ERGO CONSULTING

Wellington Network

Supplementary Information – Substation Load Characteristics

EECA

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Document History & Status

Revision	Date	Author	Reviewed by	Approved by	Status
A	28/11/2024	C Bergervoet	K Morison	K Morison	Approved

Revision	Details
A	Approved

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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 Wellington region. This document supplements the main report titled "*Wellington – 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:

Central Park
11 kV MVA

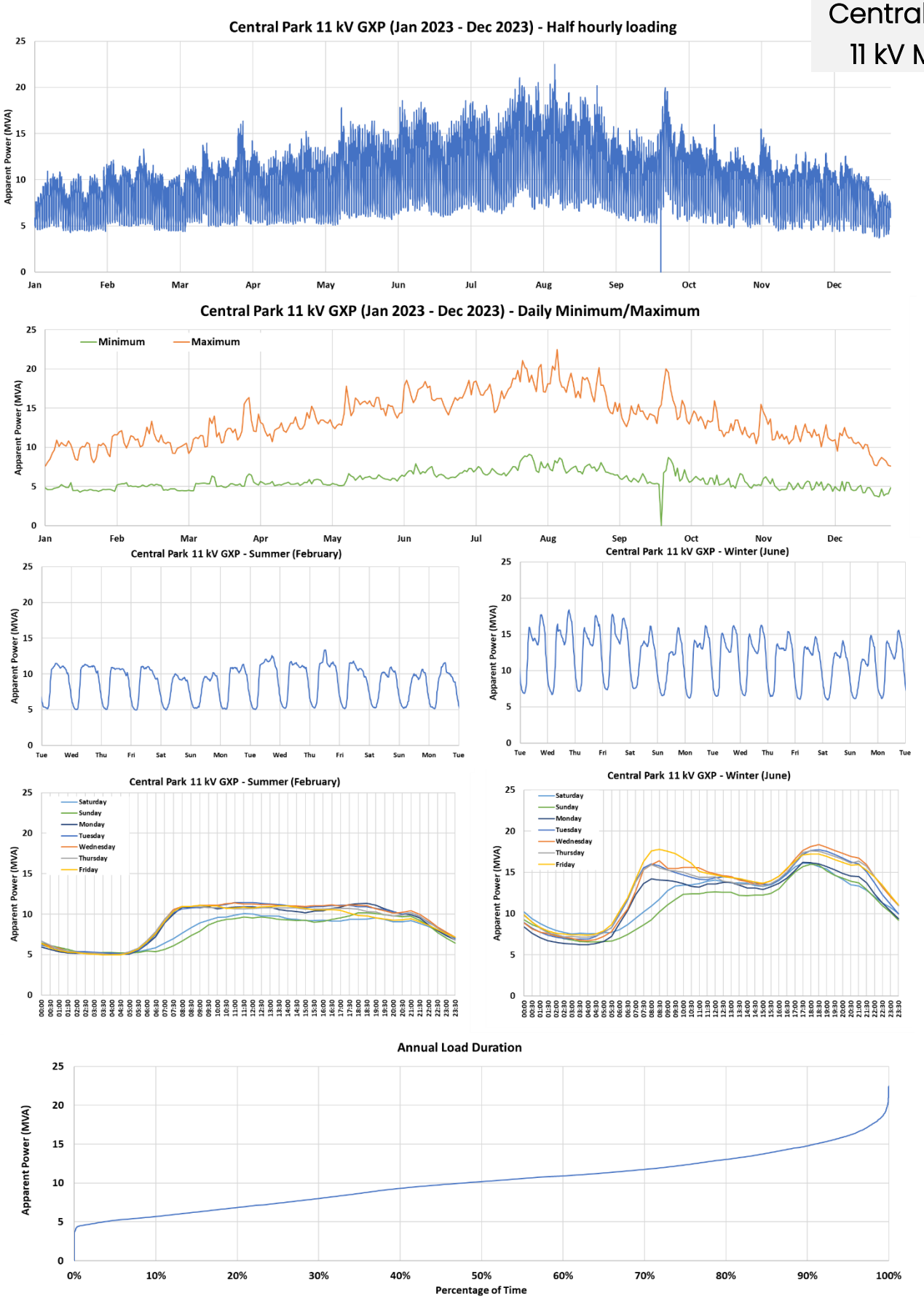

Figure 1. Central Park 11 kV GXP: Apparent Power (MVA) load characteristics

Central Park 11 kV MVAr

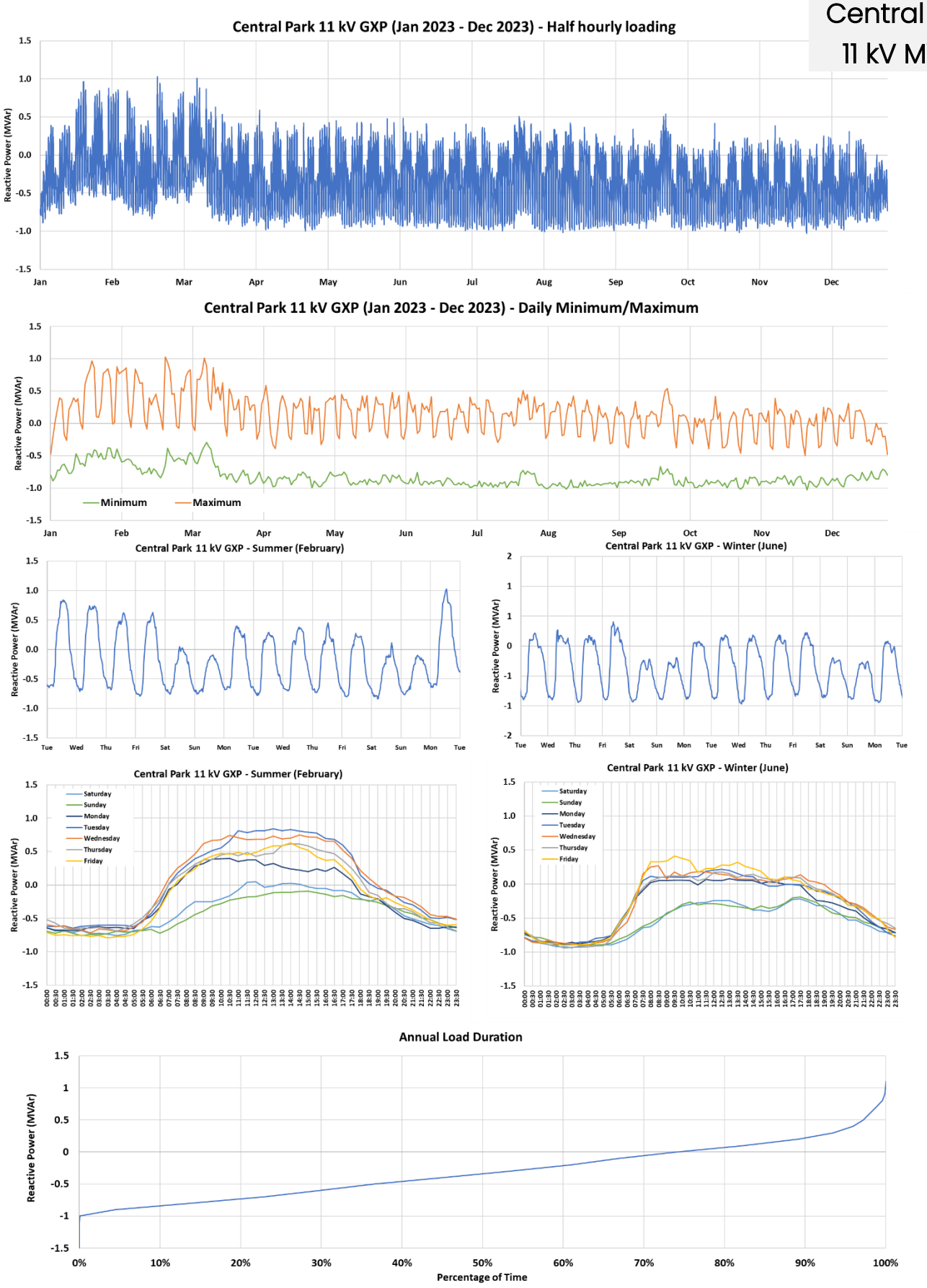

Figure 2. Central Park 11 kV GXP: Reactive Power (MVAr) load characteristics

Central Park
33 kV MVA

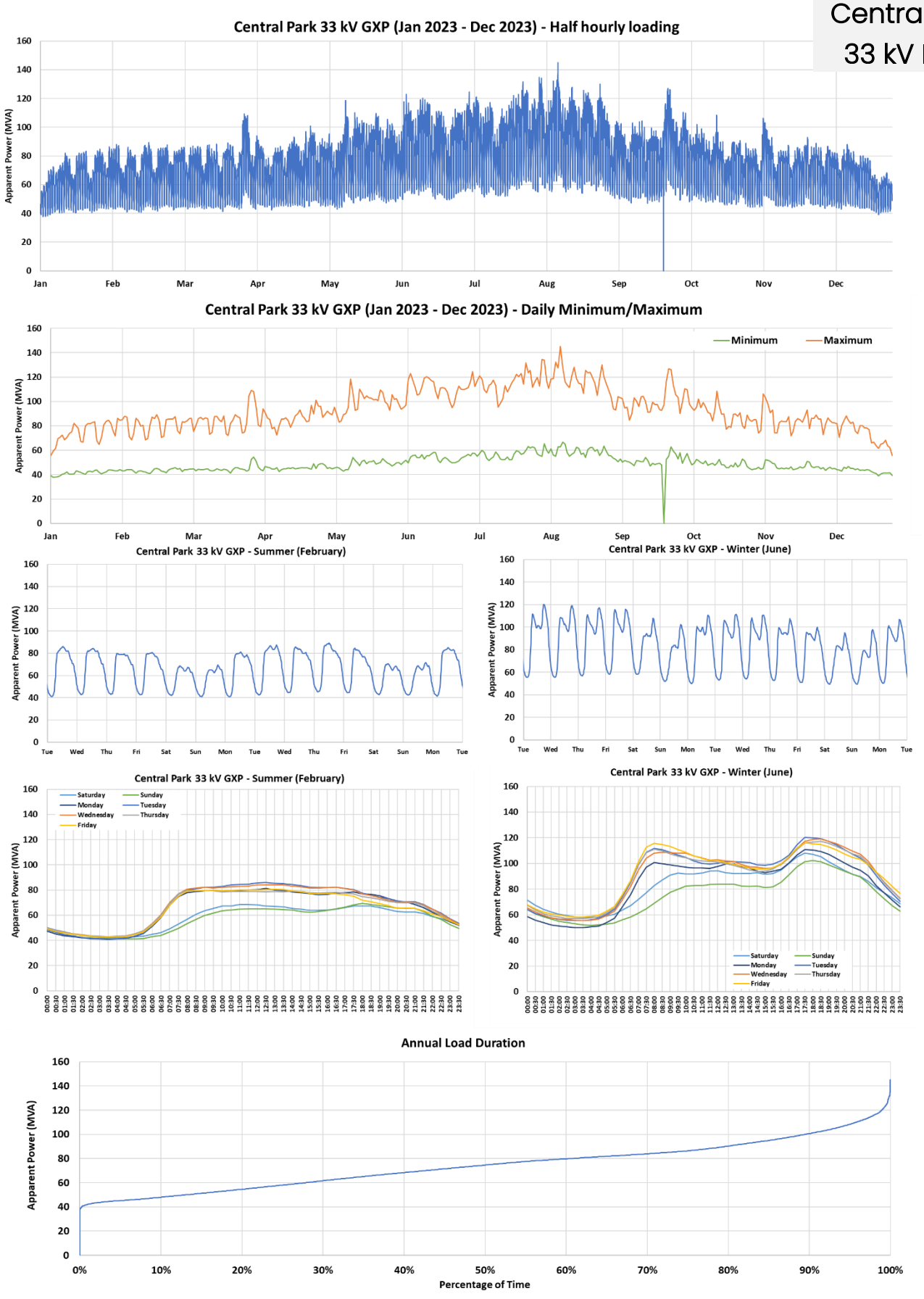

Figure 3. Central Park 33 kV GXP: Apparent Power (MVA) load characteristics

Central Park 33 kV MVAr

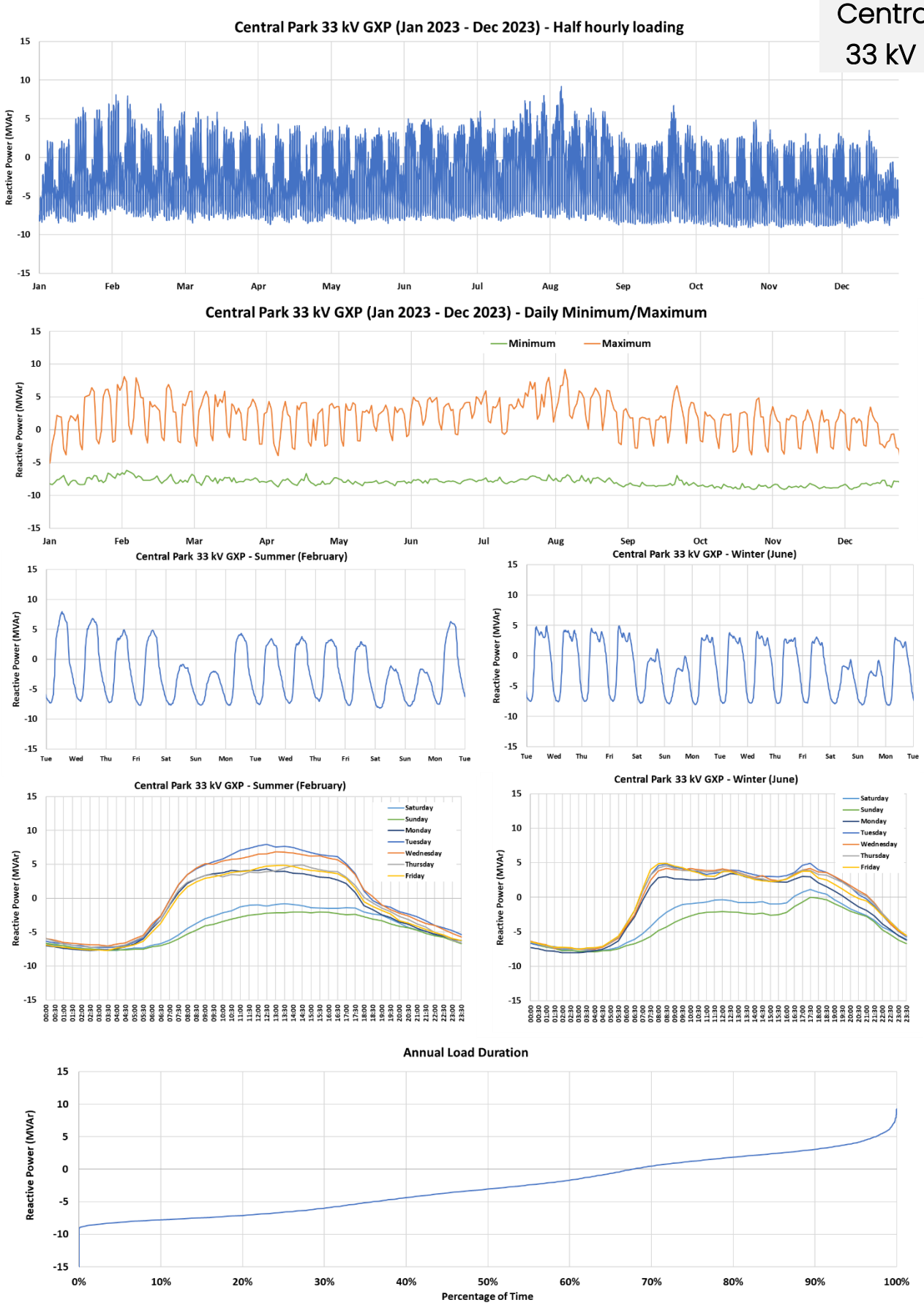

Figure 4. Central Park 33 kV GXP: Reactive Power (MVAr) load characteristics

Gracefield MVA

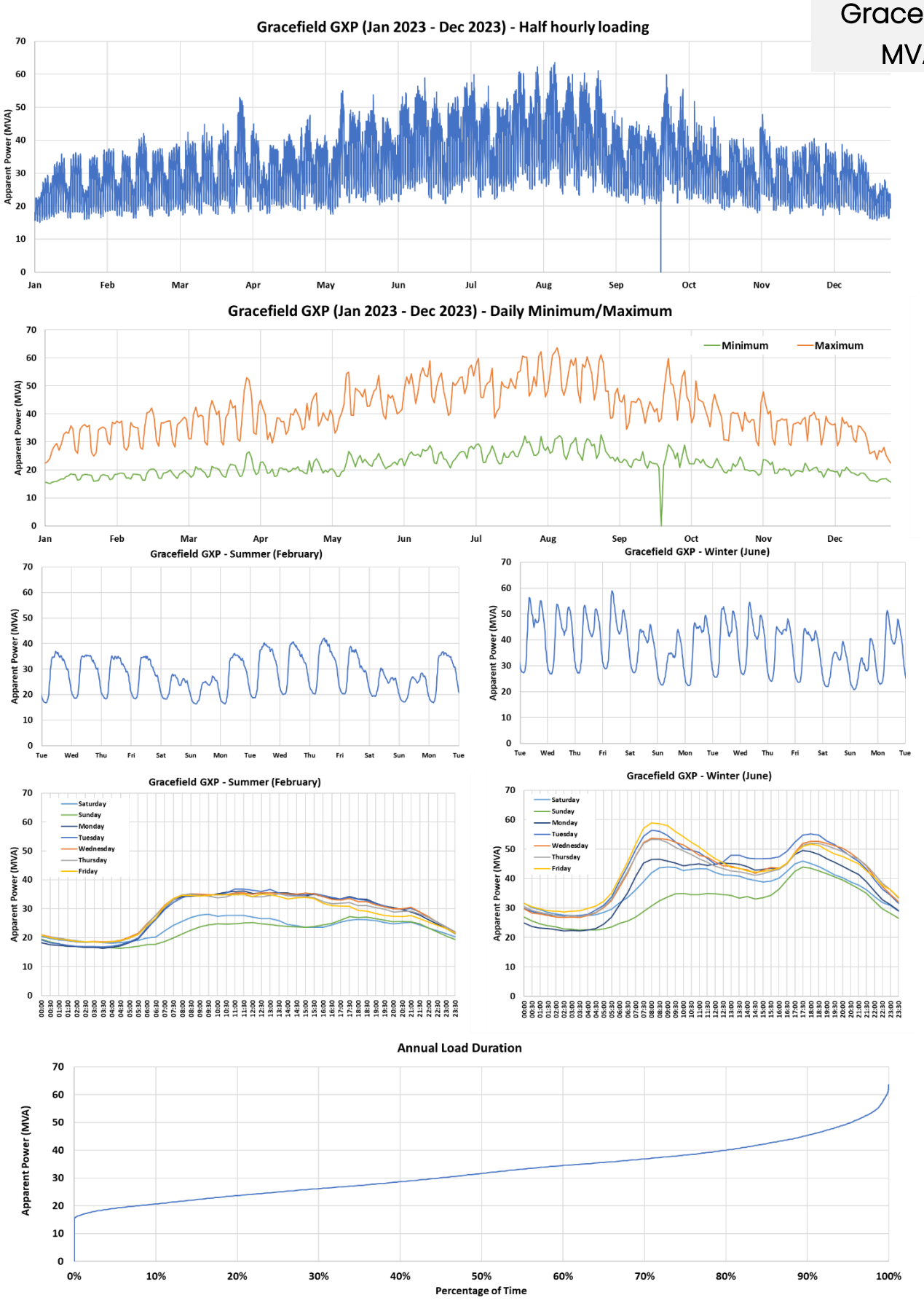

Figure 5. Gracefield GXP: Apparent Power (MVA) load characteristics

Gracefield MVAr

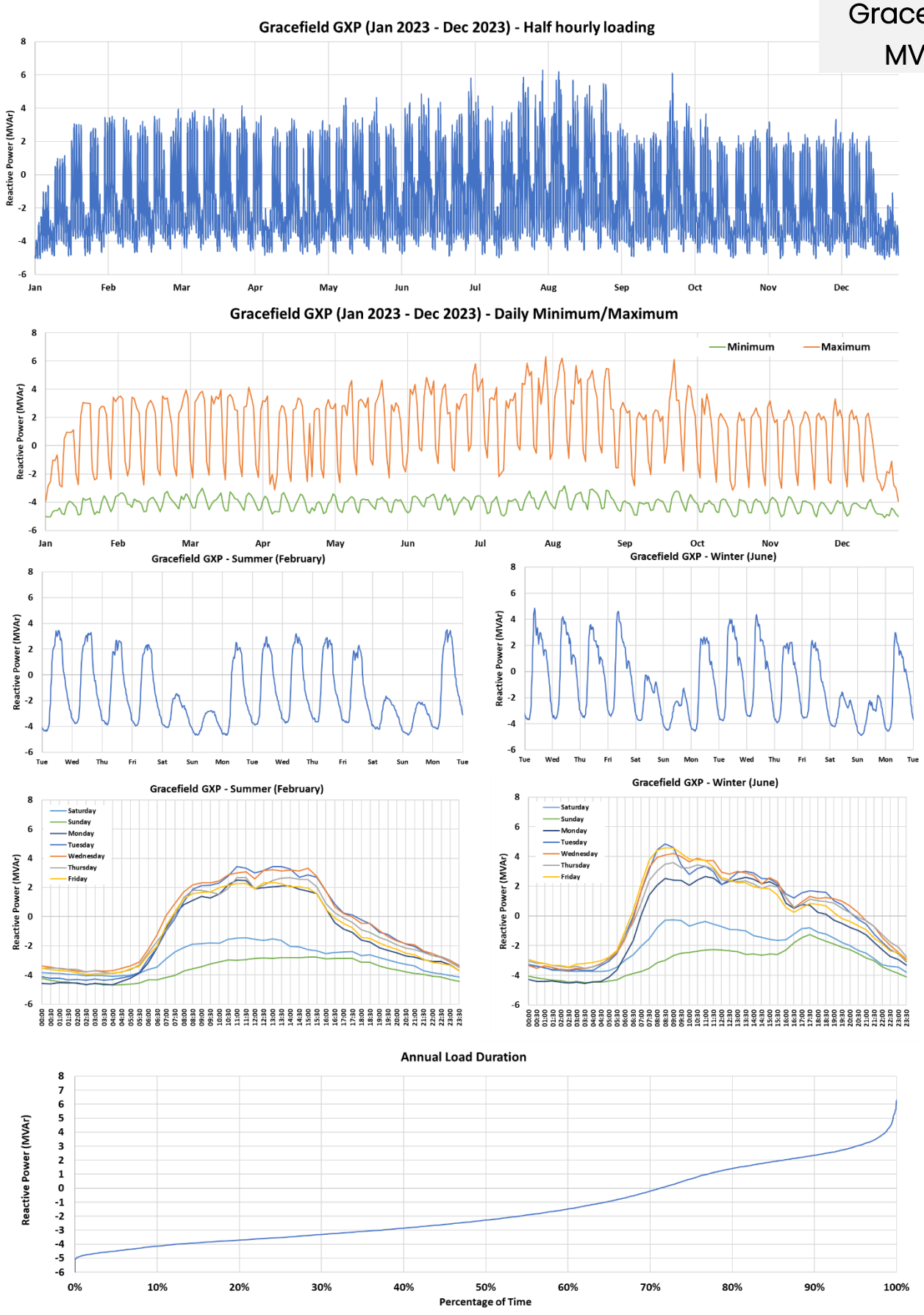

Figure 6. Gracefield GXP: Reactive Power (MVAr) load characteristics

Greytown MVA

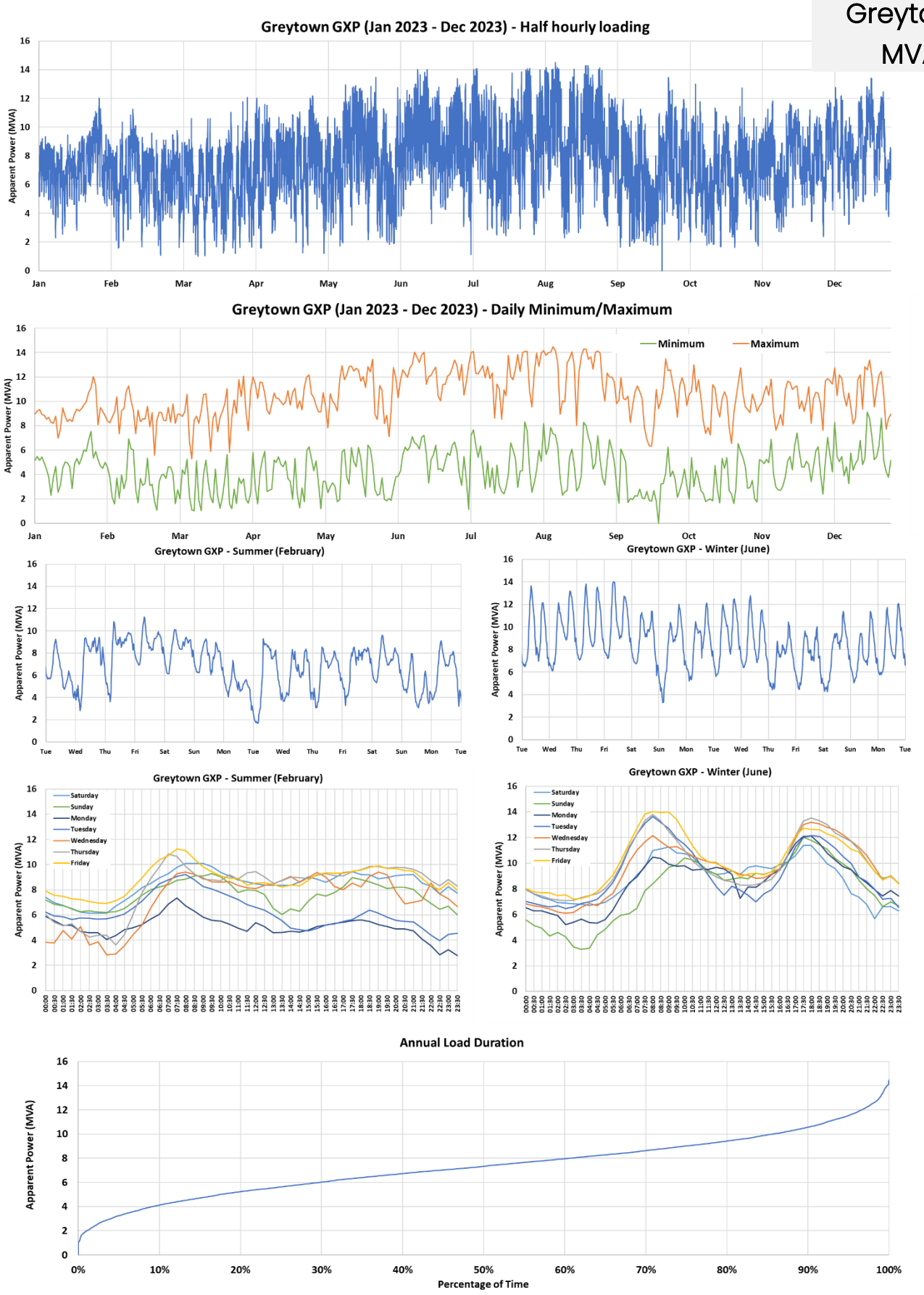

Figure 7. Greytown GXP: Apparent Power (MVA) load characteristics

Greytown MVAr

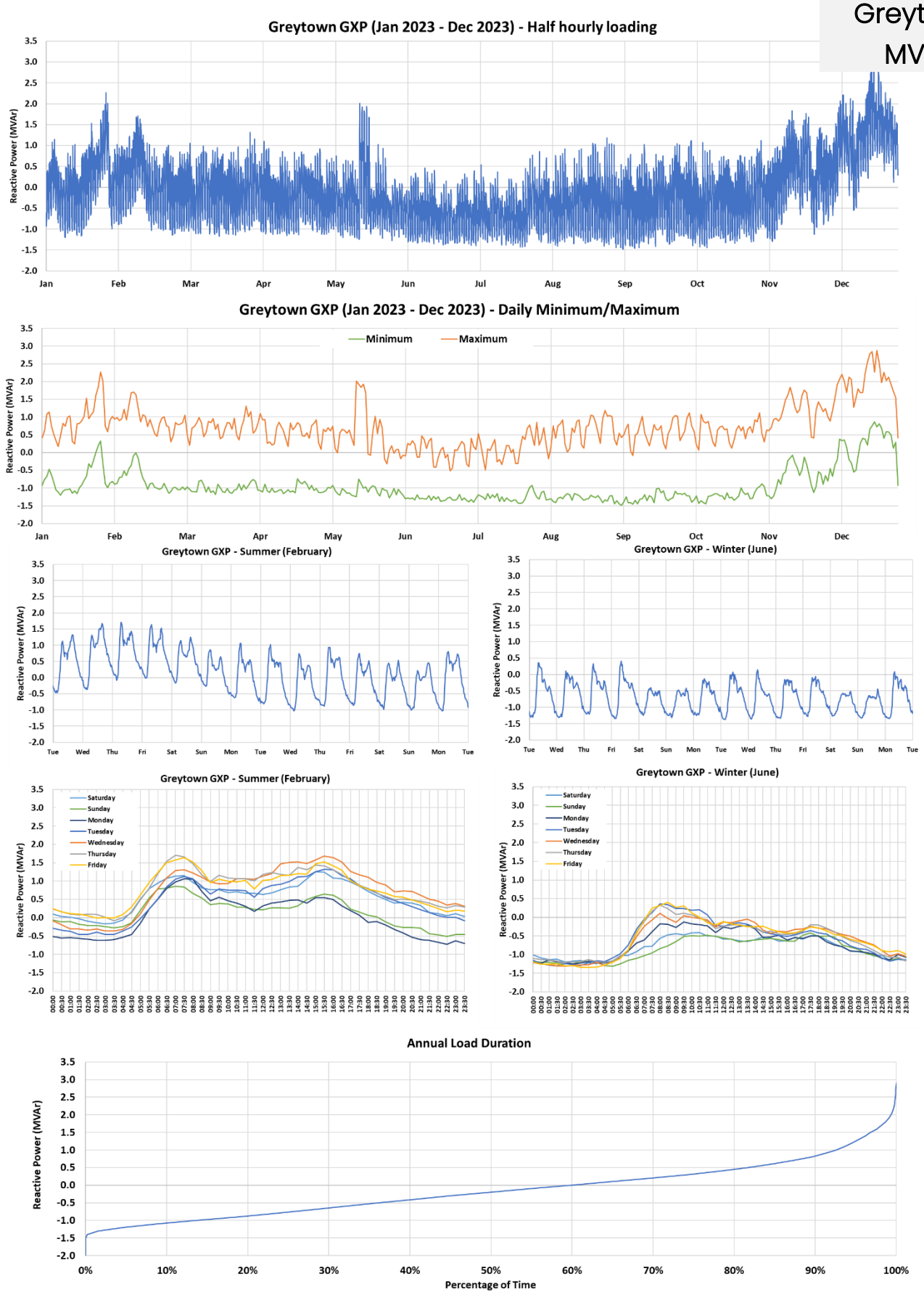

Figure 8. Greytown GXP: Reactive Power (MVAr) load characteristics

Haywards
11 kV MVA

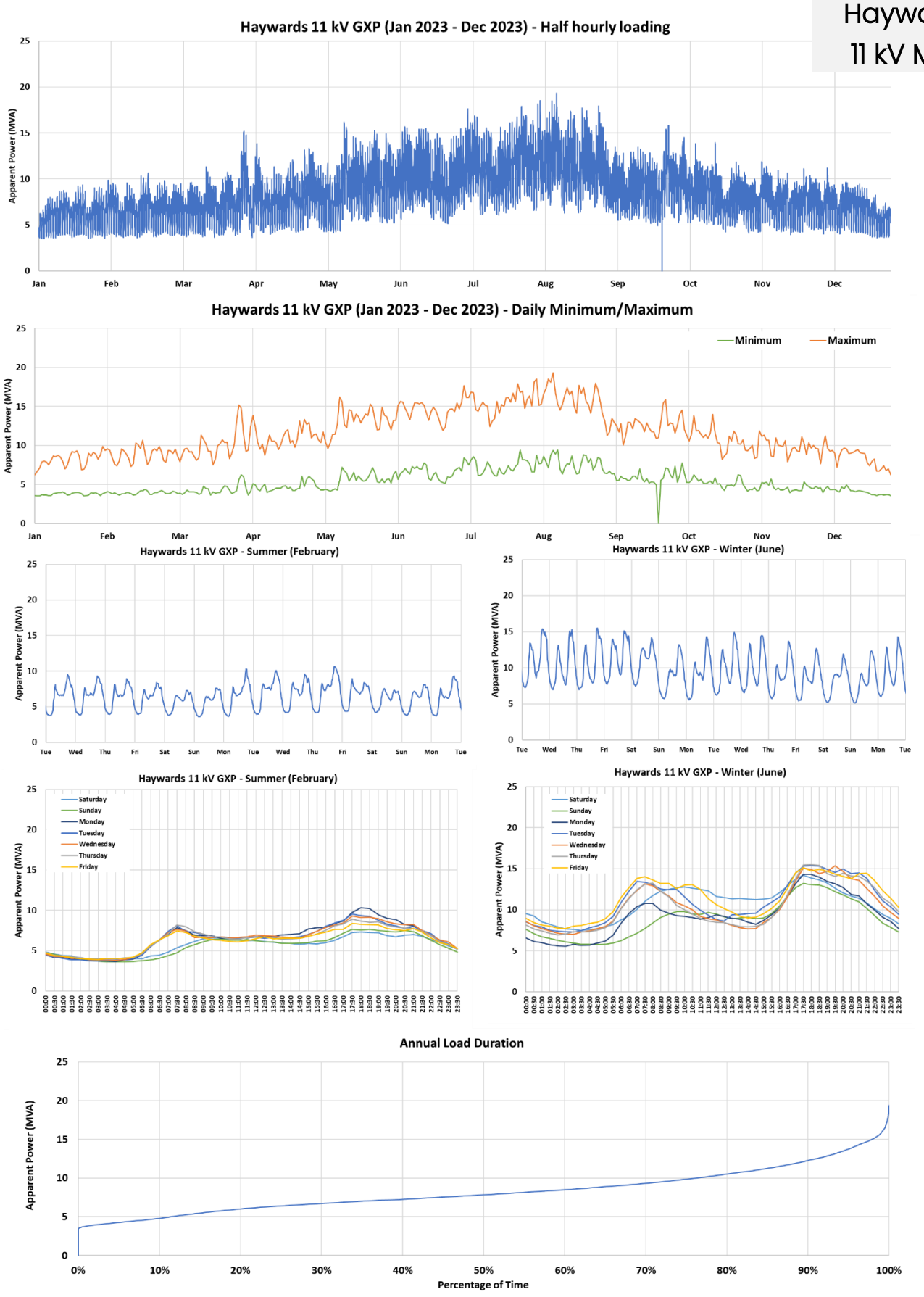

Figure 9. Haywards 11 kV GXP: Apparent Power (MVA) load characteristics

Haywards
11 kV MVAr

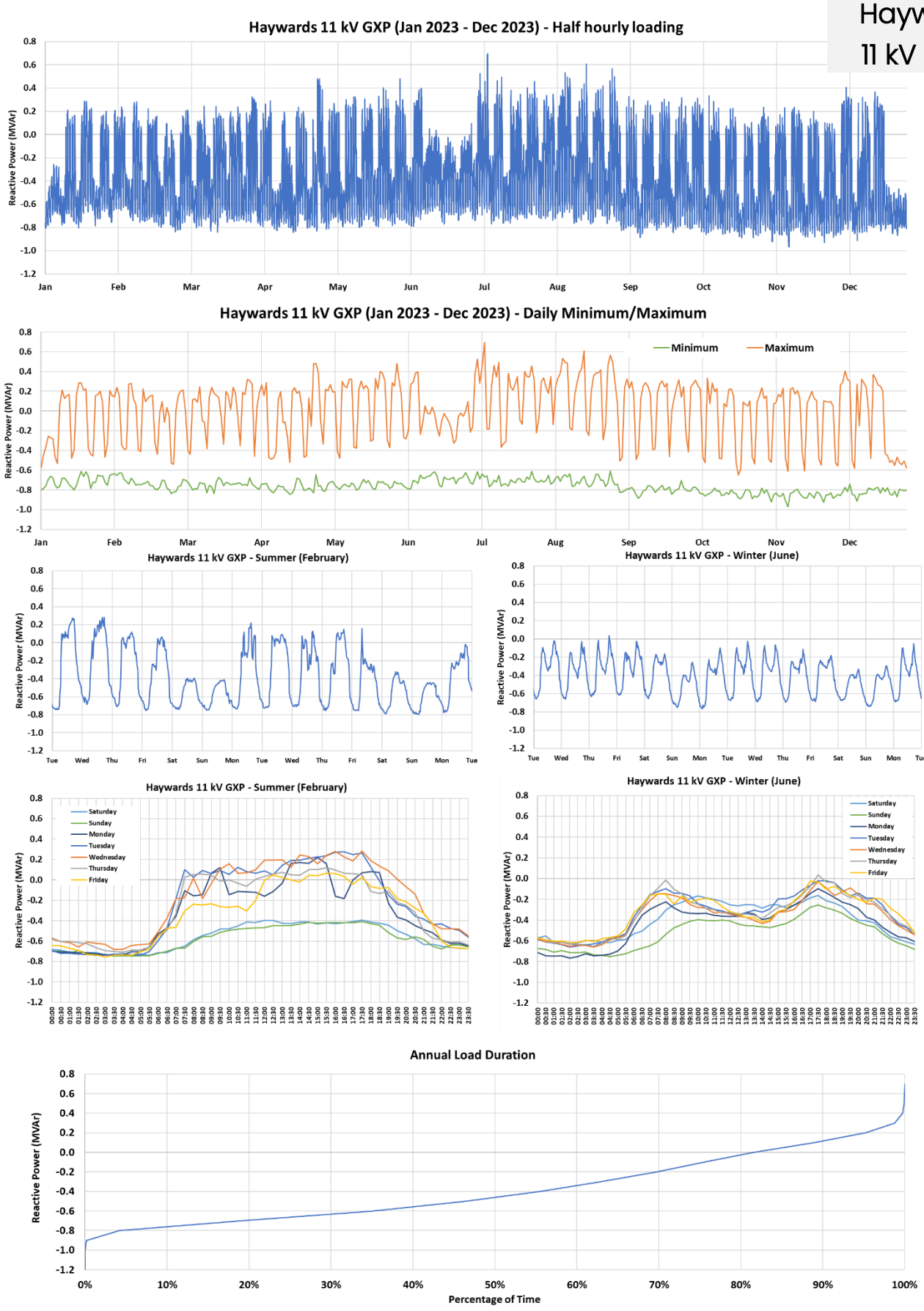

Figure 10. Haywards 11 kV GXP: Reactive Power (MVAr) load characteristics

Haywards
33 kV MVA

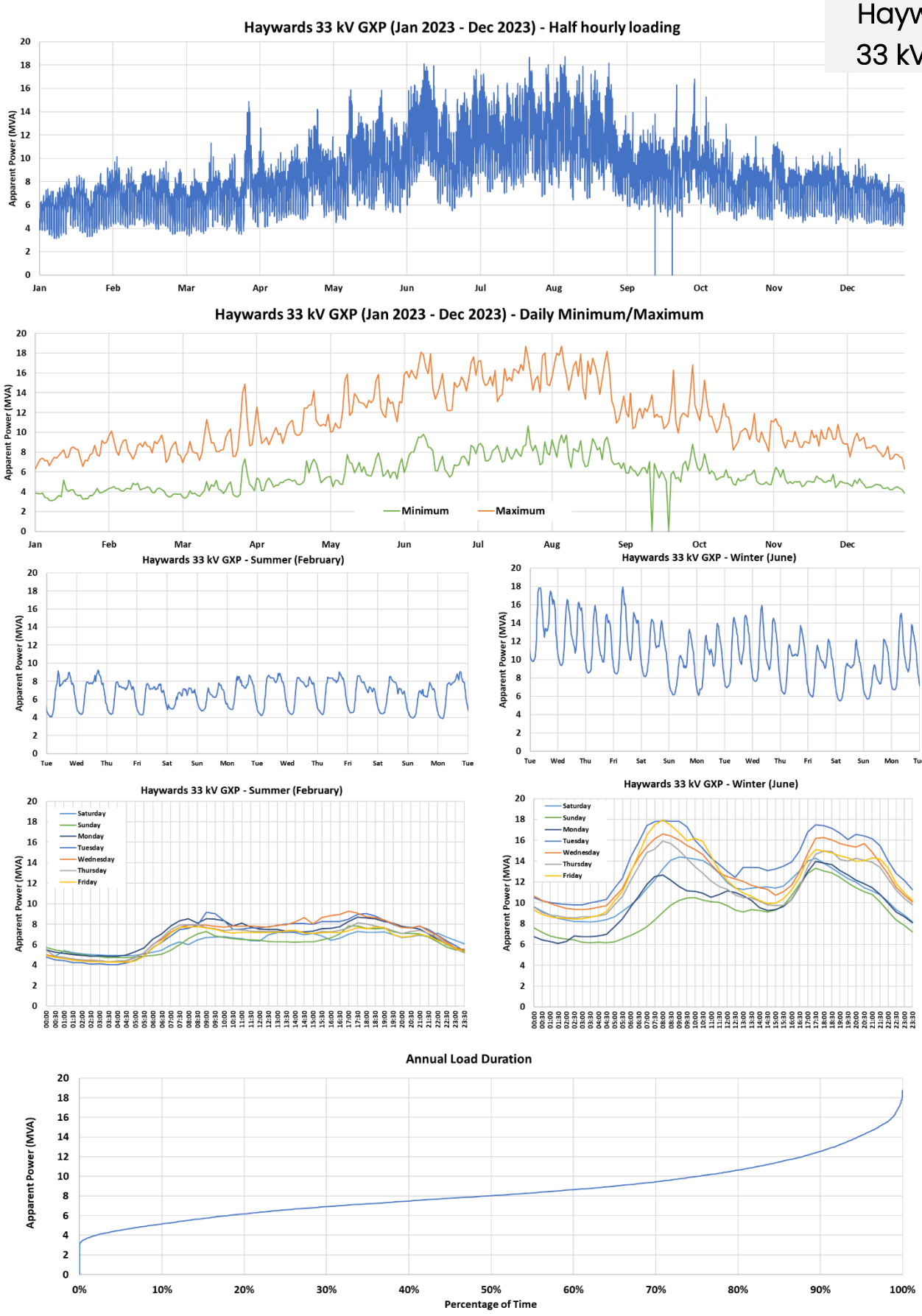

Figure 11. Haywards 33 kV GXP: Apparent Power (MVA) load characteristics

Haywards
33 kV MVAr

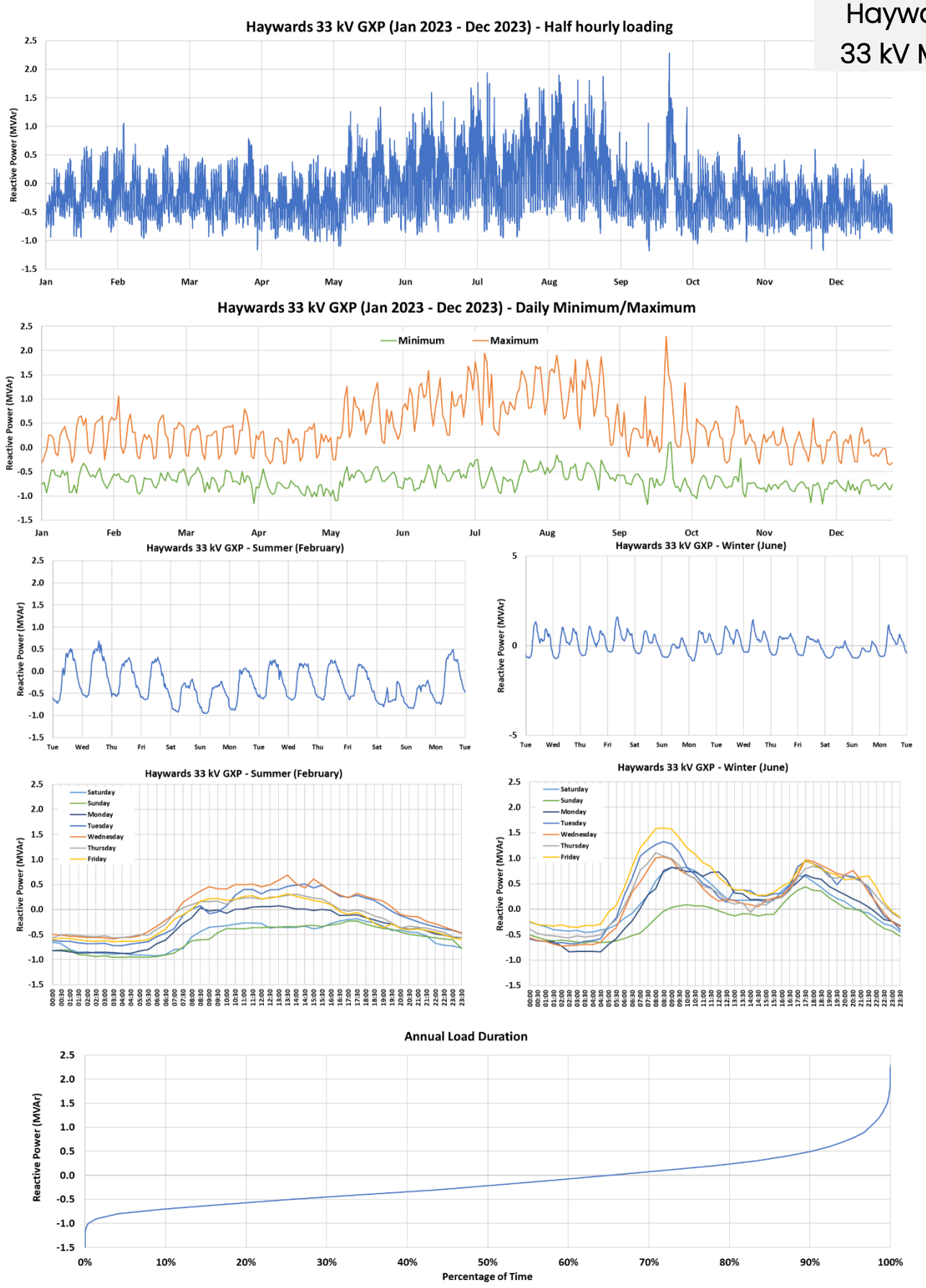

Figure 12. Haywards 33 kV GXP: Reactive Power (MVAr) load characteristics

Kaiwharawhara MVA

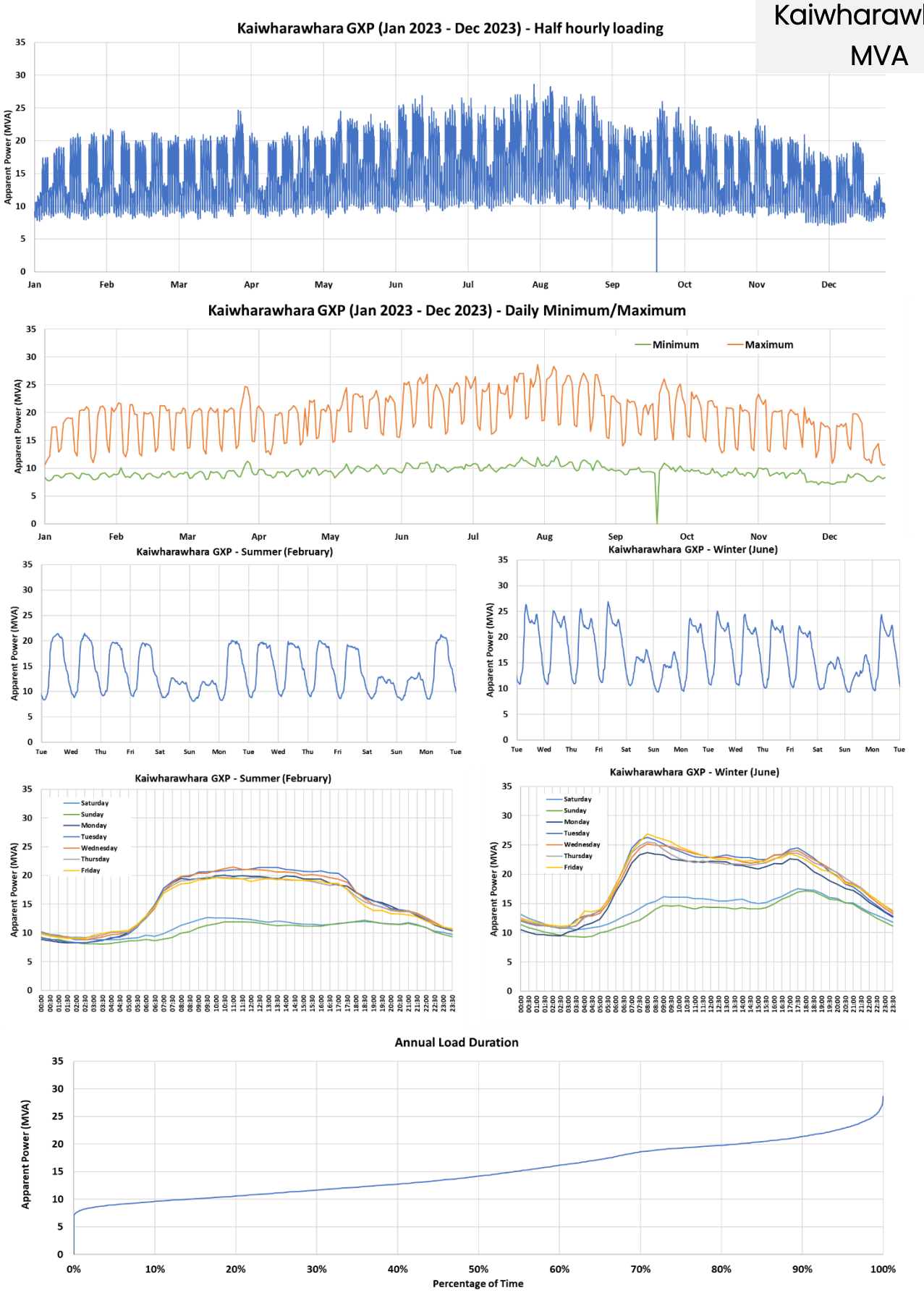

Figure 13. Kaiwharawhara GXP: Apparent Power (MVA) load characteristics

Kaiwharawhara MVAr

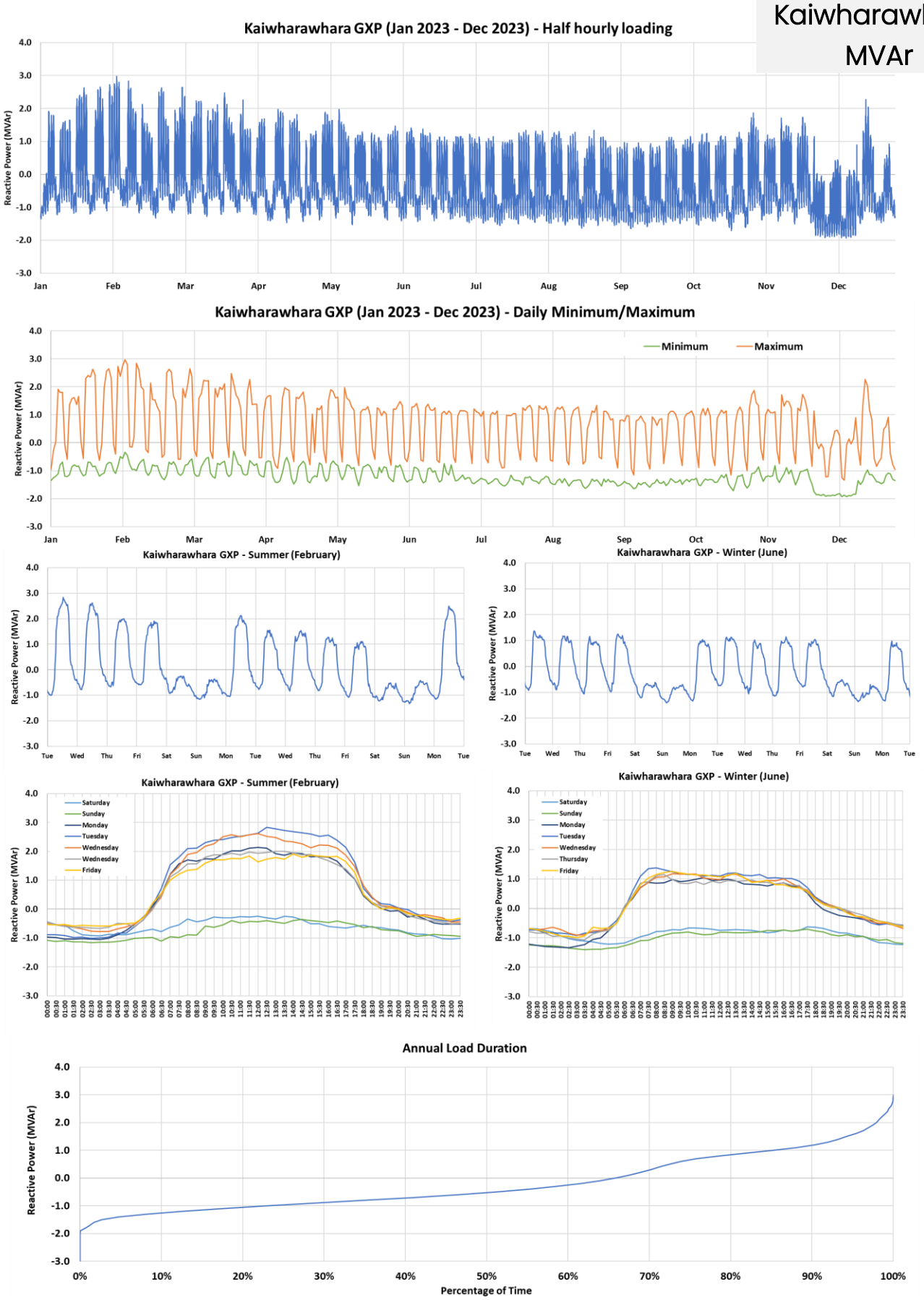

Figure 14. Kaiwharawhara GXP: Reactive Power (MVAr) load characteristics

Masterton MVA

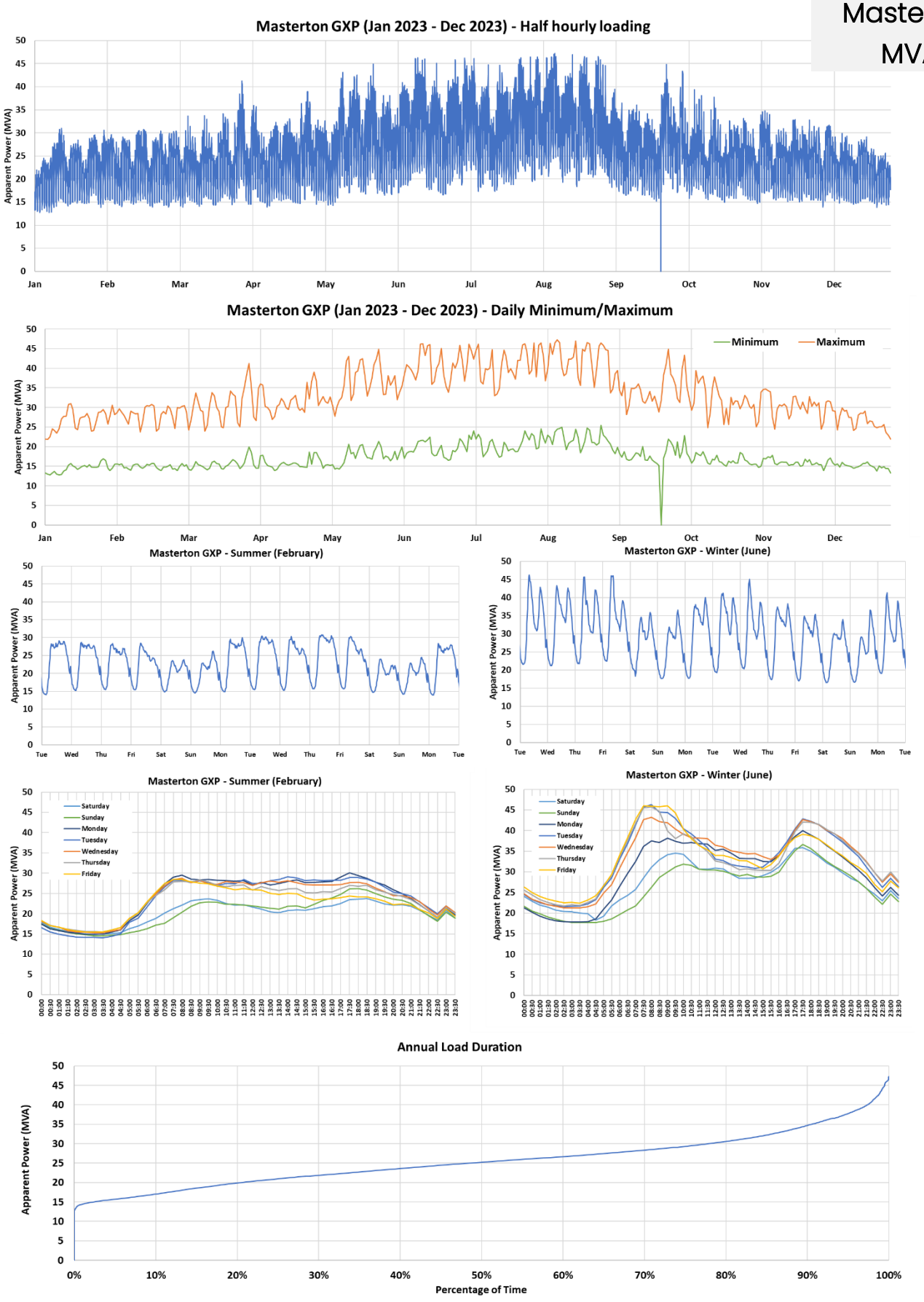

Figure 15. Masterton GXP: Apparent Power (MVA) load characteristics

Masterton MVAr

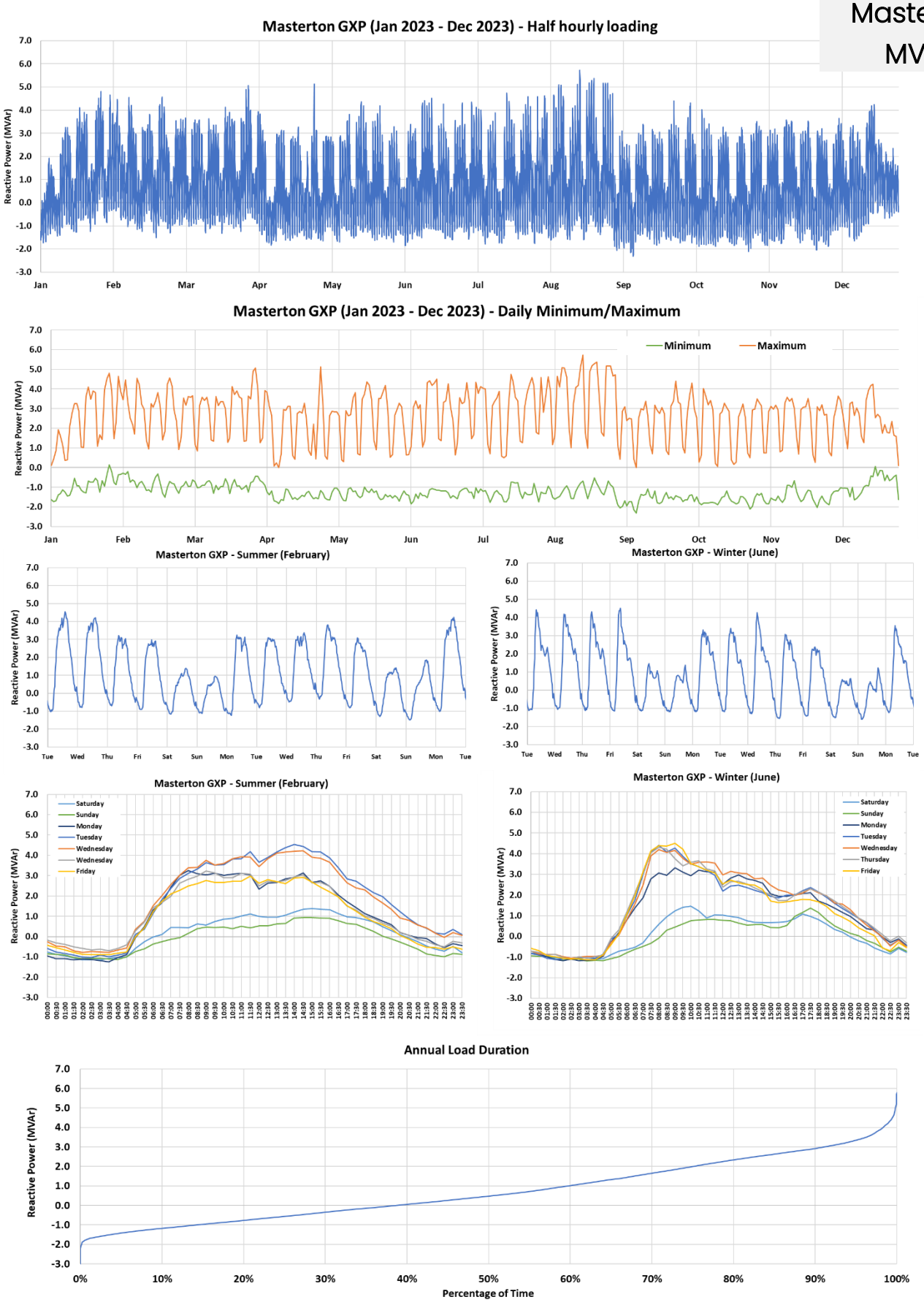

Figure 16. Masterton GXP: Reactive Power (MVAr) load characteristics

Melling 11 kV MVA

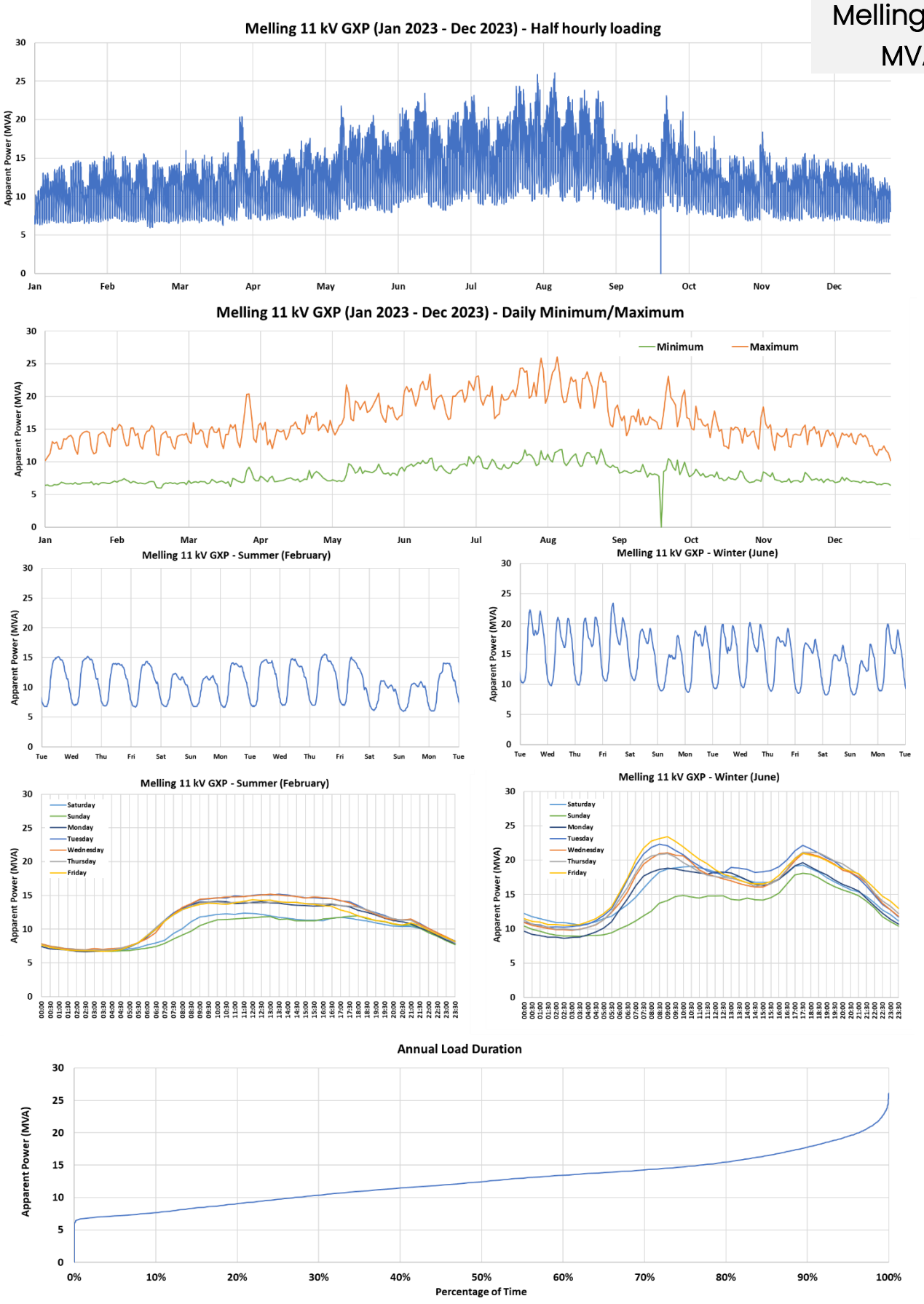

Figure 17. Melling 11 kV GXP: Apparent Power (MVA) load characteristics

Melling 11 kV MVAr

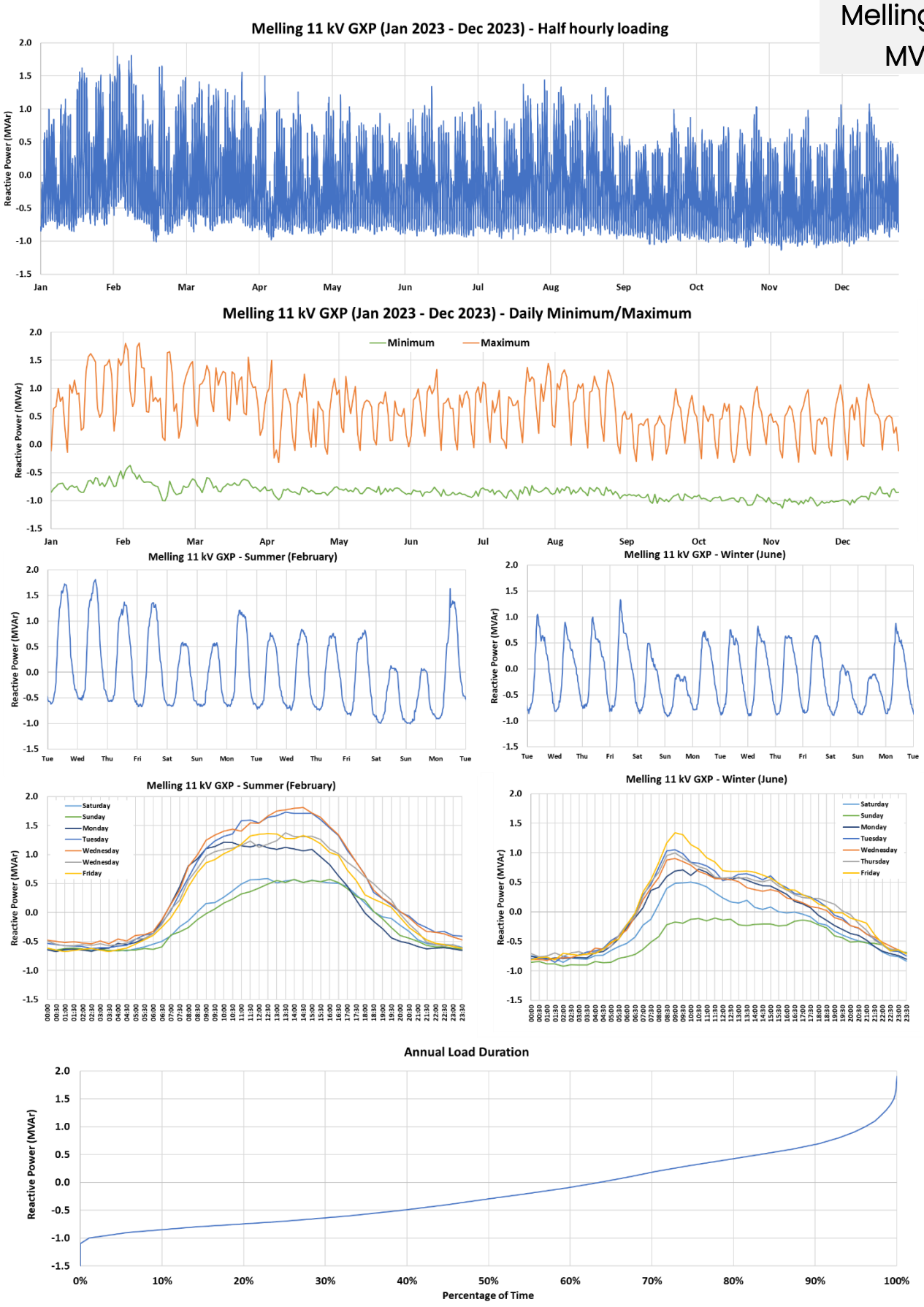

Figure 18. Melling 11 kV GXP: Reactive Power (MVAr) load characteristics

Melling
33 kV MVA

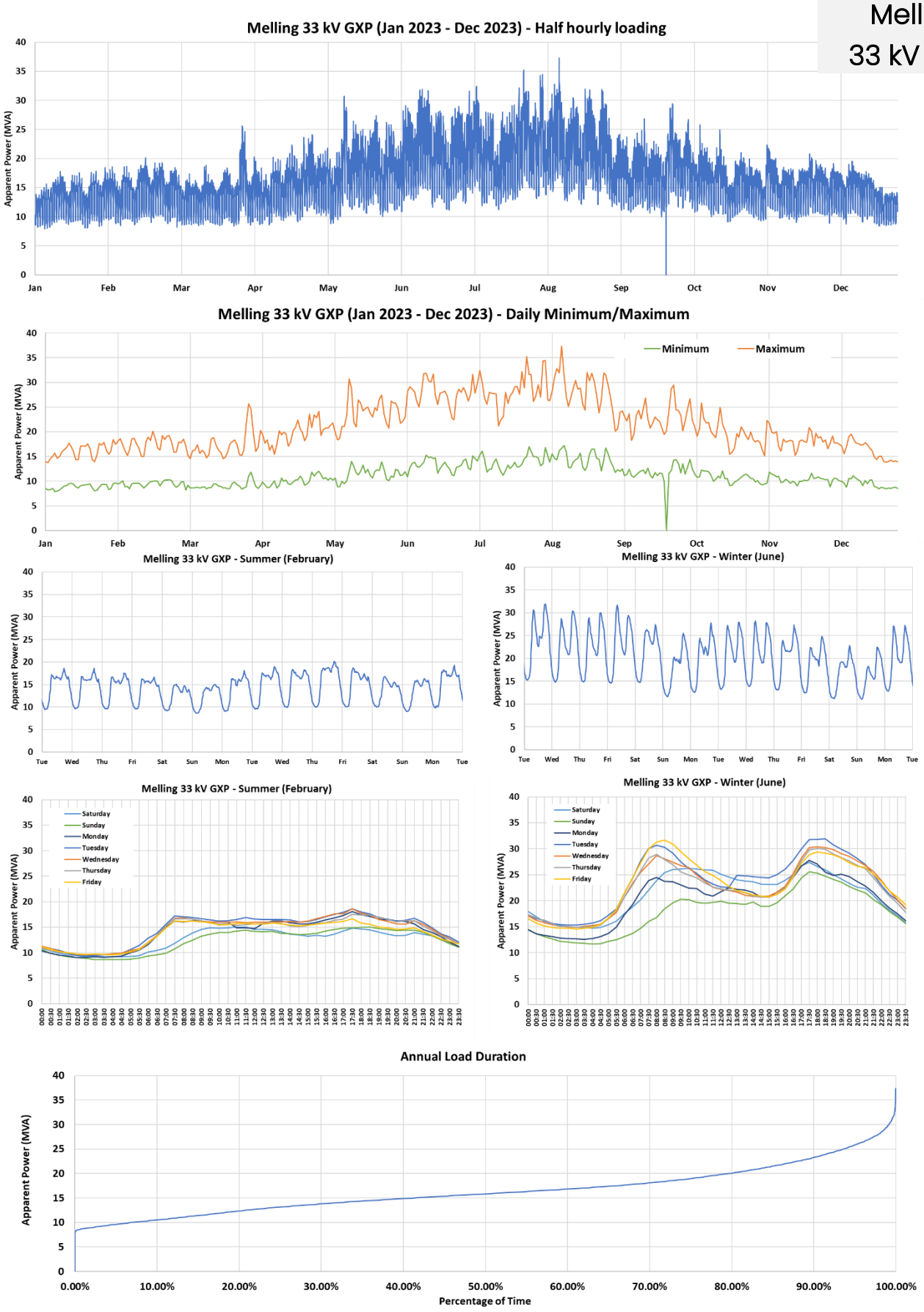

Figure 19. Melling 33 kV GXP: Apparent Power (MVA) load characteristics

Melling
33 kV MVAr

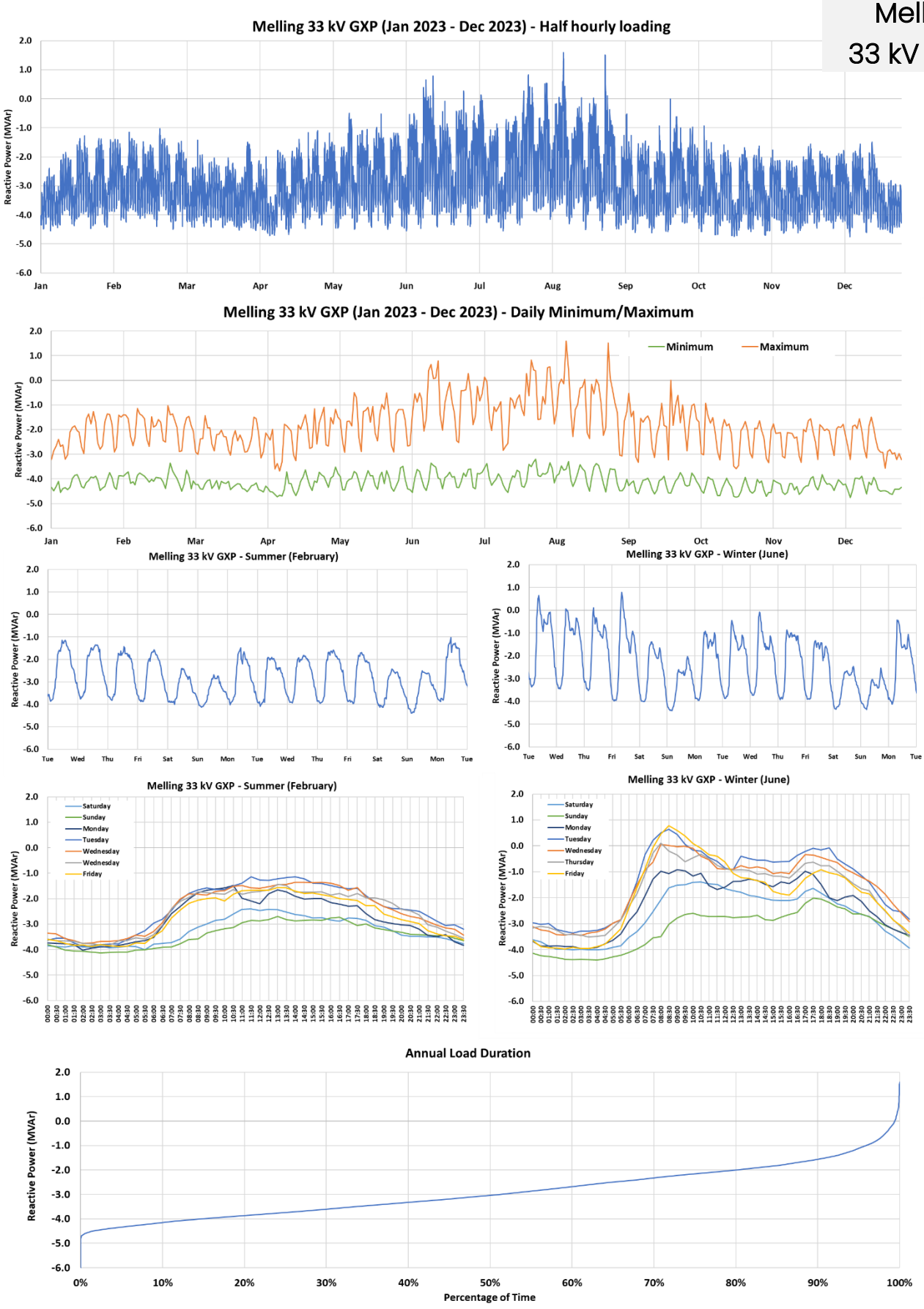

Figure 20. Melling 33 kV GXP: Reactive Power (MVAr) load characteristics

Paraparaumu MVA

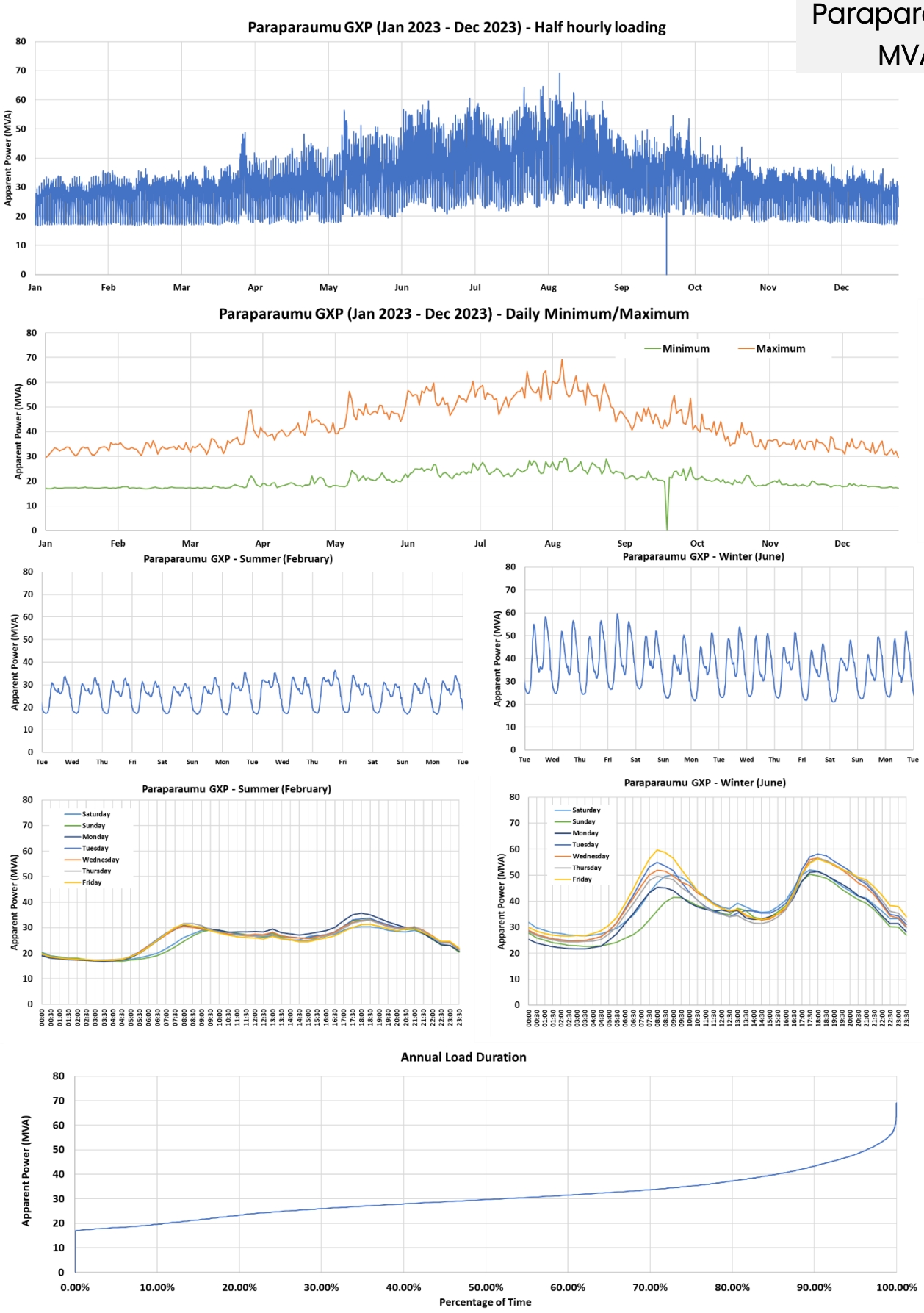

Figure 21. Paraparaumu GXP: Apparent Power (MVA) load characteristics

Paraparaumu MVAr

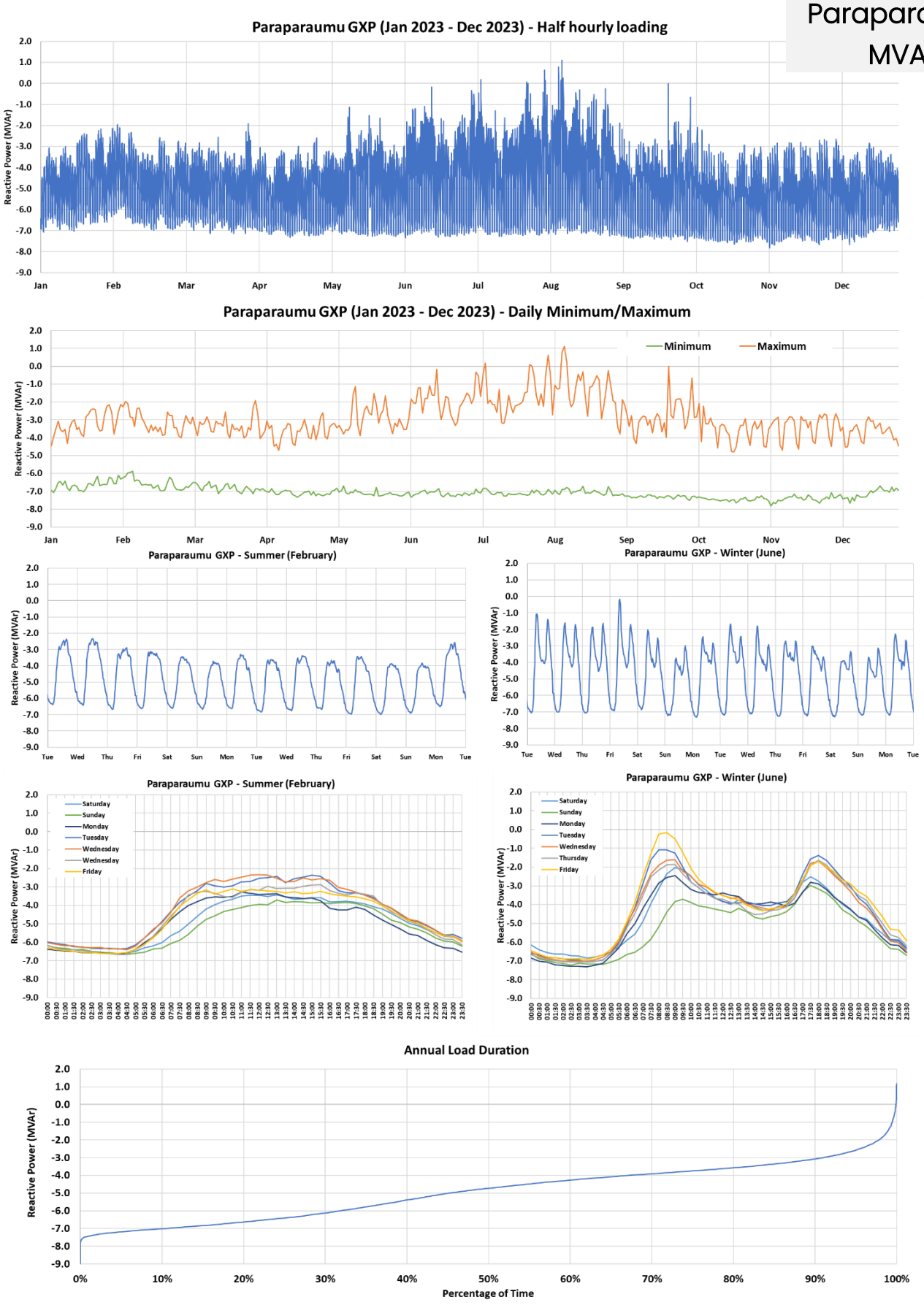

Figure 22. Paraparaumu GXP: Reactive Power (MVAr) load characteristics

Pāuatahanui MVA

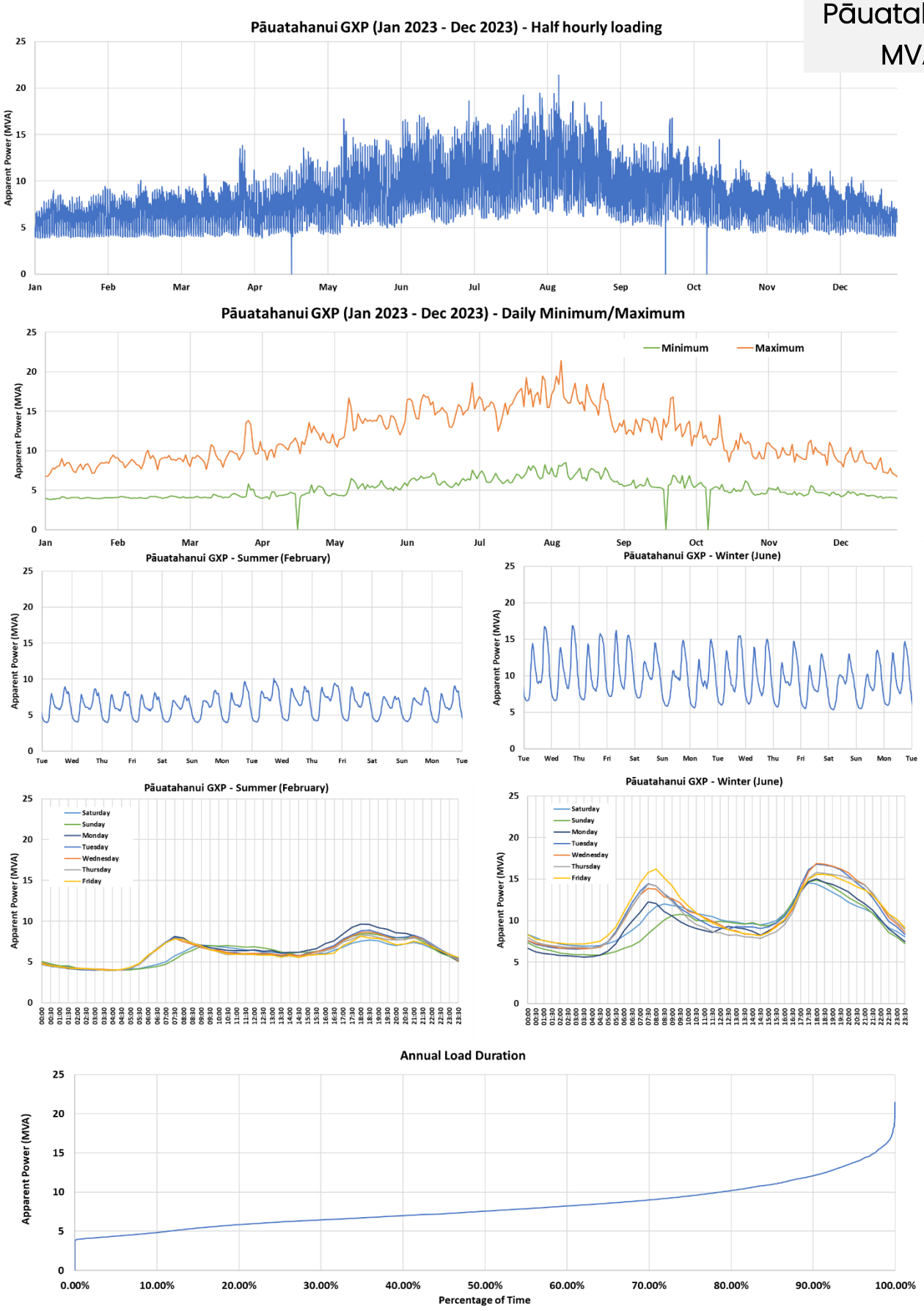

Figure 23. Pāuatahanui GXP: Apparent Power (MVA) load characteristics

Pāuatahanui MVAr

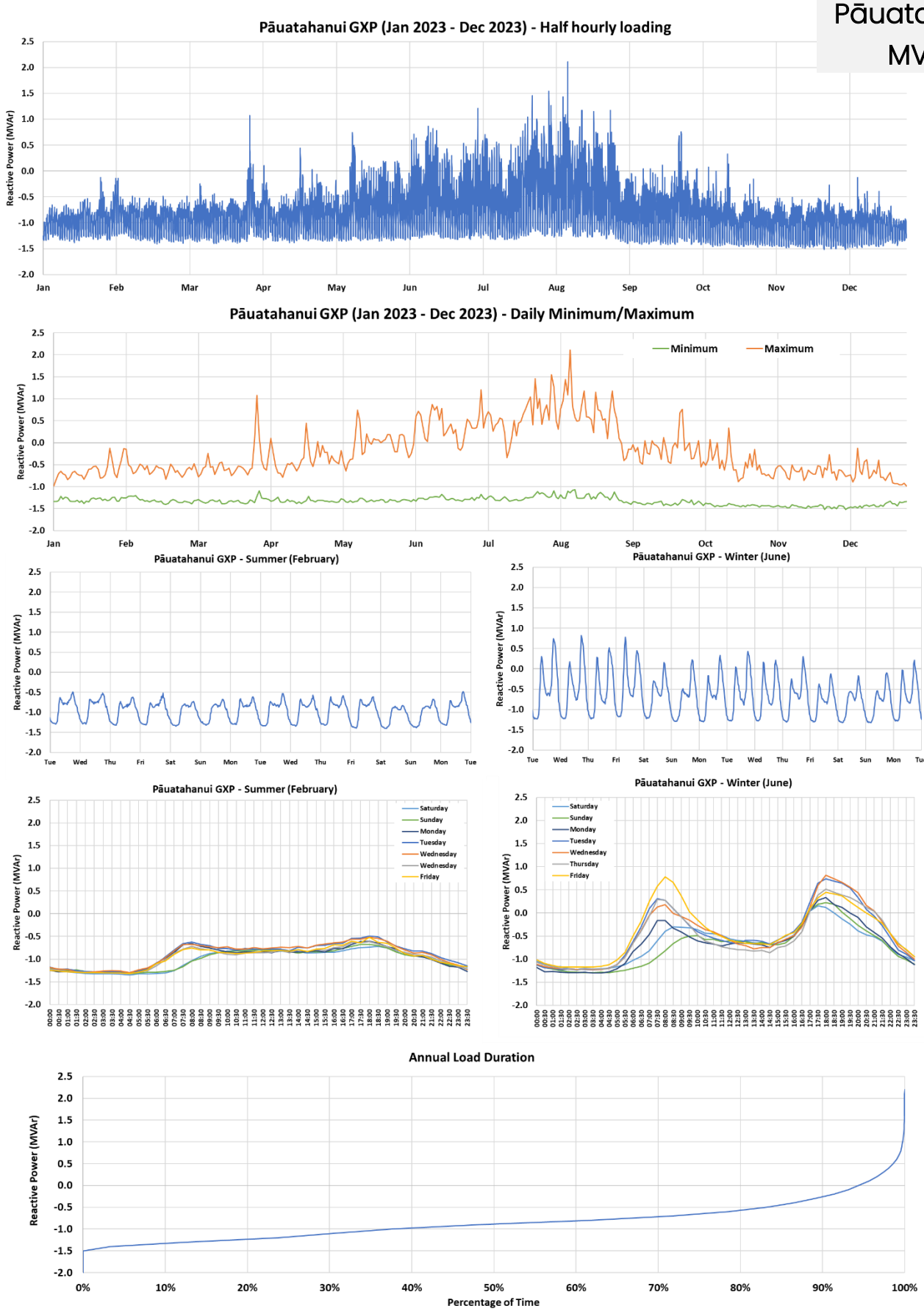

Figure 24. Pāuatahanui GXP: Reactive Power (MVAr) load characteristics

Takapu Road MVA

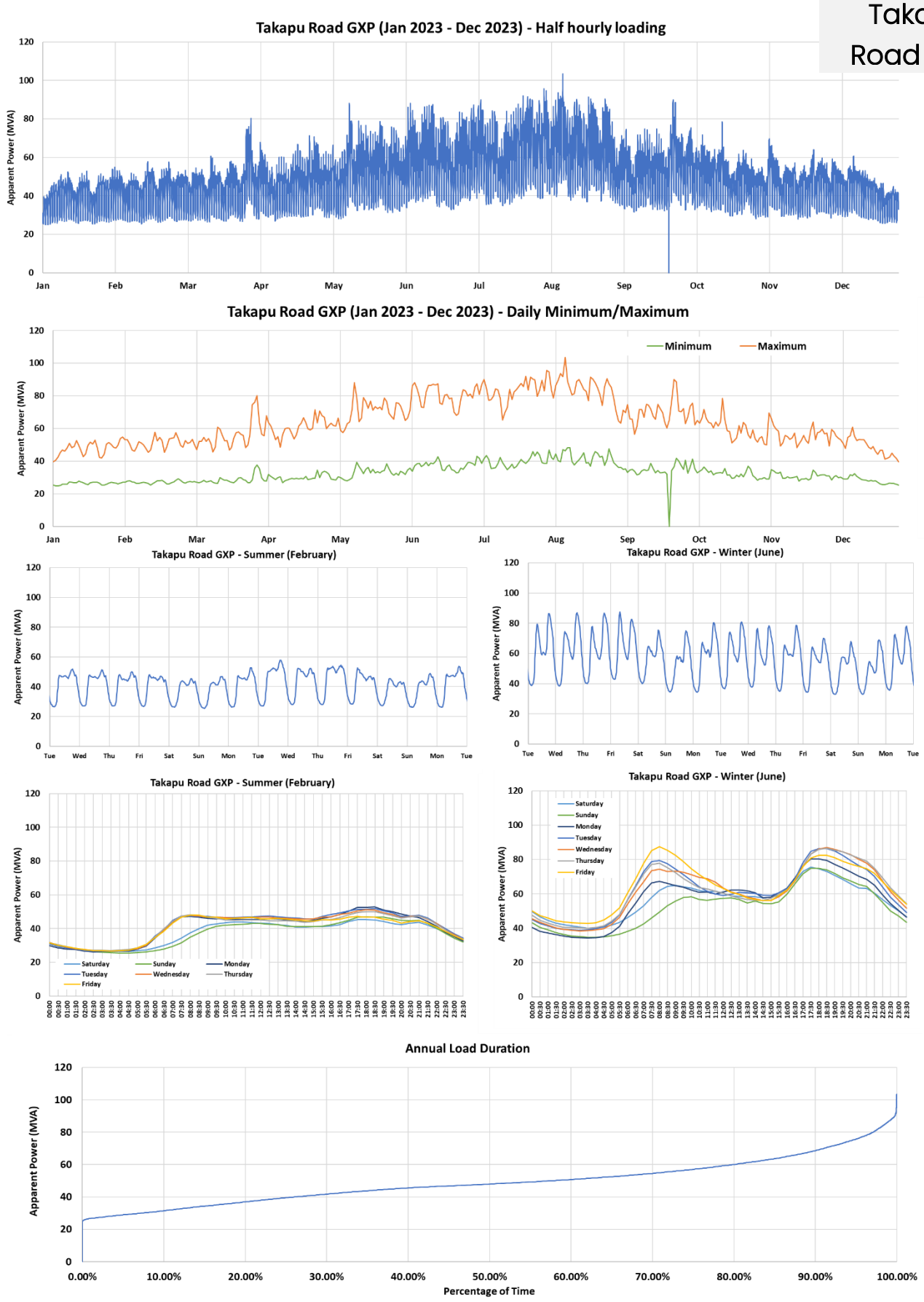

Figure 25. Takapu Road GXP: Apparent Power (MVA) load characteristics

Takapu Road MVAr

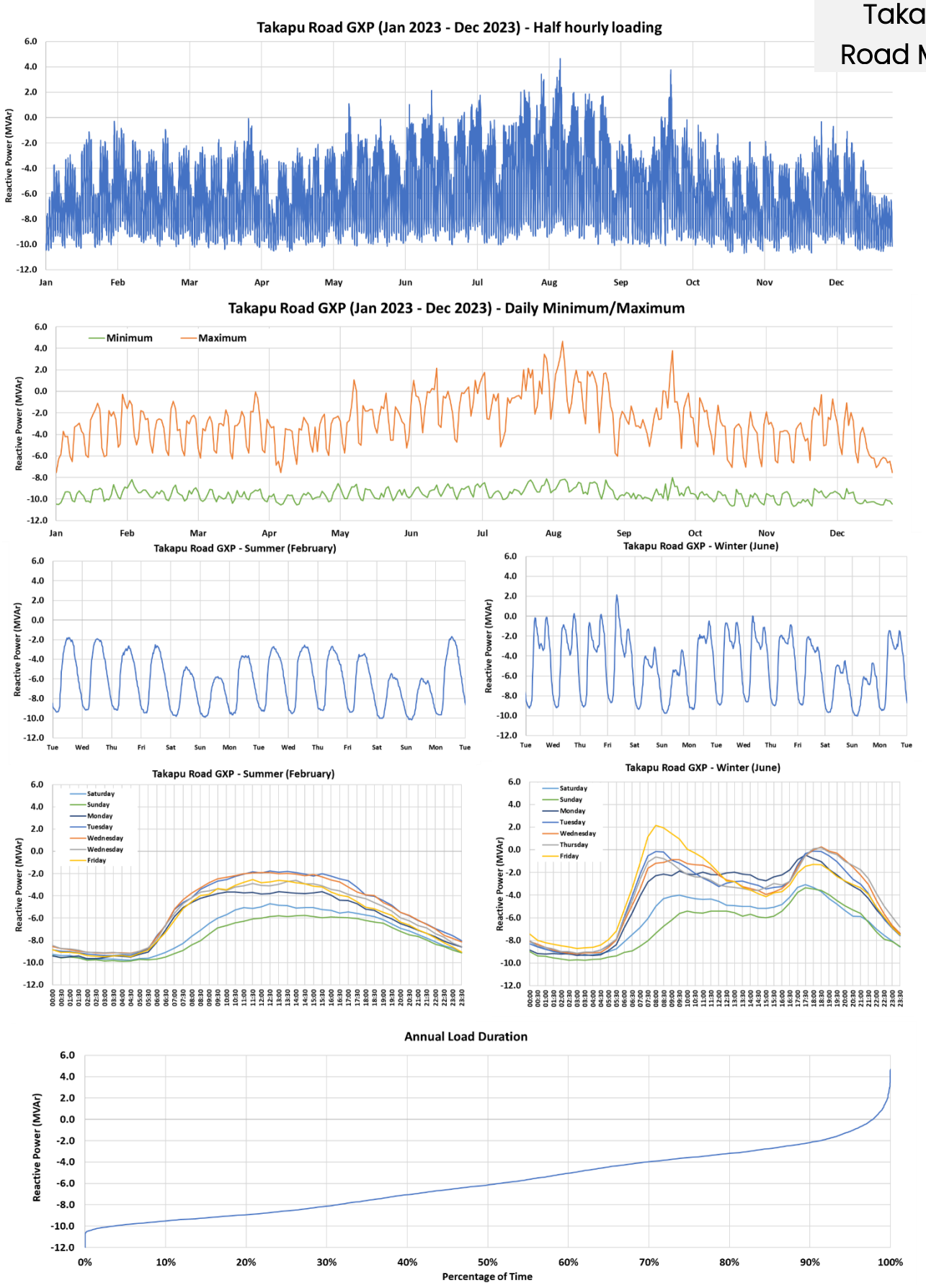

Figure 26. Takapu Road GXP: Reactive Power (MVAr) load characteristics

Upper Hutt MVA

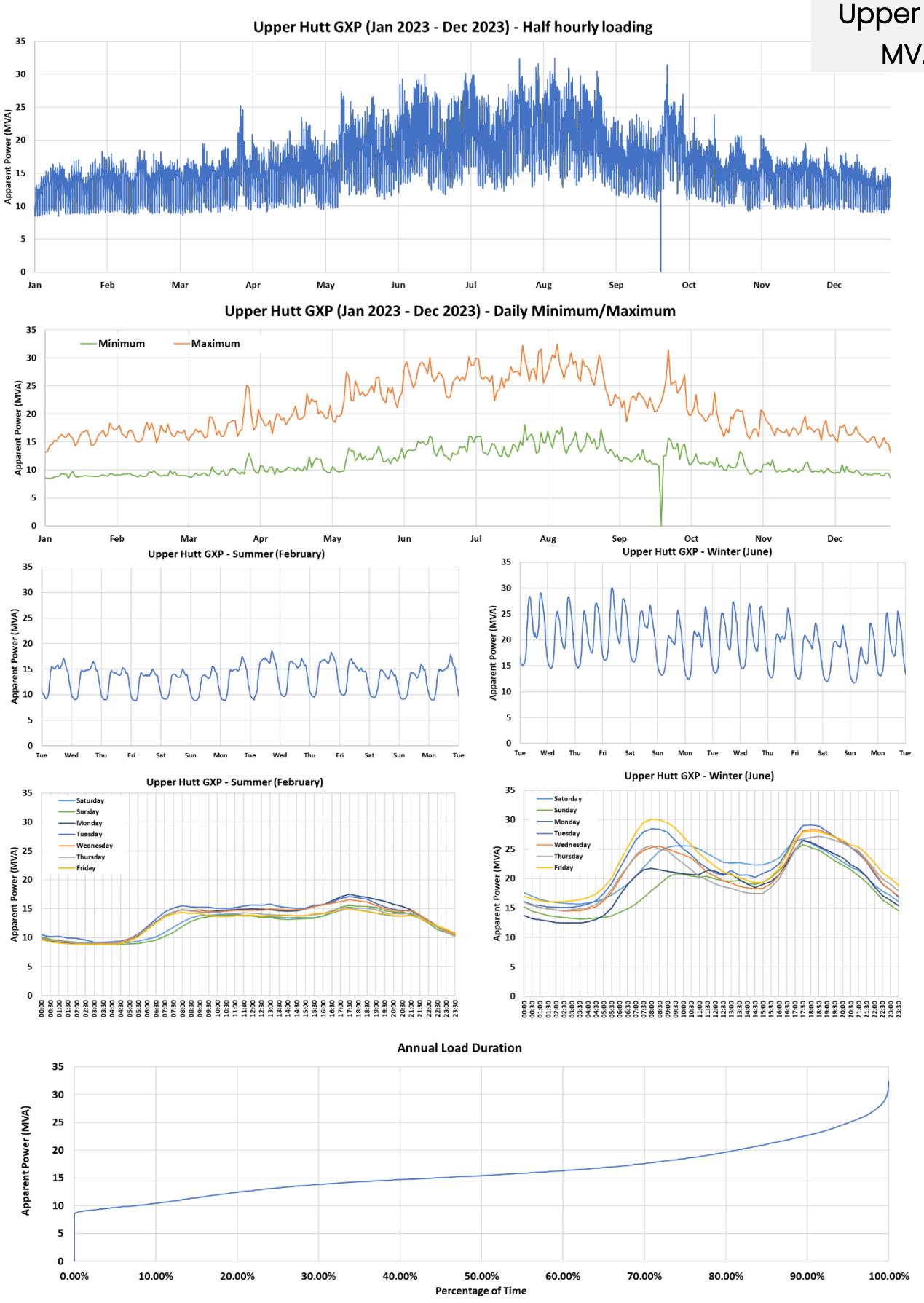

Figure 27. Upper Hutt GXP: Apparent Power (MVA) load characteristics

Upper Hutt MVAr

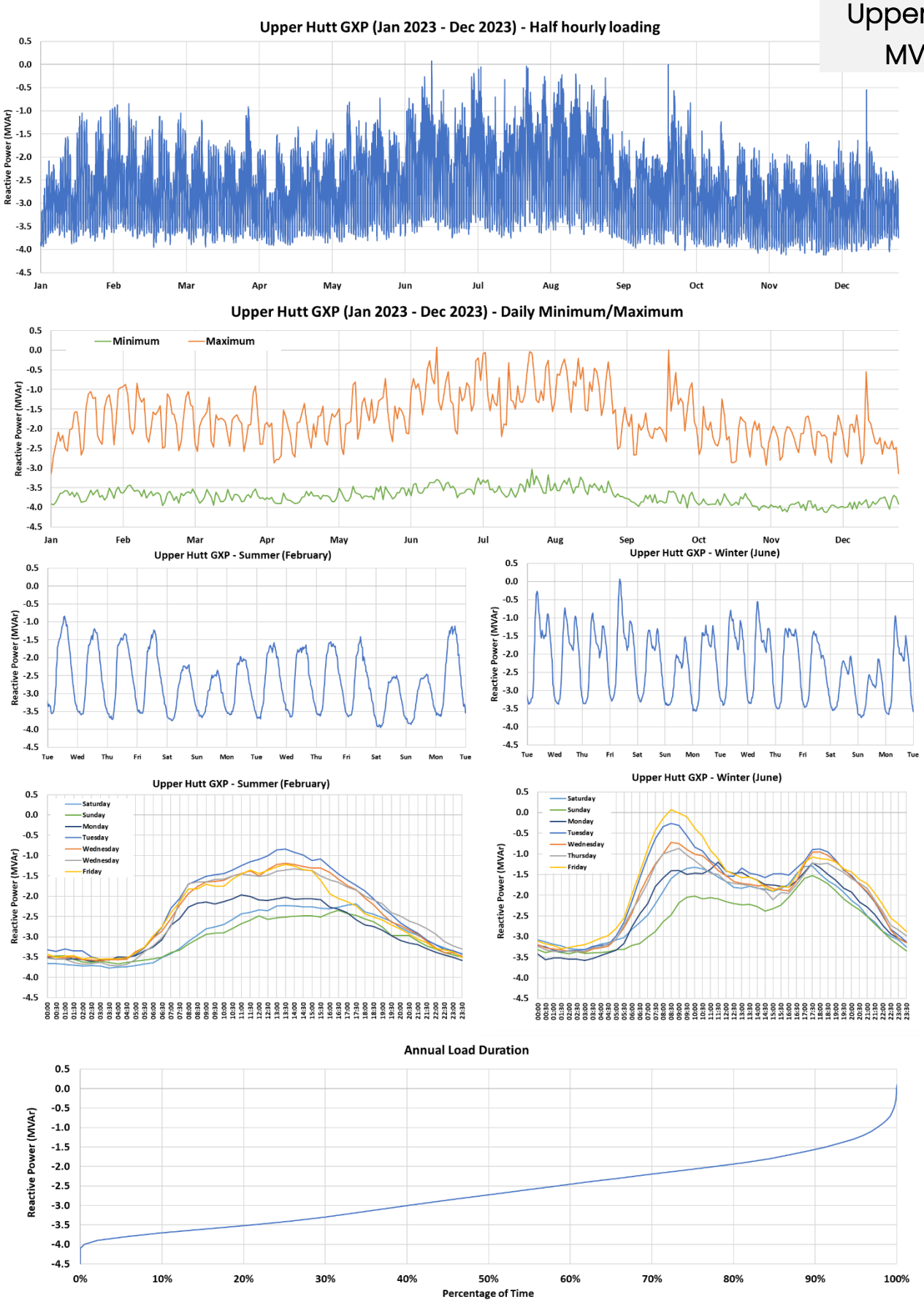

Figure 28. Upper Hutt GXP: Reactive Power (MVAr) load characteristics

Wilton MVA

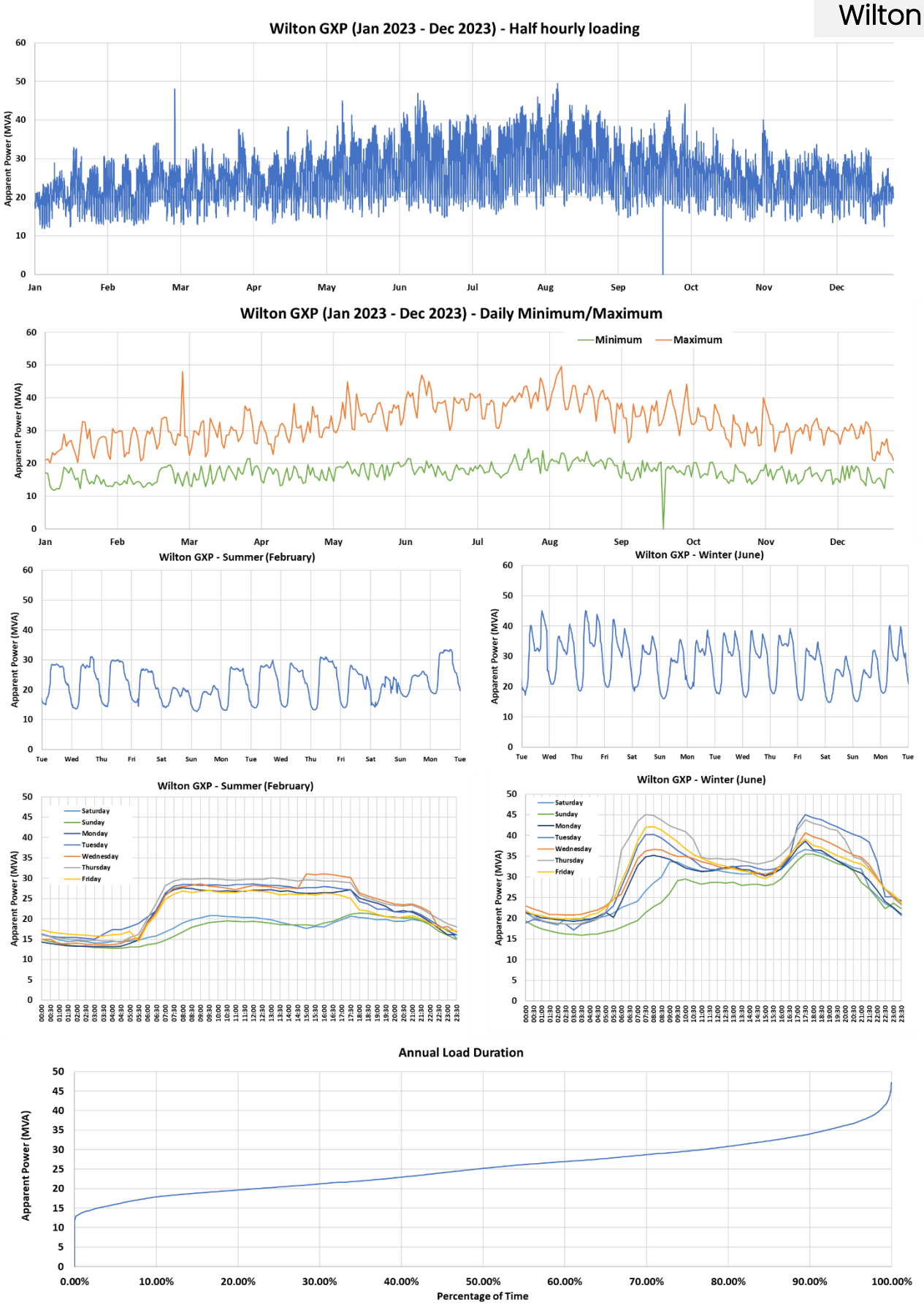

Figure 29. Wilton GXP: Apparent Power (MVA) load characteristics

Wilton MVAr

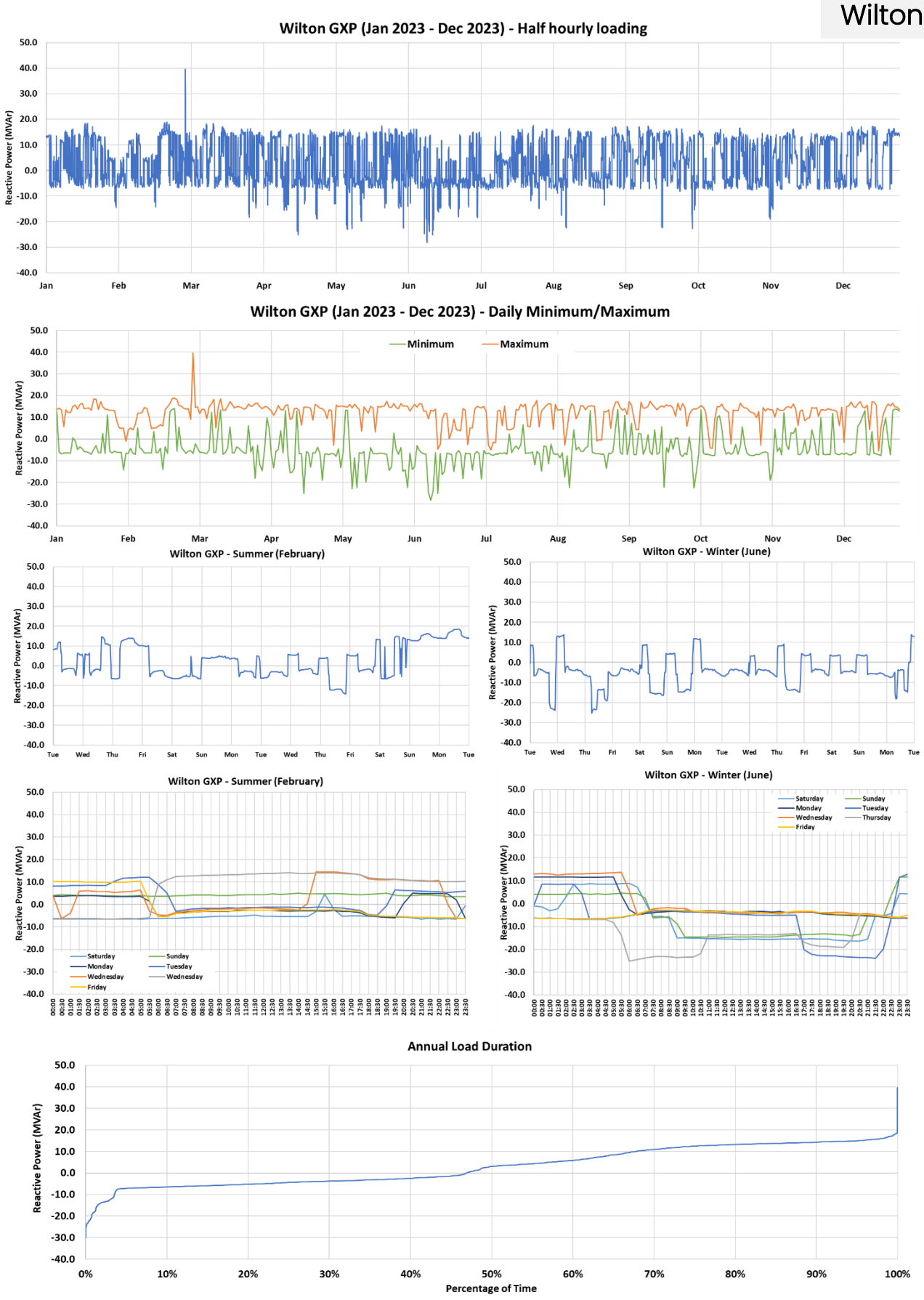

Figure 30. Wilton GXP: Reactive Power (MVAr) load characteristic

3. Zone Substations

3.1 Electra

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

Ōtaki MVA

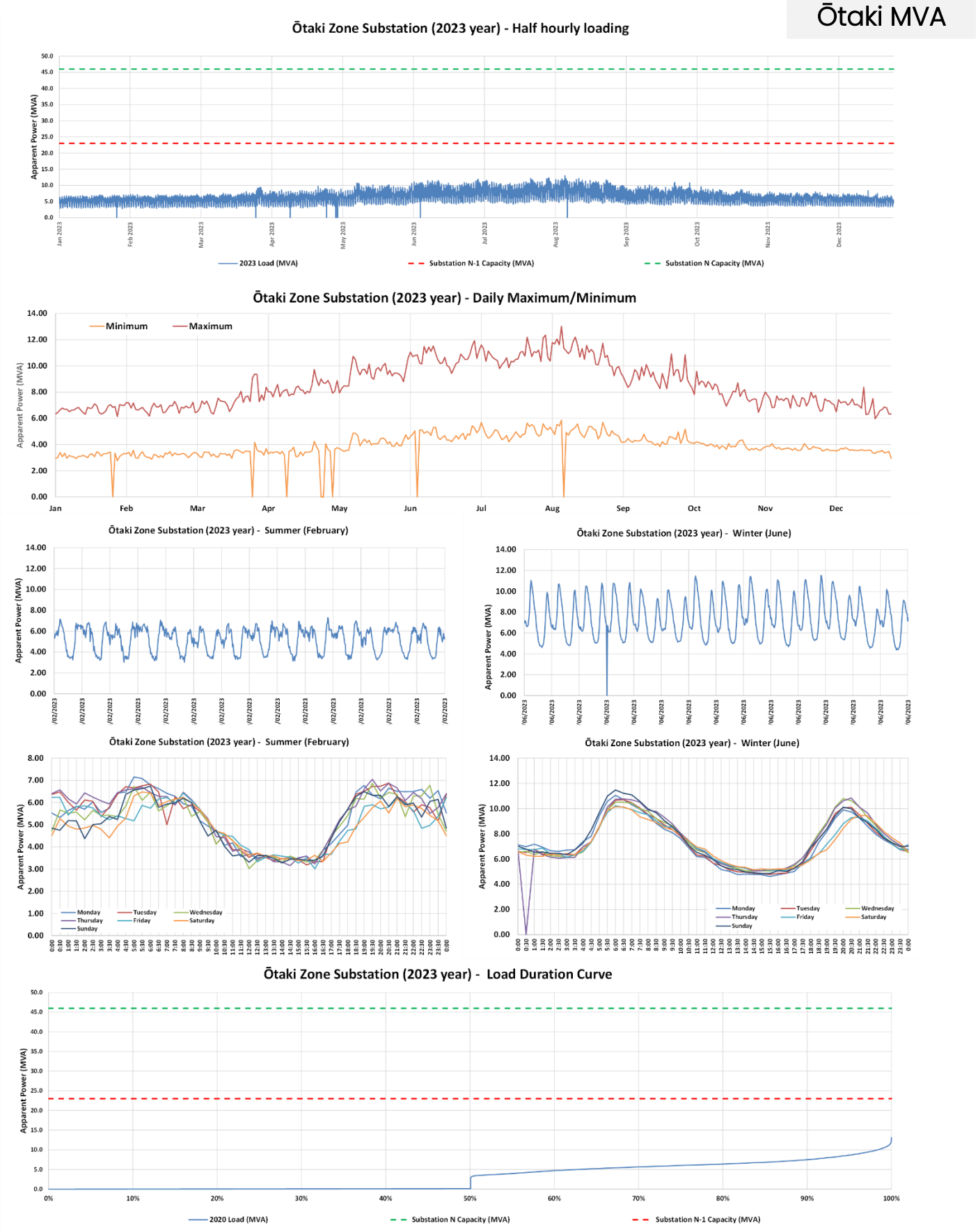

Figure 31. Ōtaki 33/11 kV zone substation: Apparent Power (MVA) load characteristics

Paekākāriki MVA

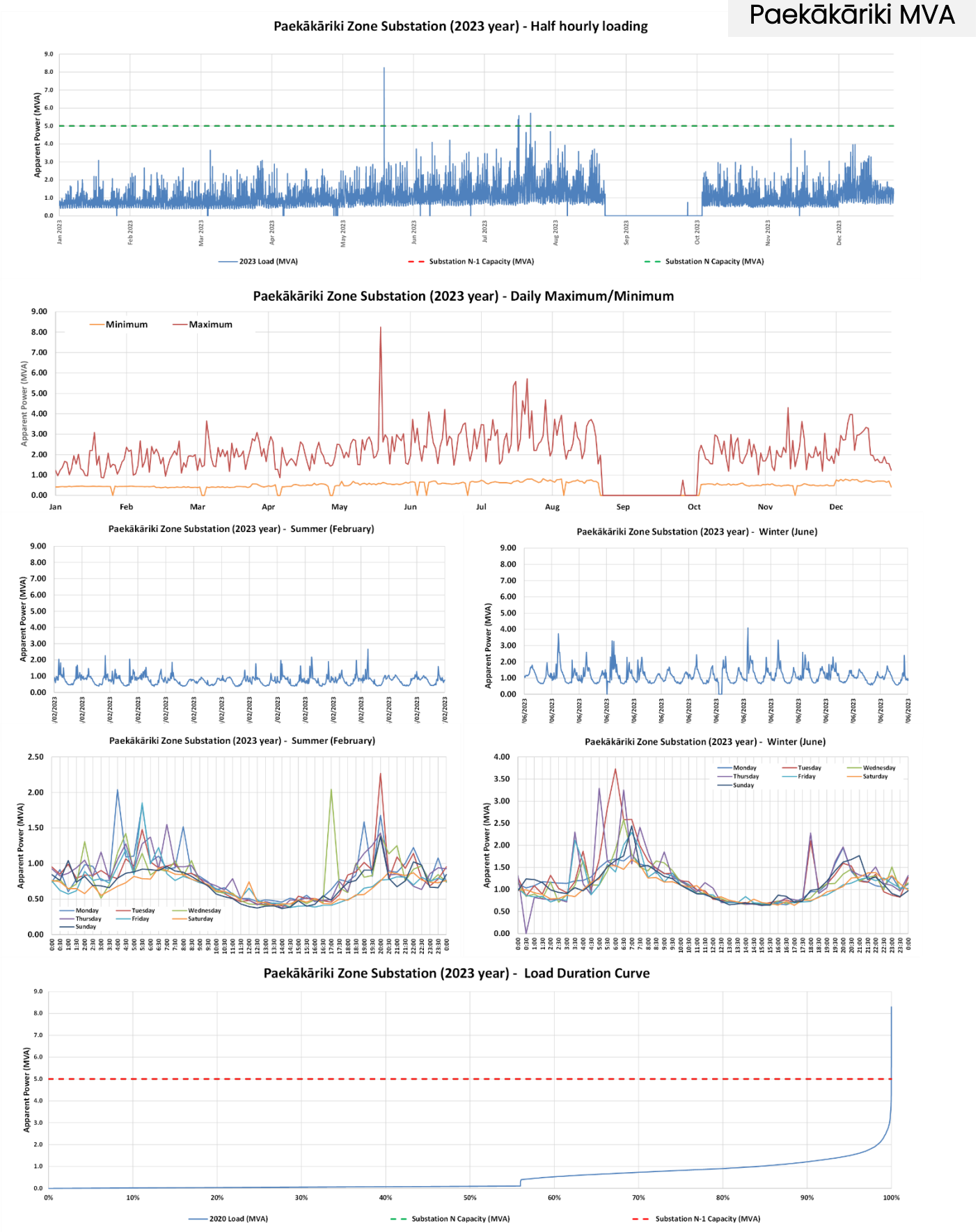

Figure 32. Paekākāriki 33/11 kV zone substation: Apparent Power (MVA) load characteristics

Paraparaumu East MVA

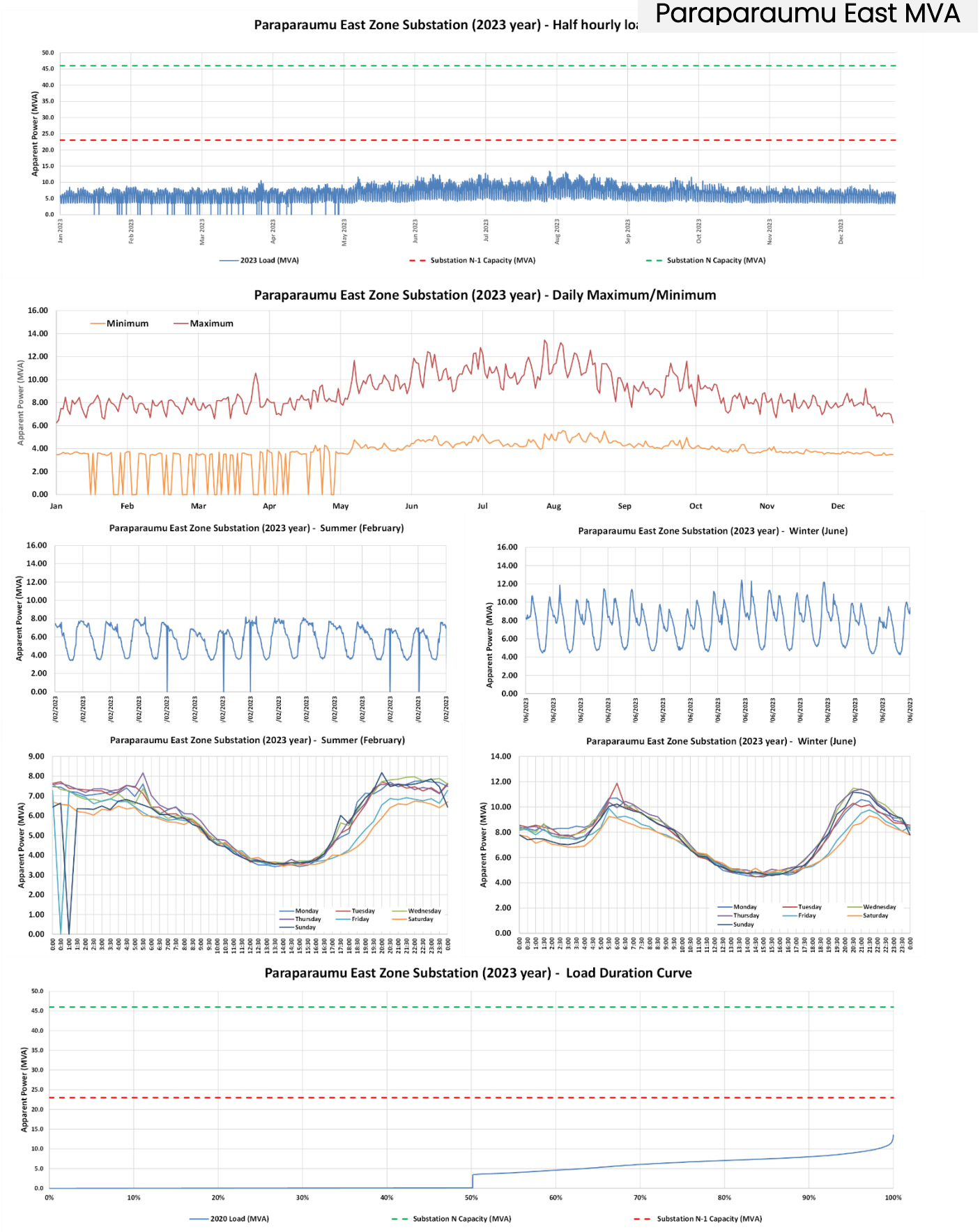

Figure 33. Paraparaumu East 33/11 kV zone substation: Apparent Power (MVA) load characteristics

Paraparaumu West MVA

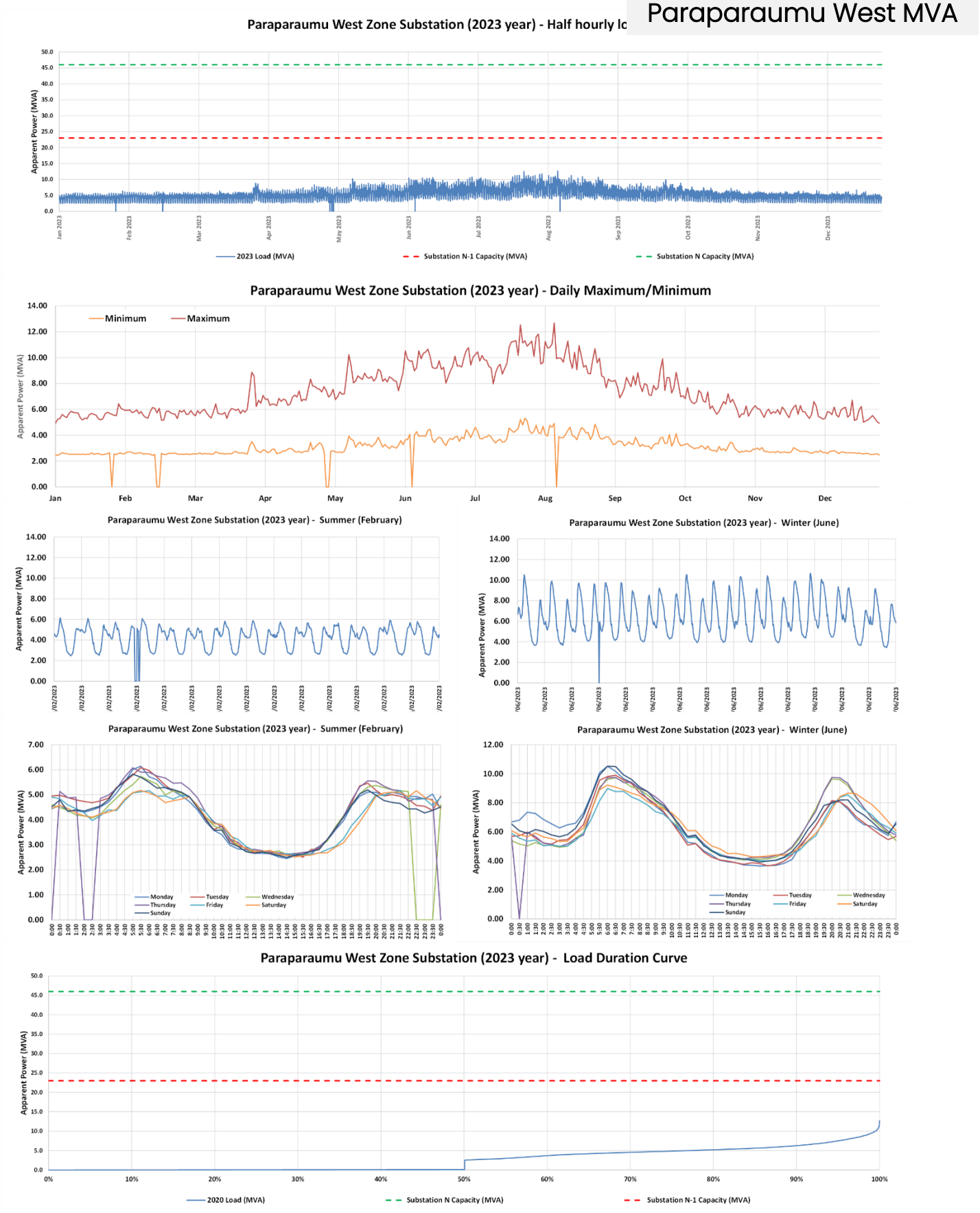

Figure 34. Paraparaumu West 33/11 kV zone substation: Apparent Power (MVA) load characteristics

Raumati MVA

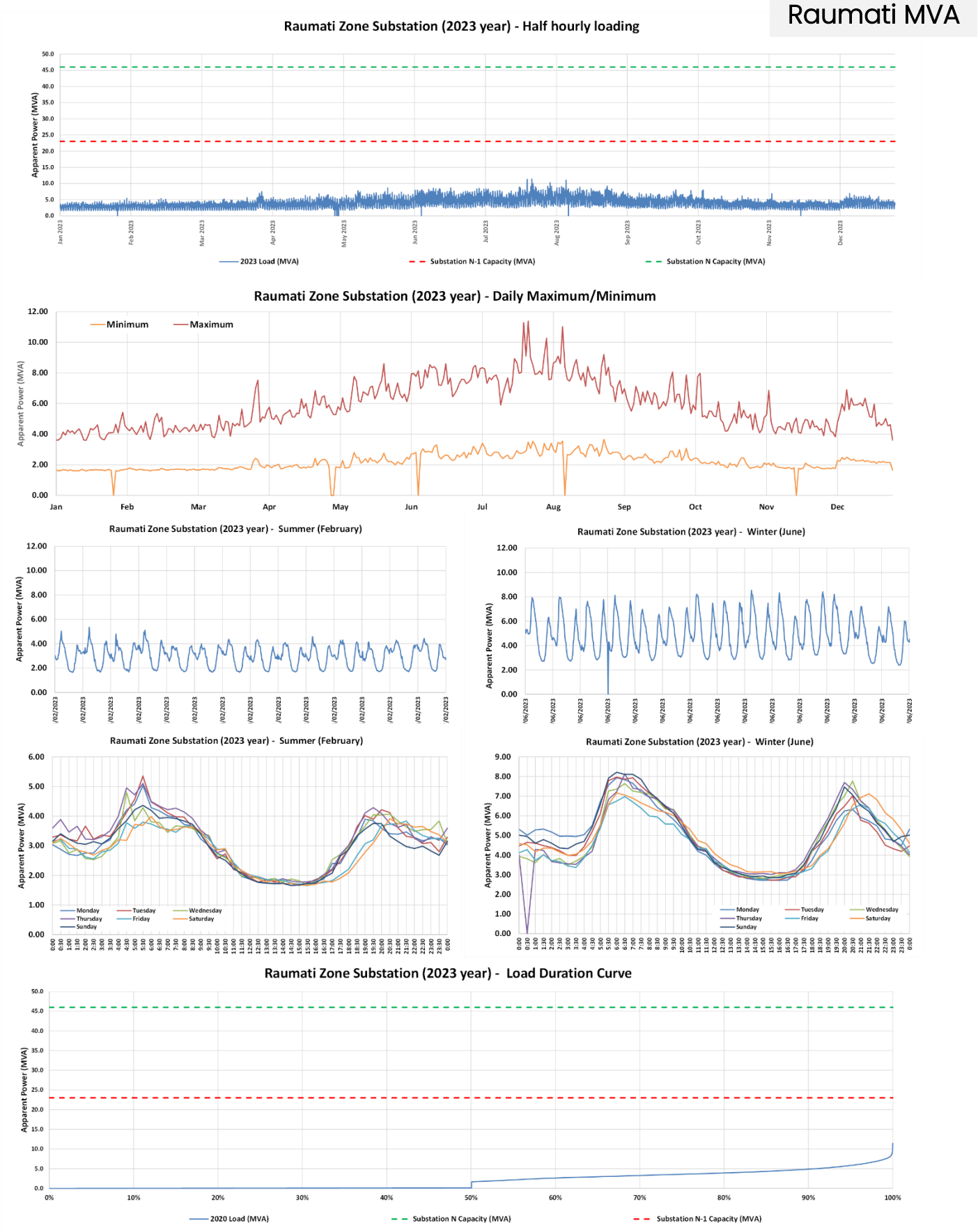

Figure 35. Raumati 33/11 kV zone substation: Apparent Power (MVA) load characteristics

Waikanae MVA

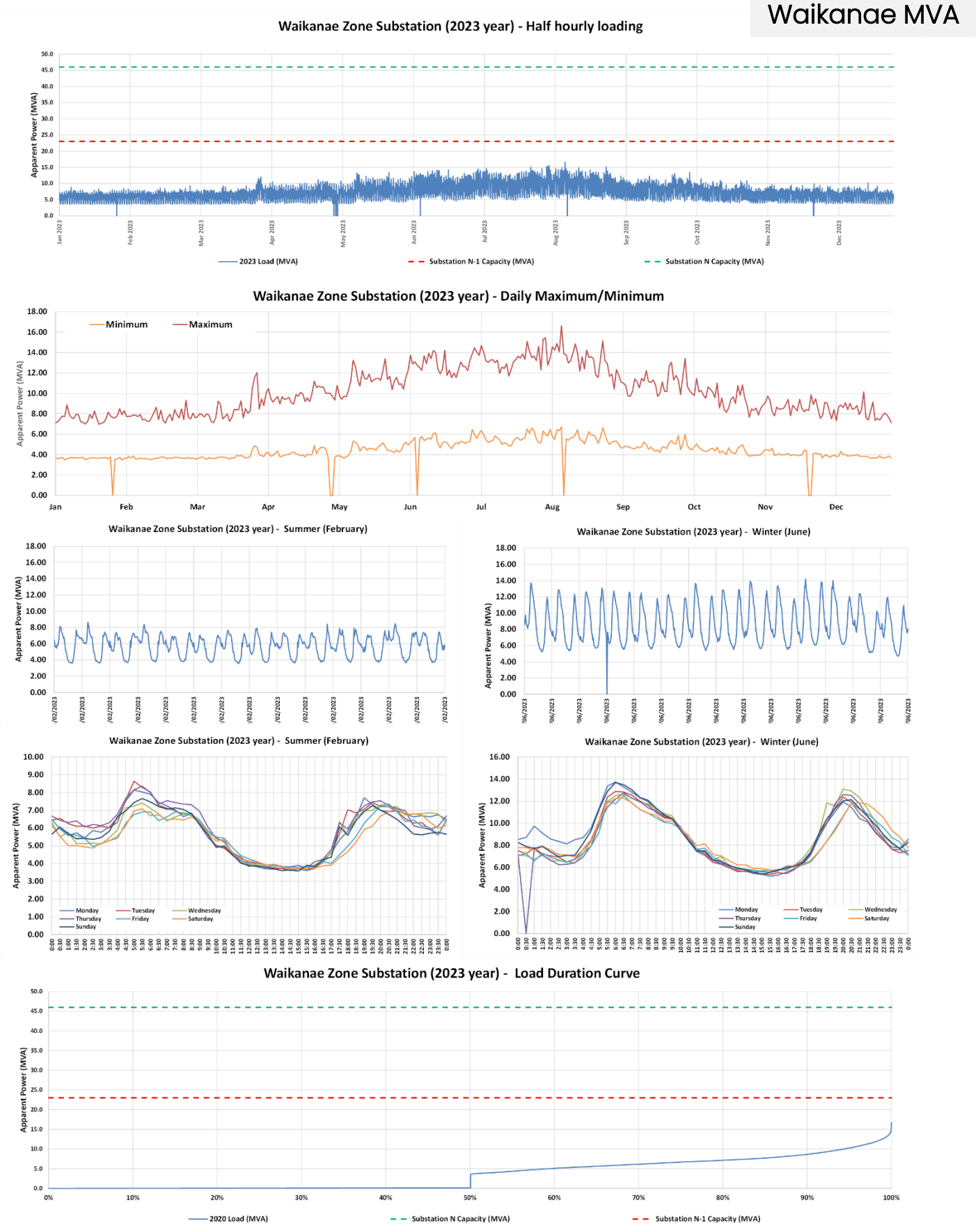

Figure 36. Waikanae 33/11 kV zone substation: Apparent Power (MVA) load characteristics

3.2 Powerco

Ergo did not receive zone substation load profiles from Powerco.

3.3 Wellington Electricity

Ergo did not receive zone substation load profiles from Wellington Electricity. However, Wellington Electricity takes direct supply from Haywards and Kaiwharawhara 11 kV GXPs, Trentham is the sole zone substation supplied from the Haywards 33 kV GXP, and Nairn Street is the sole zone substation supplied from the Central Park 11 kV GXP Therefore, the load profile of these Transpower-owned substations can be considered analogous for the purpose of this assessment.