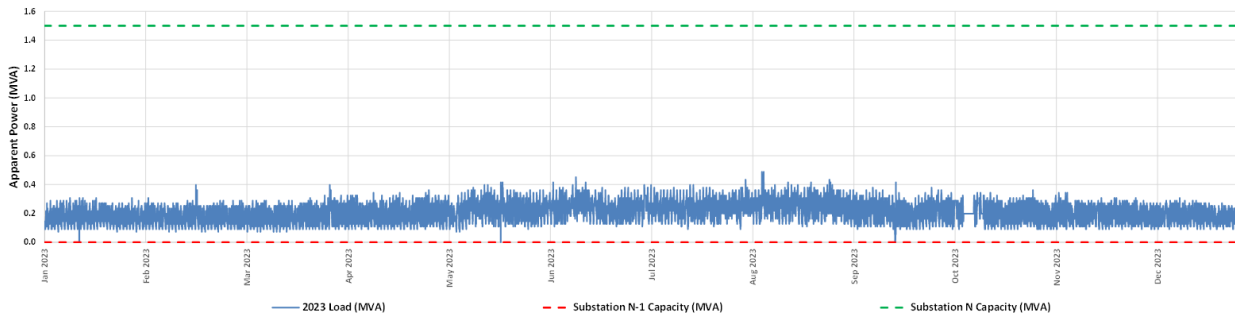
3.2 The Lines Company

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

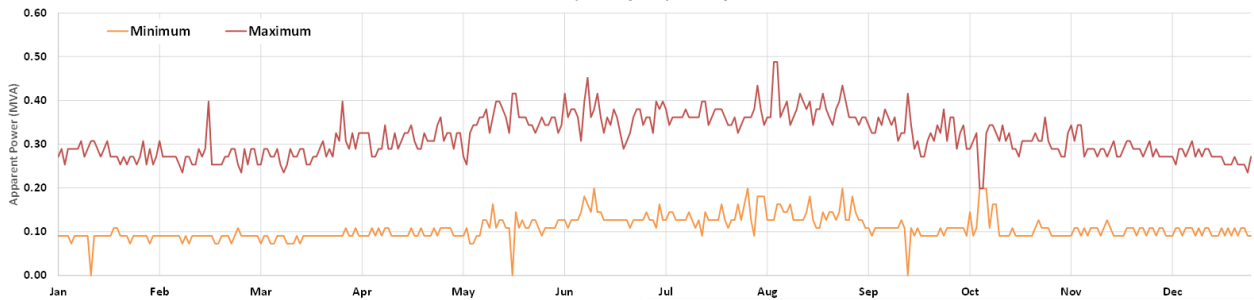
- Figure 35. Nihoniho 33/11 kV zone substation: Apparent power (MVA) load characteristics.
- Figure 36. Borough 33/11 kV zone substation: Apparent power (MVA) load characteristics.
- Figure 37. Mananui 33/11 kV zone substation: Apparent power (MVA) load characteristics.
- Figure 38. Kuratau 33/11 kV zone substation: Apparent power (MVA) load characteristics.
- Figure 39. Turangi 33/11 kV zone substation: Apparent power (MVA) load characteristics.
- Figure 40. Otukou 33/11 kV zone substation: Apparent power (MVA) load characteristics.
- Figure 41. Tawhai 33/11 kV zone substation: Apparent power (MVA) load characteristics.
- Figure 42. National Park 33/11 kV zone substation: Apparent power (MVA) load characteristics.
- Figure 43. Awamate 33/11 kV zone substation: Apparent power (MVA) load characteristics.
- Figure 44. Tokaanu 33/11 kV zone substation: Apparent power (MVA) load characteristics.
- Figure 45. Waiotaka 33/11 kV zone substation: Apparent power (MVA) load characteristics.
- Figure 46. Kiko Rd 33/11 kV zone substation: Apparent power (MVA) load characteristics.

Nihoniho MVA

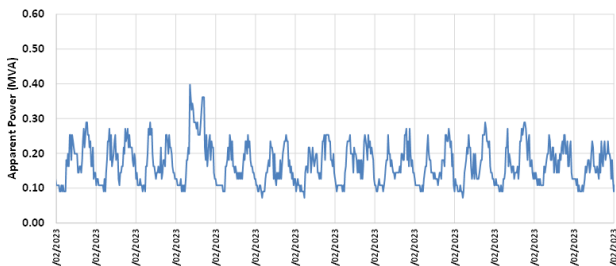
Nihoniho Zone Substation (2023 year) - Half hourly loading



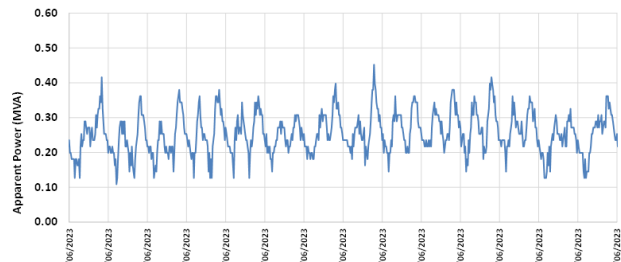
Nihoniho Zone Substation (2023 year) - Daily Maximum/Minimum



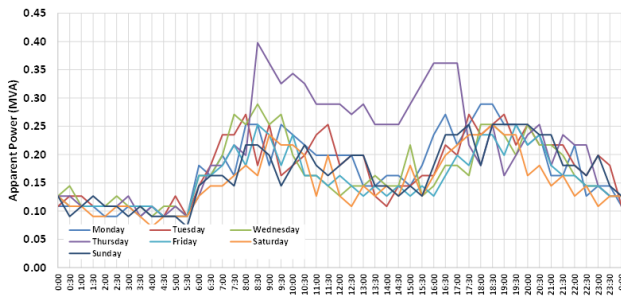
Nihoniho Zone Substation (2023 year) - Summer (February)



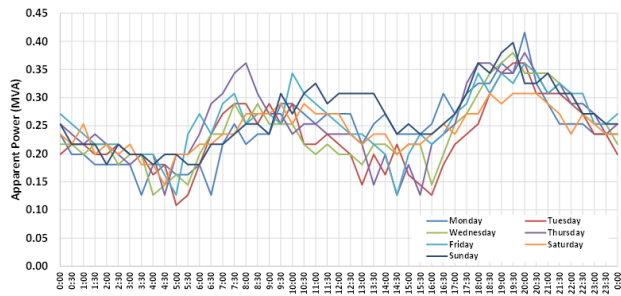
Nihoniho Zone Substation (2023 year) - Winter (June)



Nihoniho Zone Substation (2023 year) - Summer (February)



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



Nihoniho Zone Substation (2023 year) - Load Duration Curve

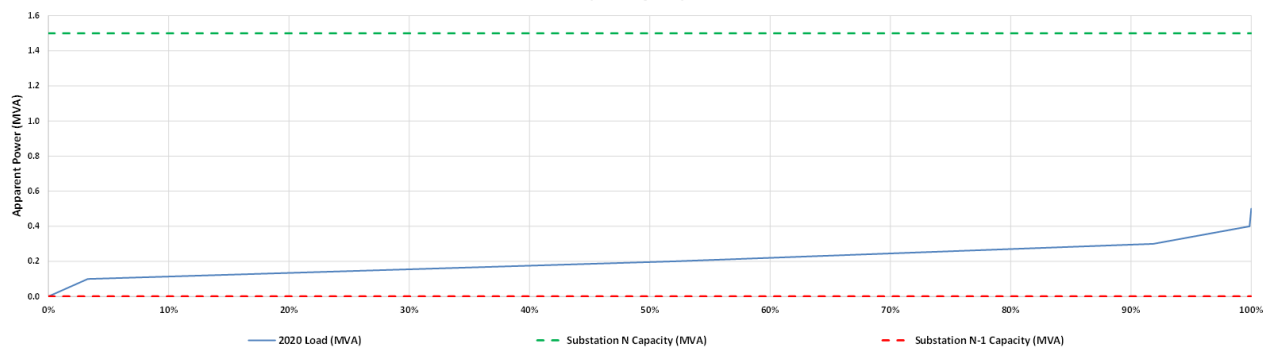
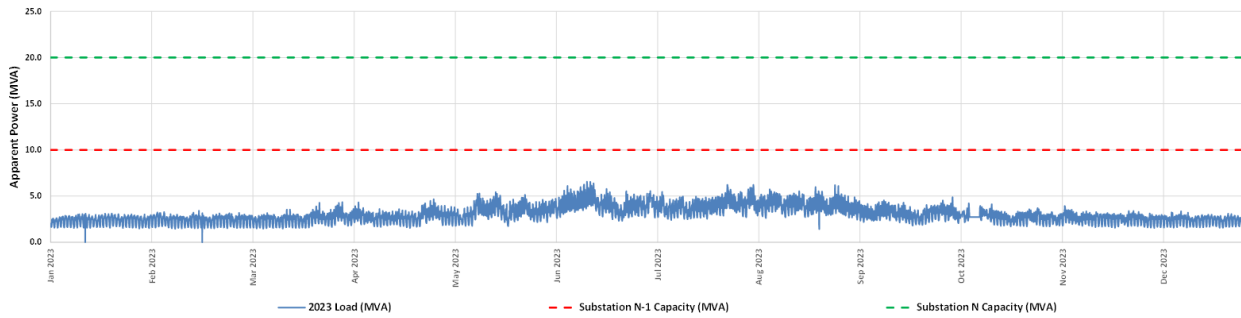


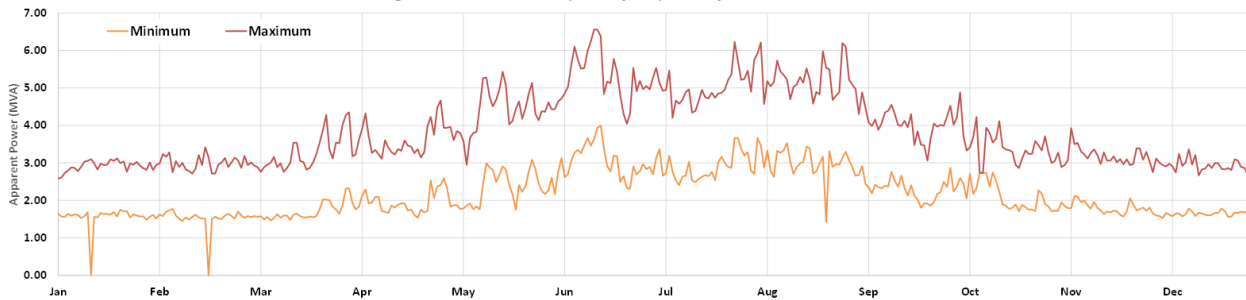
Figure 35. Nihoniho 33/11 kV zone substation: Apparent power (MVA) load characteristics.

Borough MVA

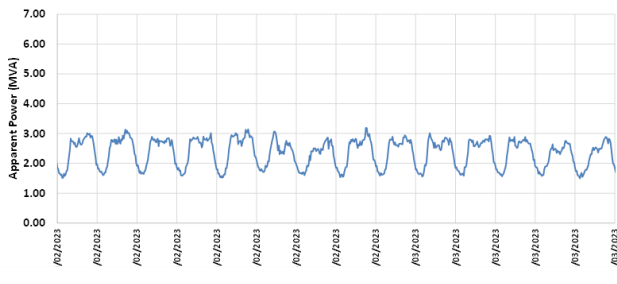
Borough Zone Substation (2023 year) - Half hourly loading



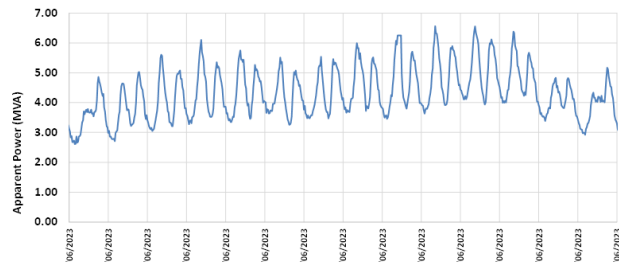
Borough Zone Substation (2023 year) - Daily Maximum/Minimum



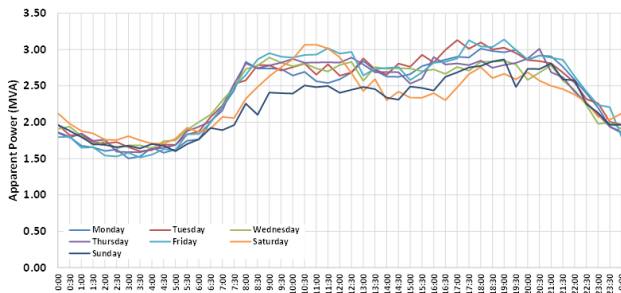
Borough Zone Substation (2023 year) - Summer (February)



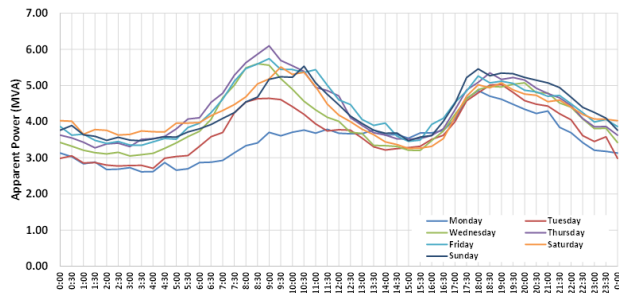
Borough Zone Substation (2023 year) - Winter (June)



Borough Zone Substation (2023 year) - Summer (February)



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



Borough Zone Substation (2023 year) - Load Duration Curve

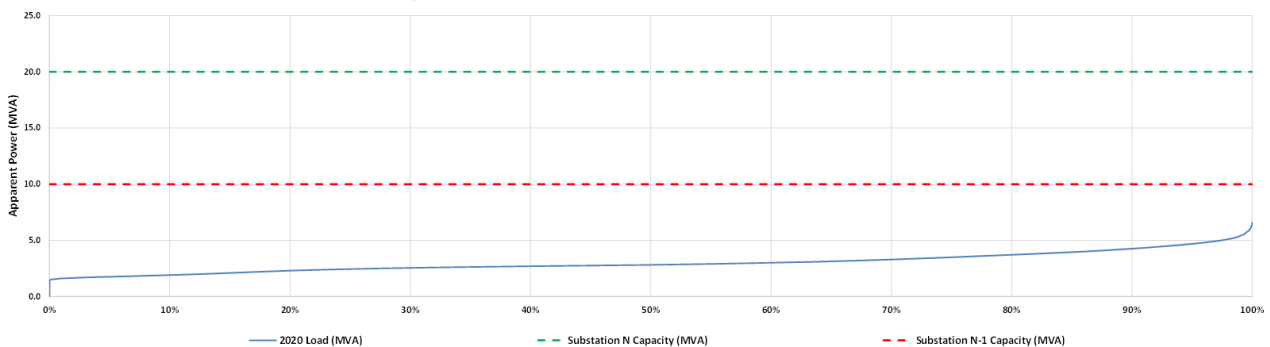
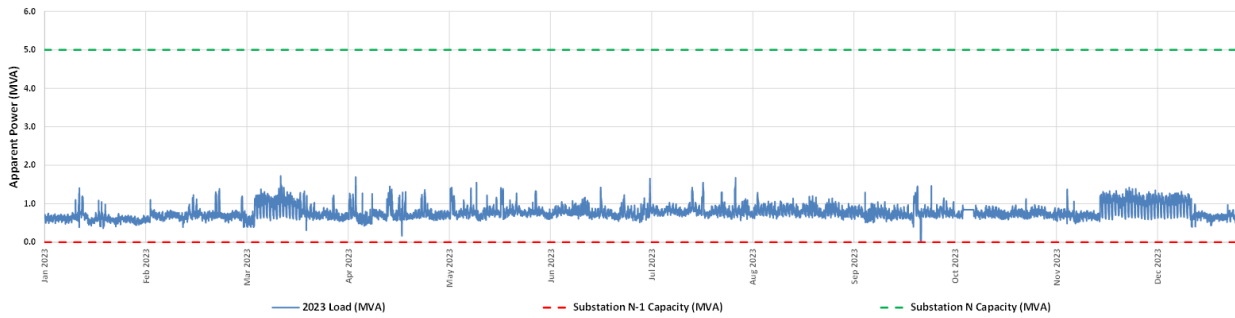


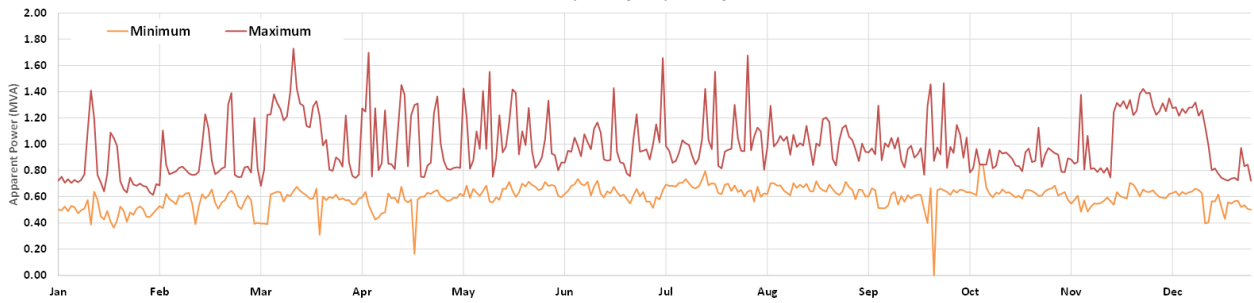
Figure 36. Borough 33/11 kv zone substation: Apparent power (MVA) load characteristics.

Mananui MVA

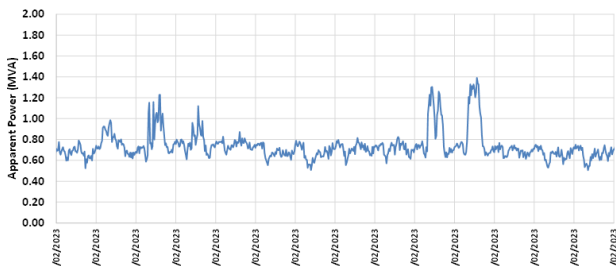
Manunui Zone Substation (2023 year) - Half hourly loading



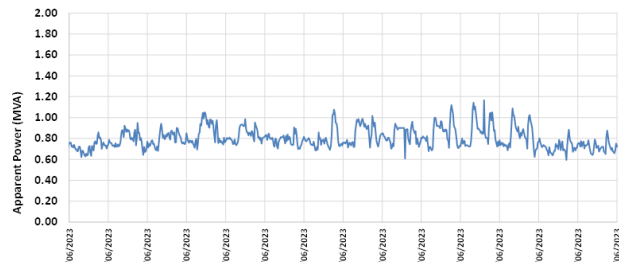
Manunui Zone Substation (2023 year) - Daily Maximum/Minimum



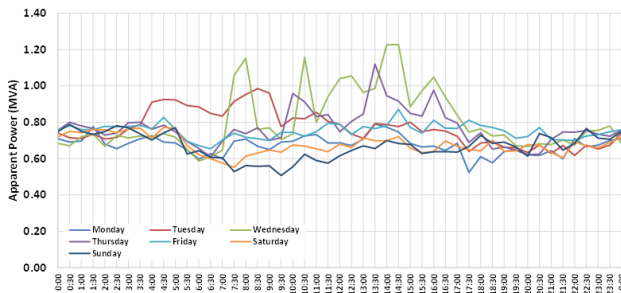
Manunui Zone Substation (2023 year) - Summer (February)



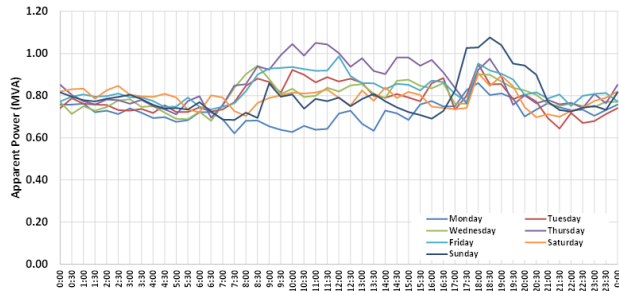
Manunui Zone Substation (2023 year) - Winter (June)



Manunui Zone Substation (2023 year) - Summer (February)



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



Manunui Zone Substation (2023 year) - Load Duration Curve

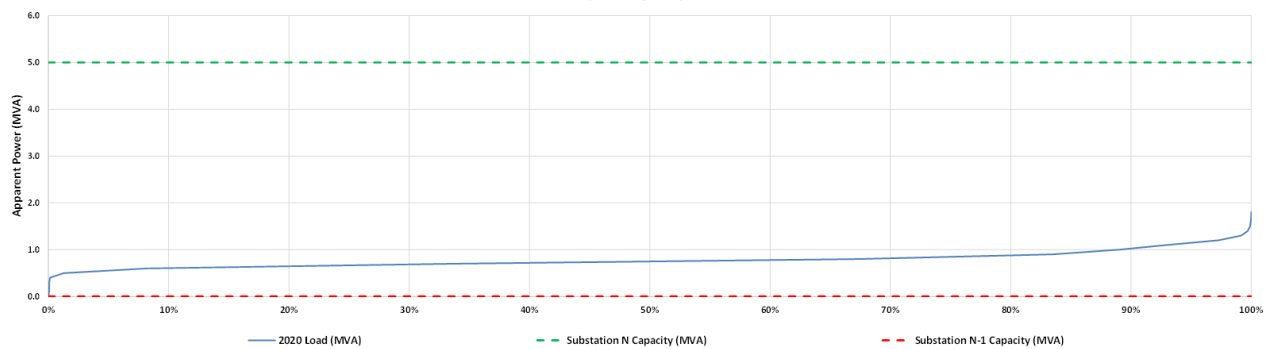
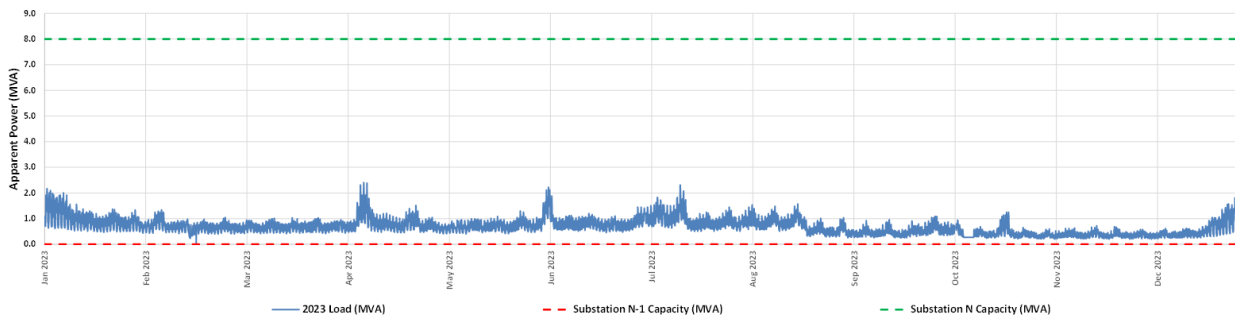


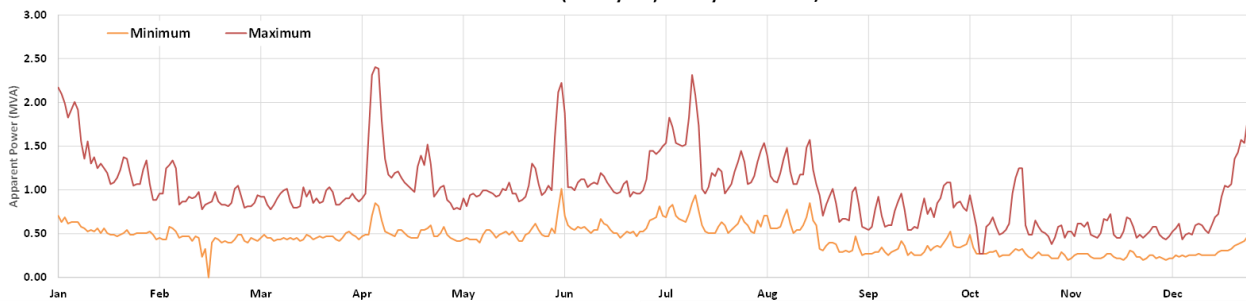
Figure 37. Mananui 33/11 kv zone substation: Apparent power (MVA) load characteristics.

Kuratau MVA

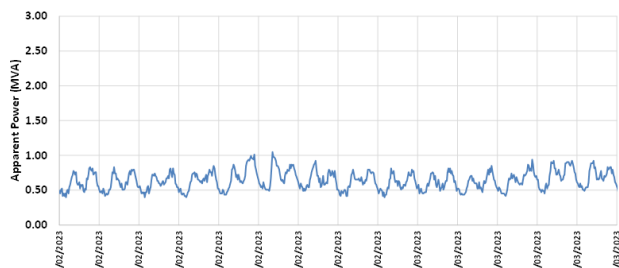
Kuratau Zone Substation (2023 year) - Half hourly loading



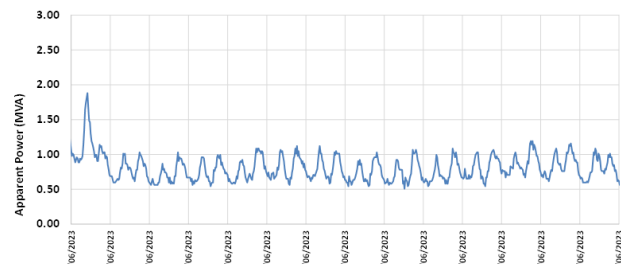
Kuratau Zone Substation (2023 year) - Daily Maximum/Minimum



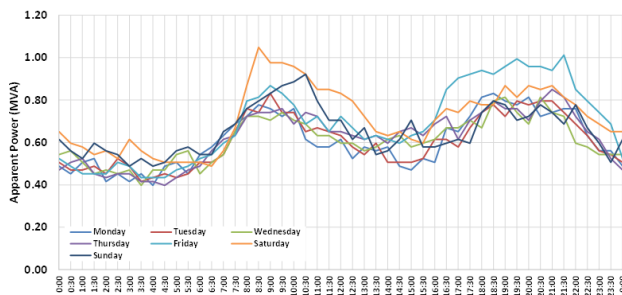
Kuratau Zone Substation (2023 year) - Summer (February)



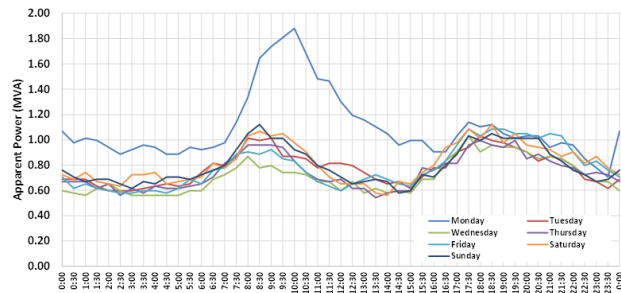
Kuratau Zone Substation (2023 year) - Winter (June)



Kuratau Zone Substation (2023 year) - Summer (February)



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



Kuratau Zone Substation (2023 year) - Load Duration Curve

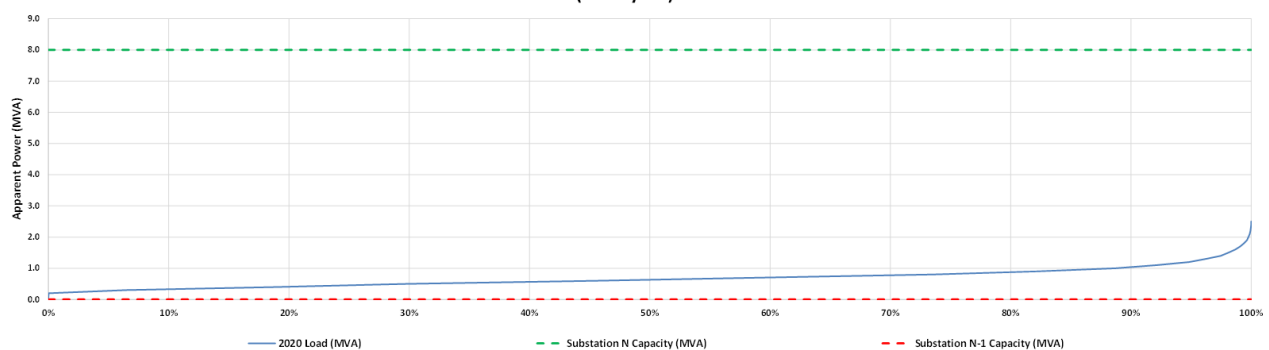
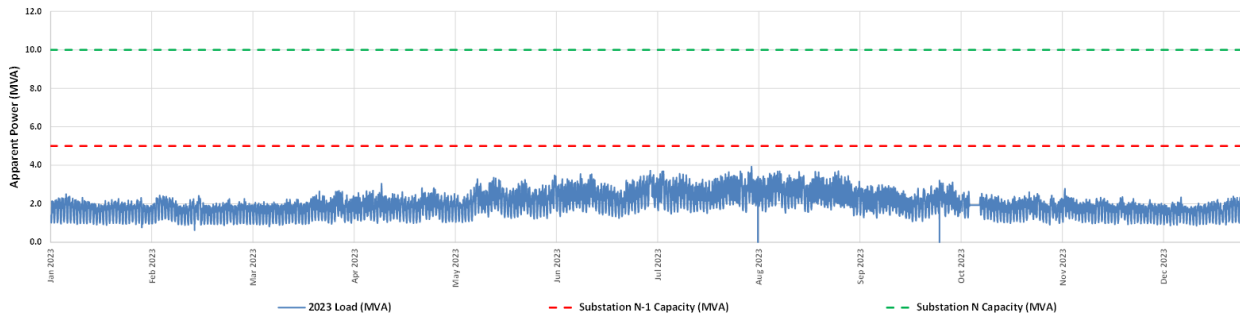


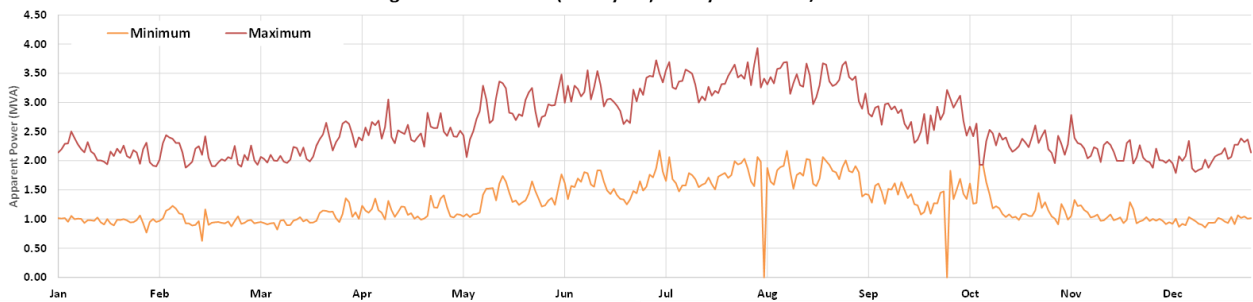
Figure 38. Kuratau 33/11 kV zone substation: Apparent power (MVA) load characteristics.

Turangi MVA

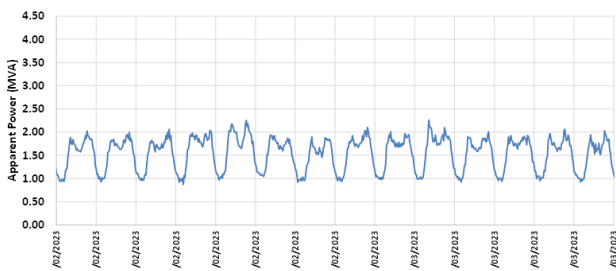
Turangi Zone Substation (2023 year) - Half hourly loading



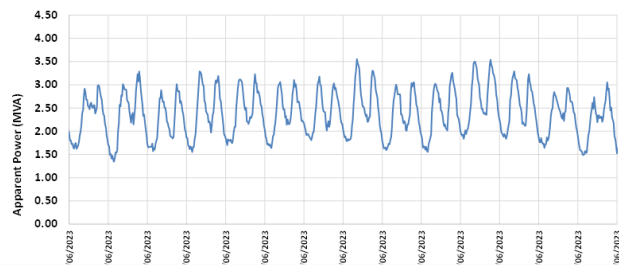
Turangi Zone Substation (2023 year) - Daily Maximum/Minimum



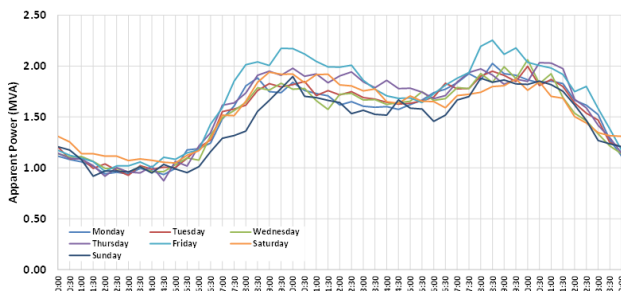
Turangi Zone Substation (2023 year) - Summer (February)



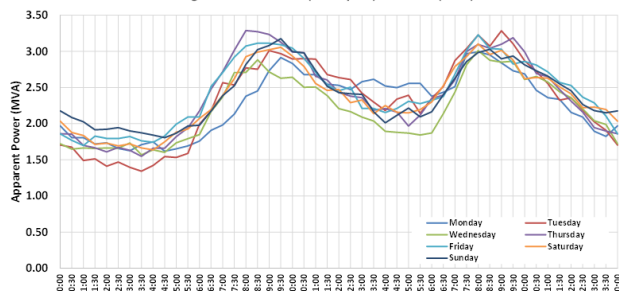
Turangi Zone Substation (2023 year) - Winter (June)



Turangi Zone Substation (2023 year) - Summer (February)



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



Turangi Zone Substation (2023 year) - Load Duration Curve

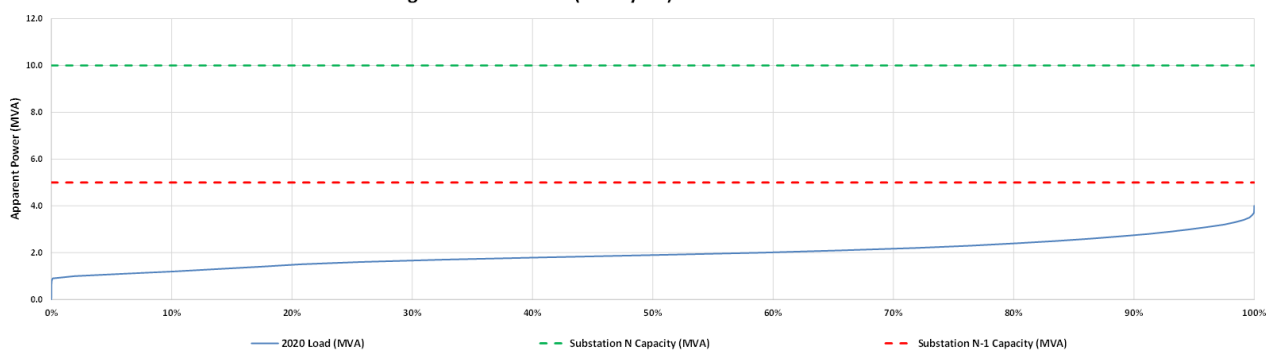
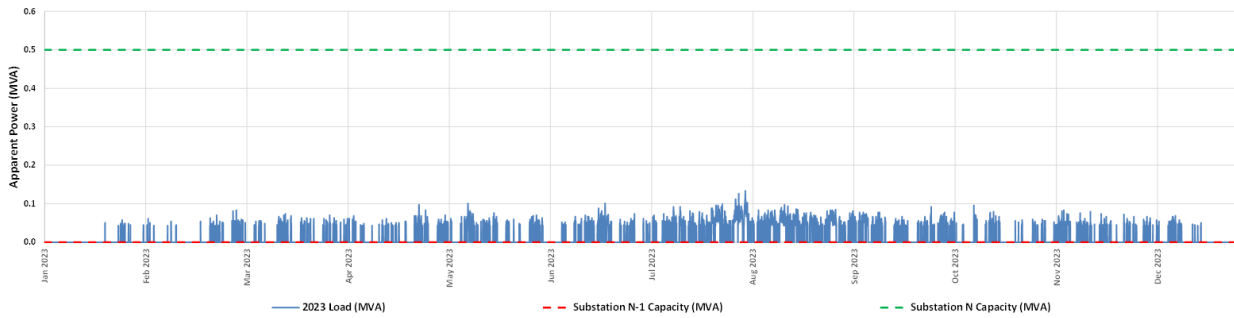


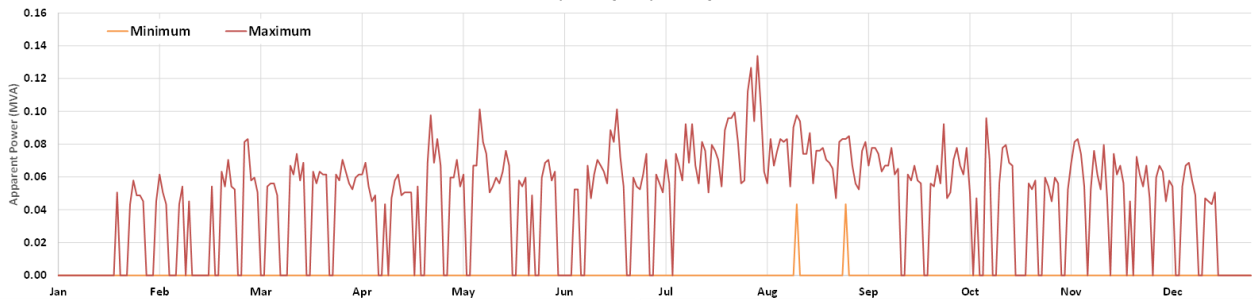
Figure 39. Turangi 33/11 kV zone substation: Apparent power (MVA) load characteristics.

Otukou MVA

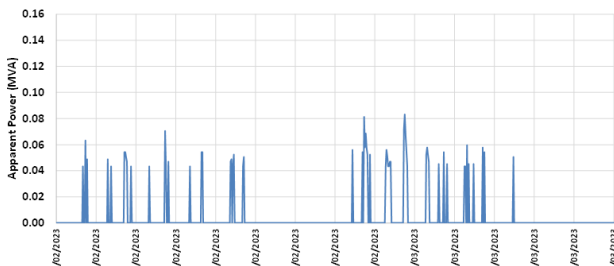
Otukou Zone Substation (2023 year) - Half hourly loading



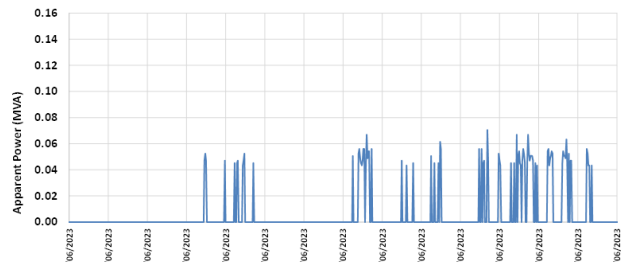
Otukou Zone Substation (2023 year) - Daily Maximum/Minimum



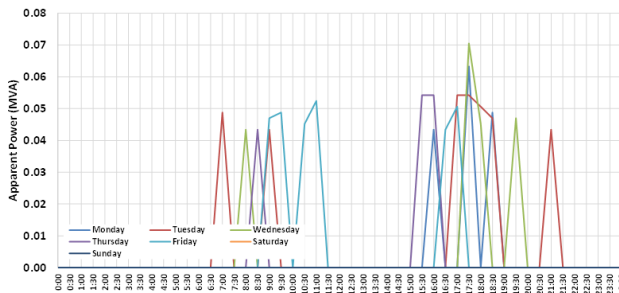
Otukou Zone Substation (2023 year) - Summer (February)



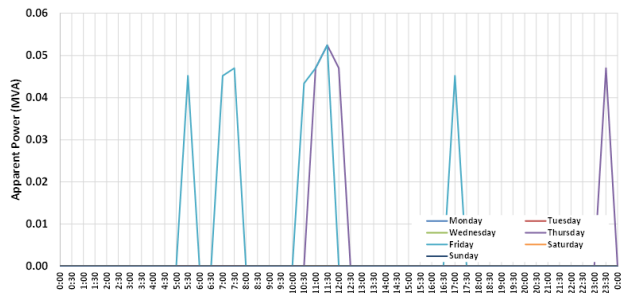
Otukou Zone Substation (2023 year) - Winter (June)



Otukou Zone Substation (2023 year) - Summer (February)



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



Otukou Zone Substation (2023 year) - Load Duration Curve

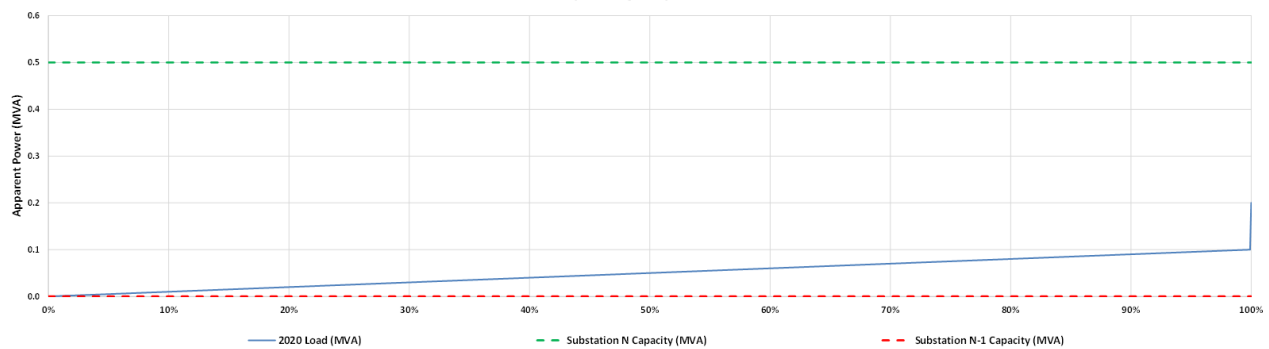
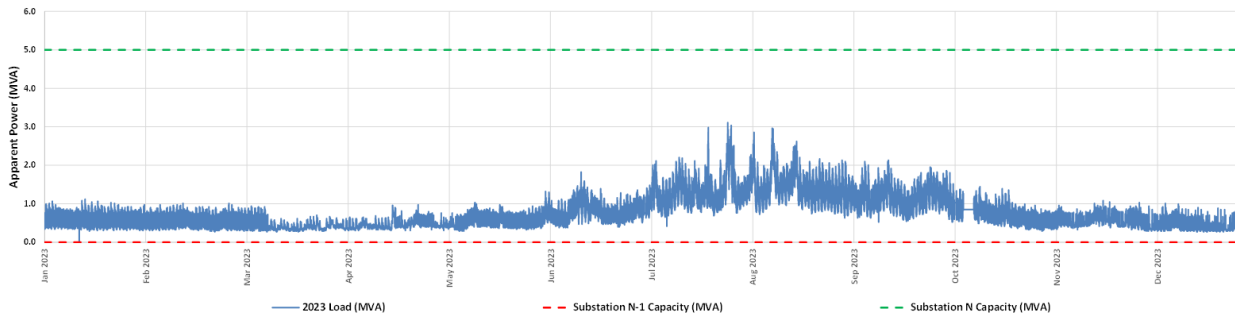


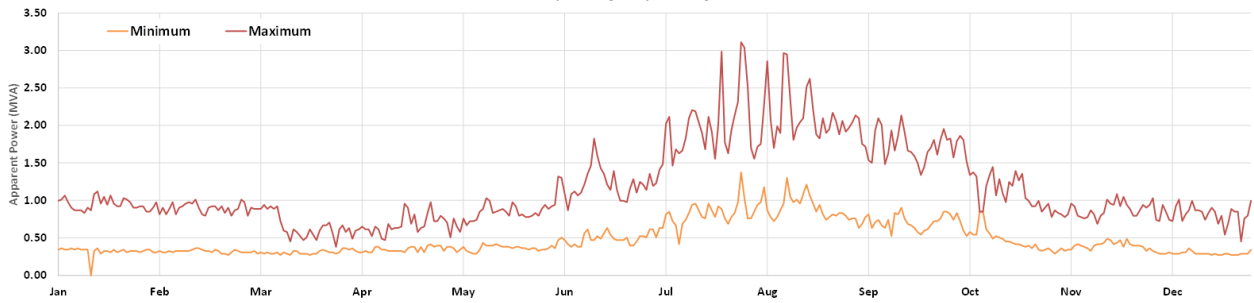
Figure 40. Otukou 33/11 kv zone substation: Apparent power (MVA) load characteristics.

Tawhai MVA

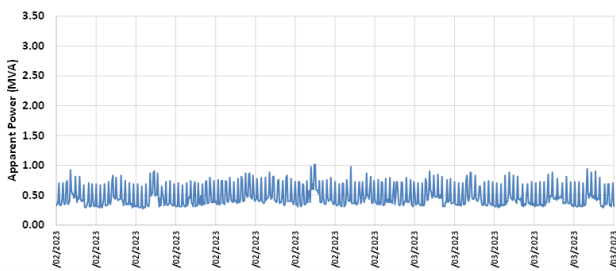
Tawhai Zone Substation (2023 year) - Half hourly loading



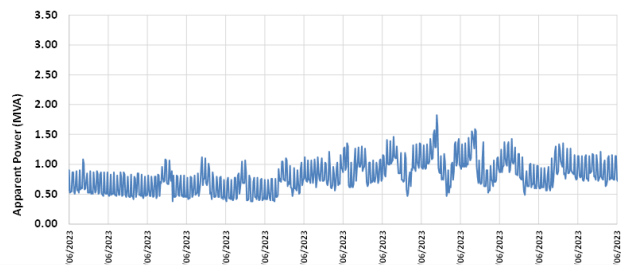
Tawhai Zone Substation (2023 year) - Daily Maximum/Minimum



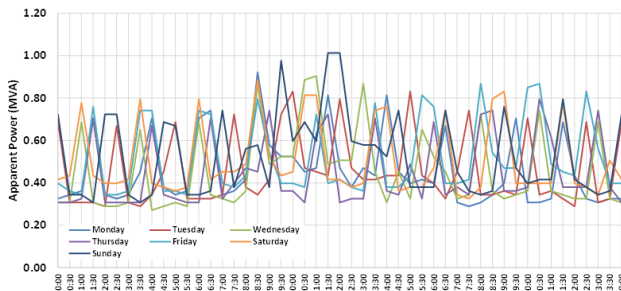
Tawhai Zone Substation (2023 year) - Summer (February)



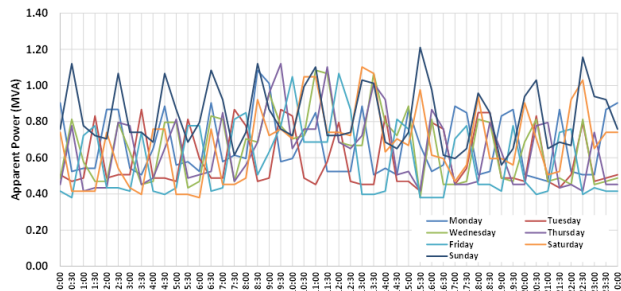
Tawhai Zone Substation (2023 year) - Winter (June)



Tawhai Zone Substation (2023 year) - Summer (February)



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



Tawhai Zone Substation (2023 year) - Load Duration Curve

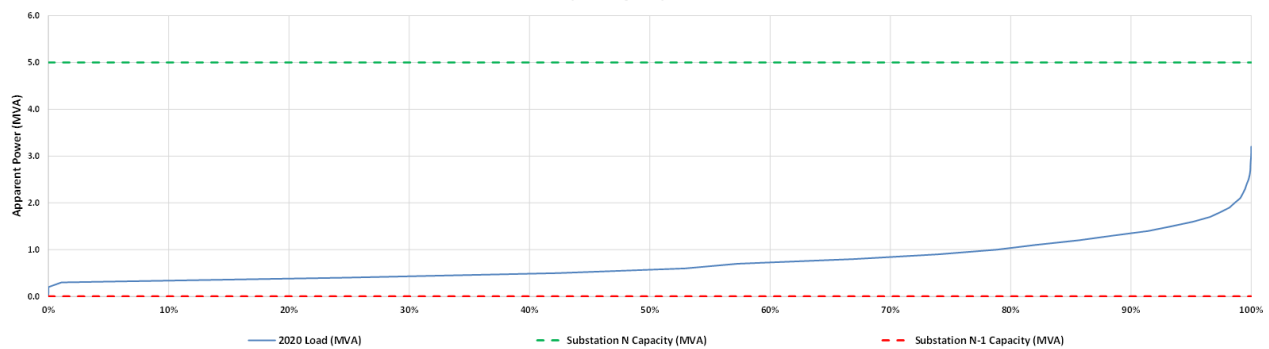
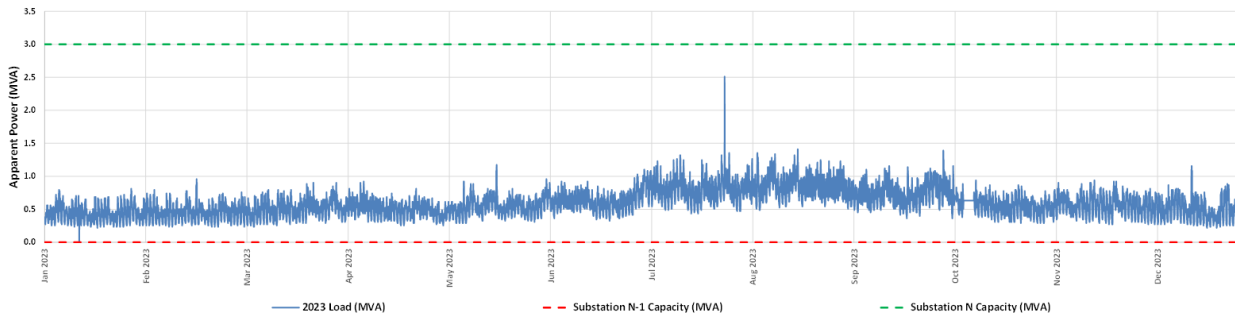


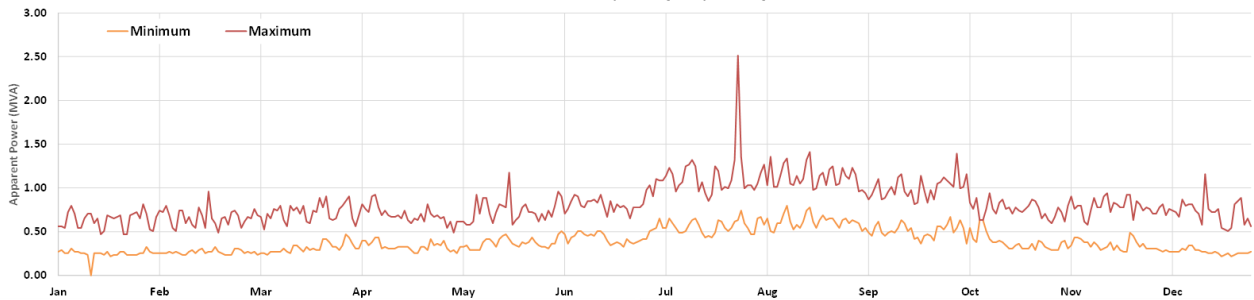
Figure 41. Tawhai 33/11 kV zone substation: Apparent power (MVA) load characteristics.

National Park MVA

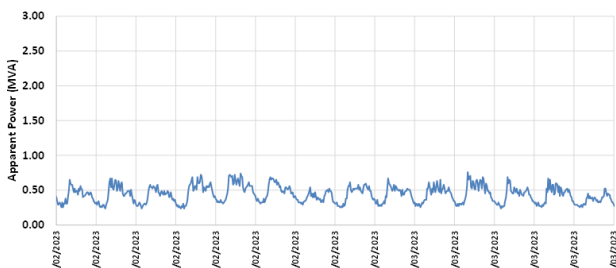
National Park Zone Substation (2023 year) - Half hourly loading



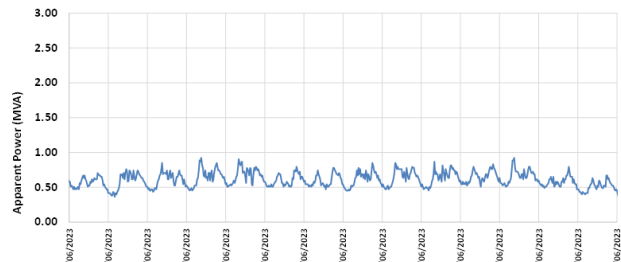
National Park Zone Substation (2023 year) - Daily Maximum/Minimum



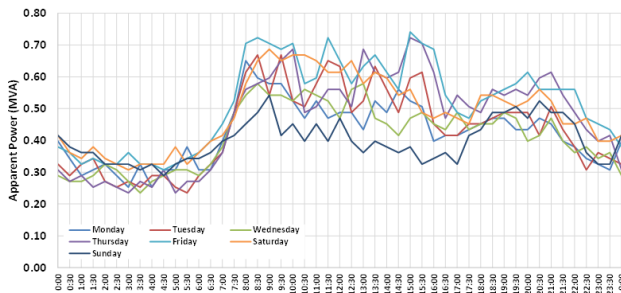
National Park Zone Substation (2023 year) - Summer (February)



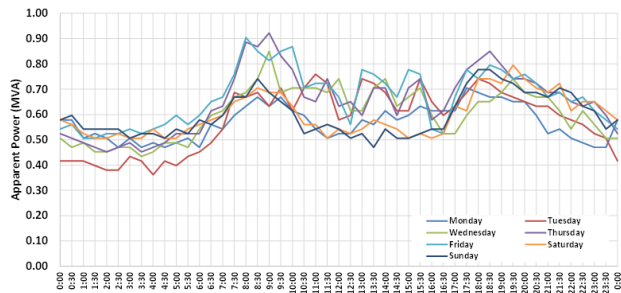
National Park Zone Substation (2023 year) - Winter (June)



National Park Zone Substation (2023 year) - Summer (February)



National Park Zone Substation (2023 year) - Winter (June)



National Park Zone Substation (2023 year) - Load Duration Curve

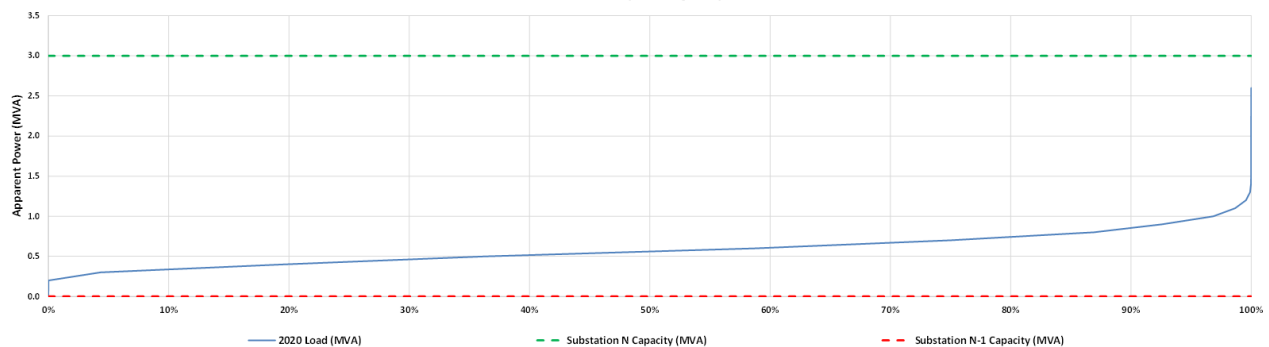
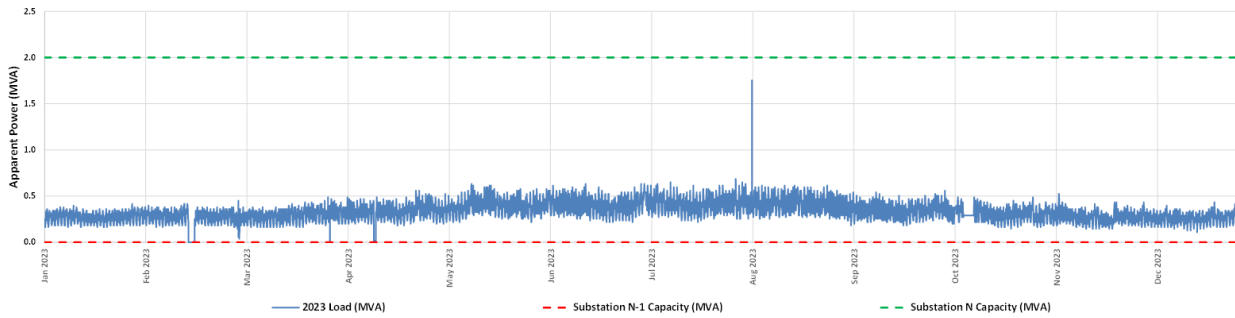


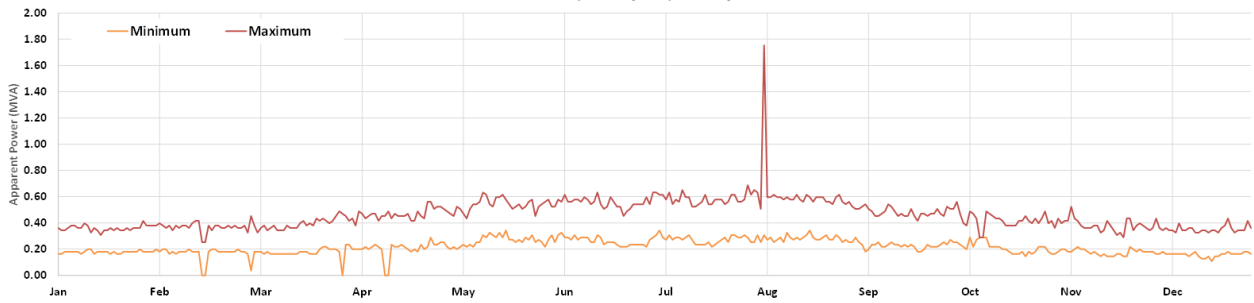
Figure 42. National Park 33/11 kV zone substation: Apparent power (MVA) load characteristics.

Awamate MVA

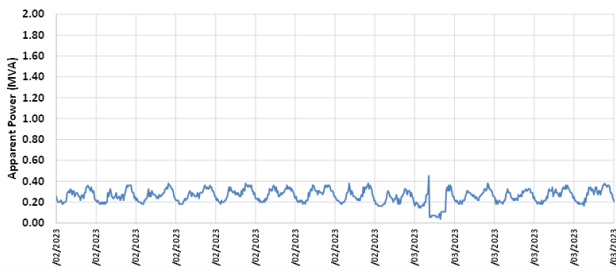
Awamate Zone Substation (2023 year) - Half hourly loading



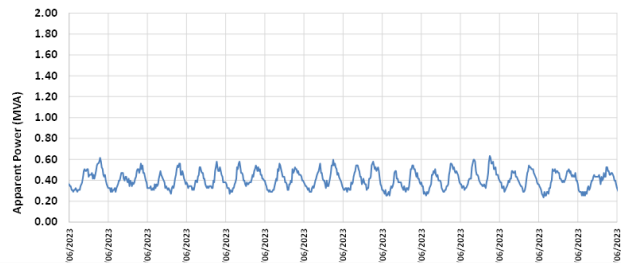
Awamate Zone Substation (2023 year) - Daily Maximum/Minimum



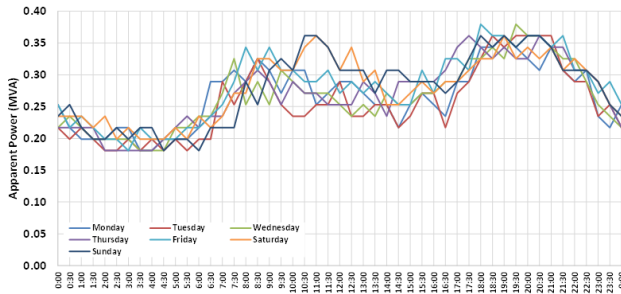
Awamate Zone Substation (2023 year) - Summer (February)



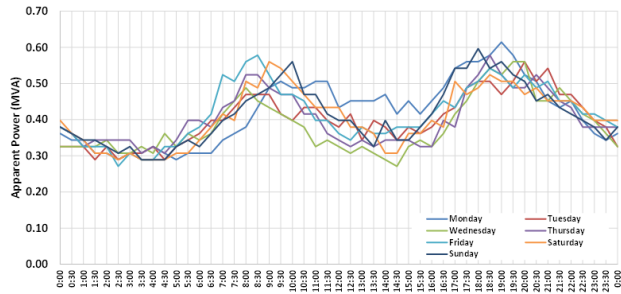
Awamate Zone Substation (2023 year) - Winter (June)



Awamate Zone Substation (2023 year) - Summer (February)



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



Awamate Zone Substation (2023 year) - Load Duration Curve

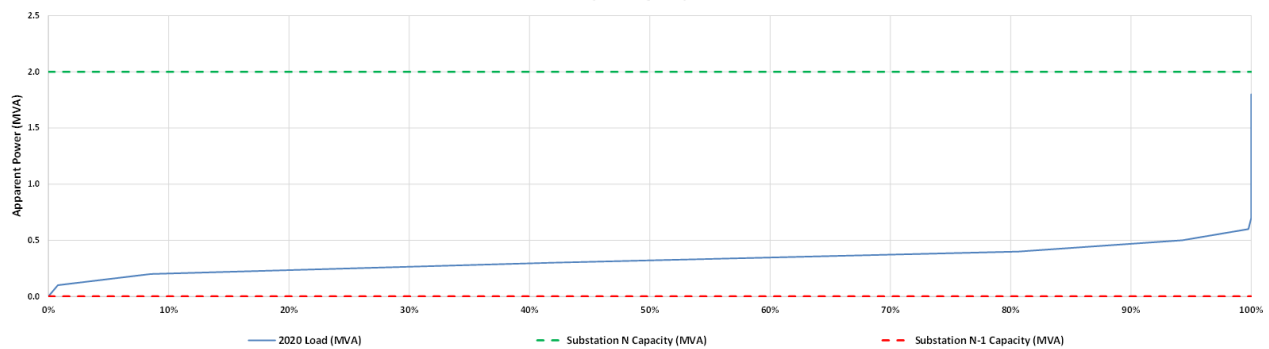


Figure 43. Awamate 33/11 kV zone substation: Apparent power (MVA) load characteristics.

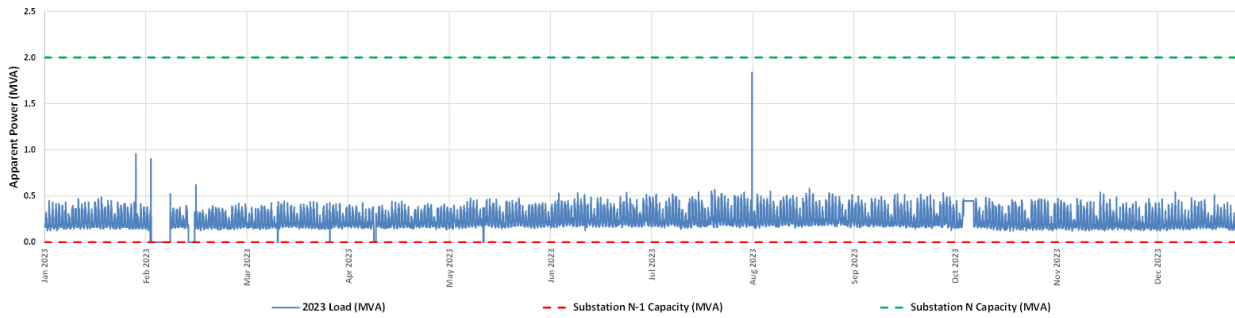
Unknown

Tokaanu MVA

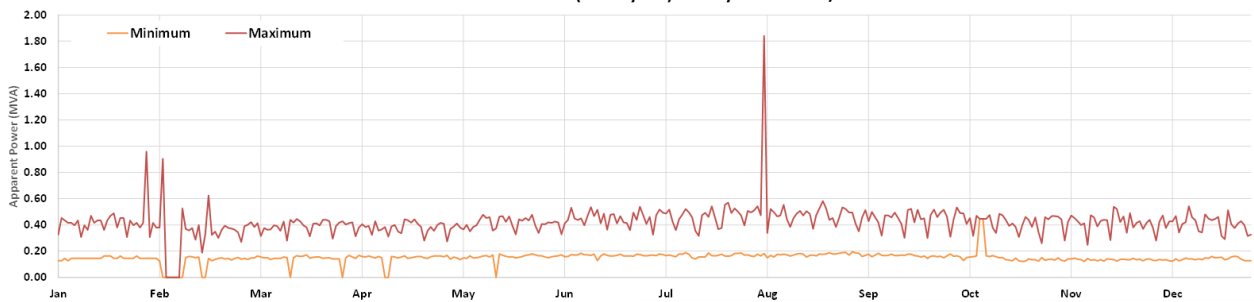
Figure 44. Tokaanu 33/11 kV zone substation: Apparent power (MVA) load characteristics.

Waiotaka MVA

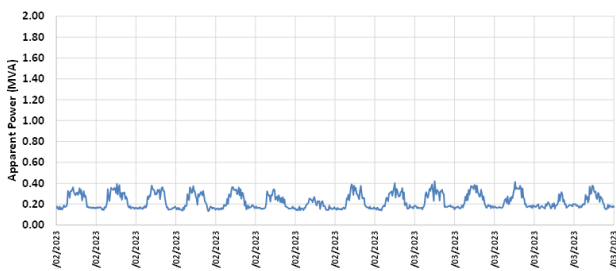
Waiotaka Zone Substation (2023 year) - Half hourly loading



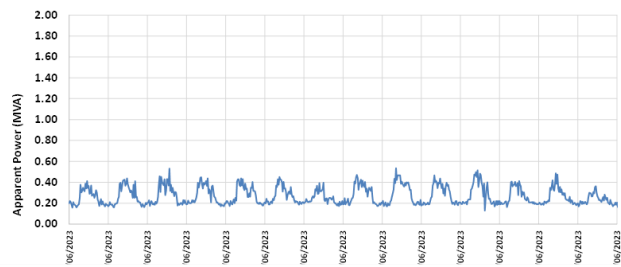
Waiotaka Zone Substation (2023 year) - Daily Maximum/Minimum



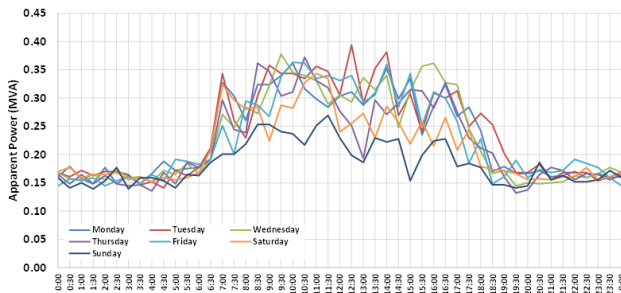
Waiotaka Zone Substation (2023 year) - Summer (February)



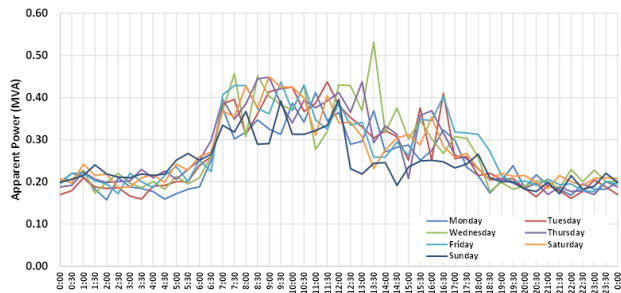
Waiotaka Zone Substation (2023 year) - Winter (June)



Waiotaka Zone Substation (2023 year) - Summer (February)



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



Waiotaka Zone Substation (2023 year) - Load Duration Curve

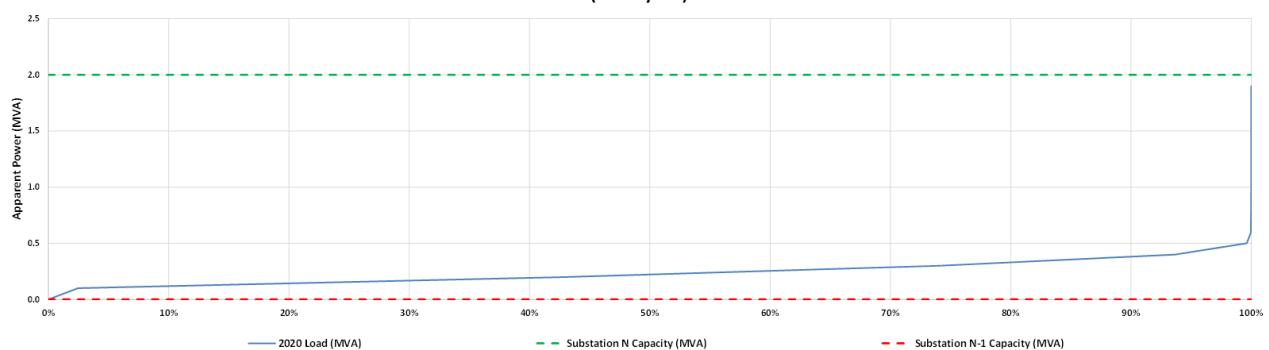
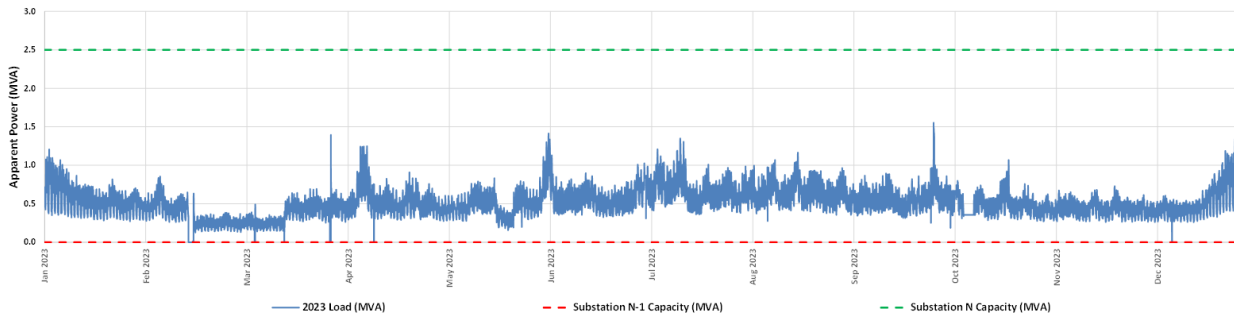


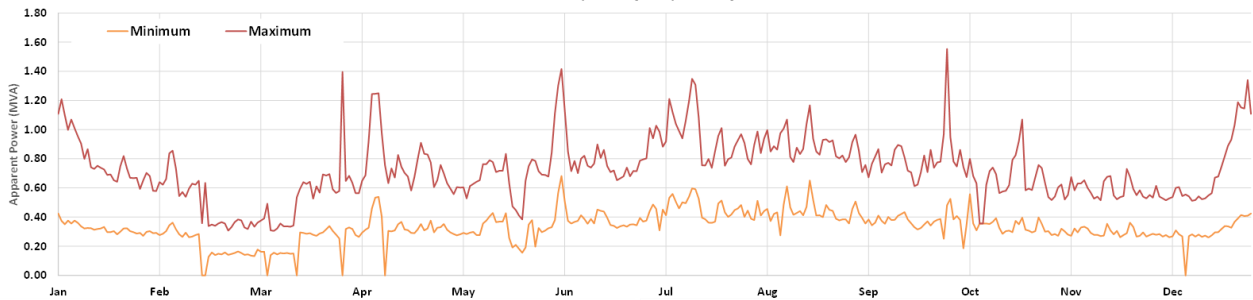
Figure 45. Waiotaka 33/11 kV zone substation: Apparent power (MVA) load characteristics.

Kiko Rd MVA

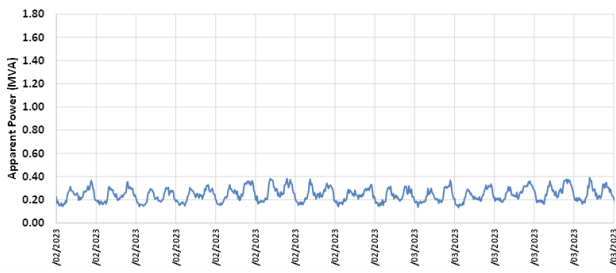
Kiko Road Zone Substation (2023 year) - Half hourly loading



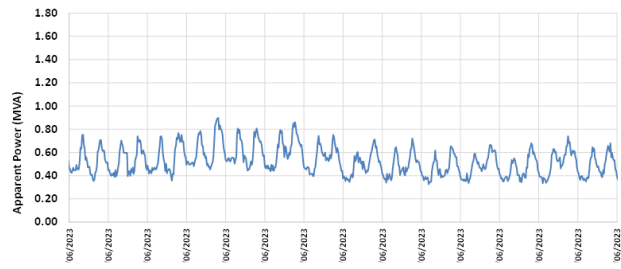
Kiko Road Zone Substation (2023 year) - Daily Maximum/Minimum



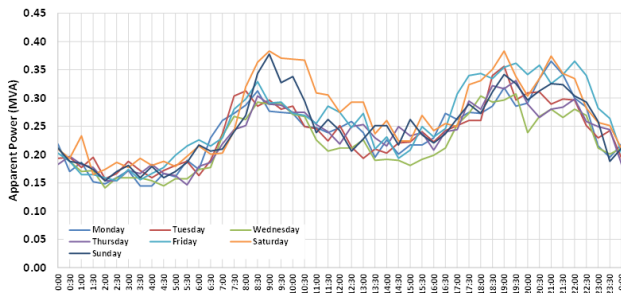
Kiko Road Zone Substation (2023 year) - Summer (February)



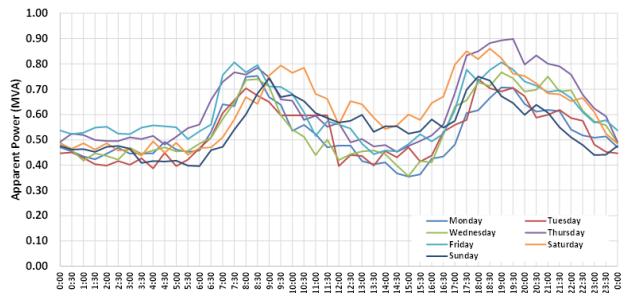
Kiko Road Zone Substation (2023 year) - Winter (June)



Kiko Road Zone Substation (2023 year) - Summer (February)



Kiko Road Zone Substation (2023 year) - Winter (June)



Kiko Road Zone Substation (2023 year) - Load Duration Curve

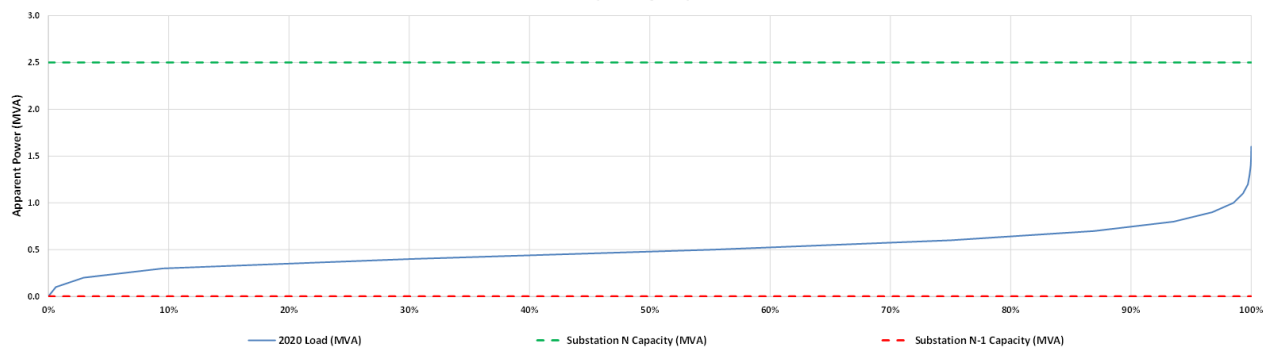


Figure 46. Kiko Rd 33/11 kV zone substation: Apparent power (MVA) load characteristics.

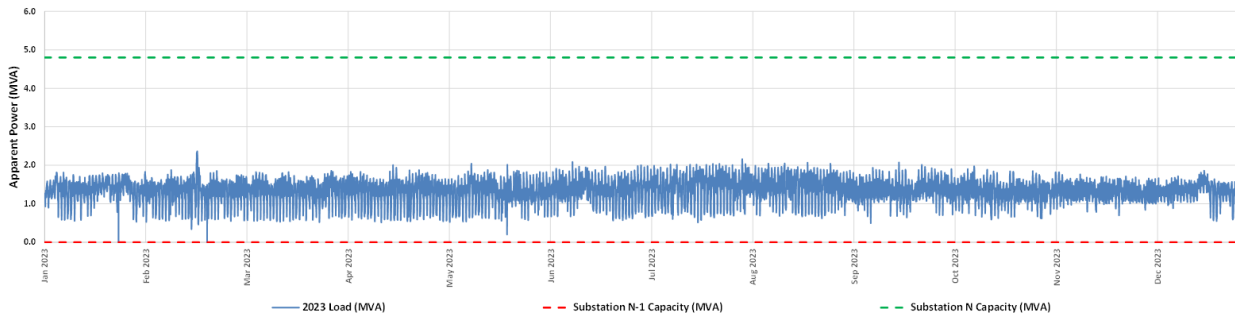
3.3 Powerco

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

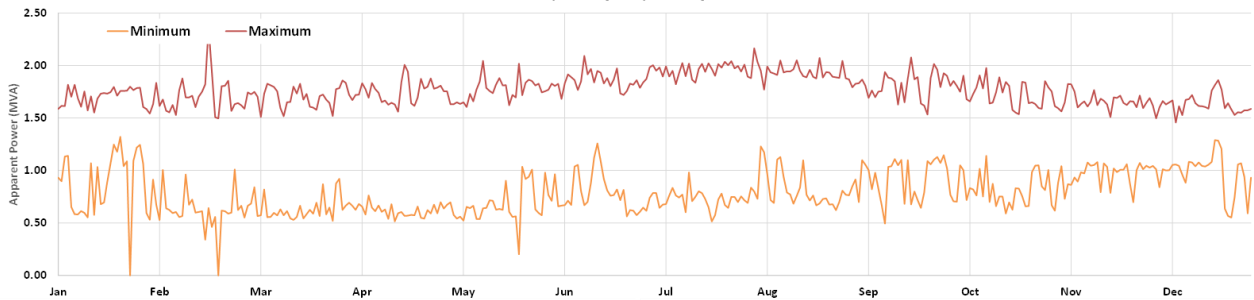
- Figure 47. Kai Iwi 33/11 kV zone substation: Real power (MW) load characteristics.
- Figure 48. Peat St 33/11 kV zone substation: Real power (MW) load characteristics.
- Figure 49. Roberts Ave 33/11 kV zone substation: Real power (MW) load characteristics.
- Figure 50. Taupō Quay 33/11 kV zone substation: Real power (MW) load characteristics.
- Figure 51. Castlecliff 33/11 kV zone substation: Real power (MW) load characteristics.
- Figure 52. Beach Rd 33/11 kV zone substation: Real power (MW) load characteristics.
- Figure 53. Hatricks Wharf 33/11 kV zone substation: Real power (MW) load characteristics.
- Figure 54. Wanganui East 33/11 kV zone substation: Real power (MW) load characteristics.
- Figure 55. Waiouru 33/11 kV zone substation: Real power (MW) load characteristics.
- Figure 56. Taihape 33/11 kV zone substation: Real power (MW) load characteristics.
- Figure 57. Rata 33/11 kV zone substation: Real power (MW) load characteristics.
- Figure 58. Arahina 33/11 kV zone substation: Real power (MW) load characteristics.
- Figure 59. Pukepapa 33/11 kV zone substation: Real power (MW) load characteristics.
- Figure 60. Bulls 33/11 kV zone substation: Real power (MW) load characteristics.
- Figure 61. Fielding 33/11 kV zone substation: Real power (MW) load characteristics.
- Figure 62. Ferguson St 33/11 kV zone substation: Real power (MW) load characteristics.
- Figure 63. Kairanga 33/11 kV zone substation: Real power (MW) load characteristics.
- Figure 64. Keith St 33/11 kV zone substation: Real power (MW) load characteristics.
- Figure 65. Kelvin Grove 33/11 kV zone substation: Real power (MW) load characteristics.
- Figure 66. Kimbolton 33/11 kV zone substation: Real power (MW) load characteristics.
- Figure 67. Main St 33/11 kV zone substation: Real power (MW) load characteristics.
- Figure 68. Milson 33/11 kV zone substation: Real power (MW) load characteristics.
- Figure 69. Ōhakea 33/11 kV zone substation: Real power (MW) load characteristics.
- Figure 70. Pascal St 33/11 kV zone substation: Real power (MW) load characteristics.
- Figure 71. Sanson 33/11 kV zone substation: Real power (MW) load characteristics.
- Figure 72. Turitea 33/11 kV zone substation: Real power (MW) load characteristics.
- Figure 73. Mangamutu 33/11 kV zone substation: Real power (MW) load characteristics.
- Figure 74. Parkville 33/11 kV zone substation: Real power (MW) load characteristics.
- Figure 75. Alfredton 33/11 kV zone substation: Real power (MW) load characteristics.
- Figure 76. Pongaroa 33/11 kV zone substation: Real power (MW) load characteristics.

Kai Iwi MW

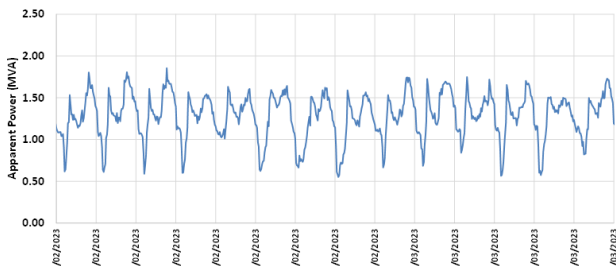
Kai Iwi Zone Substation (2023 year) - Half hourly loading



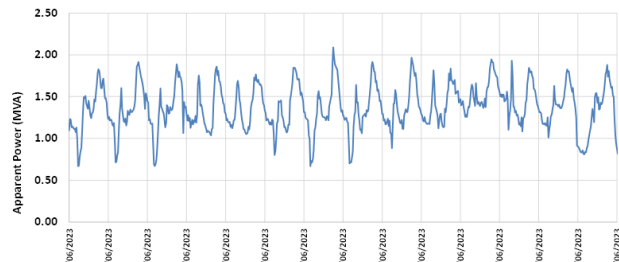
Kai Iwi Zone Substation (2023 year) - Daily Maximum/Minimum



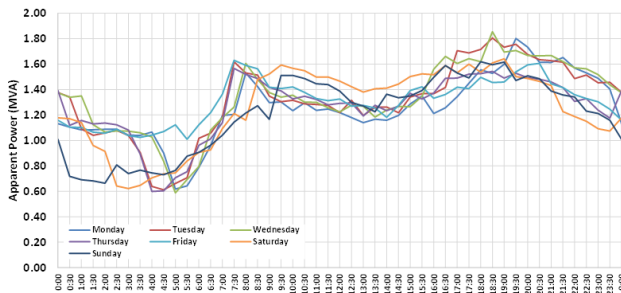
Kai Iwi Zone Substation (2023 year) - Summer (February)



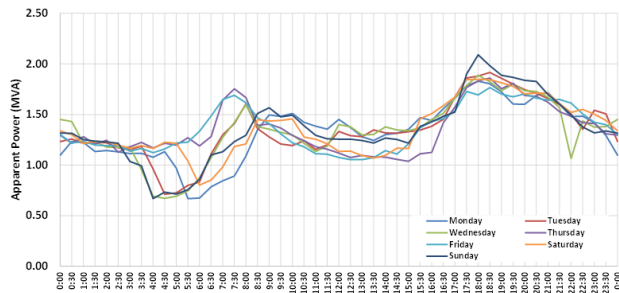
Kai Iwi Zone Substation (2023 year) - Winter (June)



Kai Iwi Zone Substation (2023 year) - Summer (February)



Kai Iwi Zone Substation (2023 year) - Winter (June)



Kai Iwi Zone Substation (2023 year) - Load Duration Curve

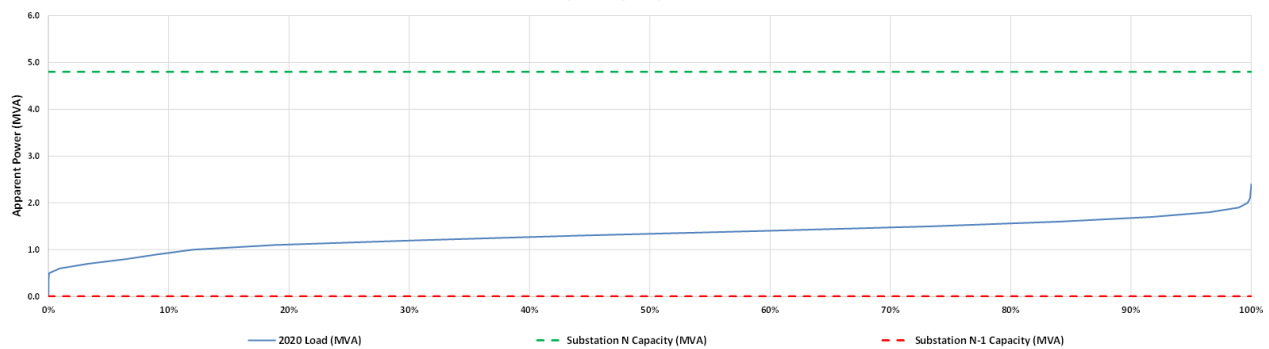
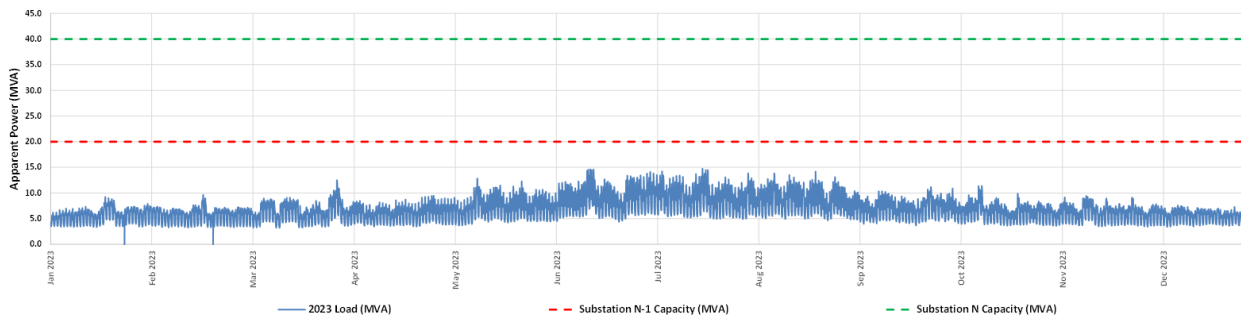


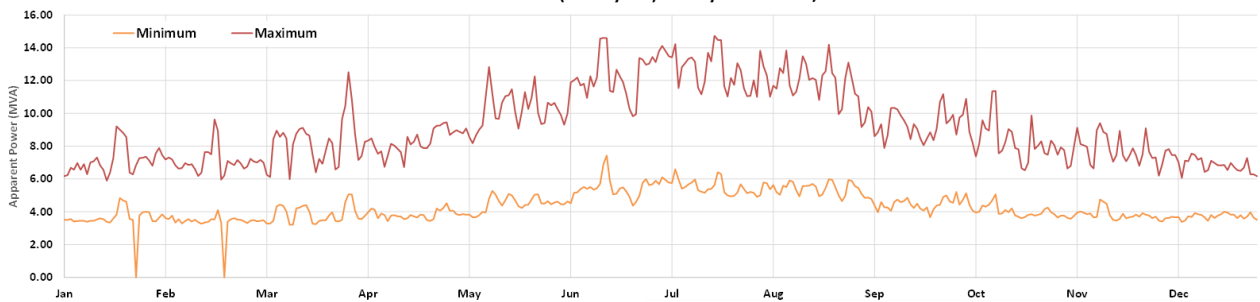
Figure 47. Kai Iwi 33/11 kV zone substation: Real power (MW) load characteristics.

Peat St MW

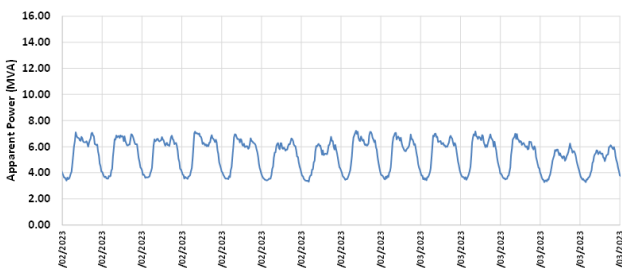
Peat St Zone Substation (2023 year) - Half hourly loading



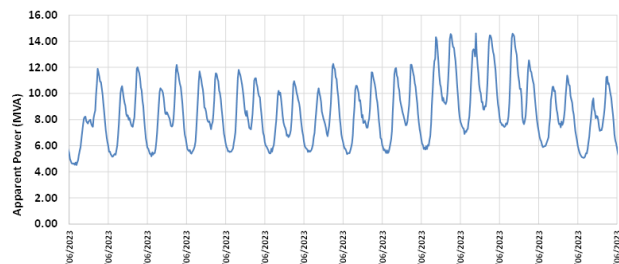
Peat St Zone Substation (2023 year) - Daily Maximum/Minimum



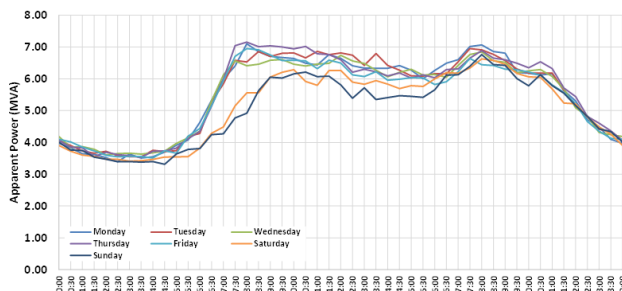
Peat St Zone Substation (2023 year) - Summer (February)



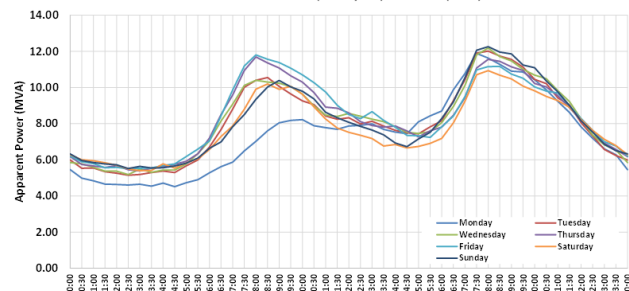
Peat St Zone Substation (2023 year) - Winter (June)



Peat St Zone Substation (2023 year) - Summer (February)



Peat St Zone Substation (2023 year) - Winter (June)



Peat St Zone Substation (2023 year) - Load Duration Curve

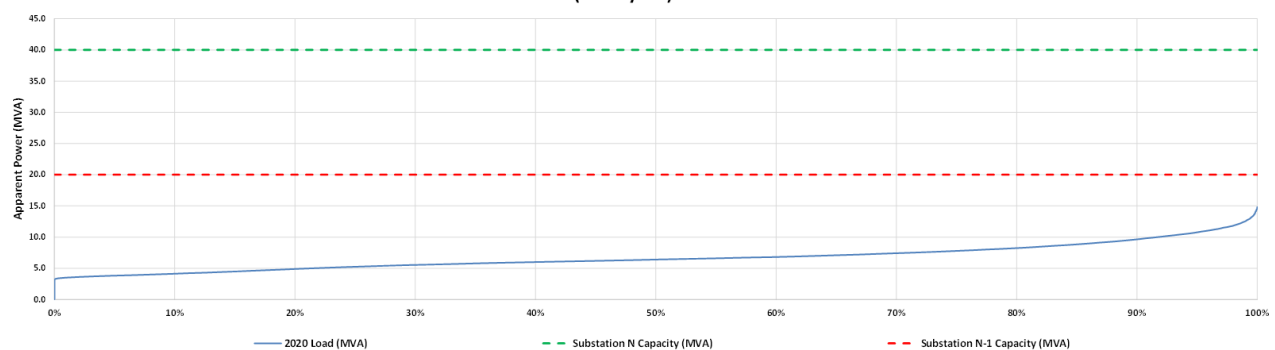
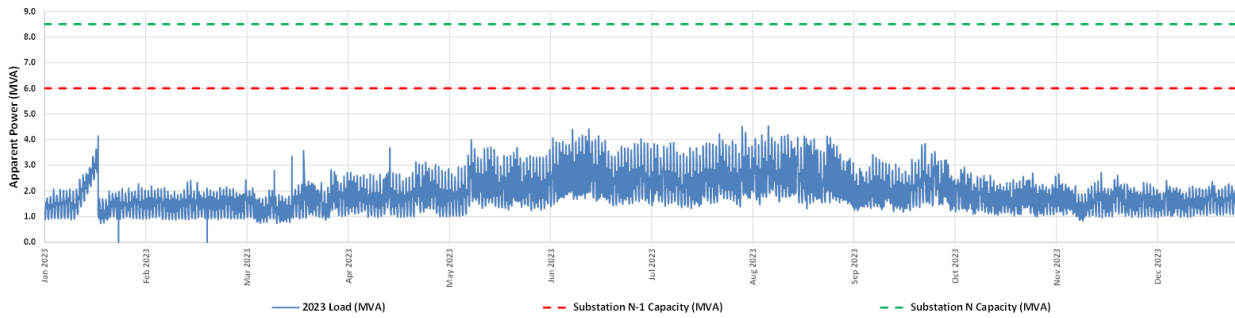


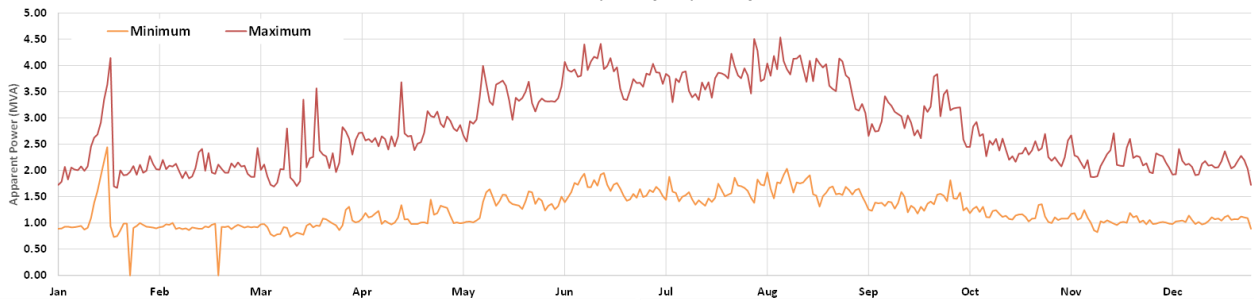
Figure 48. Peat St 33/11 kV zone substation: Real power (MW) load characteristics.

Roberts Ave MW

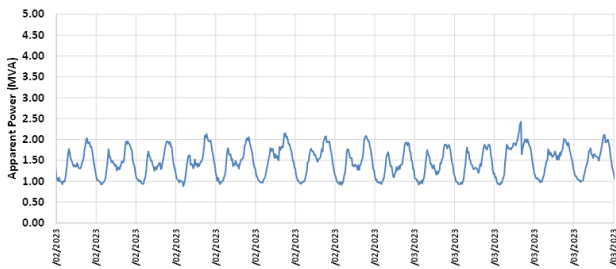
Roberts Ave Zone Substation (2023 year) - Half hourly loading



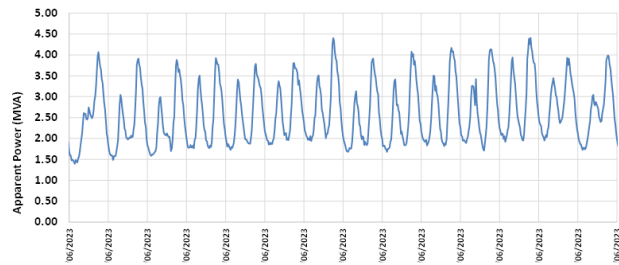
Roberts Ave Zone Substation (2023 year) - Daily Maximum/Minimum



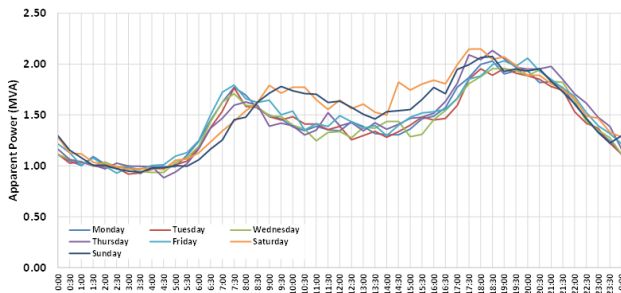
Roberts Ave Zone Substation (2023 year) - Summer (February)



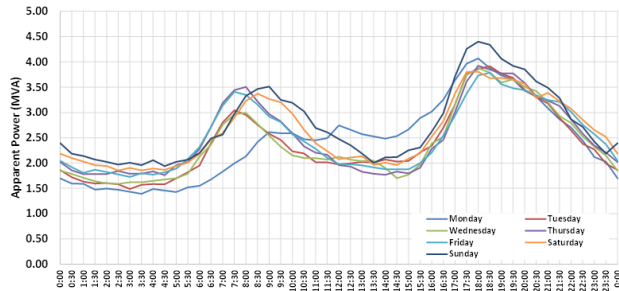
Roberts Ave Zone Substation (2023 year) - Winter (June)



Roberts Ave Zone Substation (2023 year) - Summer (February)



Roberts Ave Zone Substation (2023 year) - Winter (June)



Roberts Ave Zone Substation (2023 year) - Load Duration Curve

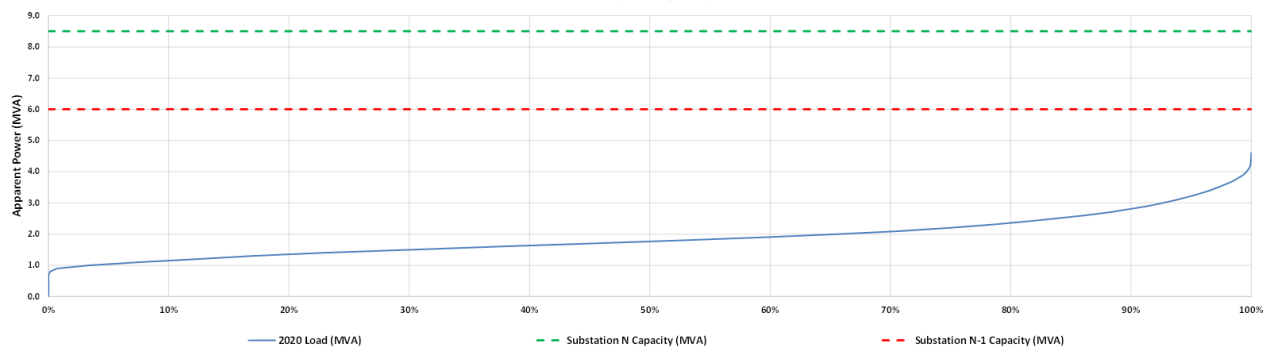
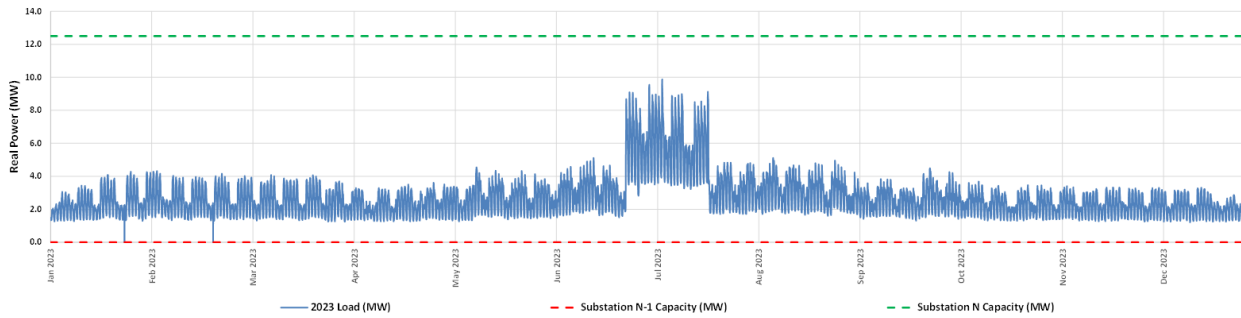


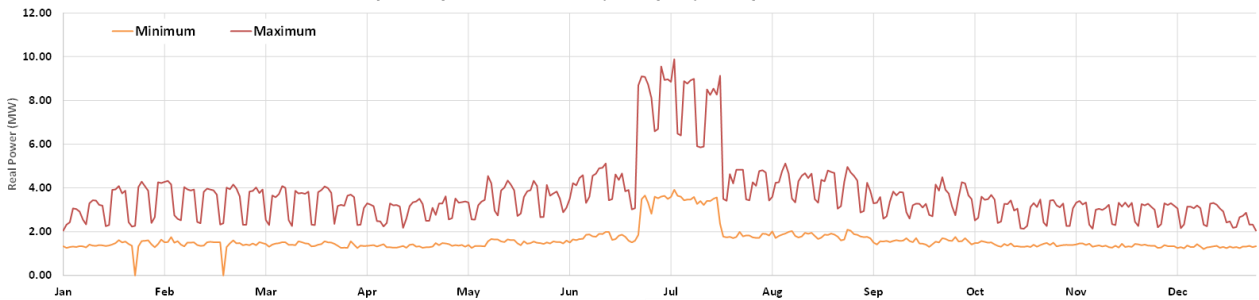
Figure 49. Roberts Ave 33/11 kV zone substation: Real power (MW) load characteristics.

Taupō Quay MW

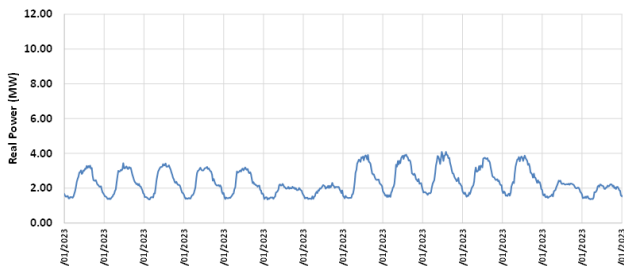
Taupō Quay Zone Substation (2023 year) - Half hourly loading



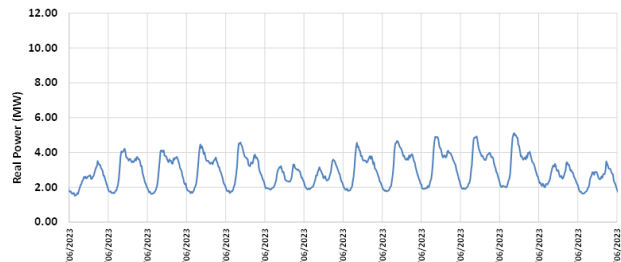
Taupō Quay Zone Substation (2023 year) - Daily Maximum/Minimum



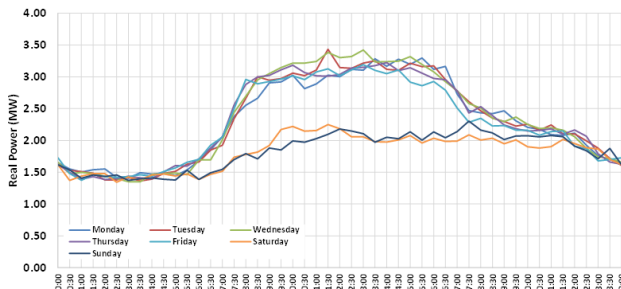
Taupō Quay Zone Substation (2023 year) - Summer (January)



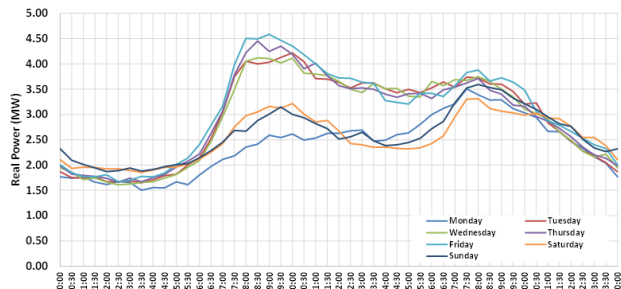
Taupō Quay Zone Substation (2023 year) - Winter (June)



Taupō Quay Zone Substation (2023 year) - Summer (January)



Taupō Quay Zone Substation (2023 year) - Winter (June)



Taupō Quay Zone Substation (2023 year) - Load Duration Curve

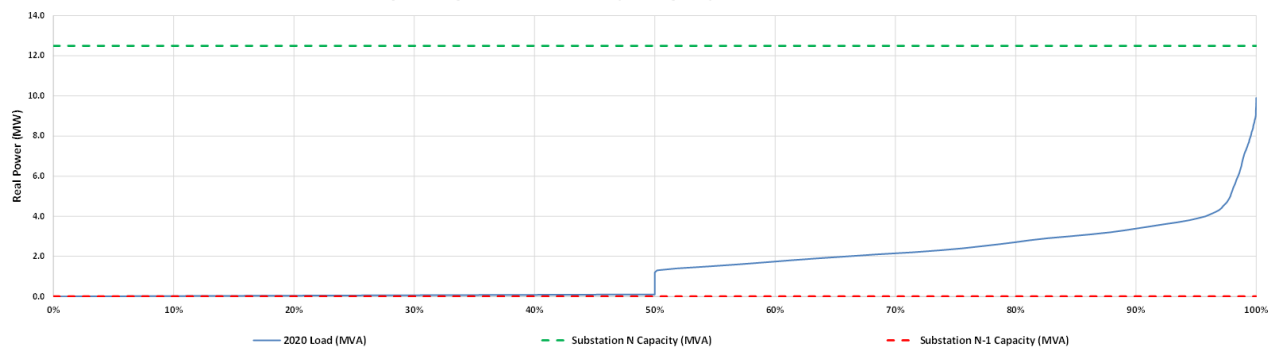
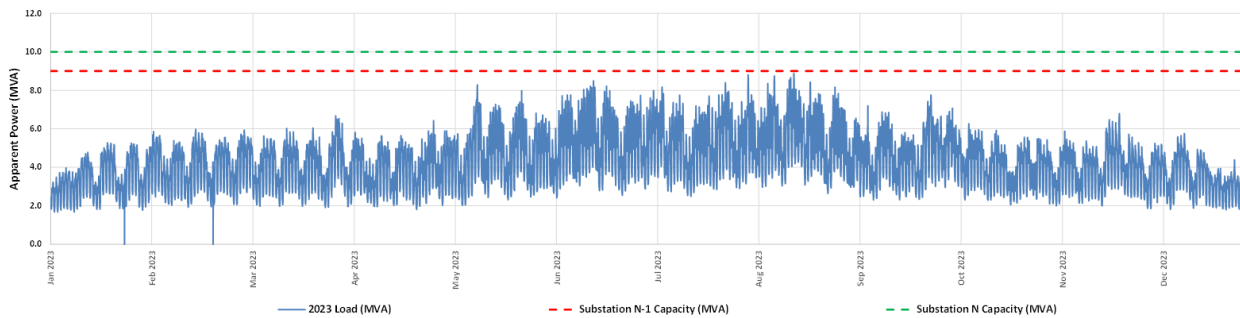


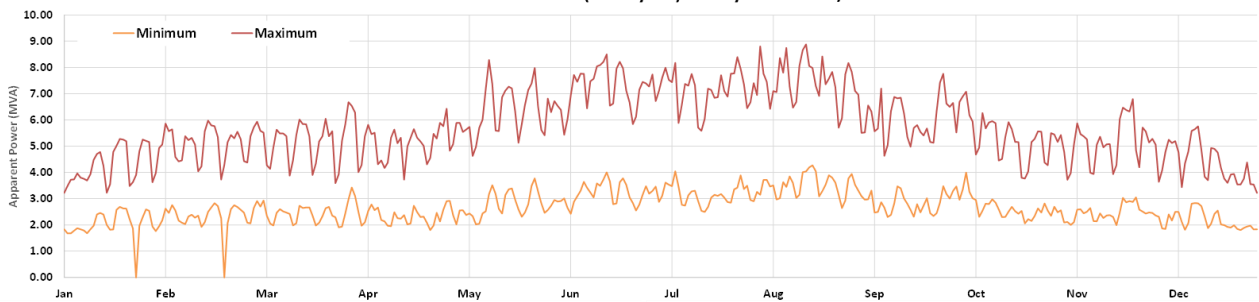
Figure 50. Taupō Quay 33/11 kV zone substation: Real power (MW) load characteristics.

Castlecliff MW

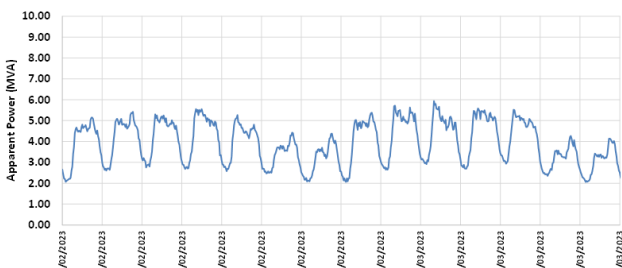
Castlecliff Zone Substation (2023 year) - Half hourly loading



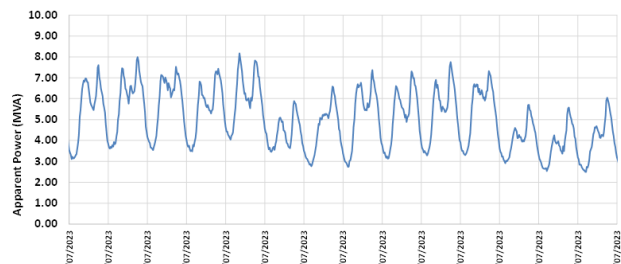
Castlecliff Zone Substation (2023 year) - Daily Maximum/Minimum



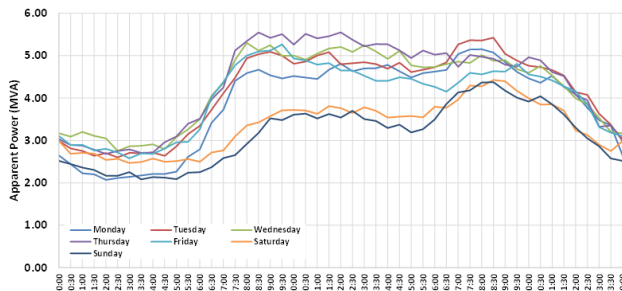
Castlecliff Zone Substation (2023 year) - Summer (February)



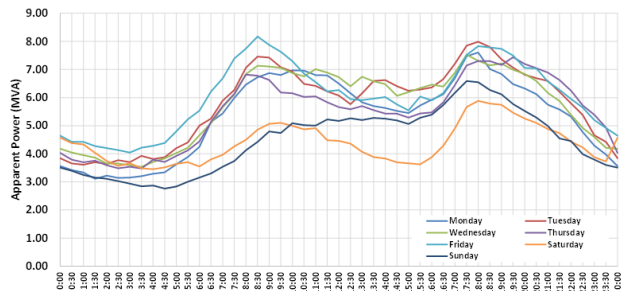
Castlecliff Zone Substation (2023 year) - Winter (July)



Castlecliff Zone Substation (2023 year) - Summer (February)



Castlecliff Zone Substation (2023 year) - Winter (July)



Castlecliff Zone Substation (2023 year) - Load Duration Curve

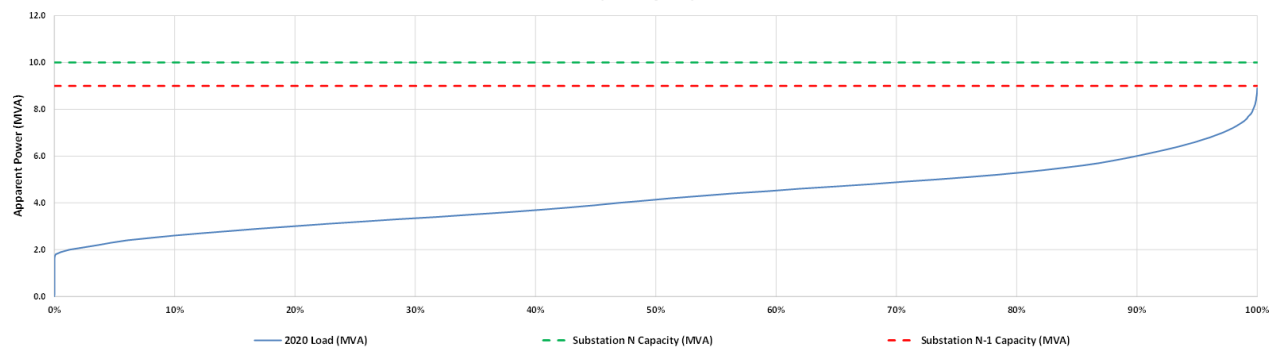
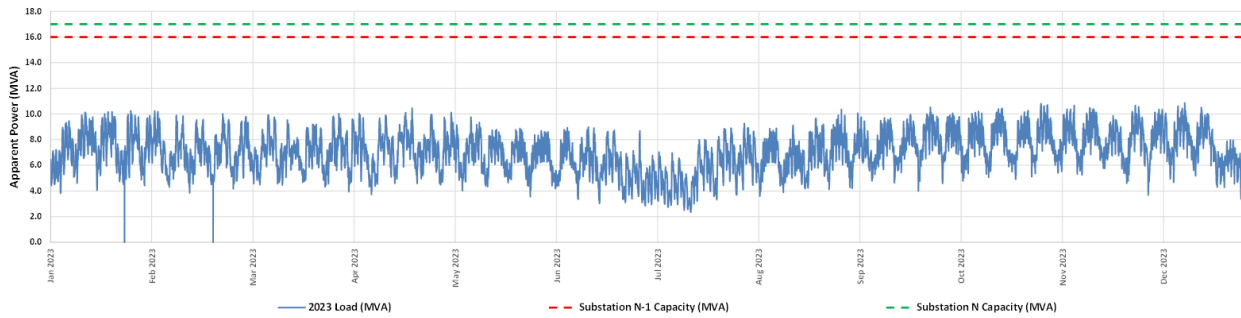


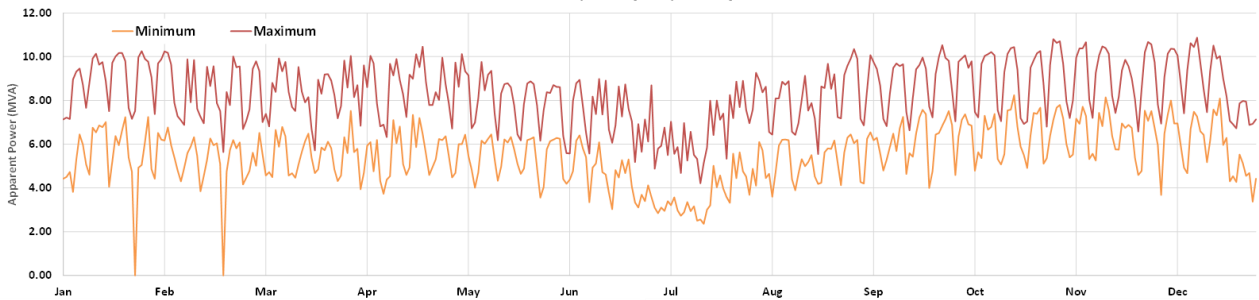
Figure 51. Castlecliff 33/11 kV zone substation: Real power (MW) load characteristics.

Beach Rd MW

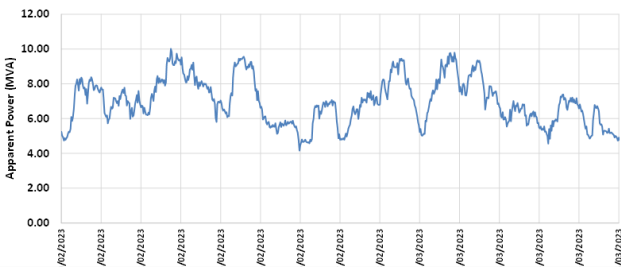
Beach Rd Zone Substation (2023 year) - Half hourly loading



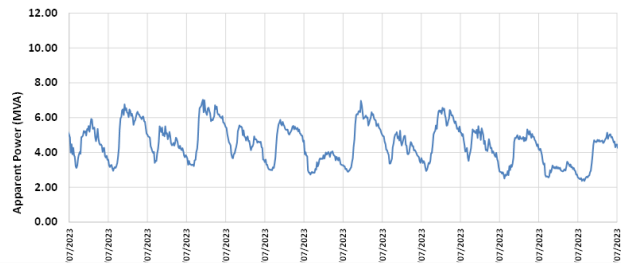
Beach Rd Zone Substation (2023 year) - Daily Maximum/Minimum



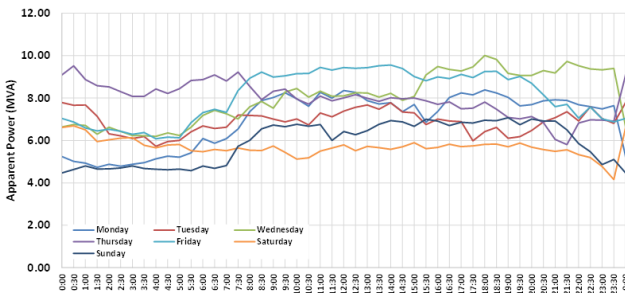
Beach Rd Zone Substation (2023 year) - Summer (February)



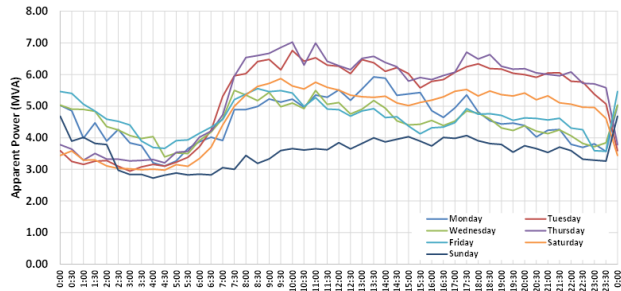
Beach Rd Zone Substation (2023 year) - Winter (July)



Beach Rd Zone Substation (2023 year) - Summer (February)



Beach Rd Zone Substation (2023 year) - Winter (July)



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

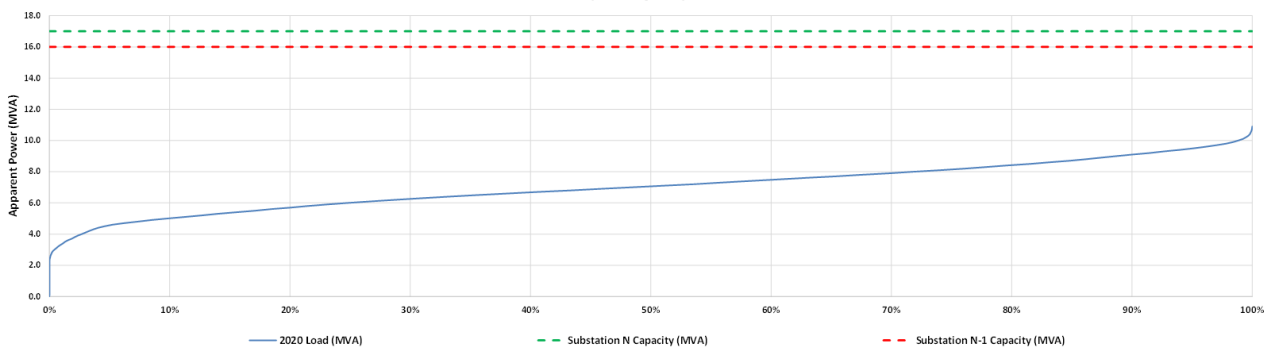
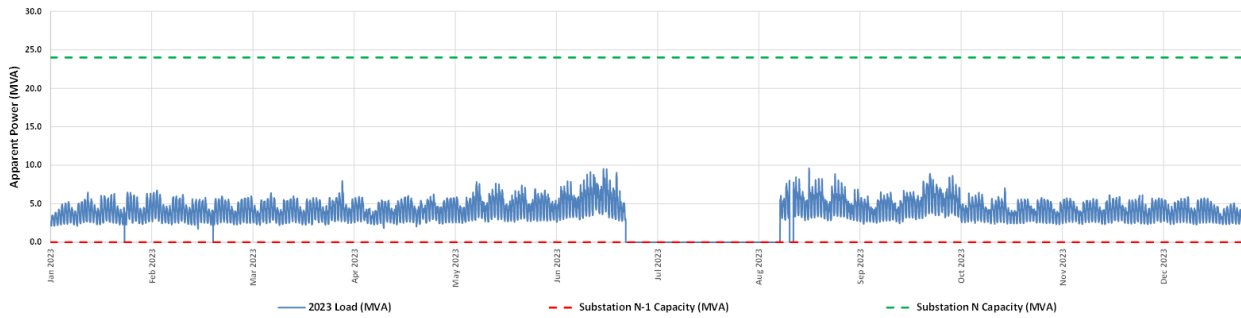


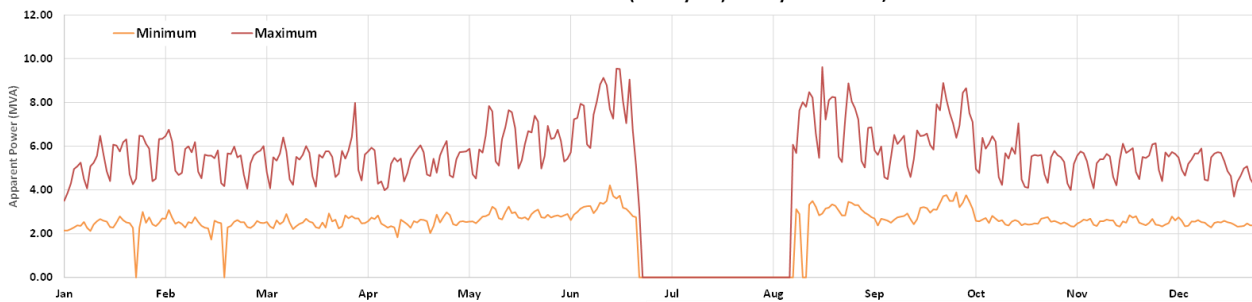
Figure 52. Beach Rd 33/11 kV zone substation: Real power (MW) load characteristics.

Hatricks Wharf MW

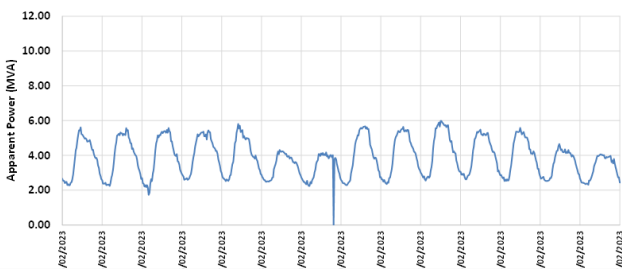
Hatricks Wharf Zone Substation (2023 year) - Half hourly loading



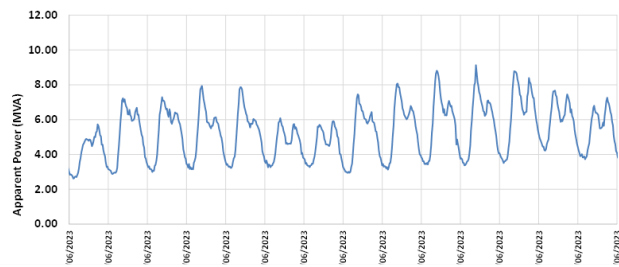
Hatricks Wharf Zone Substation (2023 year) - Daily Maximum/Minimum



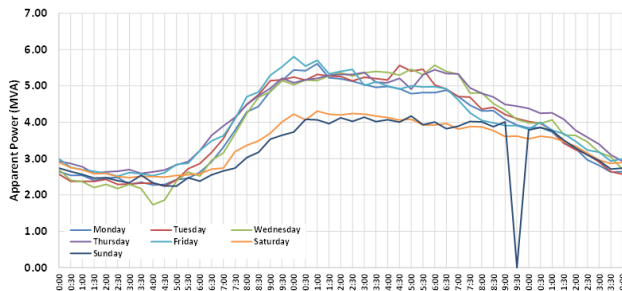
Hatricks Wharf Zone Substation (2023 year) - Summer (February)



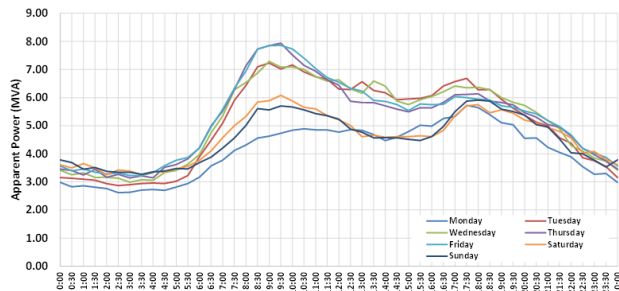
Hatricks Wharf Zone Substation (2023 year) - Winter (June)



Hatricks Wharf Zone Substation (2023 year) - Summer (February)



Hatricks Wharf Zone Substation (2023 year) - Winter (June)



Hatricks Wharf Zone Substation (2023 year) - Load Duration Curve

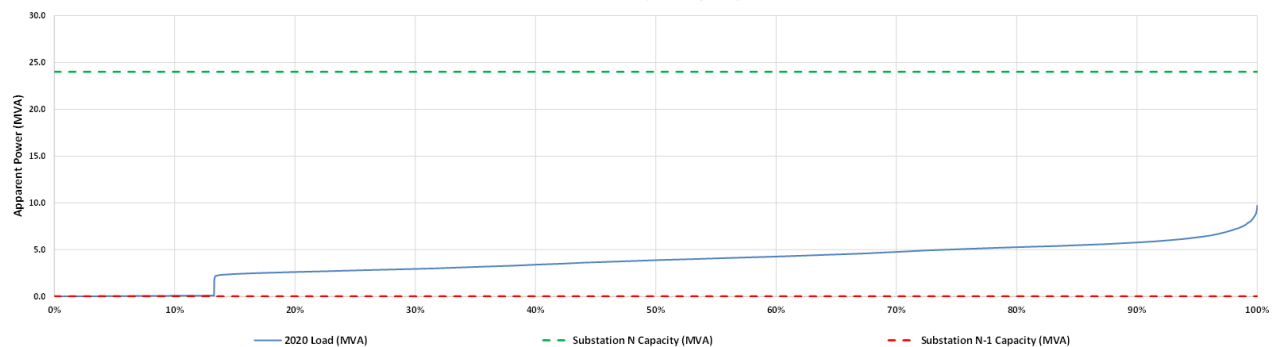
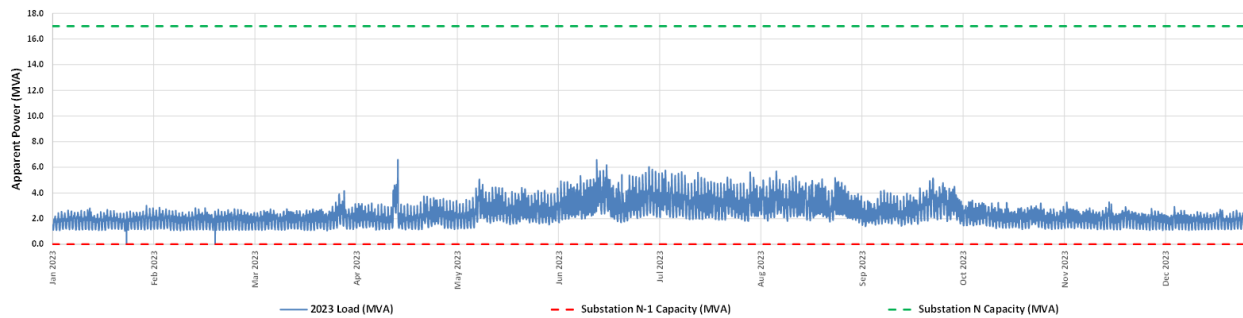


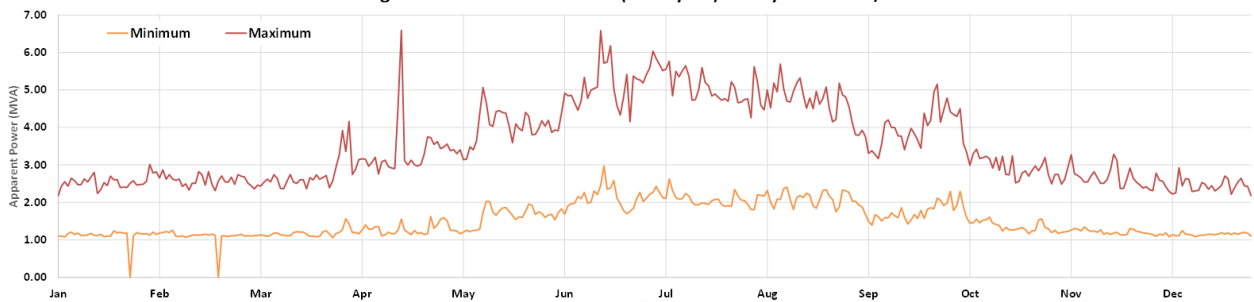
Figure 53. Hatricks Wharf 33/11 kV zone substation: Real power (MW) load characteristics.

Wanganui East MW

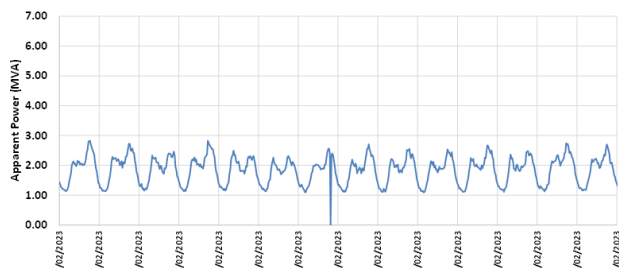
Wanganui East Zone Substation (2023 year) - Half hourly loading



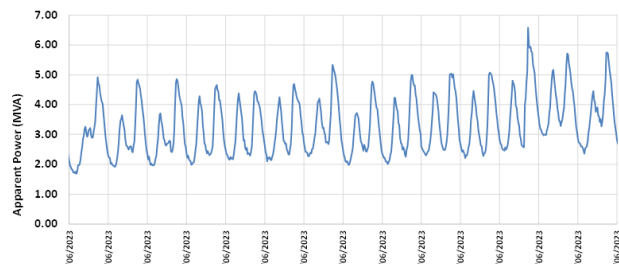
Wanganui East Zone Substation (2023 year) - Daily Maximum/Minimum



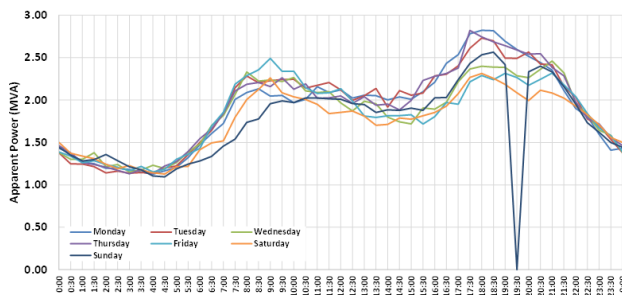
Wanganui East Zone Substation (2023 year) - Summer (February)



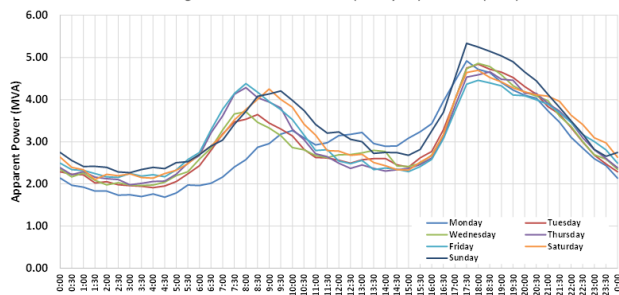
Wanganui East Zone Substation (2023 year) - Winter (June)



Wanganui East Zone Substation (2023 year) - Summer (February)



Wanganui East Zone Substation (2023 year) - Winter (June)



Wanganui East Zone Substation (2023 year) - Load Duration Curve

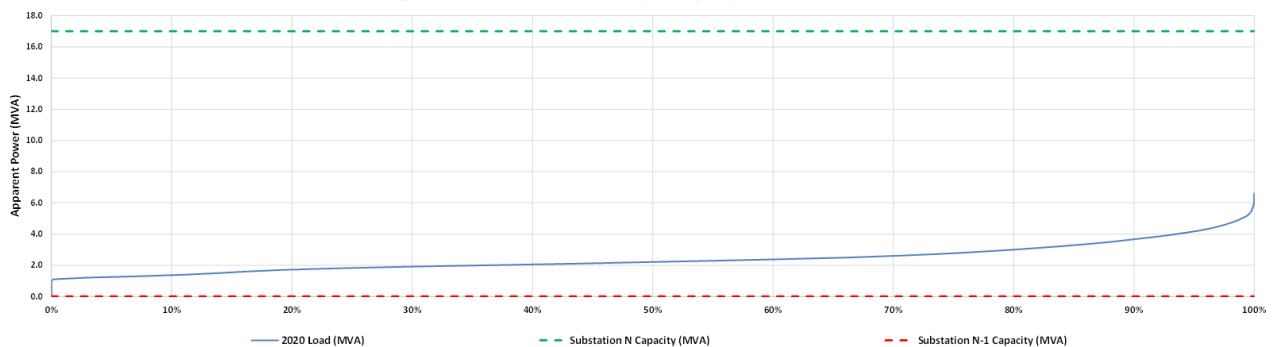
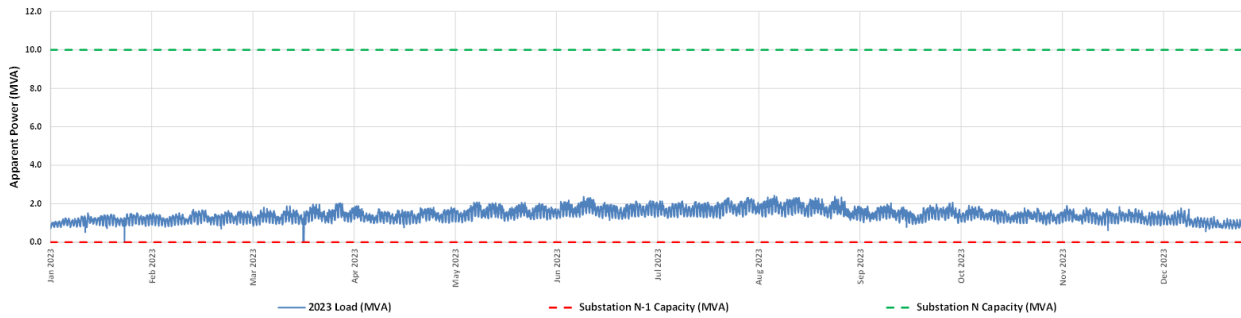


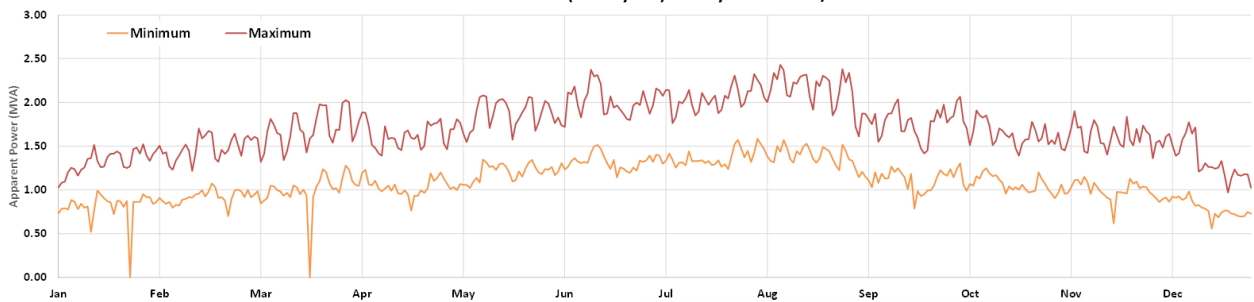
Figure 54. Wanganui East 33/11 kV zone substation: Real power (MW) load characteristics.

Waiouru MW

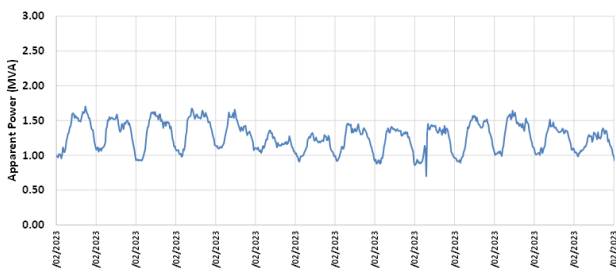
Waiouru Zone Substation (2023 year) - Half hourly loading



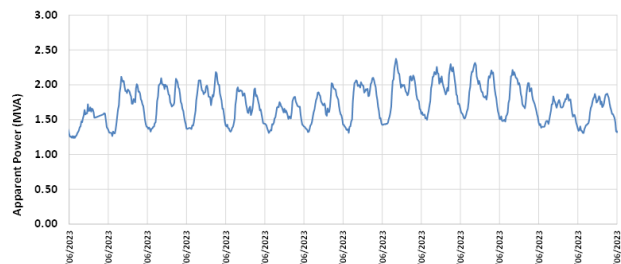
Waiouru Zone Substation (2023 year) - Daily Maximum/Minimum



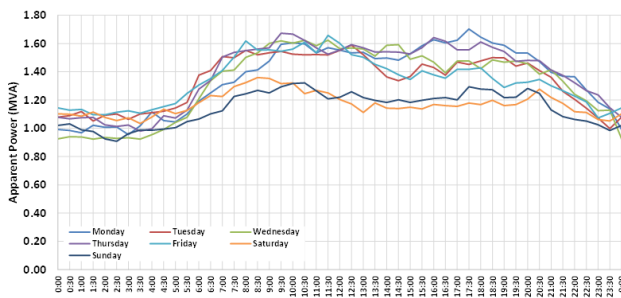
Waiouru Zone Substation (2023 year) - Summer (February)



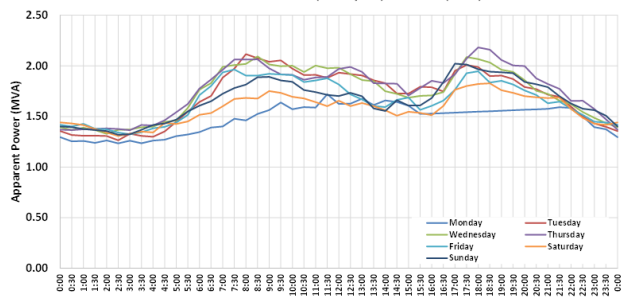
Waiouru Zone Substation (2023 year) - Winter (June)



Waiouru Zone Substation (2023 year) - Summer (February)



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



Waiouru Zone Substation (2023 year) - Load Duration Curve

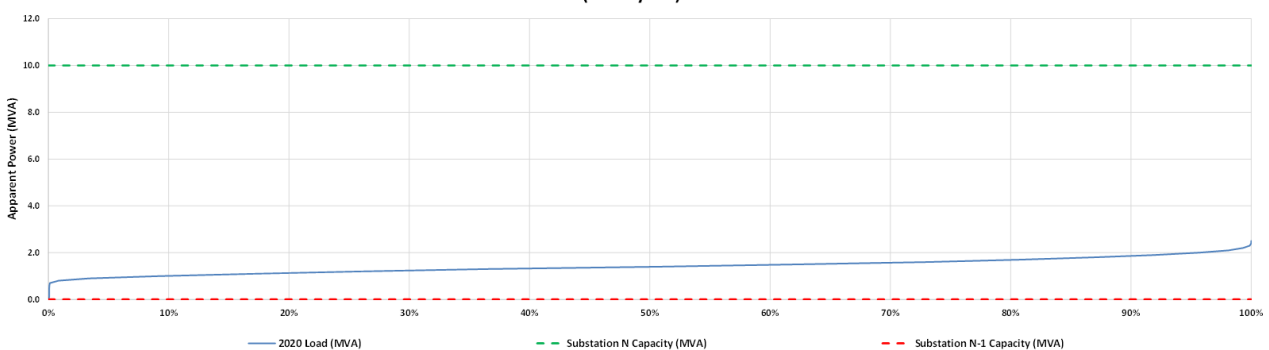
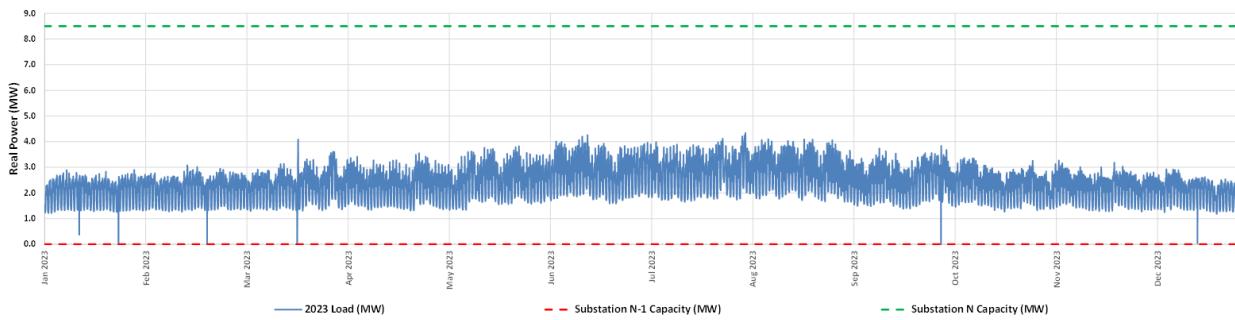


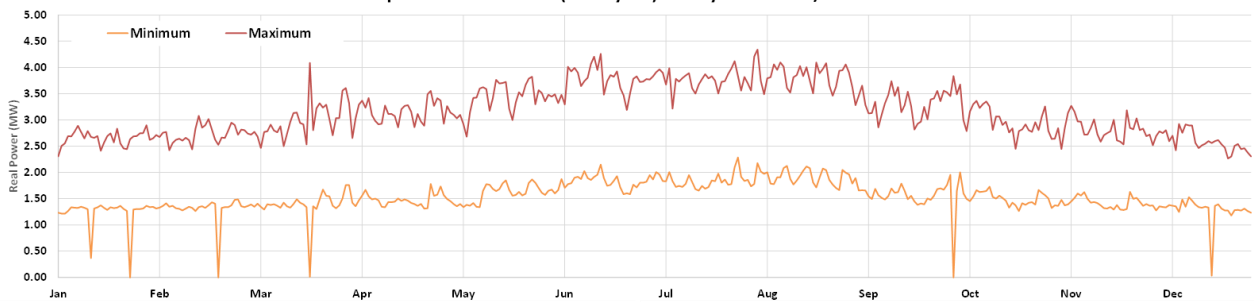
Figure 55. Waiouru 33/11 kV zone substation: Real power (MW) load characteristics.

Taihape MW

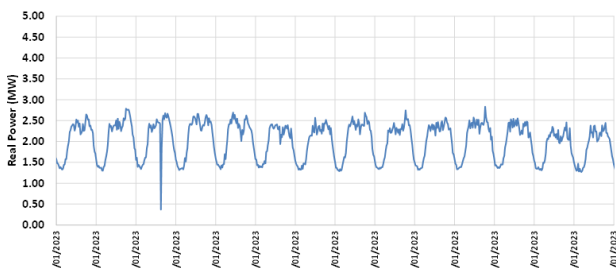
Taihape Zone Substation (2023 year) - Half hourly loading



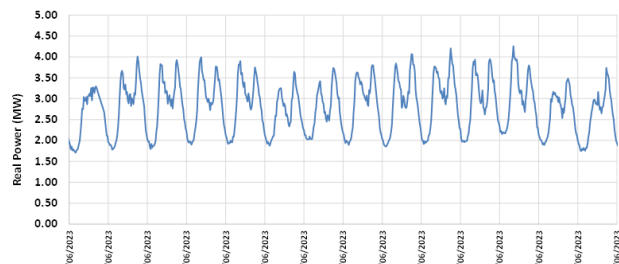
Taihape Zone Substation (2023 year) - Daily Maximum/Minimum



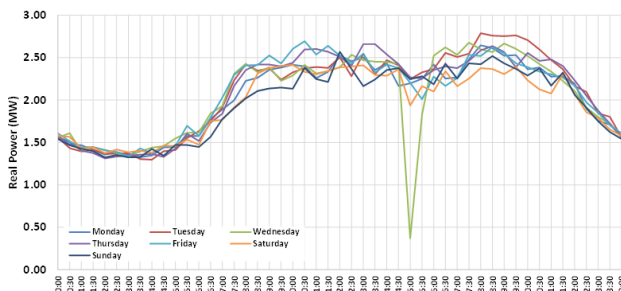
Taihape Zone Substation (2023 year) - Summer (January)



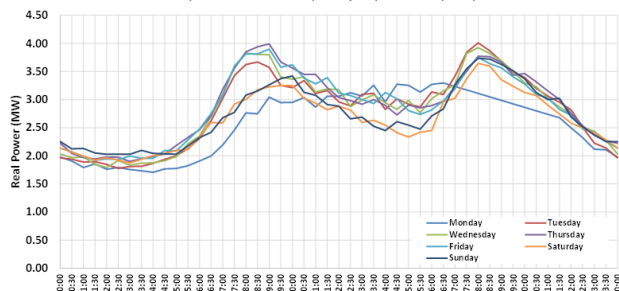
Taihape Zone Substation (2023 year) - Winter (June)



Taihape Zone Substation (2023 year) - Summer (January)



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



Taihape Zone Substation (2023 year) - Load Duration Curve

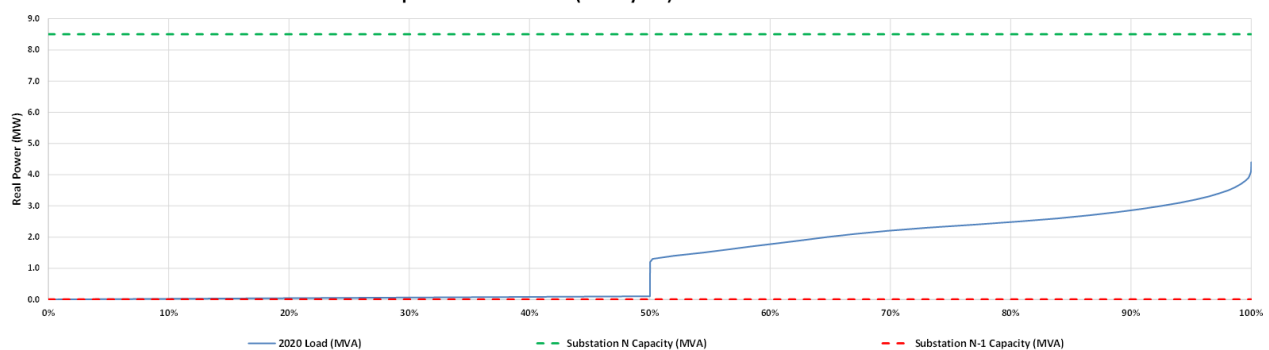
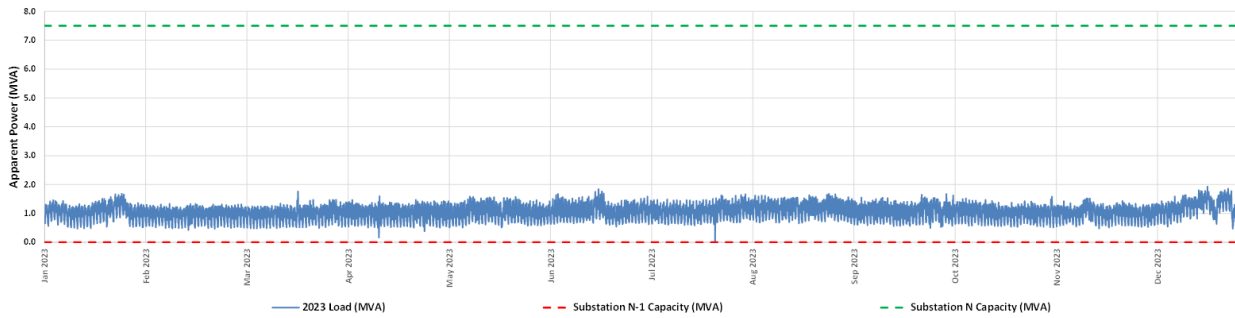


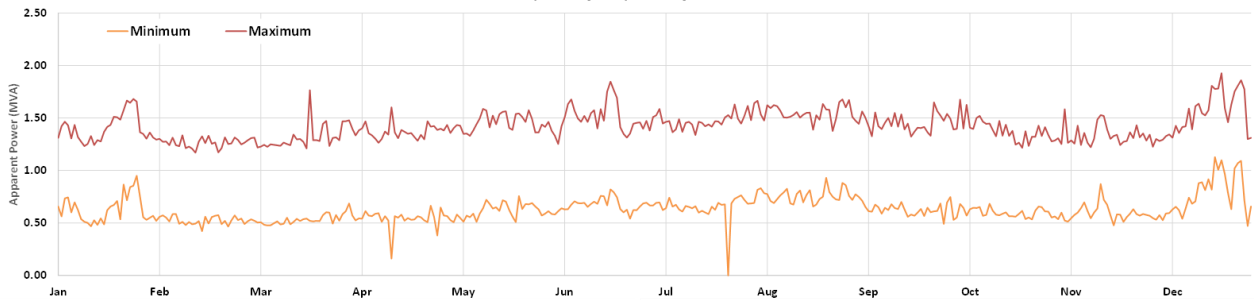
Figure 56. Taihape 33/11 kV zone substation: Real power (MW) load characteristics.

Rata MW

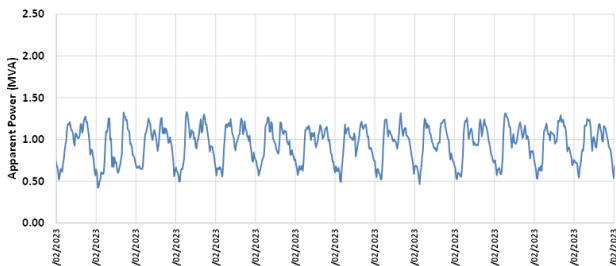
Rata Zone Substation (2023 year) - Half hourly loading



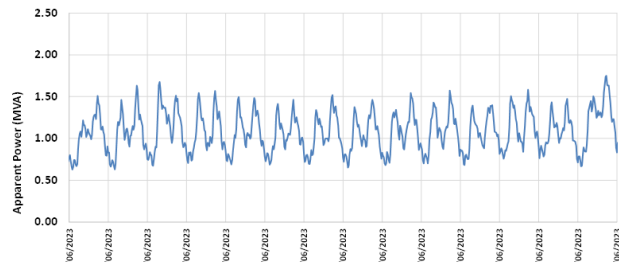
Rata Zone Substation (2023 year) - Daily Maximum/Minimum



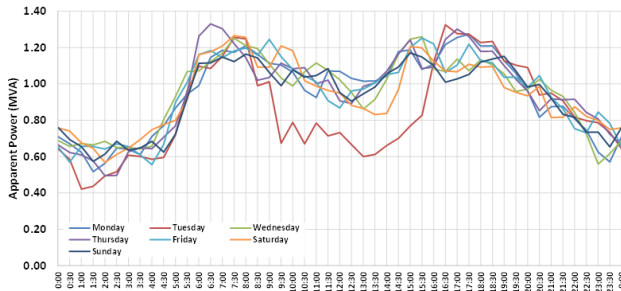
Rata Zone Substation (2023 year) - Summer (February)



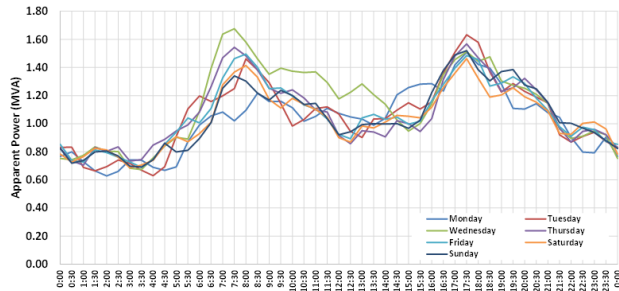
Rata Zone Substation (2023 year) - Winter (June)



Rata Zone Substation (2023 year) - Summer (February)



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



Rata Zone Substation (2023 year) - Load Duration Curve

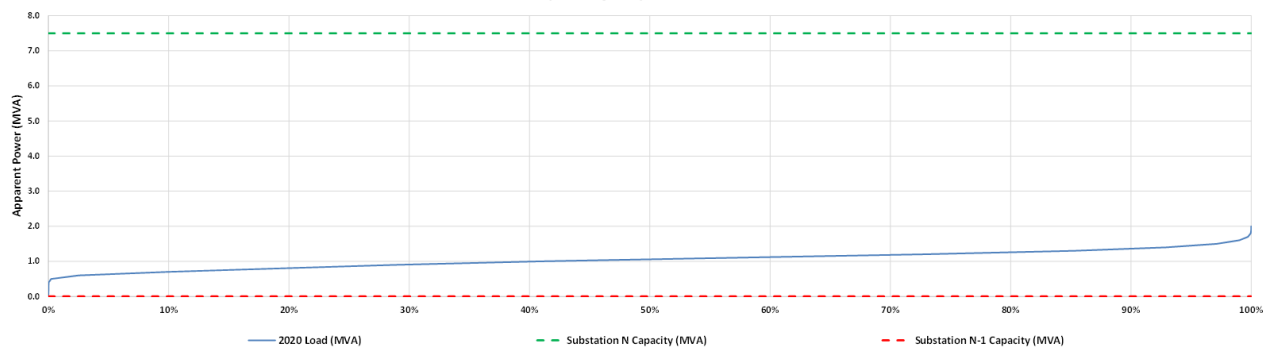
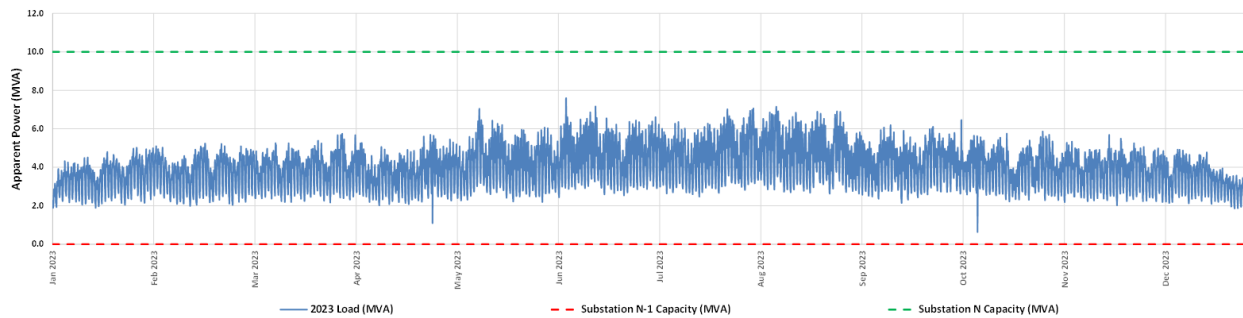


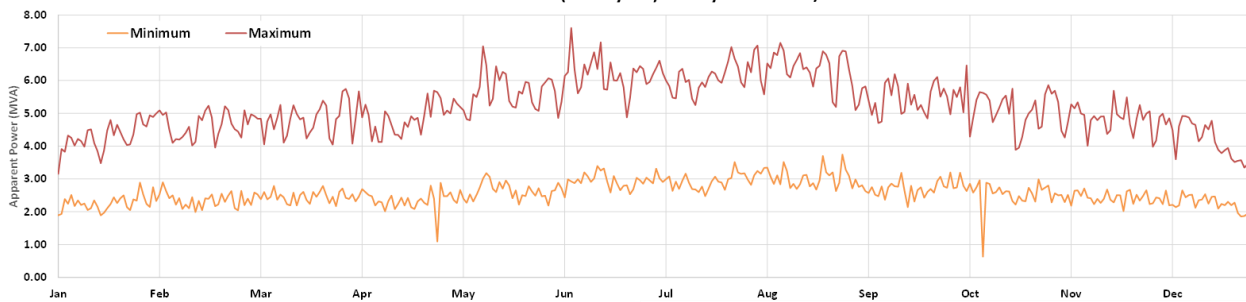
Figure 57. Rata 33/11 kV zone substation: Real power (MW) load characteristics.

Arahina MW

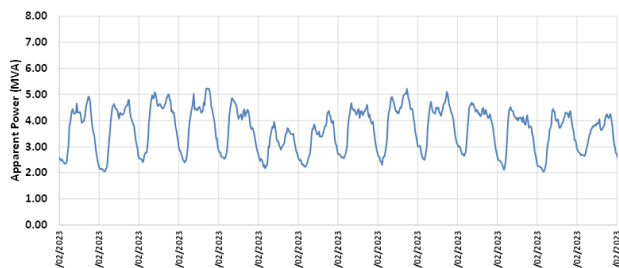
Arahina Zone Substation (2023 year) - Half hourly loading



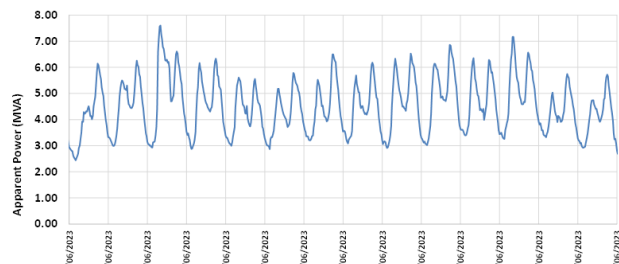
Arahina Zone Substation (2023 year) - Daily Maximum/Minimum



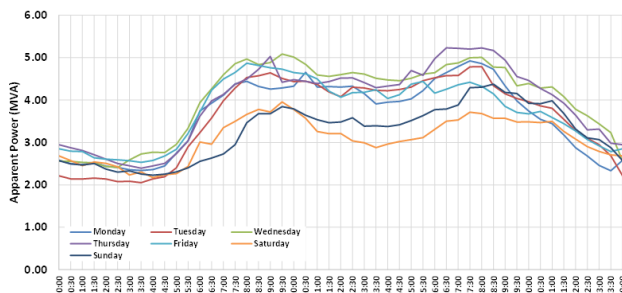
Arahina Zone Substation (2023 year) - Summer (February)



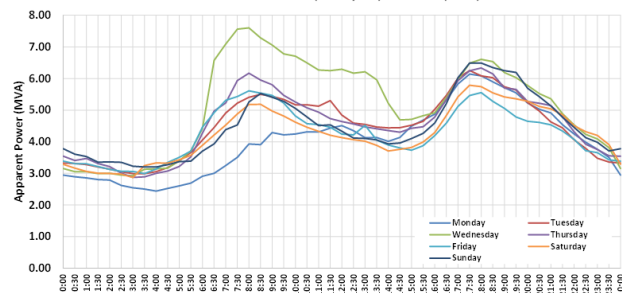
Arahina Zone Substation (2023 year) - Winter (June)



Arahina Zone Substation (2023 year) - Summer (February)



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



Arahina Zone Substation (2023 year) - Load Duration Curve

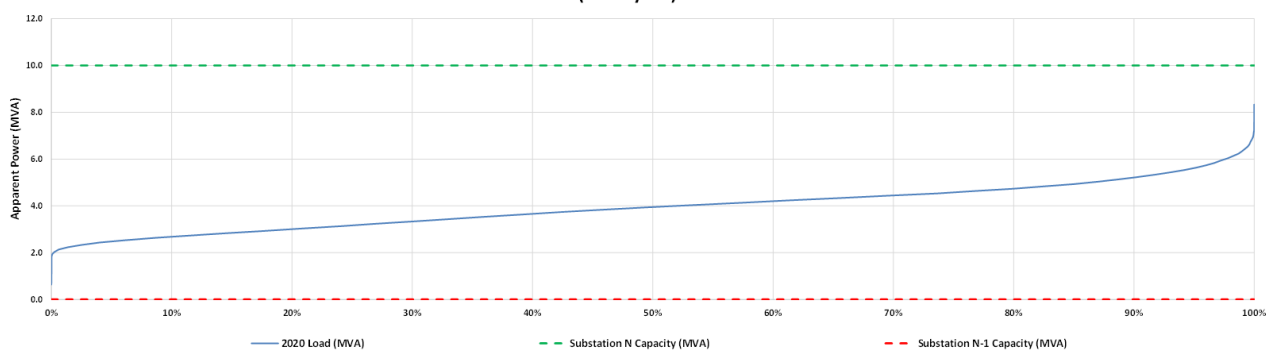
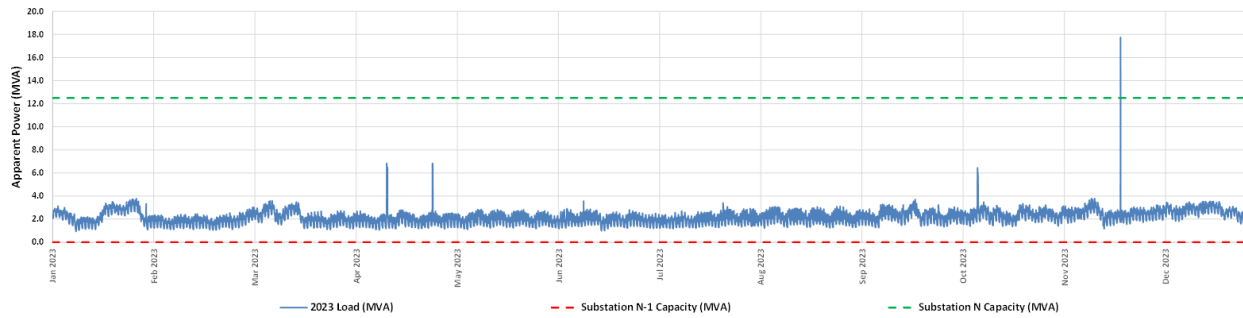


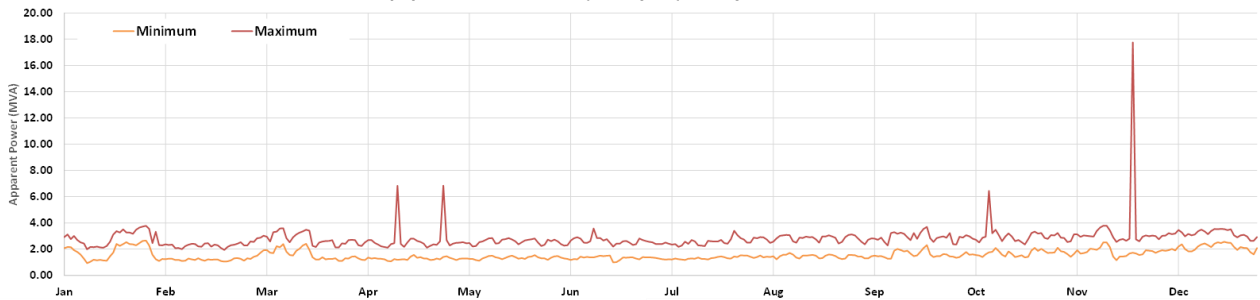
Figure 58. Arahina 33/11 kV zone substation: Real power (MW) load characteristics.

Pukepapa MW

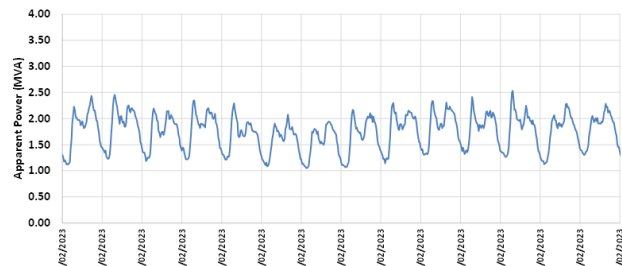
Pukepapa Zone Substation (2023 year) - Half hourly loading



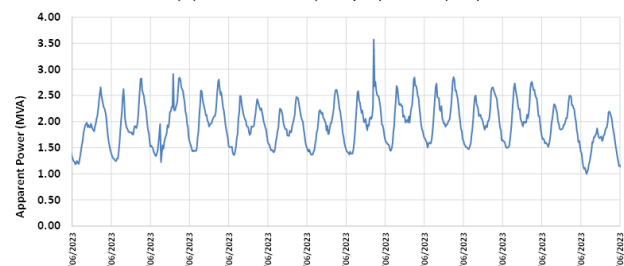
Pukepapa Zone Substation (2023 year) - Daily Maximum/Minimum



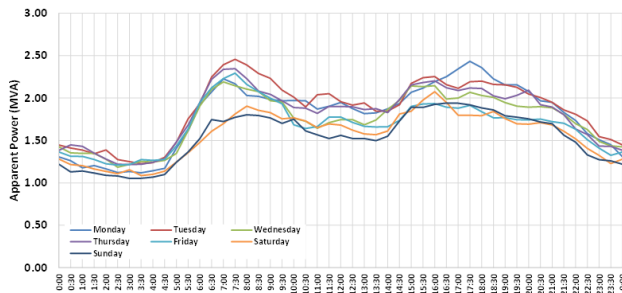
Pukepapa Zone Substation (2023 year) - Summer (February)



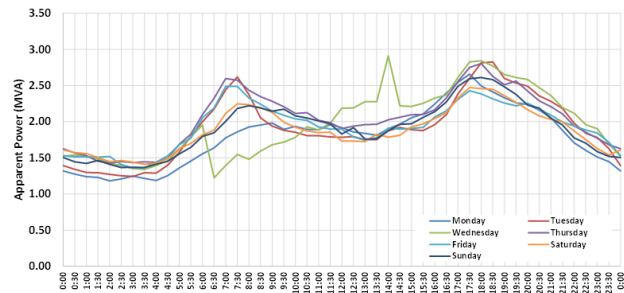
Pukepapa Zone Substation (2023 year) - Winter (June)



Pukepapa Zone Substation (2023 year) - Summer (February)



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



Pukepapa Zone Substation (2023 year) - Load Duration Curve

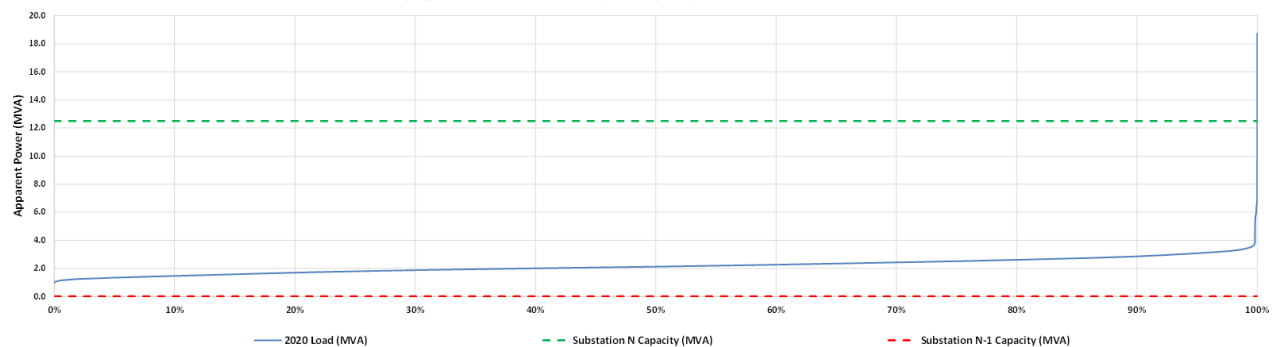
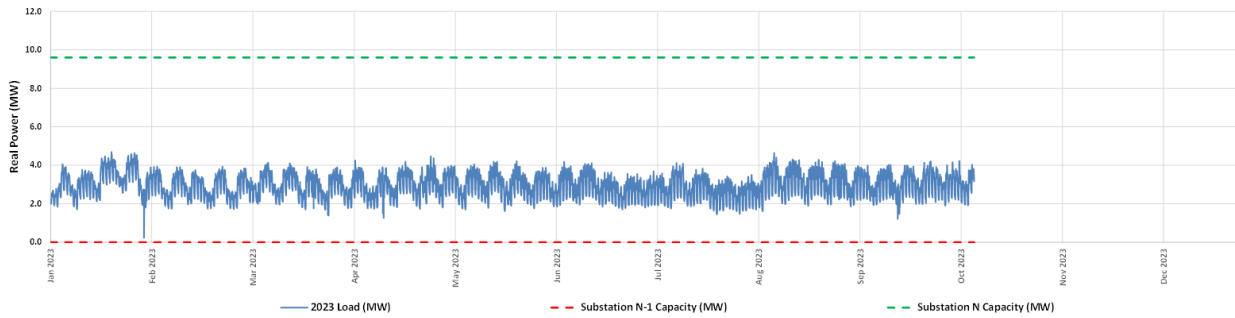


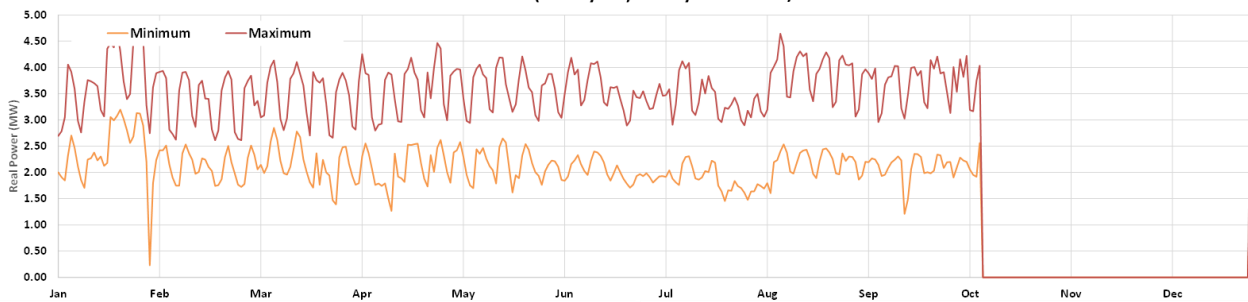
Figure 59. Pukepapa 33/11 kV zone substation: Real power (MW) load characteristics.

Bulls MW

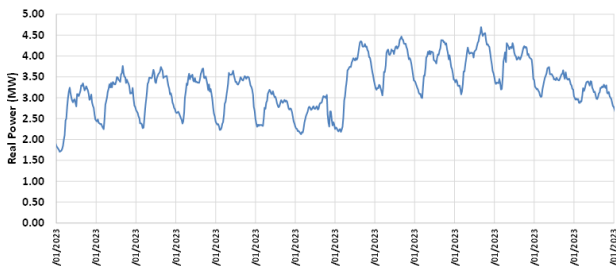
Bulls Zone Substation (2023 year) - Half hourly loading



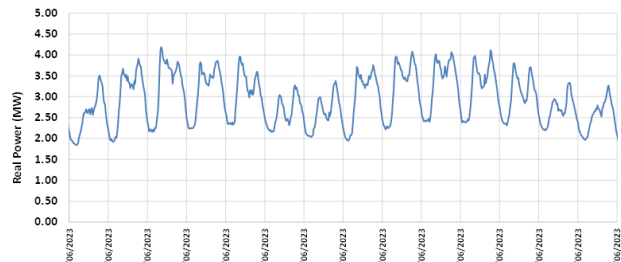
Bulls Zone Substation (2023 year) - Daily Maximum/Minimum



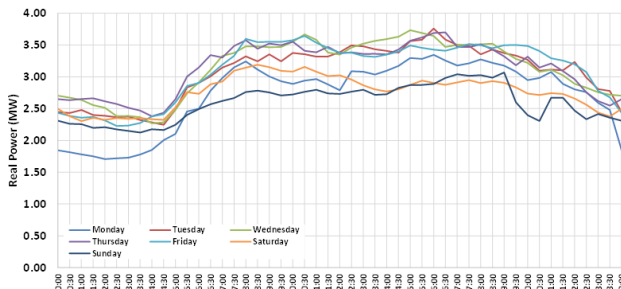
Bulls Zone Substation (2023 year) - Summer (January)



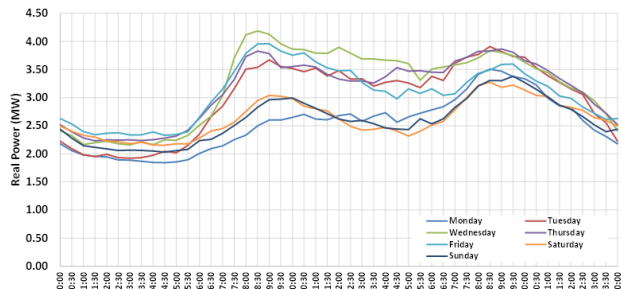
Bulls Zone Substation (2023 year) - Winter (June)



Bulls Zone Substation (2023 year) - Summer (January)



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



Bulls Zone Substation (2023 year) - Load Duration Curve

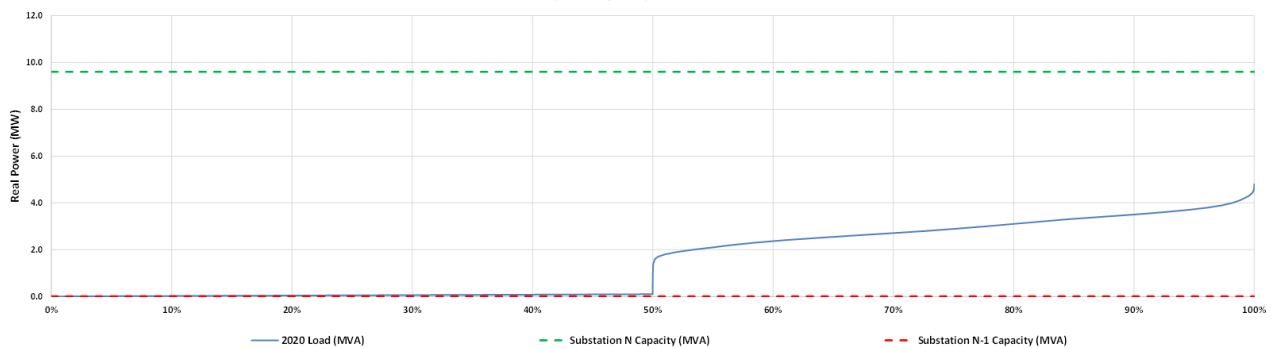
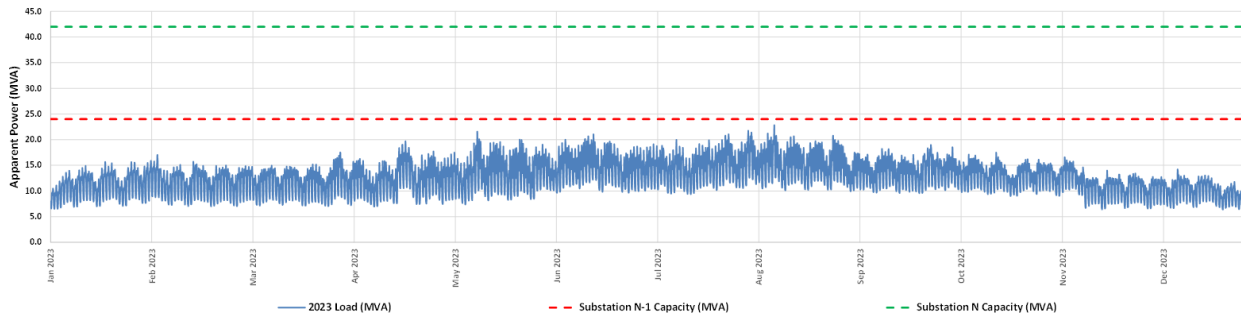


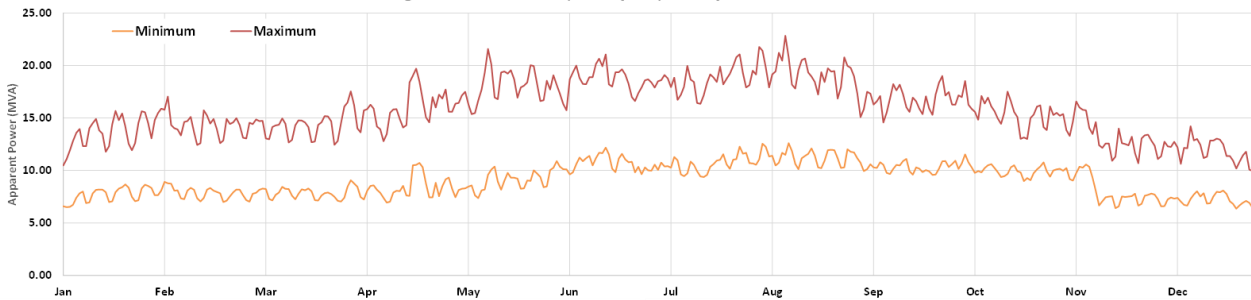
Figure 60. Bulls 33/11 kv zone substation: Real power (MW) load characteristics.

Fielding MW

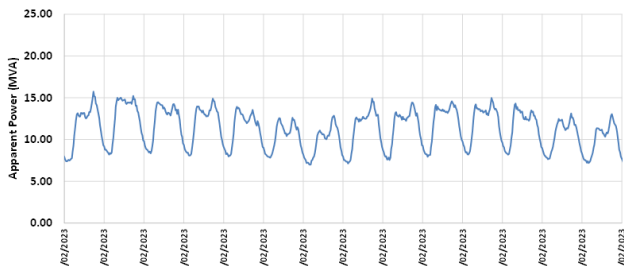
Feilding Zone Substation (2023 year) - Half hourly loading



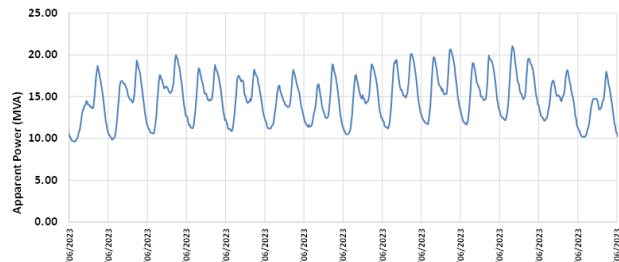
Feilding Zone Substation (2023 year) - Daily Maximum/Minimum



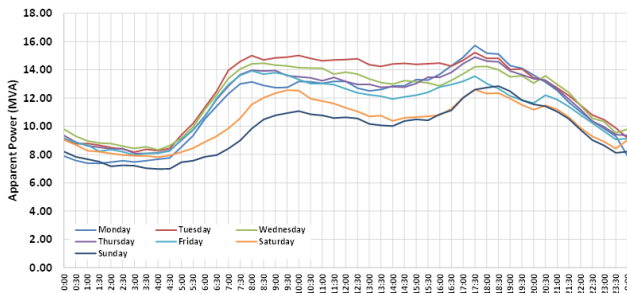
Feilding Zone Substation (2023 year) - Summer (February)



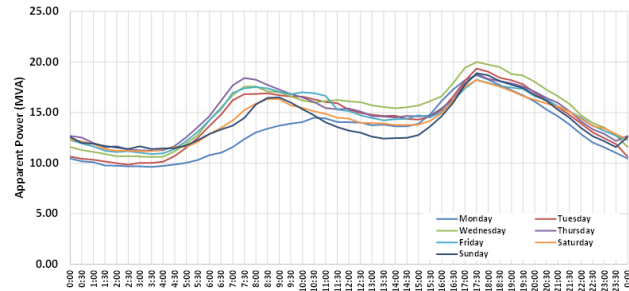
Feilding Zone Substation (2023 year) - Winter (June)



Feilding Zone Substation (2023 year) - Summer (February)



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



Feilding Zone Substation (2023 year) - Load Duration Curve

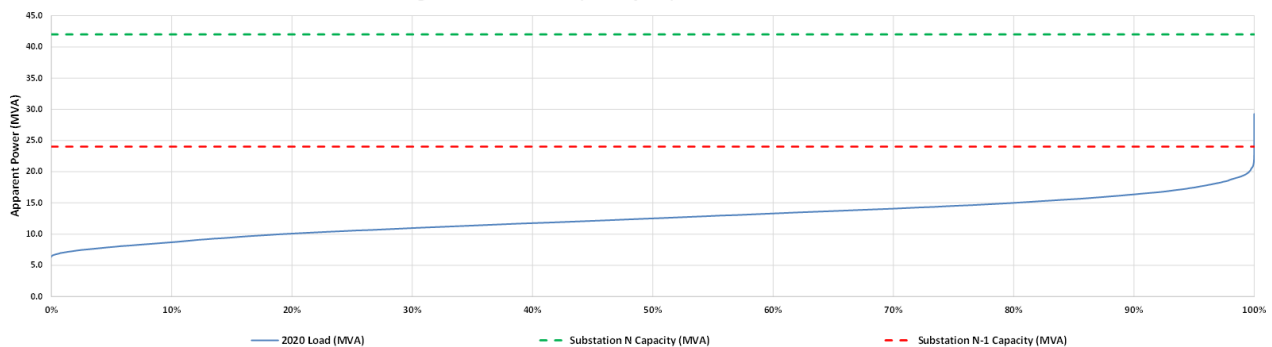
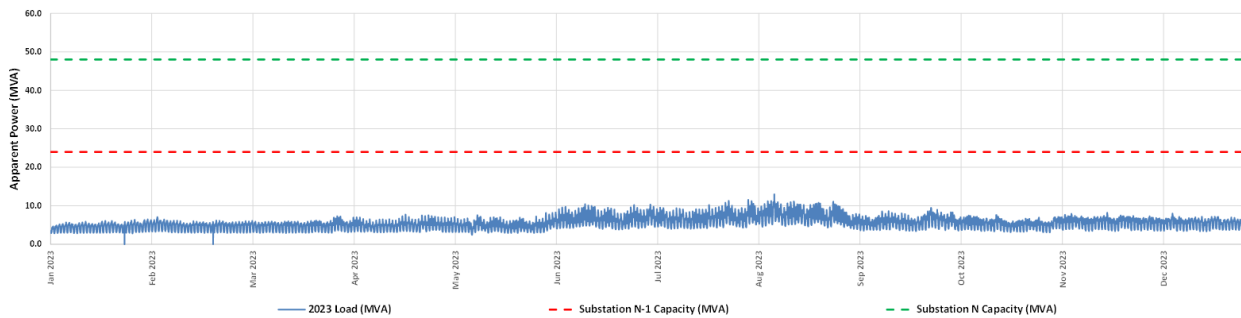


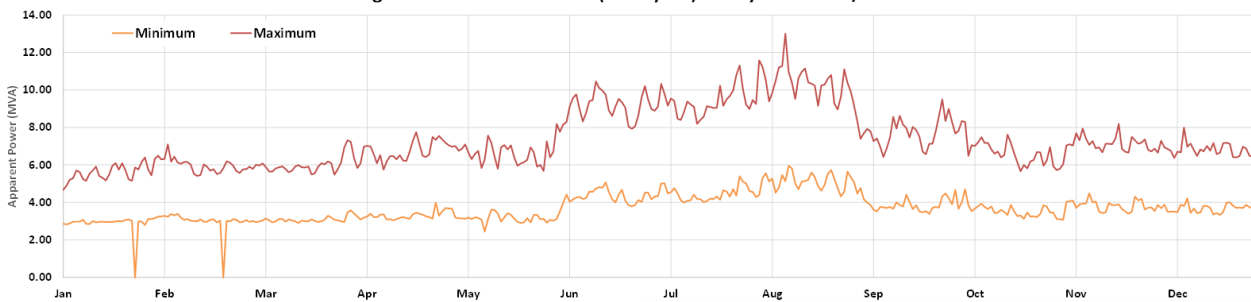
Figure 61. Fielding 33/11 kV zone substation: Real power (MW) load characteristics.

Ferguson St MW

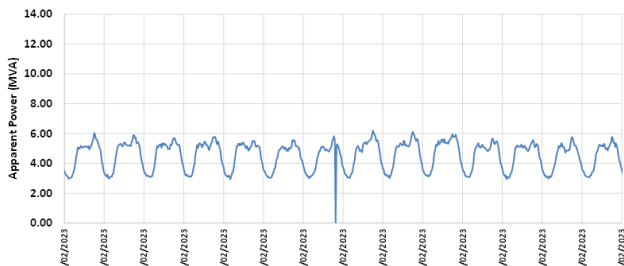
Ferguson St Zone Substation (2023 year) - Half hourly loading



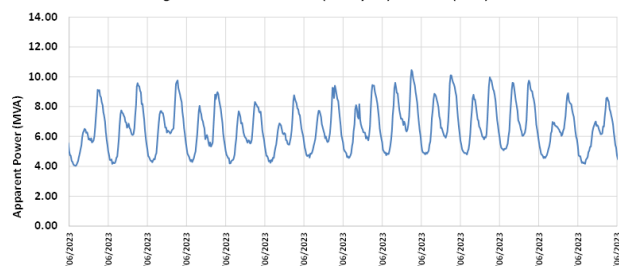
Ferguson St Zone Substation (2023 year) - Daily Maximum/Minimum



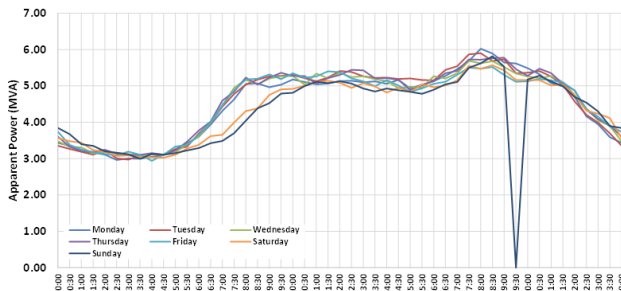
Ferguson St Zone Substation (2023 year) - Summer (February)



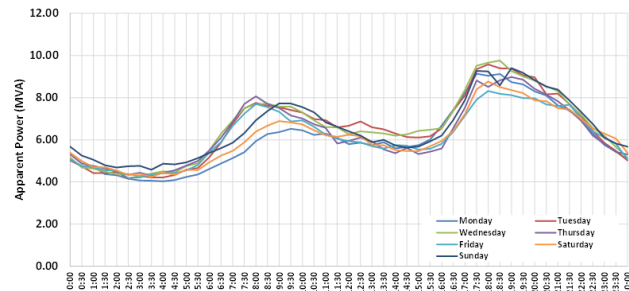
Ferguson St Zone Substation (2023 year) - Winter (June)



Ferguson St Zone Substation (2023 year) - Summer (February)



Ferguson St Zone Substation (2023 year) - Winter (June)



Ferguson St Zone Substation (2023 year) - Load Duration Curve

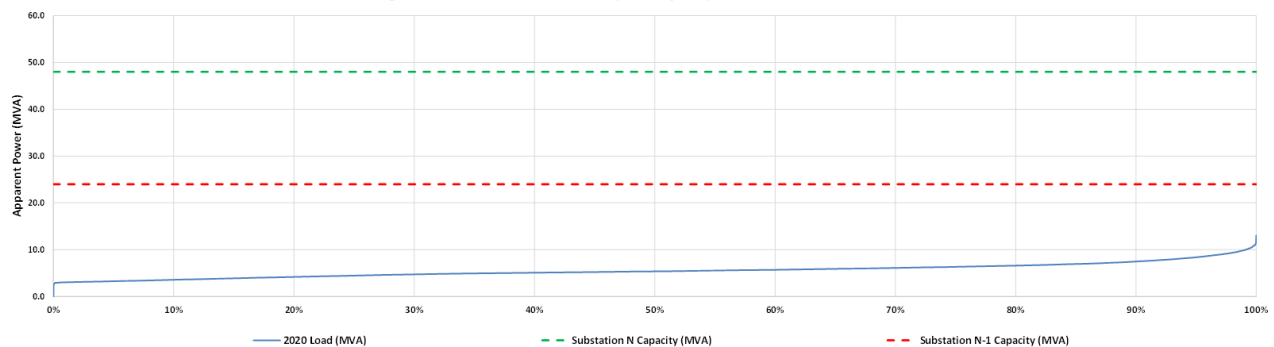
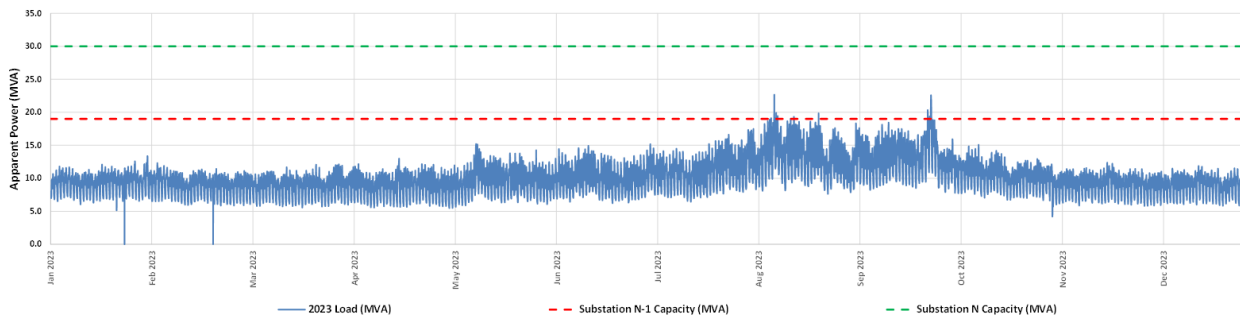


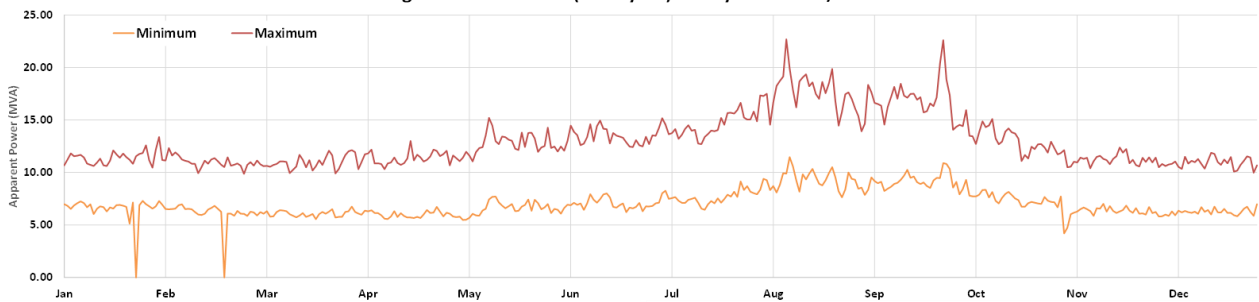
Figure 62. Ferguson St 33/11 kV zone substation: Real power (MW) load characteristics.

Kairanga MW

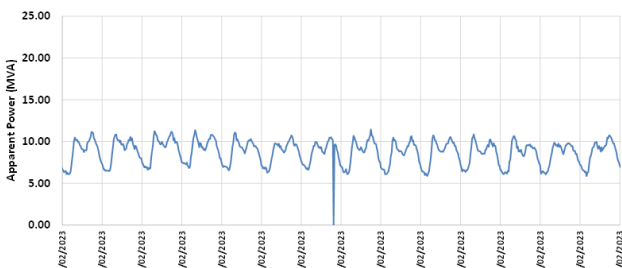
Kairanga Zone Substation (2023 year) - Half hourly loading



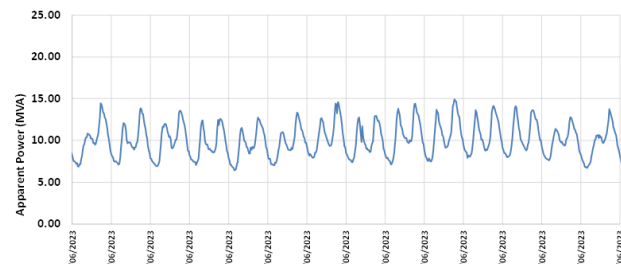
Kairanga Zone Substation (2023 year) - Daily Maximum/Minimum



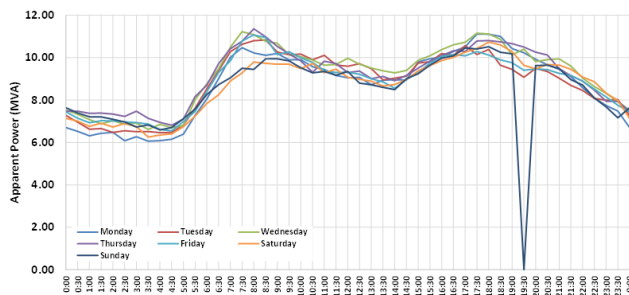
Kairanga Zone Substation (2023 year) - Summer (February)



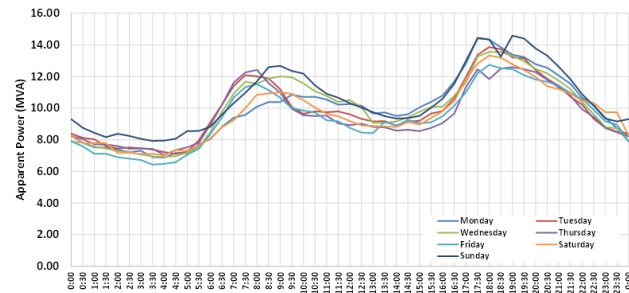
Kairanga Zone Substation (2023 year) - Winter (June)



Kairanga Zone Substation (2023 year) - Summer (February)



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



Kairanga Zone Substation (2023 year) - Load Duration Curve

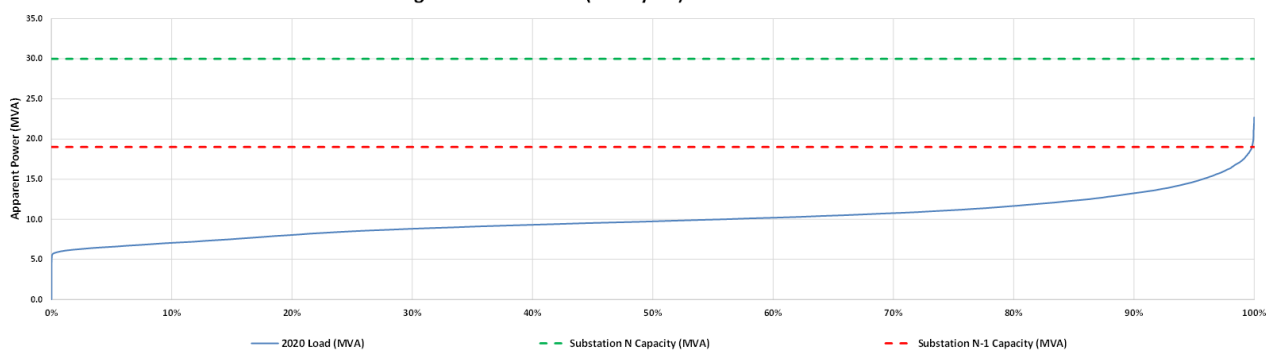
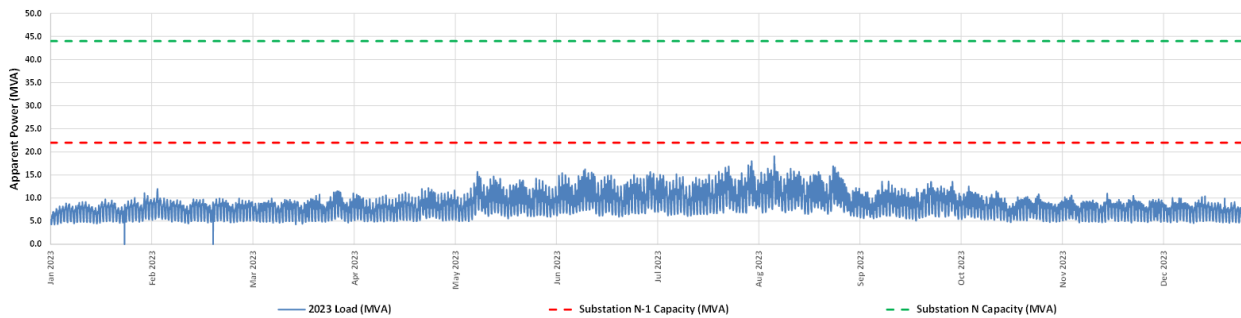


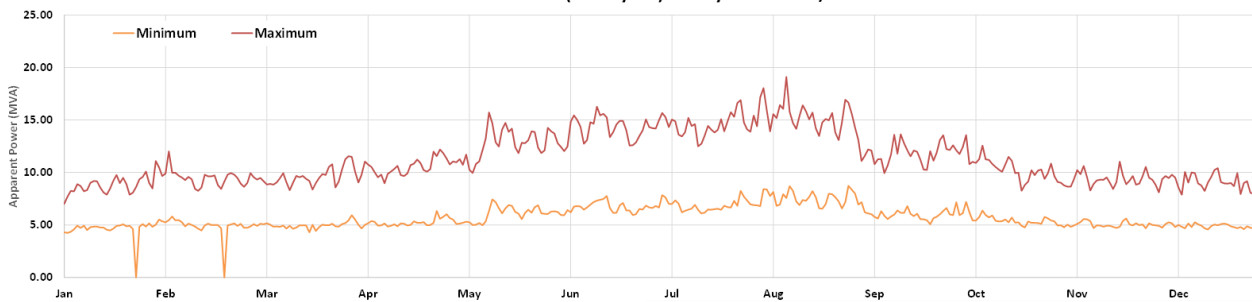
Figure 63. Kairanga 33/11 kV zone substation: Real power (MW) load characteristics.

Keith St MW

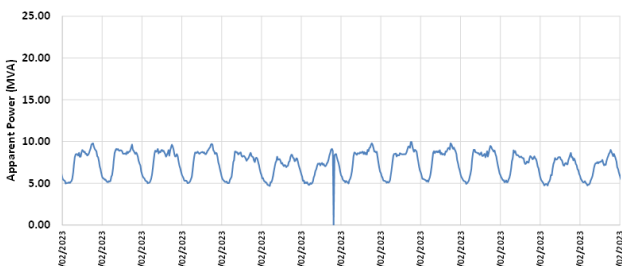
Keith St Zone Substation (2023 year) - Half hourly loading



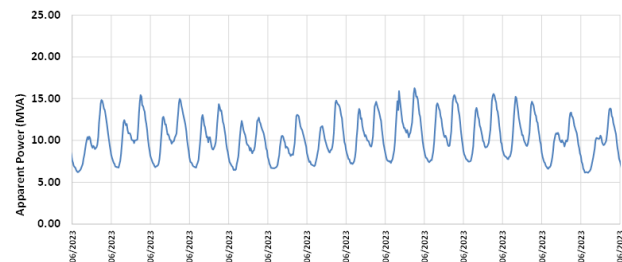
Keith St Zone Substation (2023 year) - Daily Maximum/Minimum



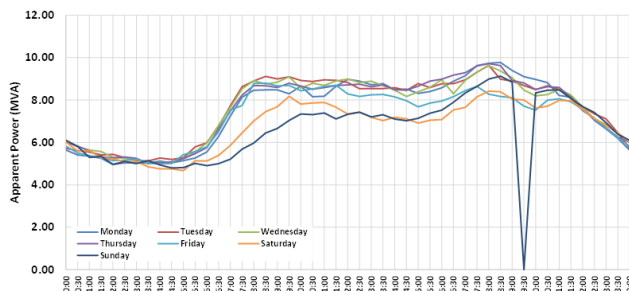
Keith St Zone Substation (2023 year) - Summer (February)



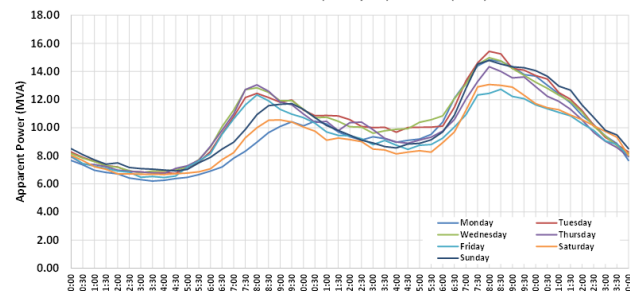
Keith St Zone Substation (2023 year) - Winter (June)



Keith St Zone Substation (2023 year) - Summer (February)



Keith St Zone Substation (2023 year) - Winter (June)



Keith St Zone Substation (2023 year) - Load Duration Curve

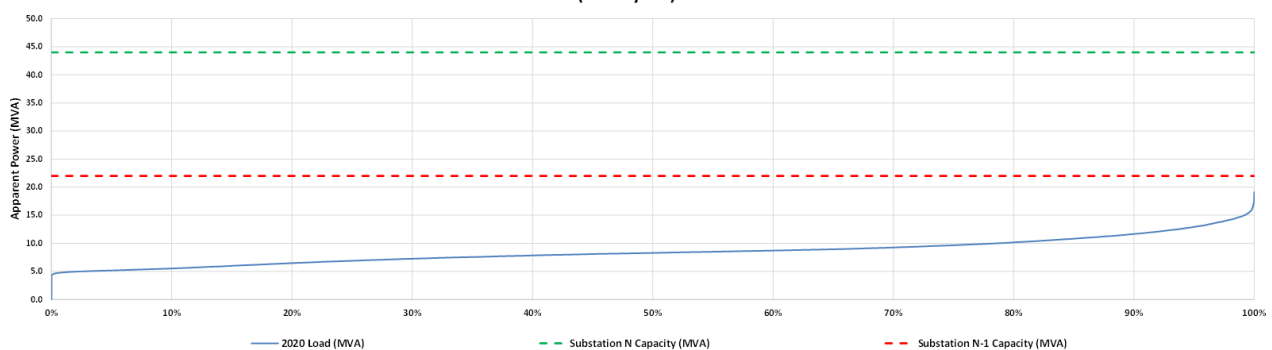
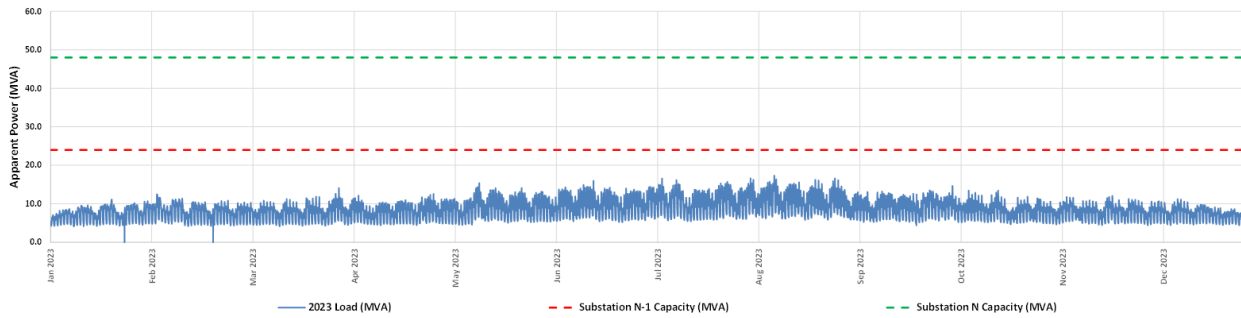


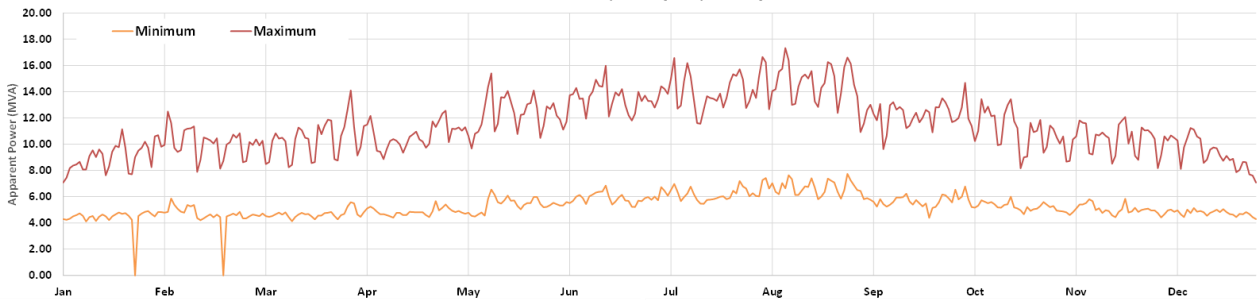
Figure 64. Keith St 33/11 kV zone substation: Real power (MW) load characteristics.

Kelvin Grove MW

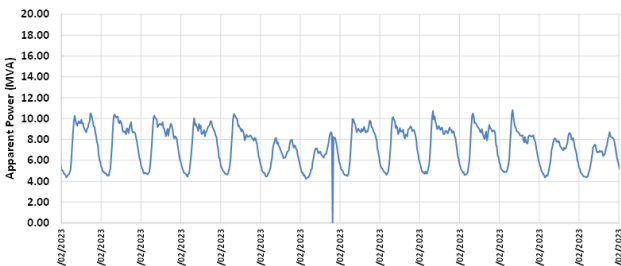
Kelvin Grove Zone Substation (2023 year) - Half hourly loading



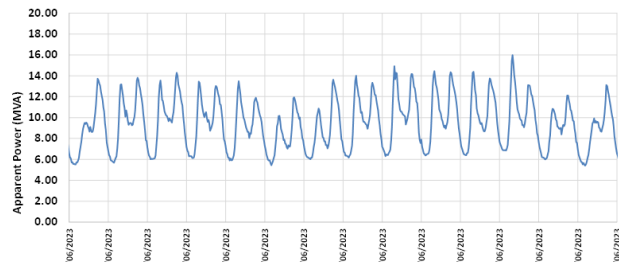
Kelvin Grove Zone Substation (2023 year) - Daily Maximum/Minimum



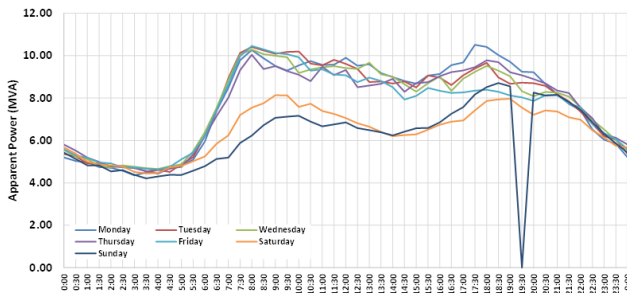
Kelvin Grove Zone Substation (2023 year) - Summer (February)



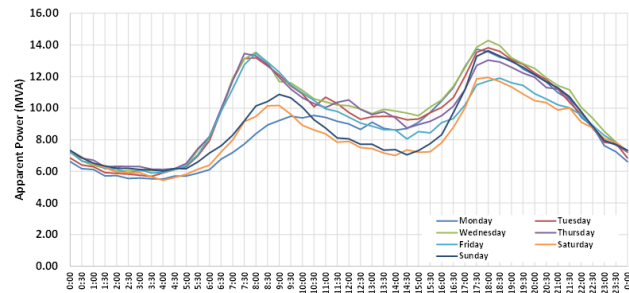
Kelvin Grove Zone Substation (2023 year) - Winter (June)



Kelvin Grove Zone Substation (2023 year) - Summer (February)



Kelvin Grove Zone Substation (2023 year) - Winter (June)



Kelvin Grove Zone Substation (2023 year) - Load Duration Curve

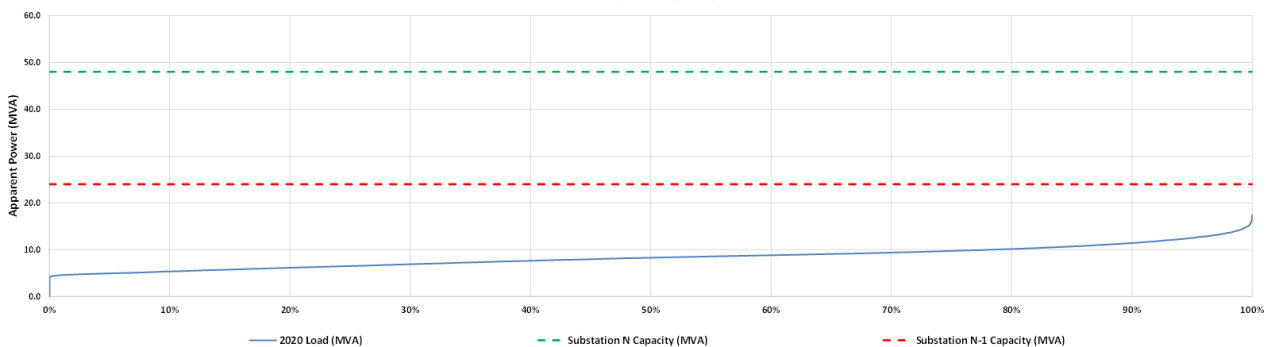
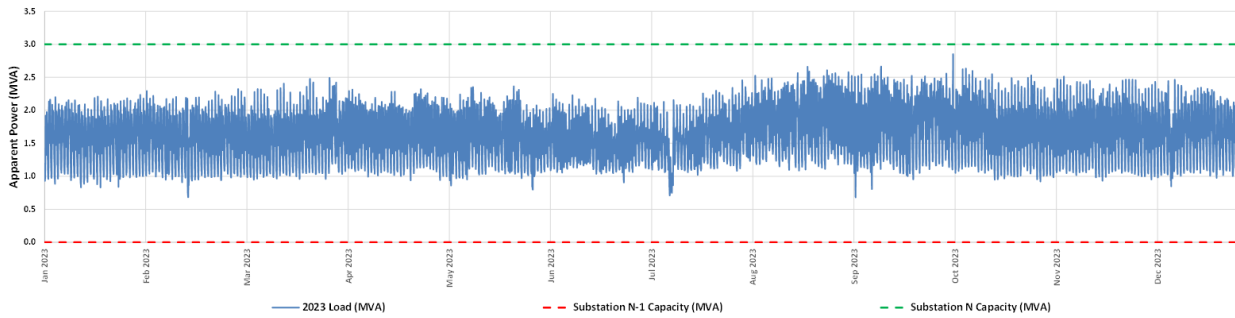


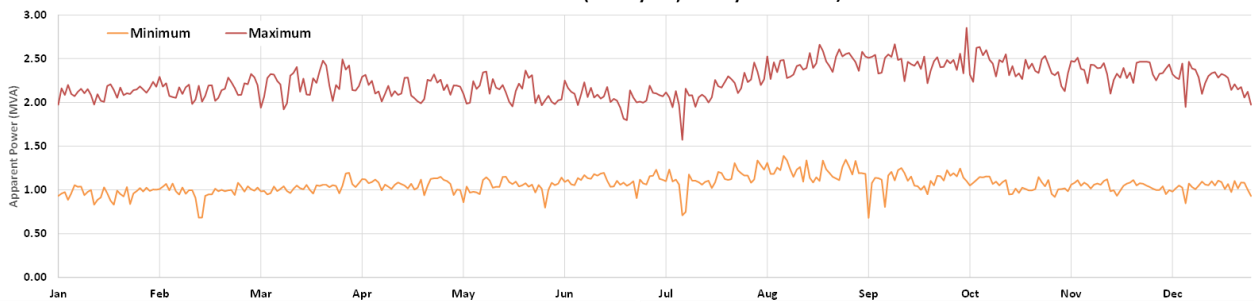
Figure 65. Kelvin Grove 33/11 kV zone substation: Real power (MW) load characteristics.

Kimbolton MW

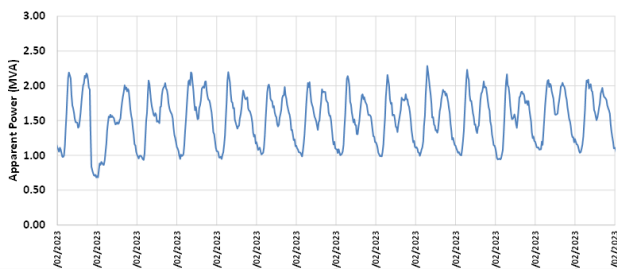
Kimbolton Zone Substation (2023 year) - Half hourly loading



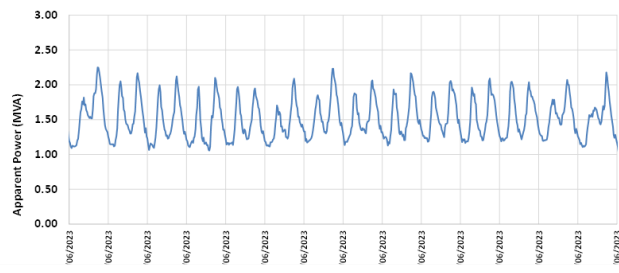
Kimbolton Zone Substation (2023 year) - Daily Maximum/Minimum



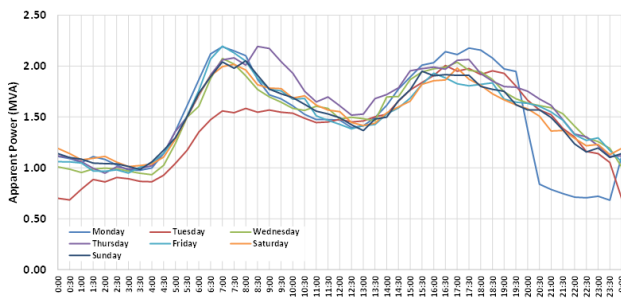
Kimbolton Zone Substation (2023 year) - Summer (February)



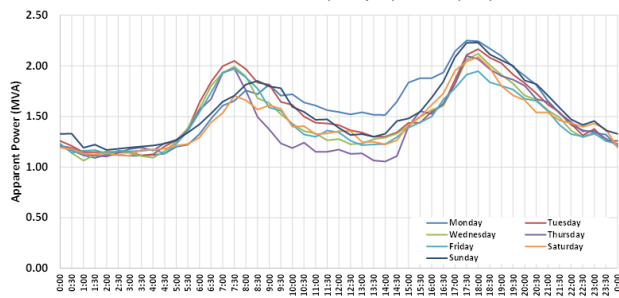
Kimbolton Zone Substation (2023 year) - Winter (June)



Kimbolton Zone Substation (2023 year) - Summer (February)



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



Kimbolton Zone Substation (2023 year) - Load Duration Curve

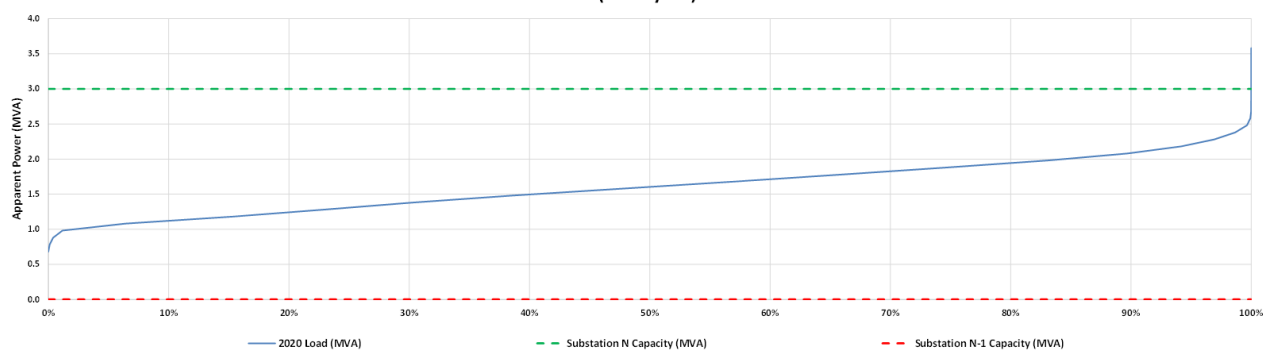
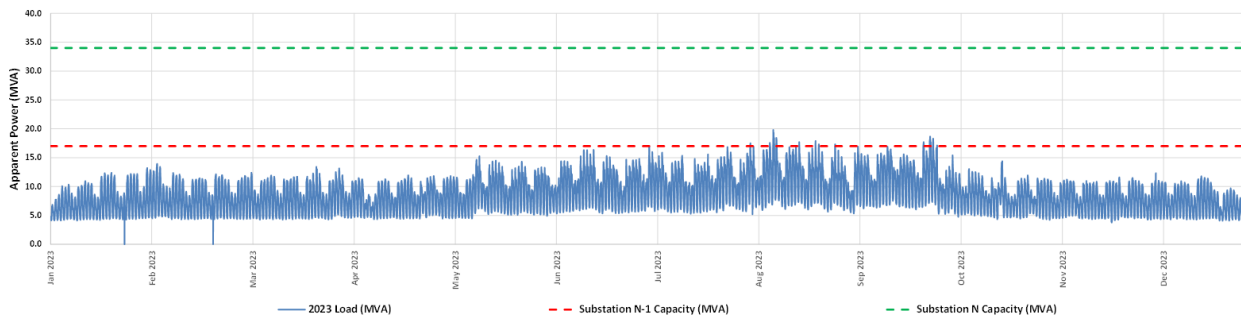


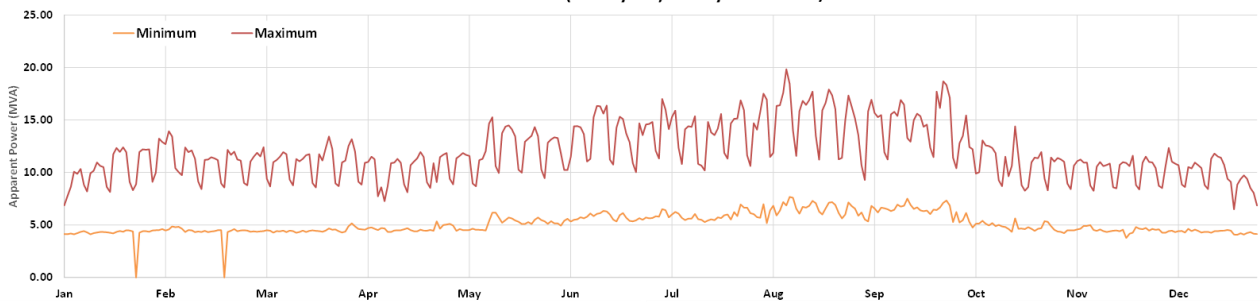
Figure 66. Kimbolton 33/11 kV zone substation: Real power (MW) load characteristics.

Main St MW

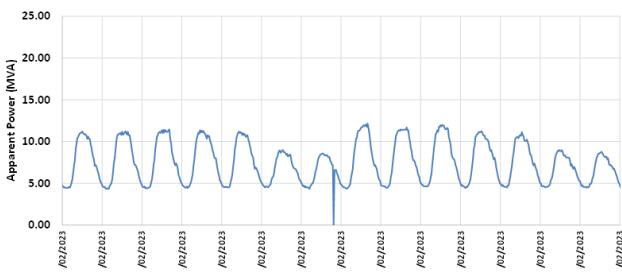
Main St Zone Substation (2023 year) - Half hourly loading



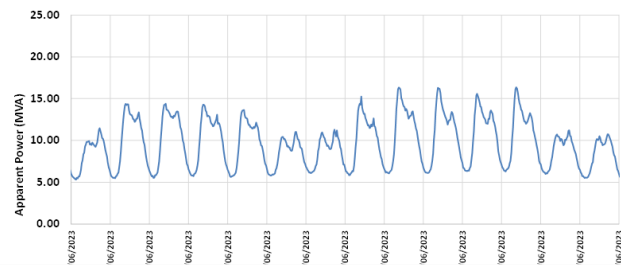
Main St Zone Substation (2023 year) - Daily Maximum/Minimum



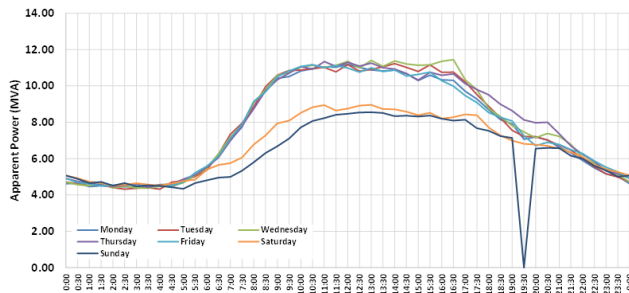
Main St Zone Substation (2023 year) - Summer (February)



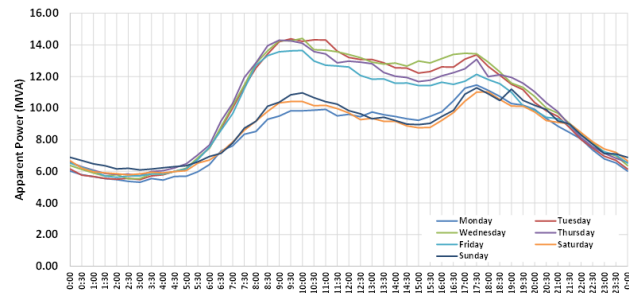
Main St Zone Substation (2023 year) - Winter (June)



Main St Zone Substation (2023 year) - Summer (February)



Main St Zone Substation (2023 year) - Winter (June)



Main St Zone Substation (2023 year) - Load Duration Curve

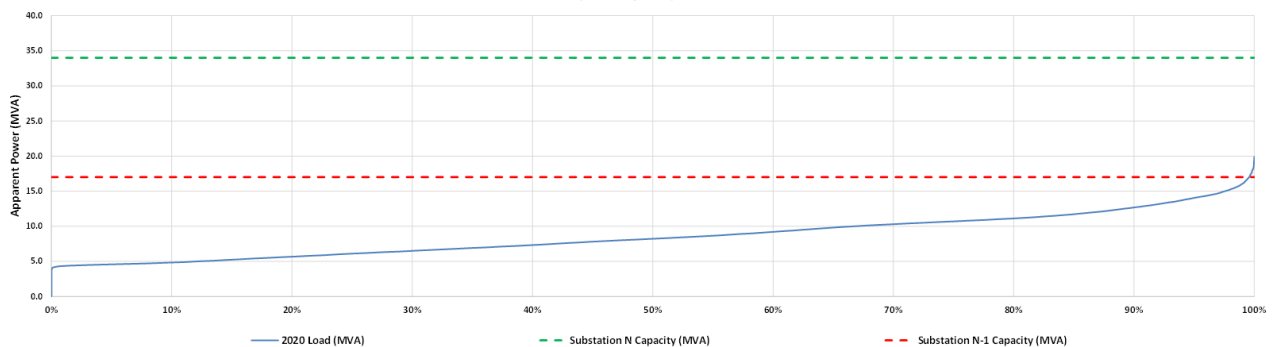
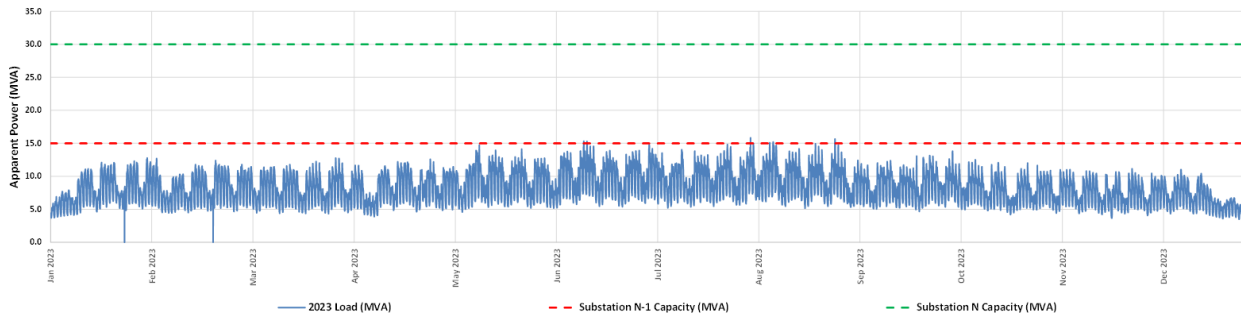


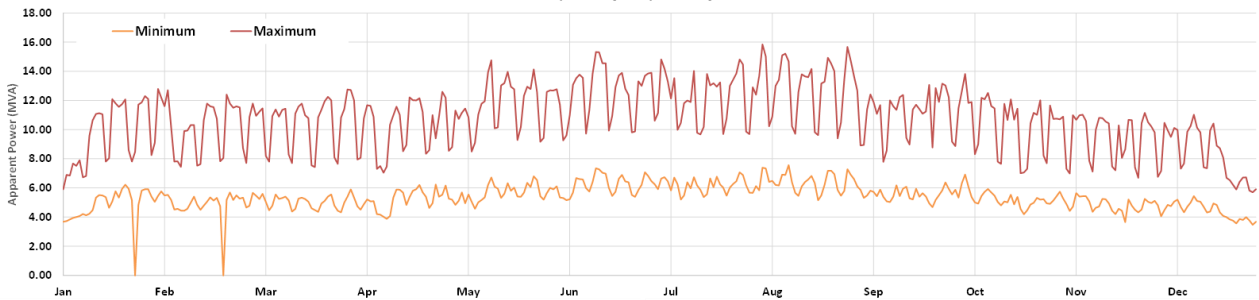
Figure 67. Main St 33/11 kv zone substation: Real power (MW) load characteristics.

Milson MW

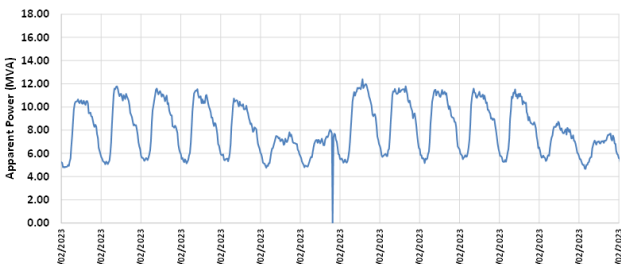
Milson Zone Substation (2023 year) - Half hourly loading



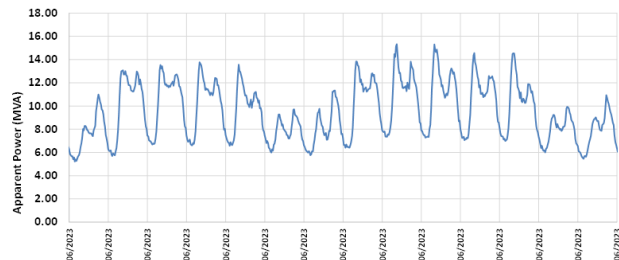
Milson Zone Substation (2023 year) - Daily Maximum/Minimum



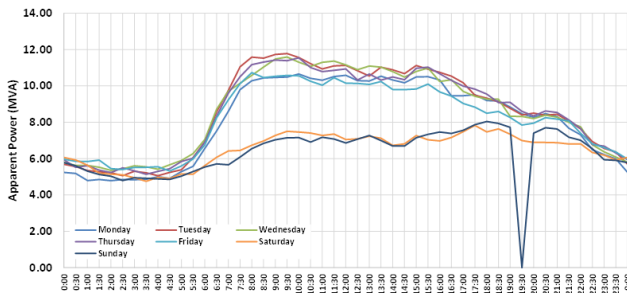
Milson Zone Substation (2023 year) - Summer (February)



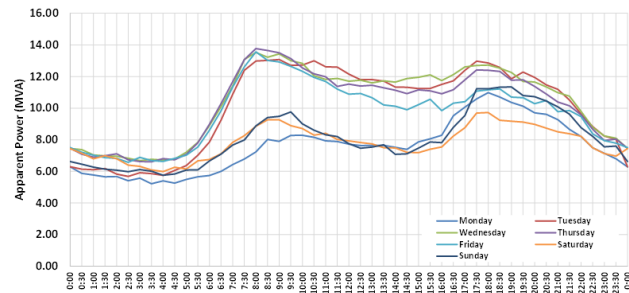
Milson Zone Substation (2023 year) - Winter (June)



Milson Zone Substation (2023 year) - Summer (February)



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



Milson Zone Substation (2023 year) - Load Duration Curve

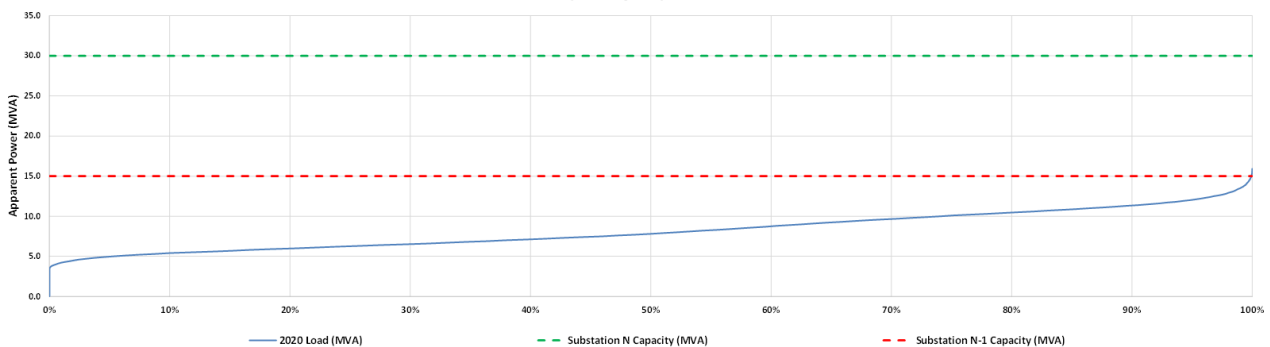
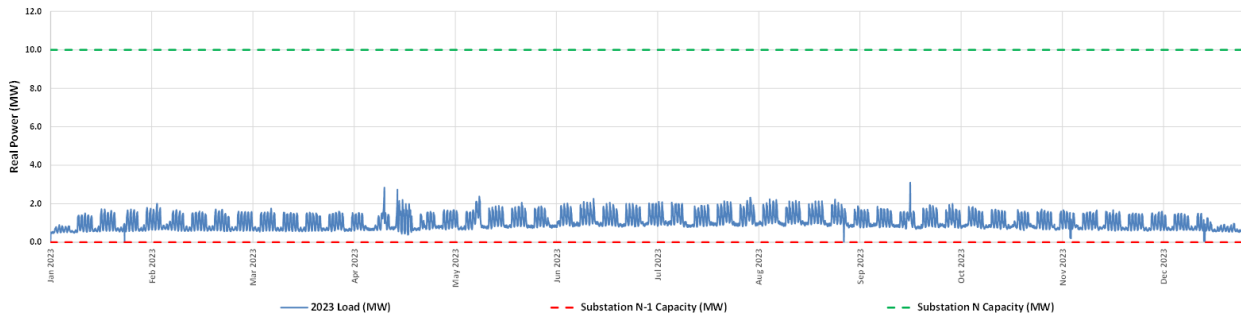


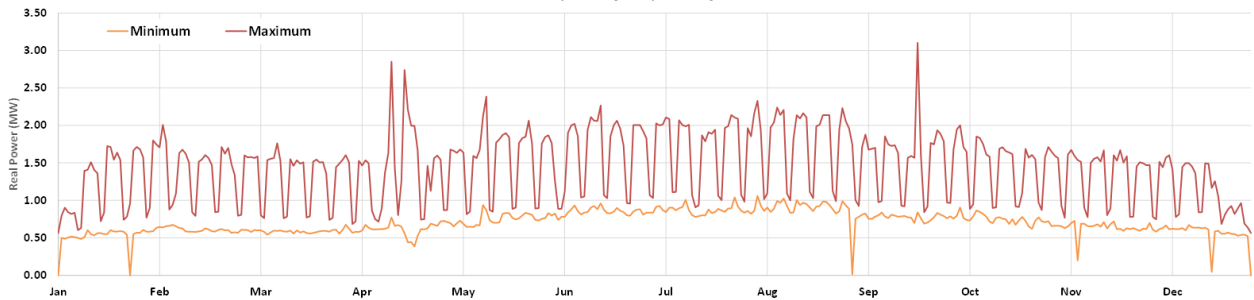
Figure 68. Milson 33/11 kV zone substation: Real power (MW) load characteristics.

Ōhakea MW

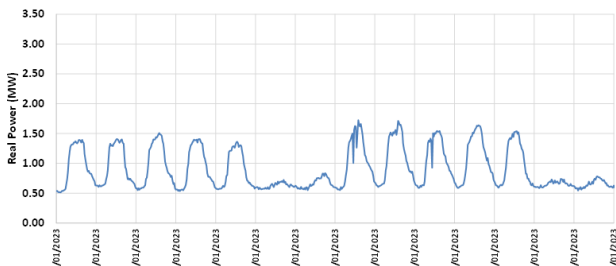
Ōhakea Zone Substation (2023 year) - Half hourly loading



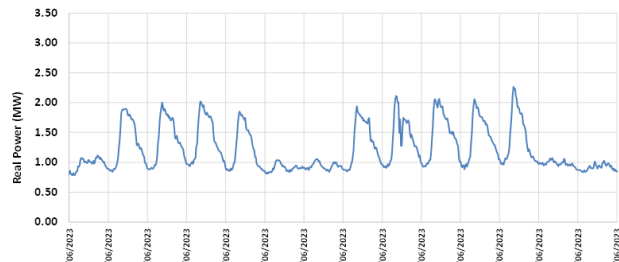
Ōhakea Zone Substation (2023 year) - Daily Maximum/Minimum



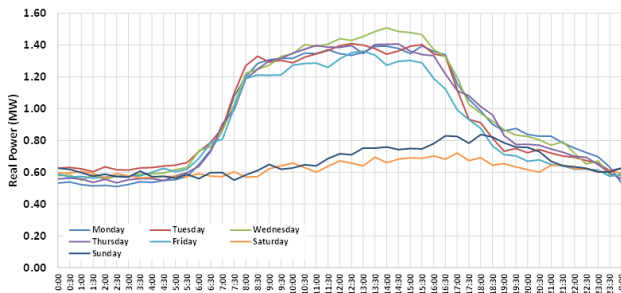
Ōhakea Zone Substation (2023 year) - Summer (January)



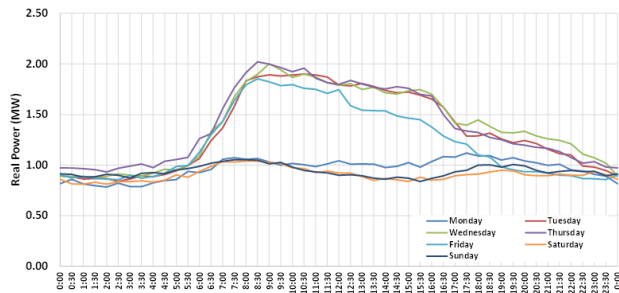
Ōhakea Zone Substation (2023 year) - Winter (June)



Ōhakea Zone Substation (2023 year) - Summer (January)



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



Ōhakea Zone Substation (2023 year) - Load Duration Curve

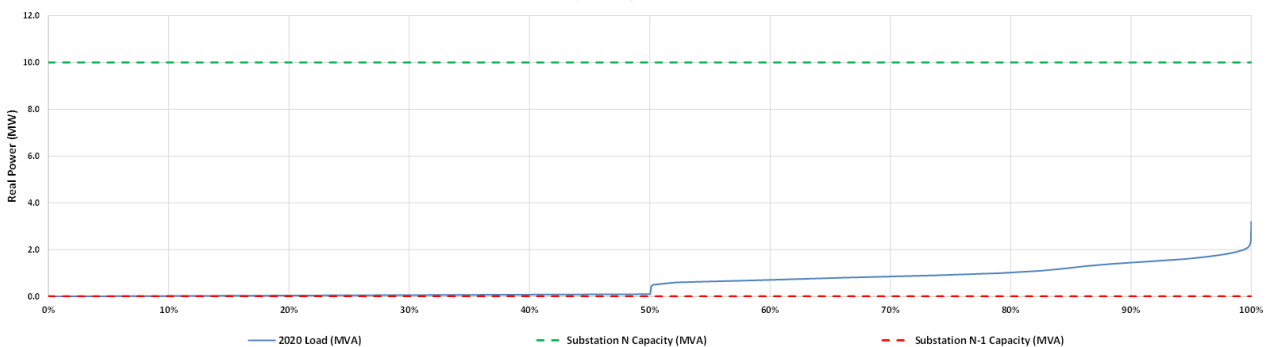
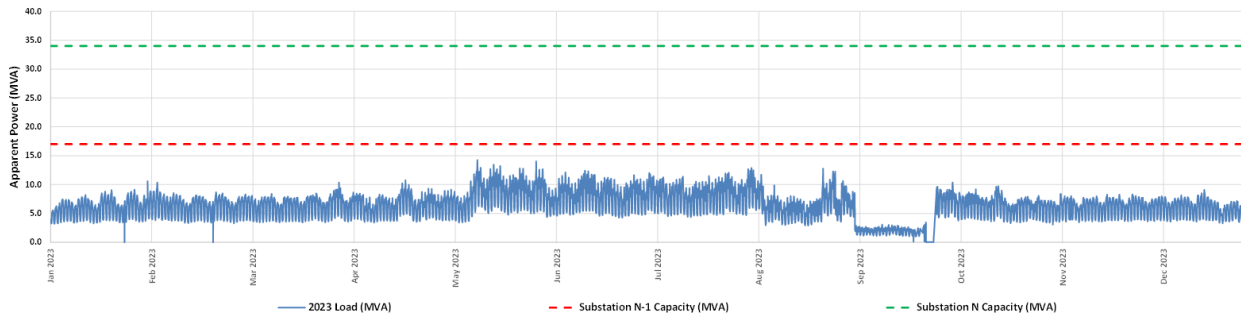


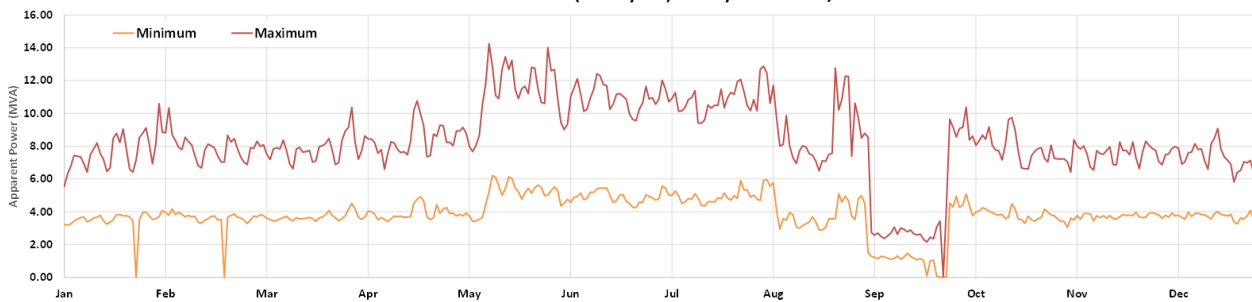
Figure 69. Ōhakea 33/11 kV zone substation: Real power (MW) load characteristics.

Pascal St MW

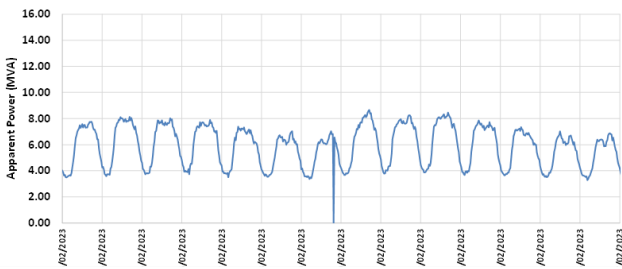
Pascal St Zone Substation (2023 year) - Half hourly loading



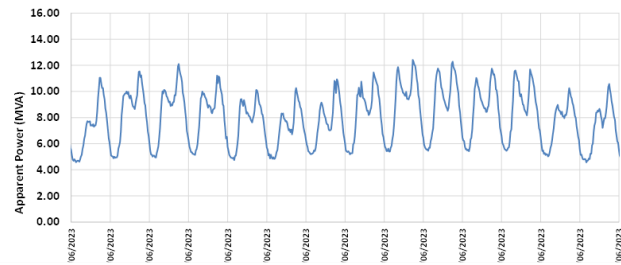
Pascal St Zone Substation (2023 year) - Daily Maximum/Minimum



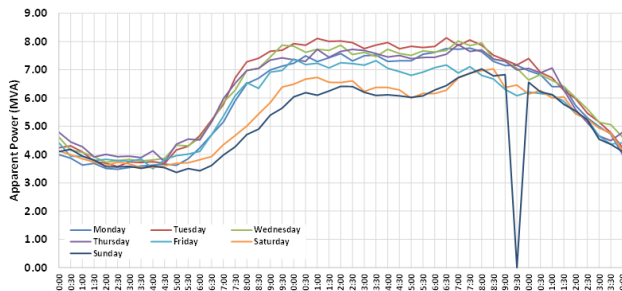
Pascal St Zone Substation (2023 year) - Summer (February)



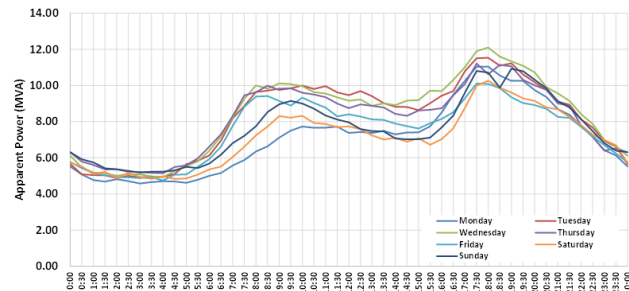
Pascal St Zone Substation (2023 year) - Winter (June)



Pascal St Zone Substation (2023 year) - Summer (February)



Pascal St Zone Substation (2023 year) - Winter (June)



Pascal St Zone Substation (2023 year) - Load Duration Curve

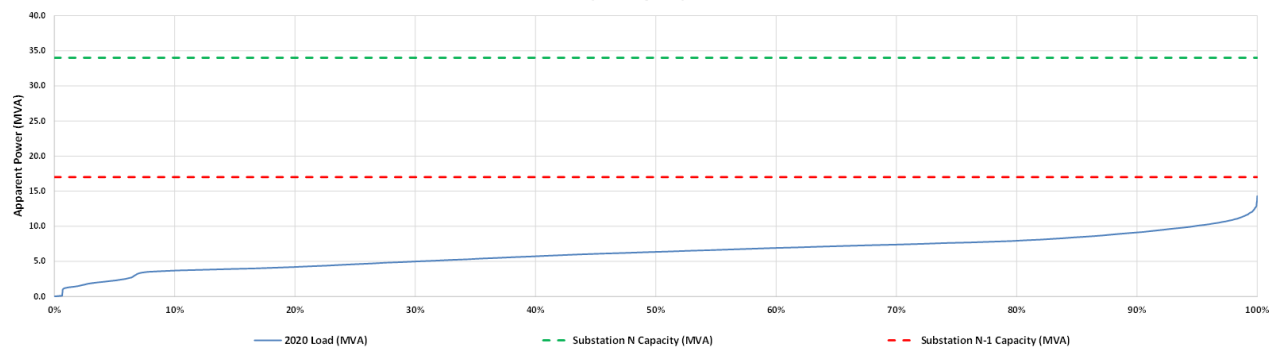
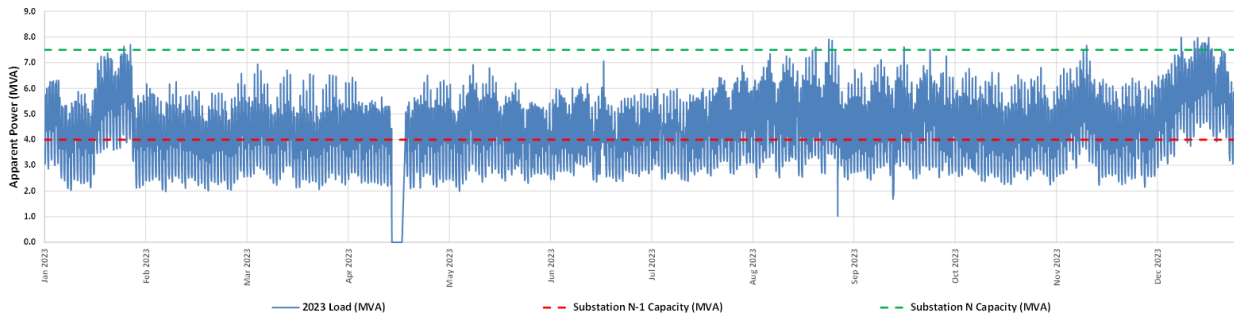


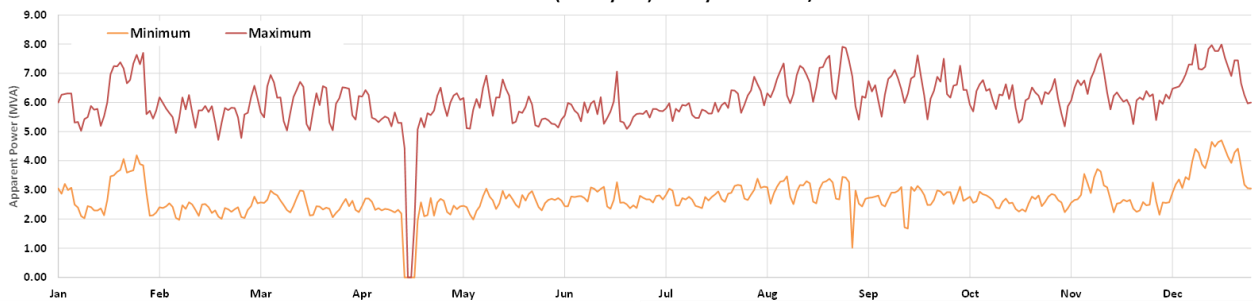
Figure 70. Pascal St 33/11 kV zone substation: Real power (MW) load characteristics.

Sanson MW

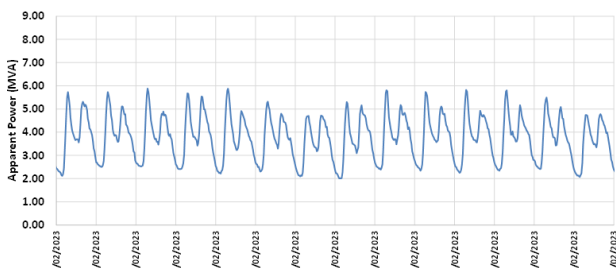
Sanson Zone Substation (2023 year) - Half hourly loading



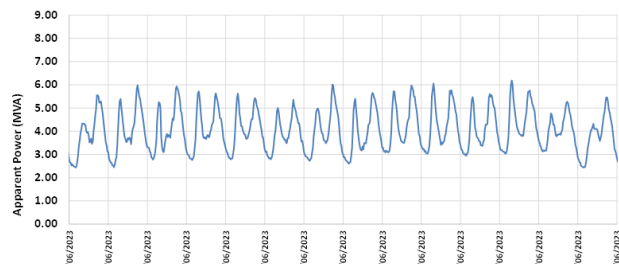
Sanson Zone Substation (2023 year) - Daily Maximum/Minimum



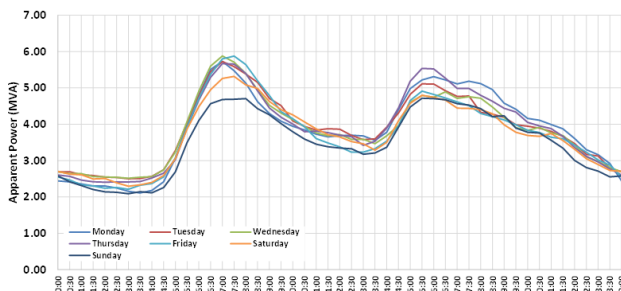
Sanson Zone Substation (2023 year) - Summer (February)



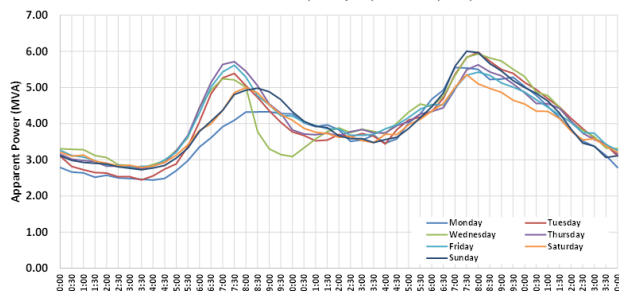
Sanson Zone Substation (2023 year) - Winter (June)



Sanson Zone Substation (2023 year) - Summer (February)



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



Sanson Zone Substation (2023 year) - Load Duration Curve

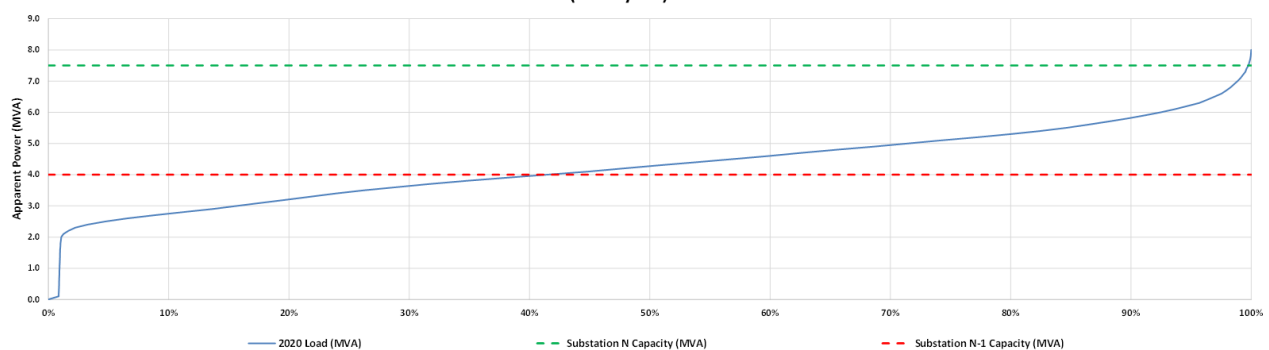
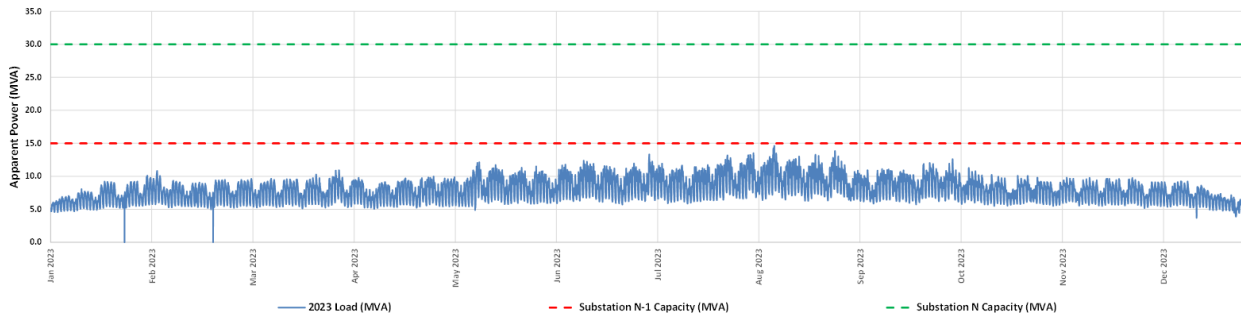


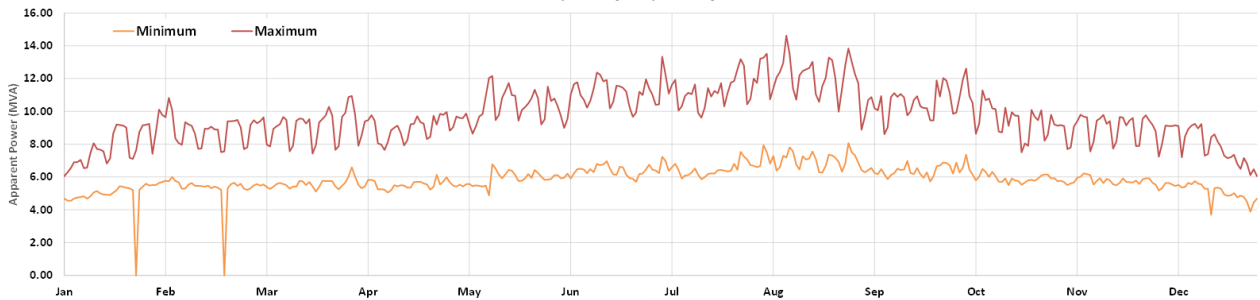
Figure 71. Sanson 33/11 kV zone substation: Real power (MW) load characteristics.

Turitea MW

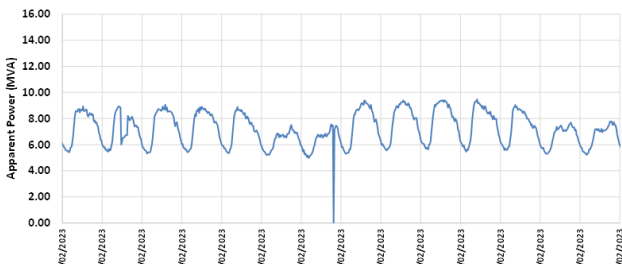
Turitea Zone Substation (2023 year) - Half hourly loading



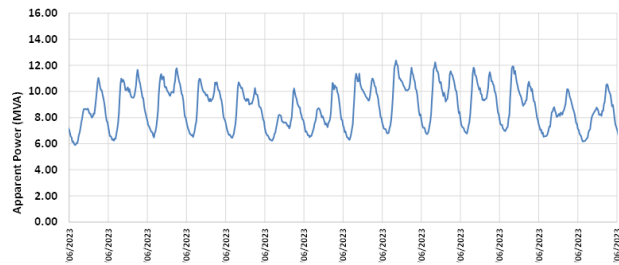
Turitea Zone Substation (2023 year) - Daily Maximum/Minimum



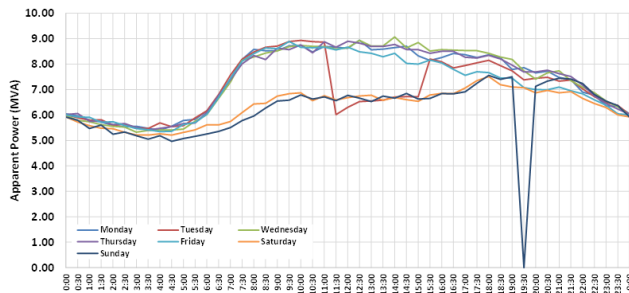
Turitea Zone Substation (2023 year) - Summer (February)



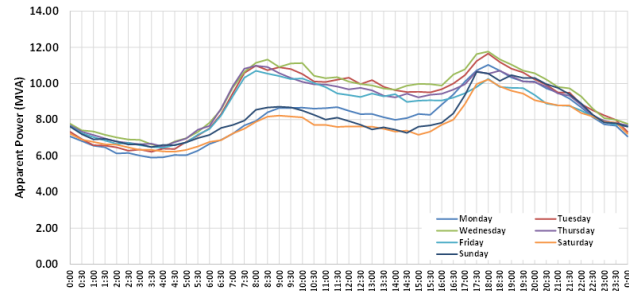
Turitea Zone Substation (2023 year) - Winter (June)



Turitea Zone Substation (2023 year) - Summer (February)



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



Turitea Zone Substation (2023 year) - Load Duration Curve

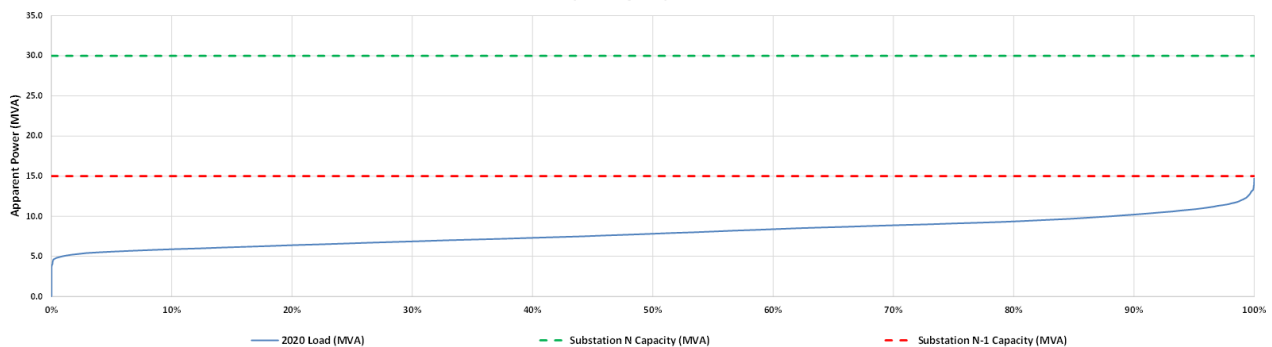


Figure 72. Turitea 33/11 kV zone substation: Real power (MW) load characteristics.

Unknown

Mangamutu MW

Figure 73. Mangamutu 33/11 kV zone substation: Real power (MW) load characteristics

Unknown

Parkville MW

Figure 74. Parkville 33/11 kV zone substation: Real power (MW) load characteristics.

Unknown

Alfredton MW

Figure 75. Alfredton 33/11 kV zone substation: Real power (MW) load characteristics

Unknown

Pongaroa MW

Figure 76. Pongaroa 33/11 kV zone substation: Real power (MW) load characteristics.

3.4 Scanpower

Scanpower does not presently own subtransmission assets or zone substations, and it takes supply at 11 kV from the two GXPs in the area (Dannevirke and Woodville). As such, no load characteristics are shown for Scanpower assets. Refer to the GXP graphs in Section 2 for these loads.