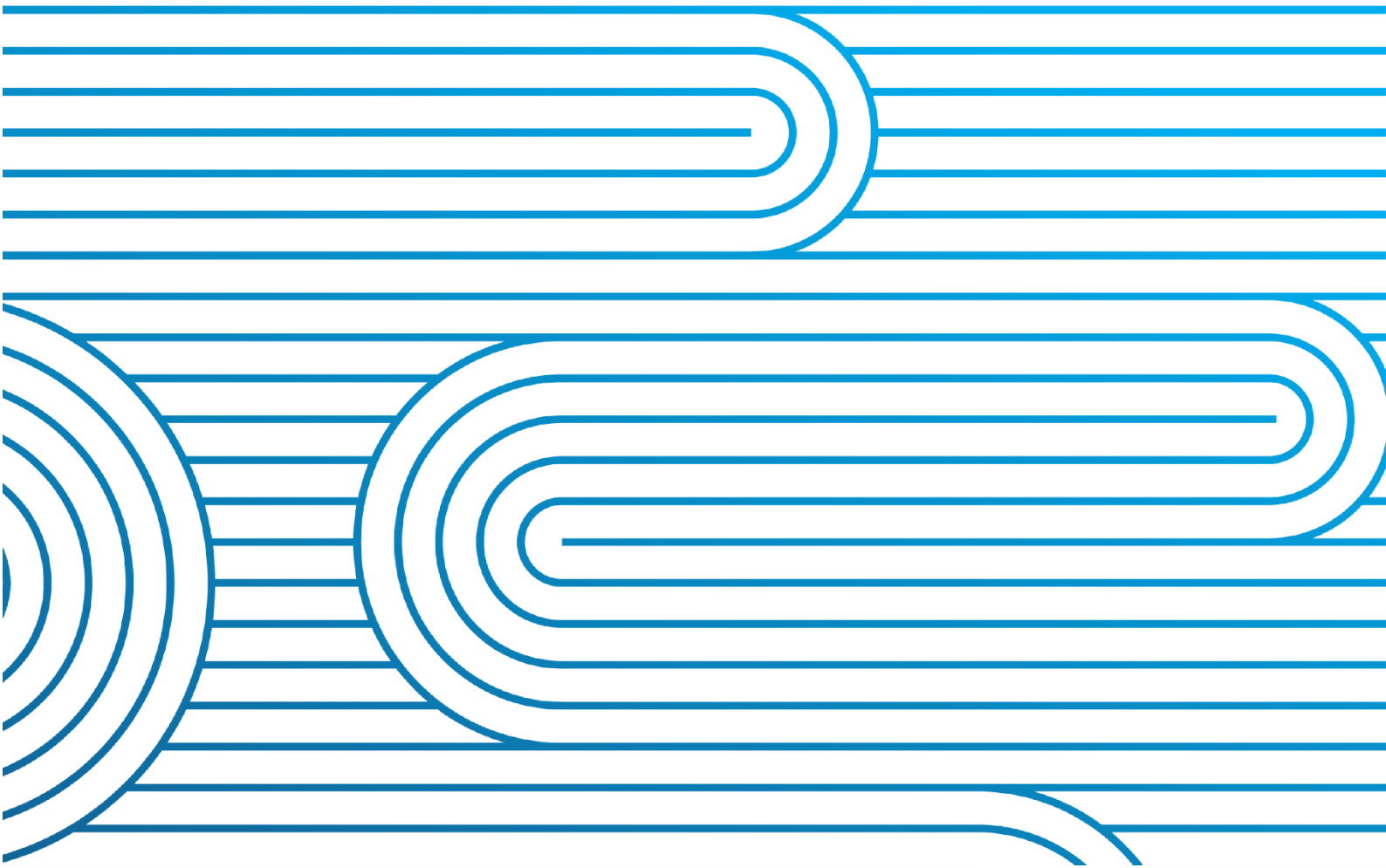
TRANSPOWER

# Quarterly system performance information

July to September 2023



# Report Purpose

To provide the information on ancillary services reporting and an overview of notices which was previously included in the Quarterly reports written for the Electricity Authority

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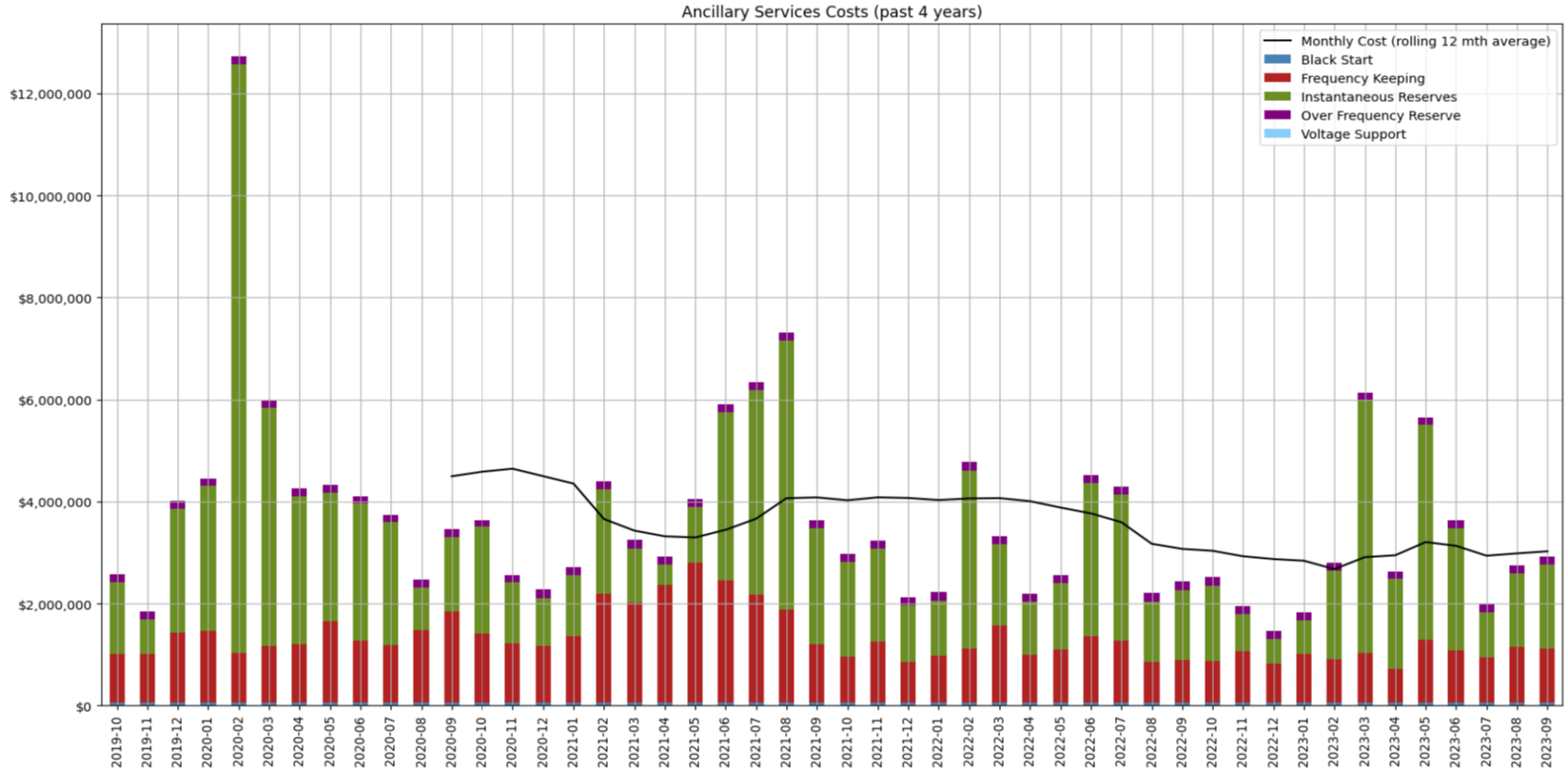
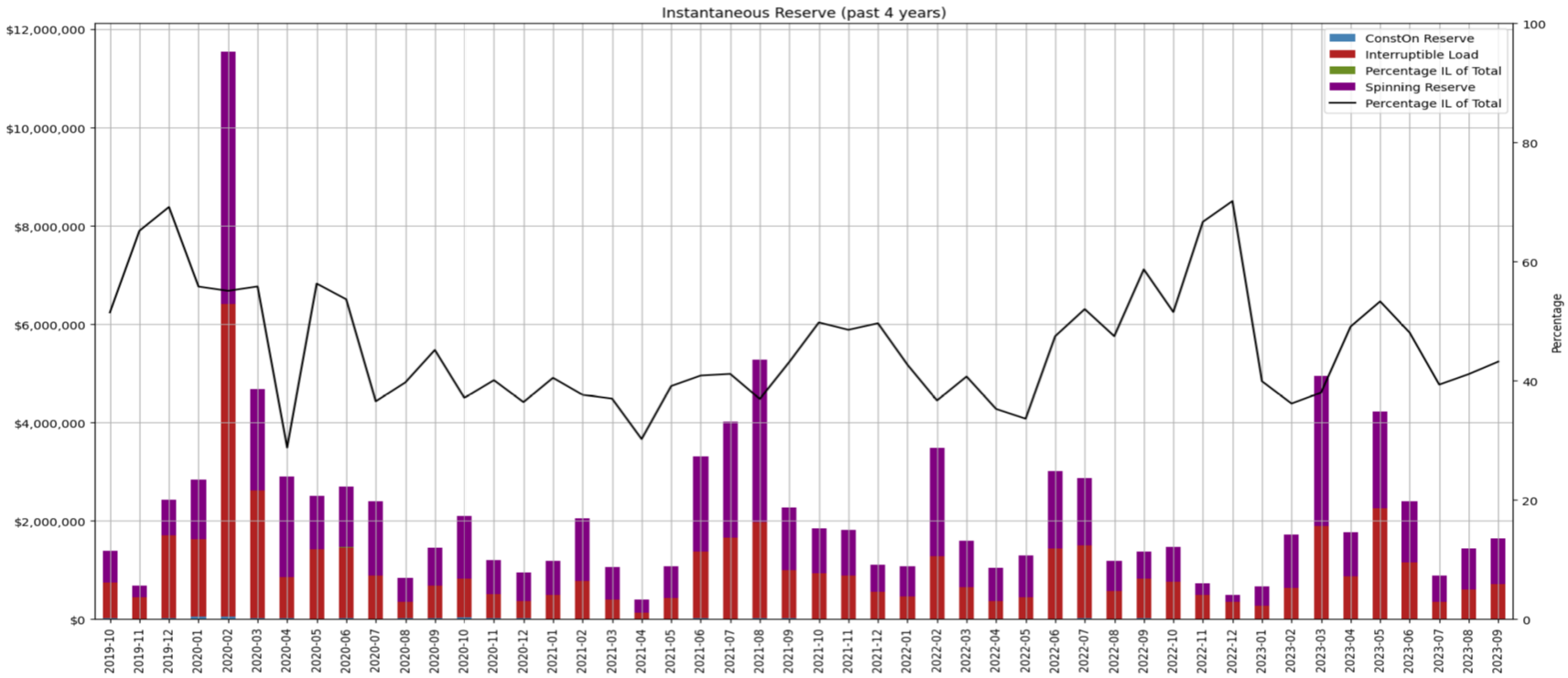
# 1 Ancillary service costs



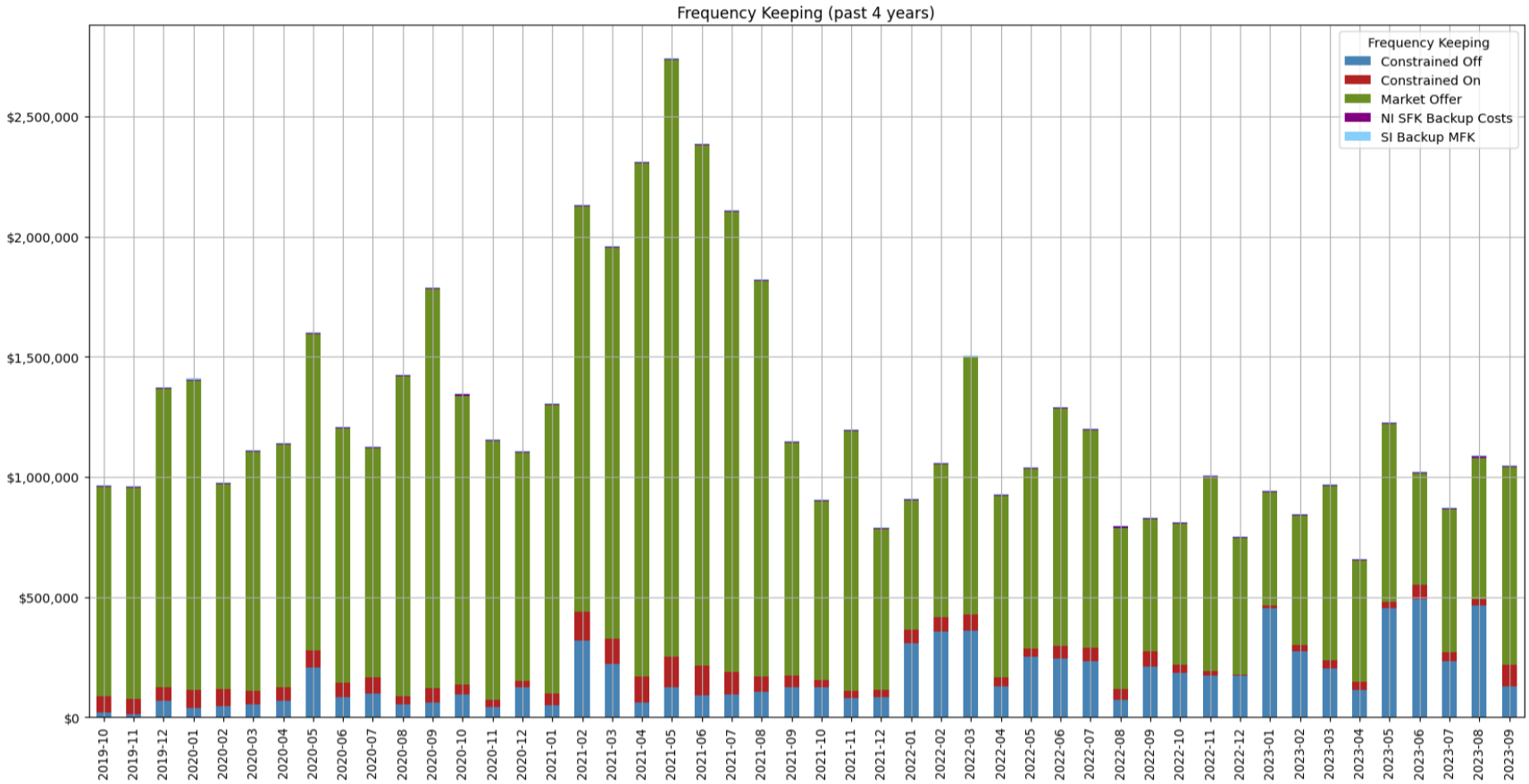

The overall ancillary service costs have been lower this quarter than the previous few months. The main factor contributing to this is the reduction in the instantaneous reserve costs which are shown in the next graph.



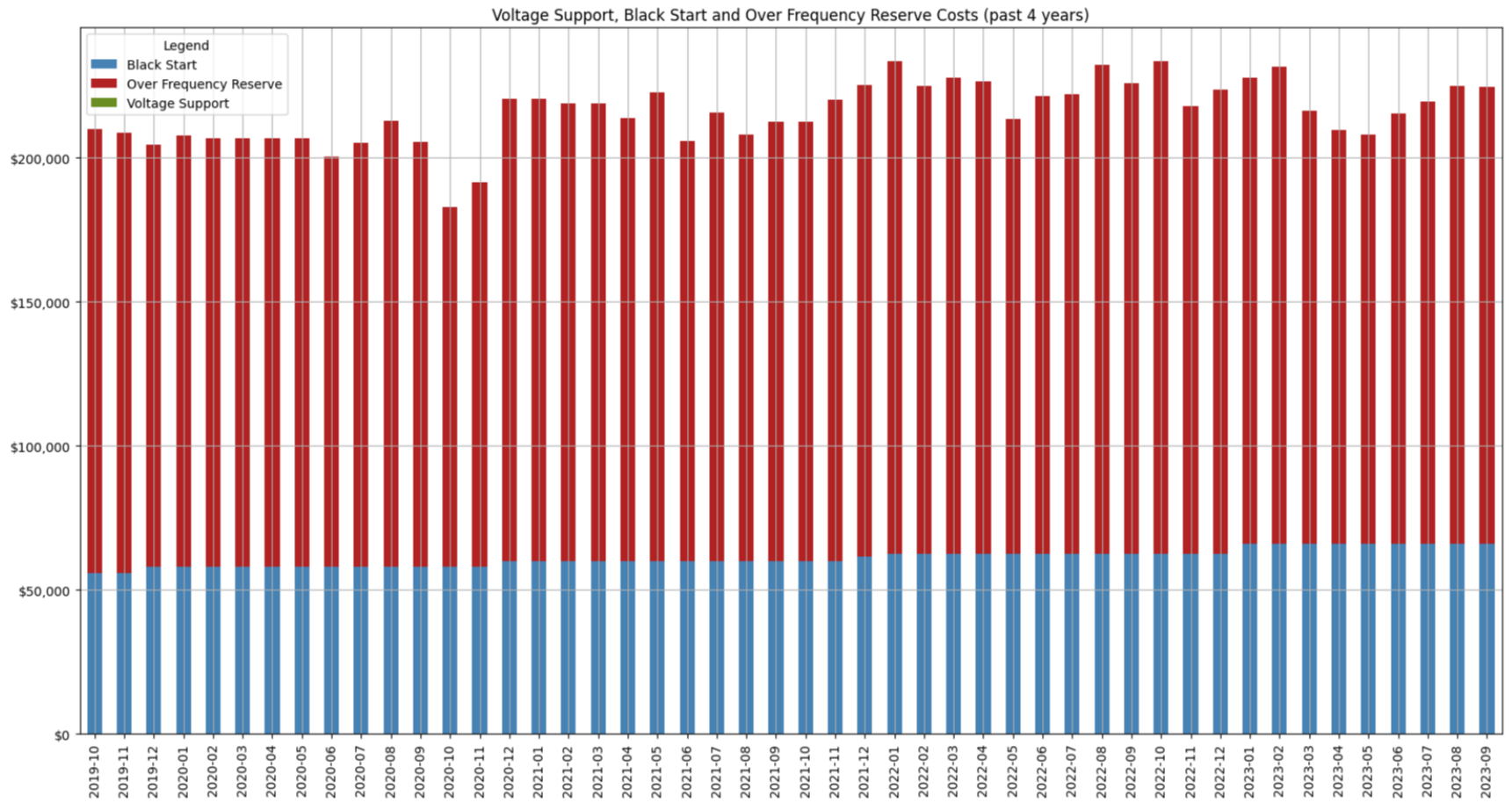

Instantaneous reserve costs have been lower this quarter. This is a result of both hydro and thermal generation costs.

Although the average hydro storage reduced, which is typical for the time of the year, it was still well above mean. With Huntly unit 5 on outage, more thermals came into the market and this combined with above average hydro storage kept reserve prices lower.

2 August was a peak demand day that saw prices spike but there was no Customer Advice Notice (CAN) as sufficient residuals were available. A Low Residual CAN was sent out on for 10 August which was another peak demand day as on this occasion more generation was required. The amount of reserves in September was lower, but the price spiked on 30 September due to reserves required to cover the HVDC outage and generator planned outages, including Manapouri unit 6 and Karapiro G2 during this period.




There was no real change to frequency keeping costs this quarter.

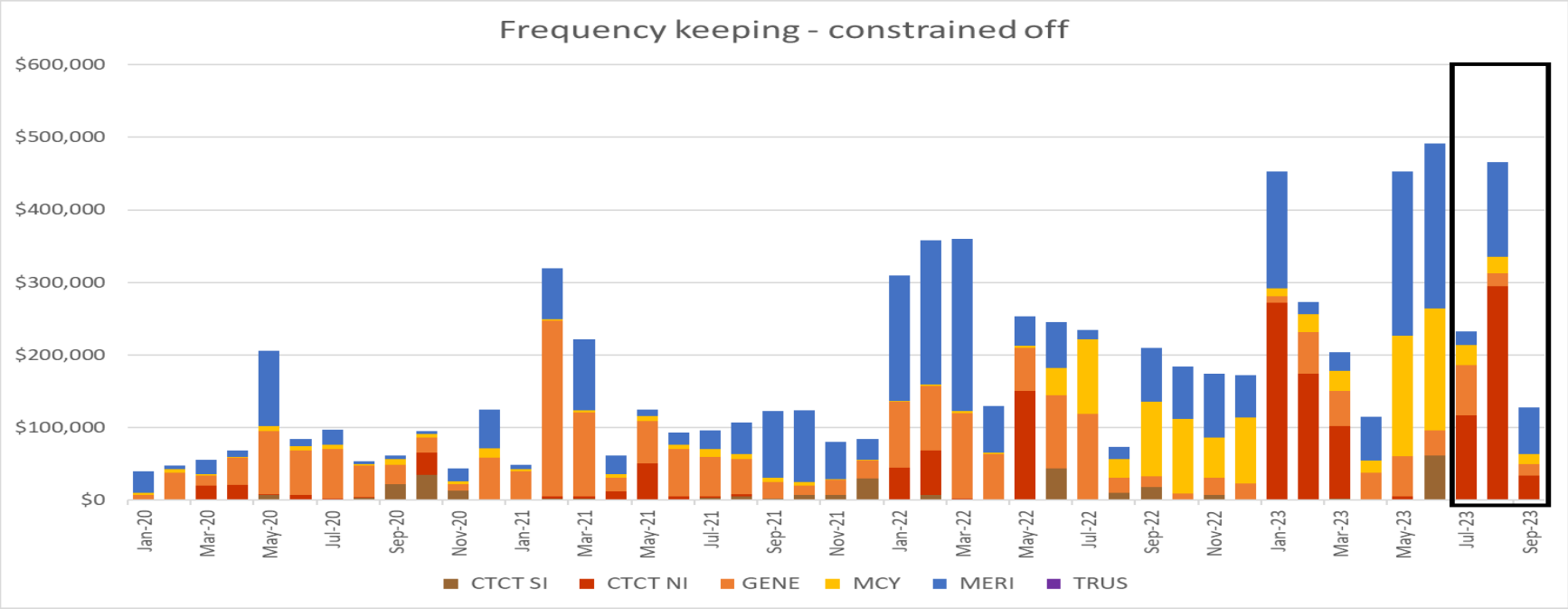



The variability in Over Frequency Reserve costs is due to reduced availability of generator units; Kawerau Geothermal power station in July, and some Manapouri units from July to September.

## 13.1 Constrained on/off costs

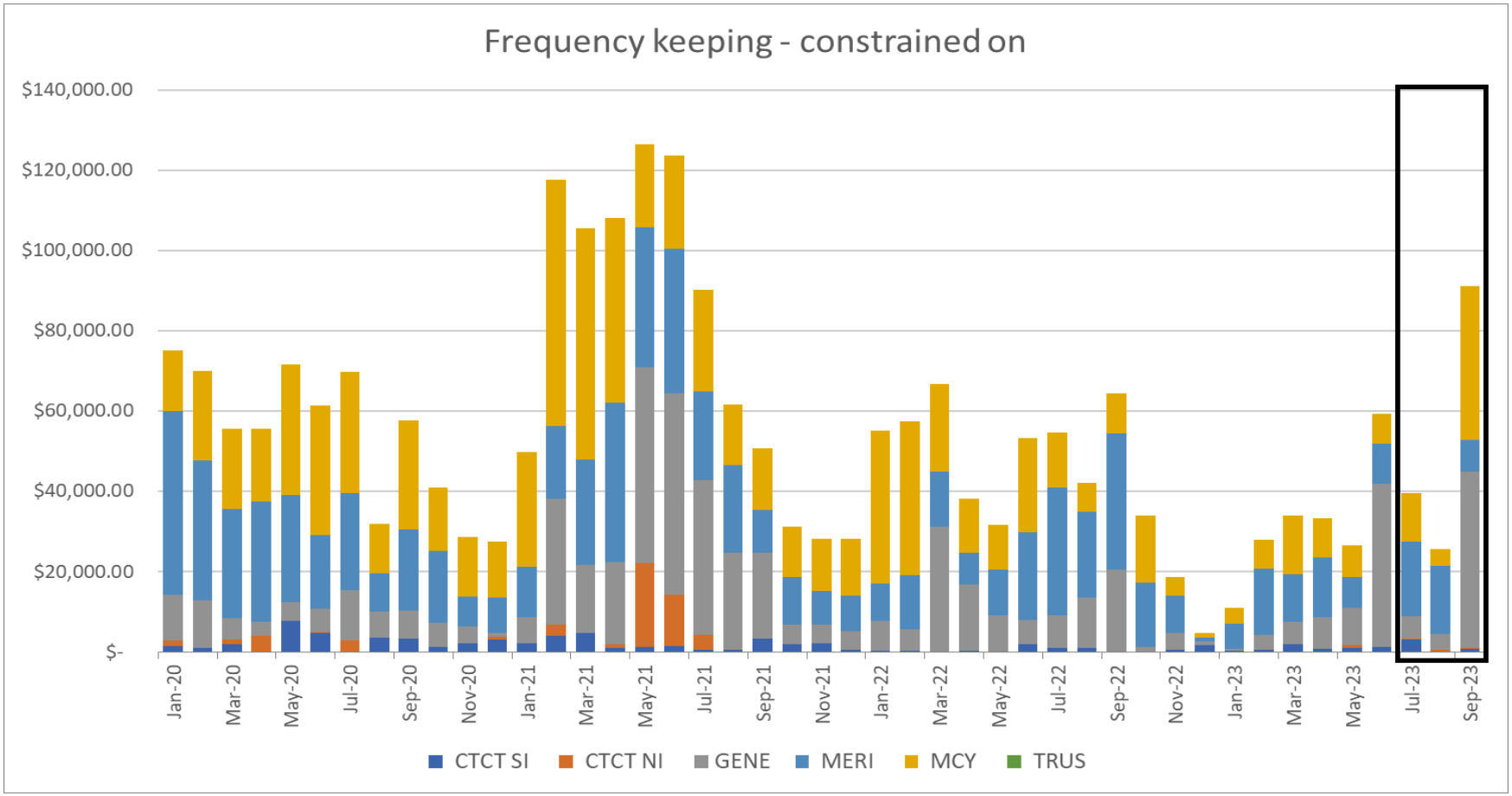
Note: Where there is a high payment, as opposed to in increasing/decreasing trend, it will often relate to payments over a small number of trading periods.

### Frequency Keeping



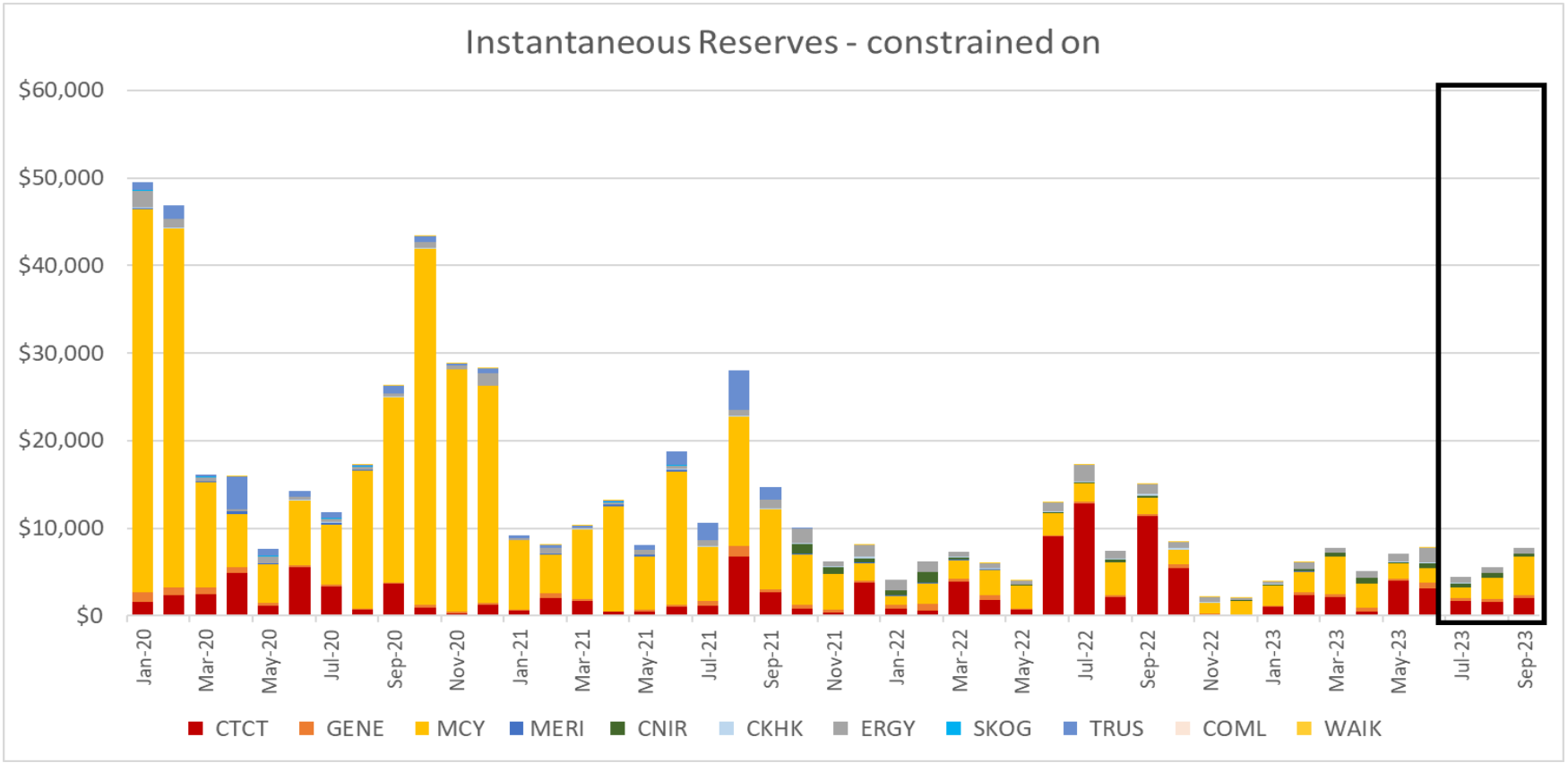

The high constrained off costs for Contact Energy in the North Island relates to the period when one of the Stratford peakers went on outage. Due to availability of only one peaker, the remaining peaker was backed off to provide room to provide the frequency keeping service.

Another factor contributing the higher costs in August was that there was reduced competition in the market with thermal generation needed to meet the demand peaks and some thermal generation out of service.




Some of the variation in September is due to higher than normal market prices. However, overall these costs are still relatively low compared to other ancillary service costs.

## Instantaneous Reserves



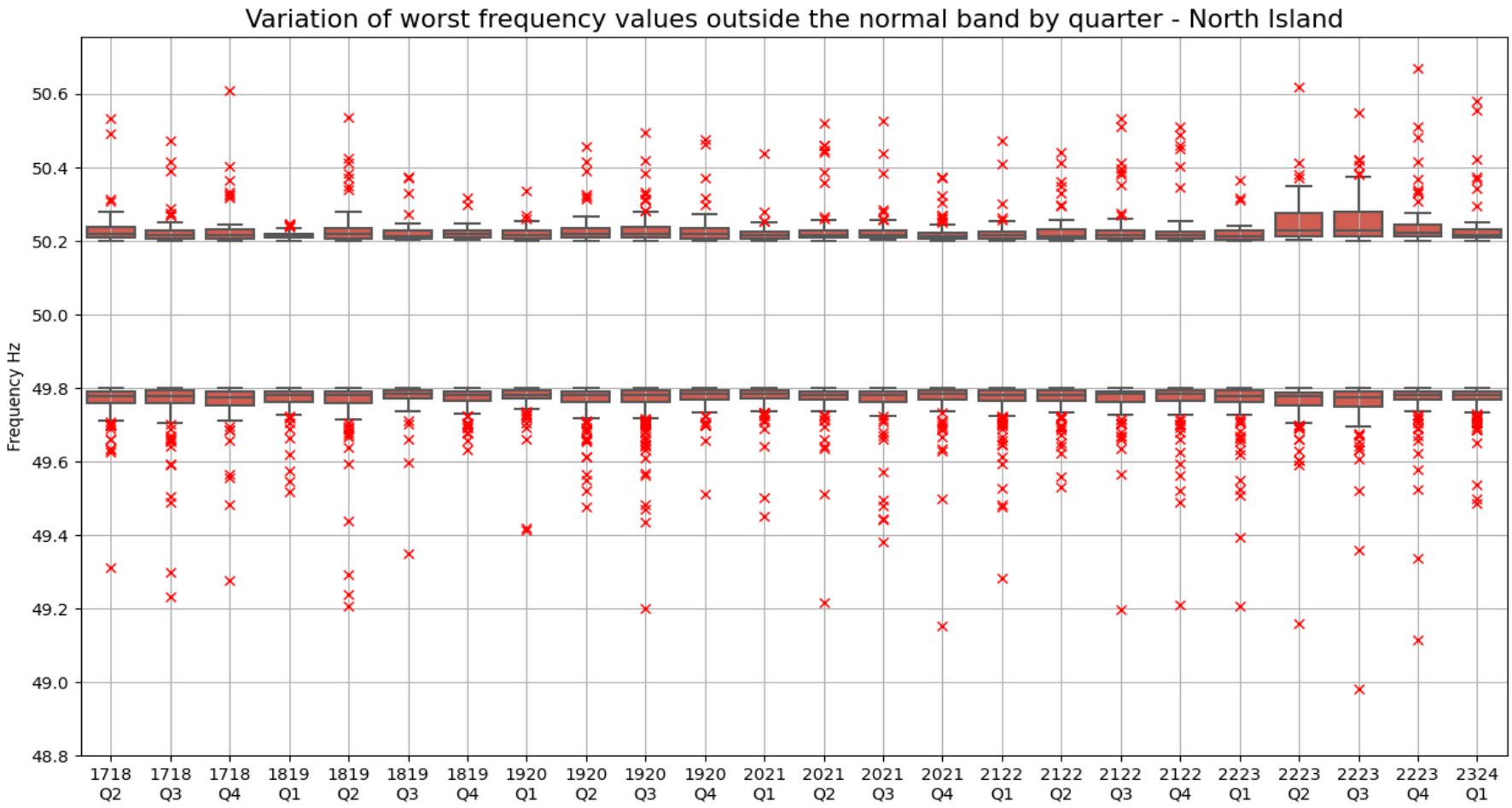

Costs have fallen in the quarter but there is no particular driver for this reduction and the variance is small.

# 2 Frequency fluctuations

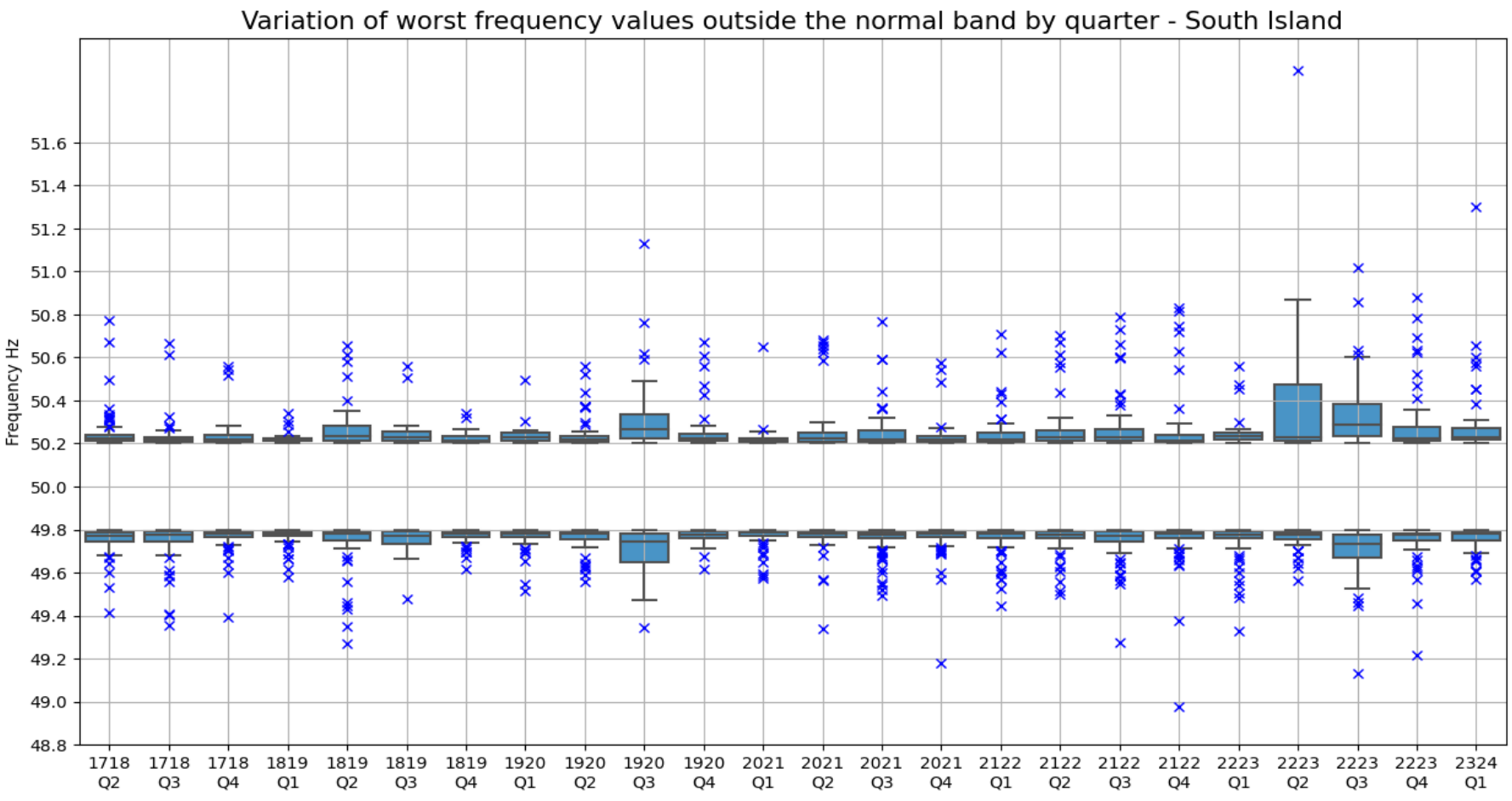
## 2.1 Maintain frequency in normal band (Frequency value)

The following charts show the distribution of the worst frequency excursion outside the normal band (49.8 to 50.2 Hz) by quarter since Q1 2015/16, including the reporting period.

**North Island**




**South Island**




Note: These box and whisker charts show the distribution of data. The “box” represents the distribution of the middle 50% of the data, the “whiskers” indicate variability, and outliers are shown as single data points.

Excursions outside the normal band this quarter:

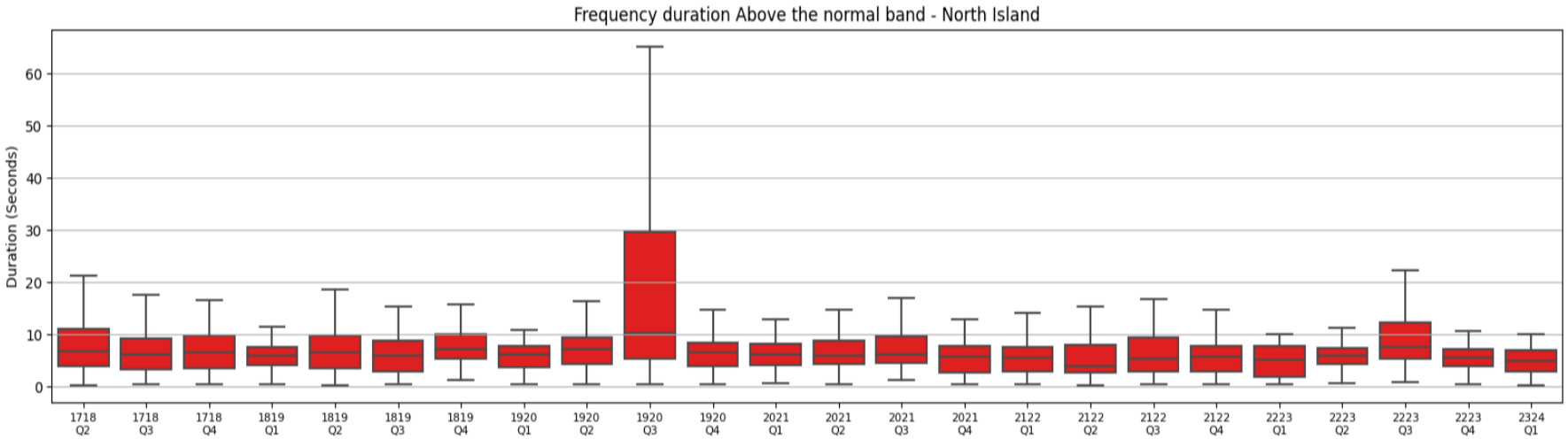
| | Above | Below |
|---|---|---|
| July | 2 x Tiwai Potline (S) – 4/7 and 20/7, Load loss due to voltage disturbance (OHW_OTA 1 tripping) (N) – 12/7 | 2 x KAG tripped (N) – 7/7 and 9/7 |
| August | Lightning storm with auto reclose on CYD_ROX 1 & 2, ~200MW of SI load lost due to voltage disturbance (S – outlier 51.3Hz,N) – 2/8, 2x Tiwai Potline (S) – 13/8 and 24/8 | |
| September | No excursions | |

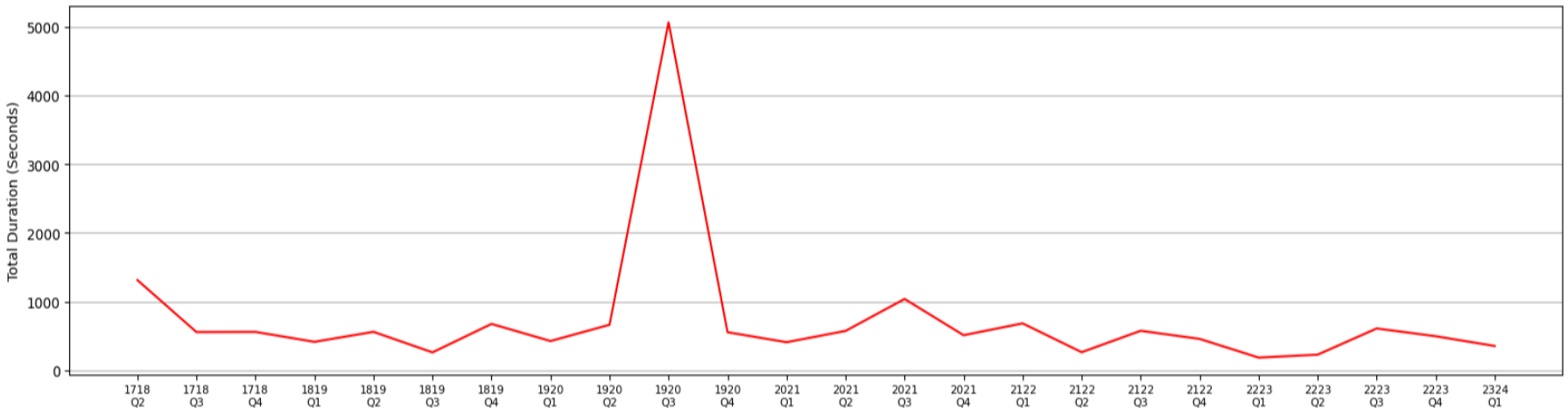
## Recover quickly from a fluctuation (Time)

The following charts show the median and total duration of all the momentary fluctuations above and below the normal band for each island. The information is shown as a 4-quarter rolling average to illustrate trends in the data.

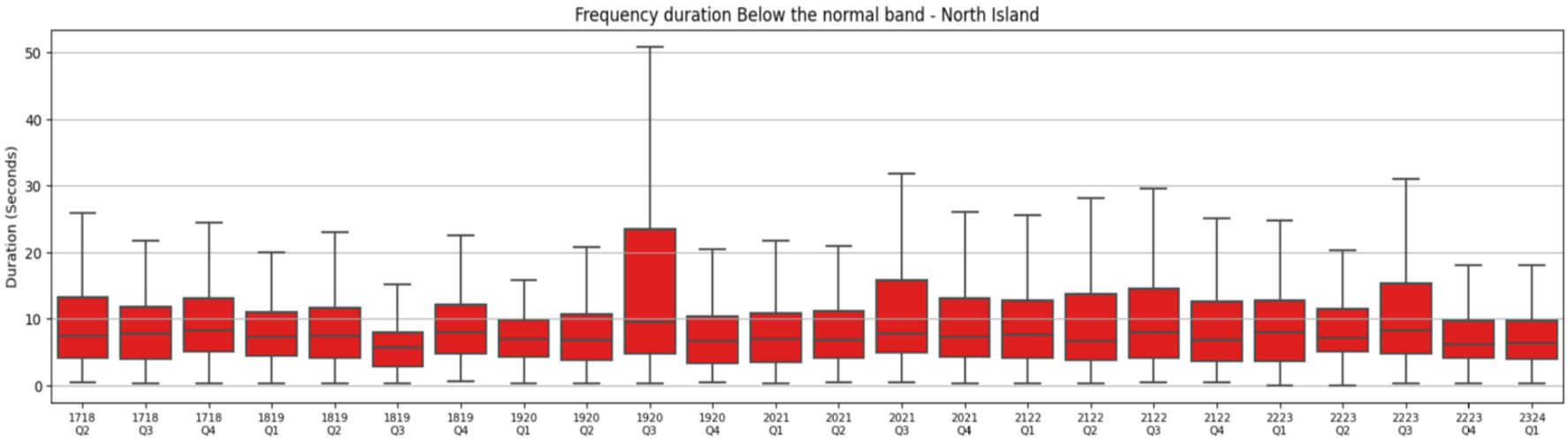
**North Island**

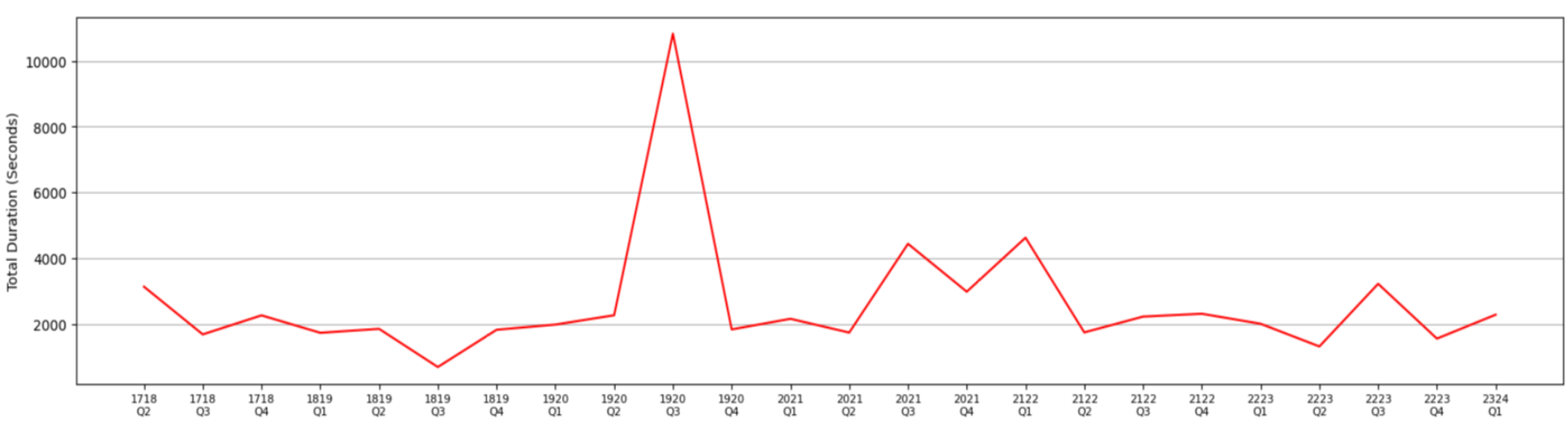
Above the normal band




Below the normal band



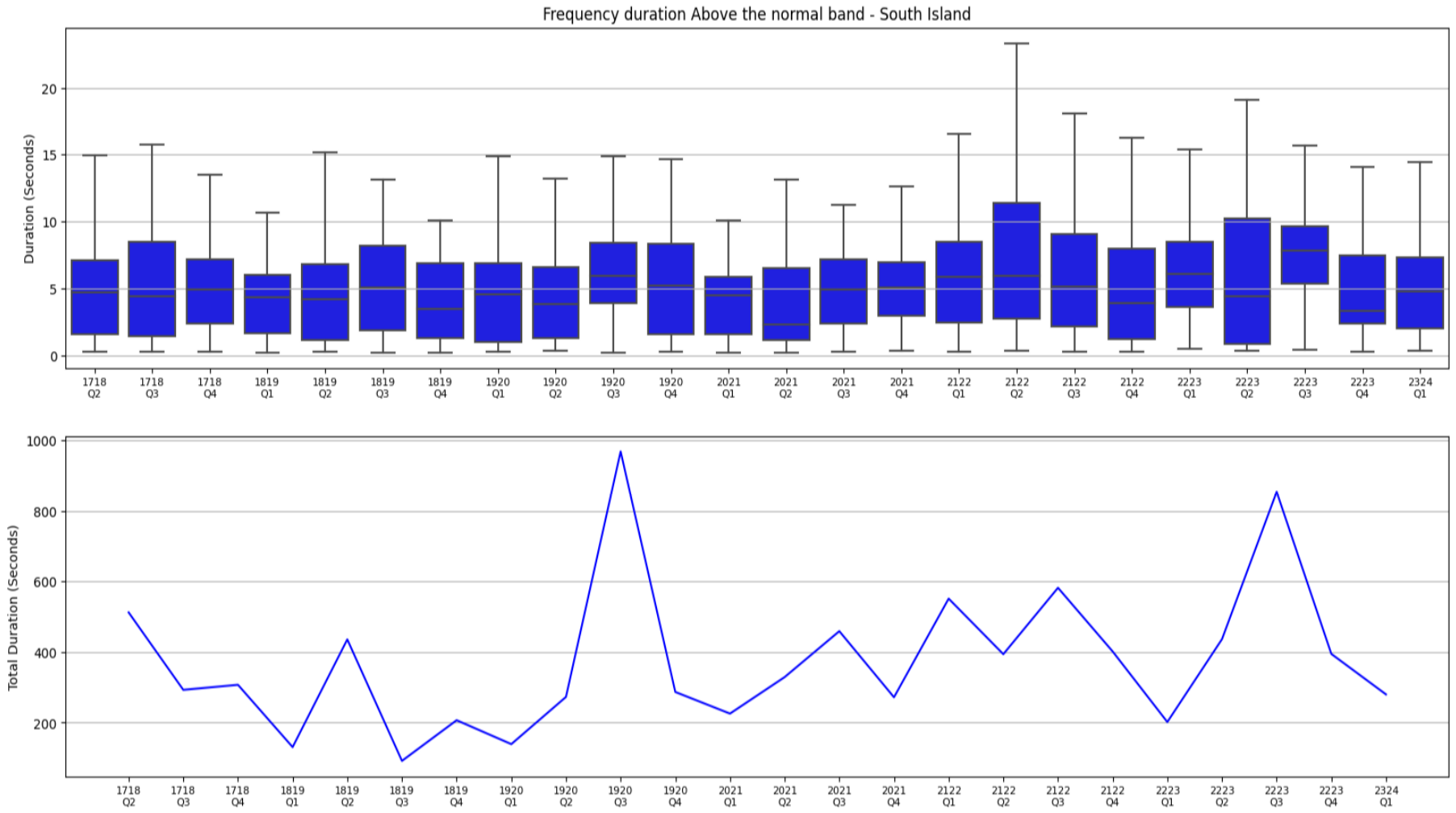




Excursions outside the normal band this quarter:

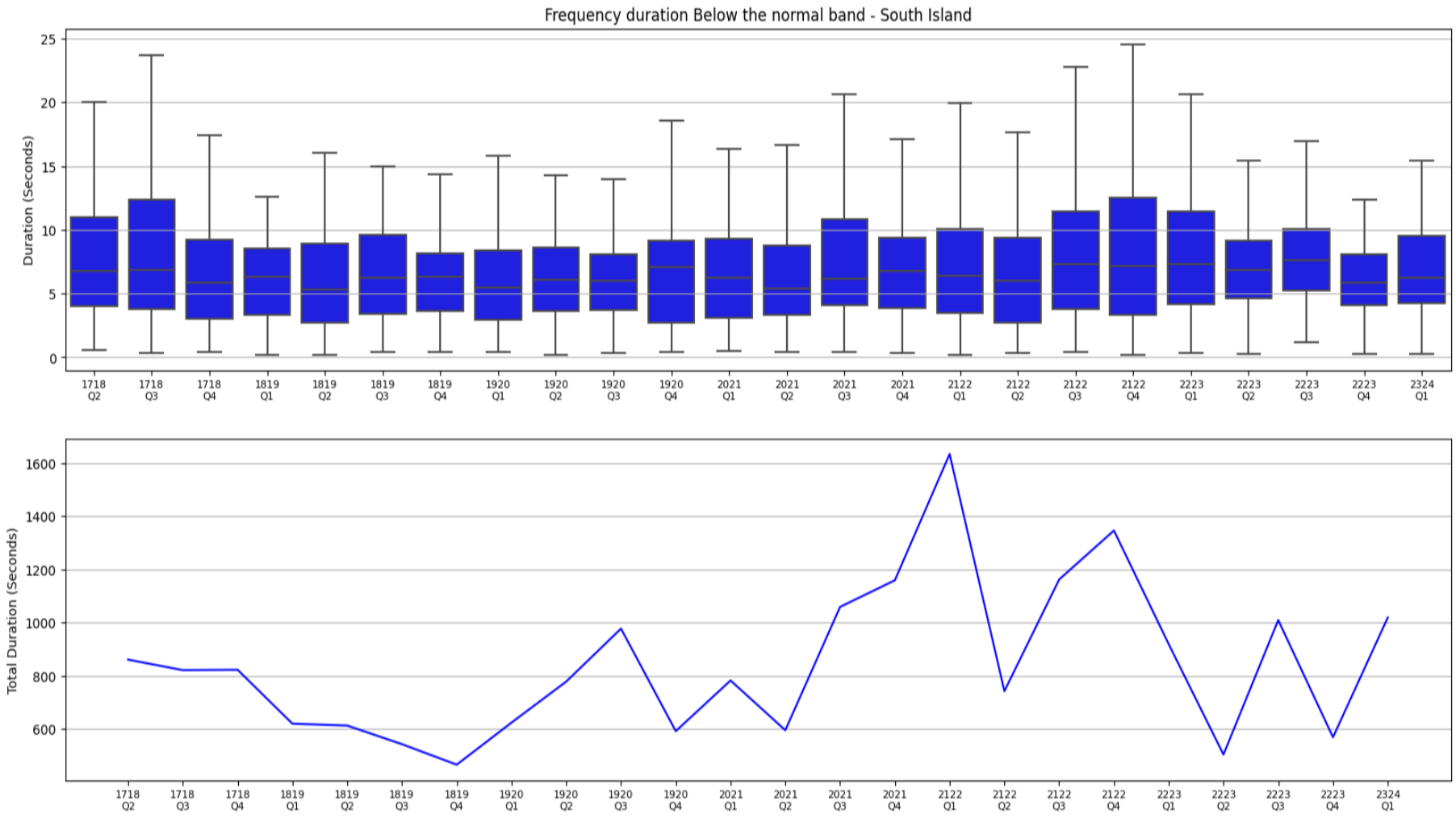
| | Above | Below |
|---|---|---|
| July | 2 x Tiwai Potline (S) – 4/7 and 20/7, Load loss due to voltage disturbance (OHW_OTA 1 tripping) (N) – 12/7 | 2 x KAG tripped (N) – 7/7 and 9/7 |
| August | Lightning storm with auto reclose on CYD_ROX 1 & 2, ~200MW of SI load lost due to voltage disturbance (S,N) – 2/8, 2x Tiwai Potline (S) – 13/8 and 24/8 | |
| September | No excursions | |

## South Island

Above the normal band




Below the normal band




Excursions outside the normal band this quarter:

| | Above | Below |
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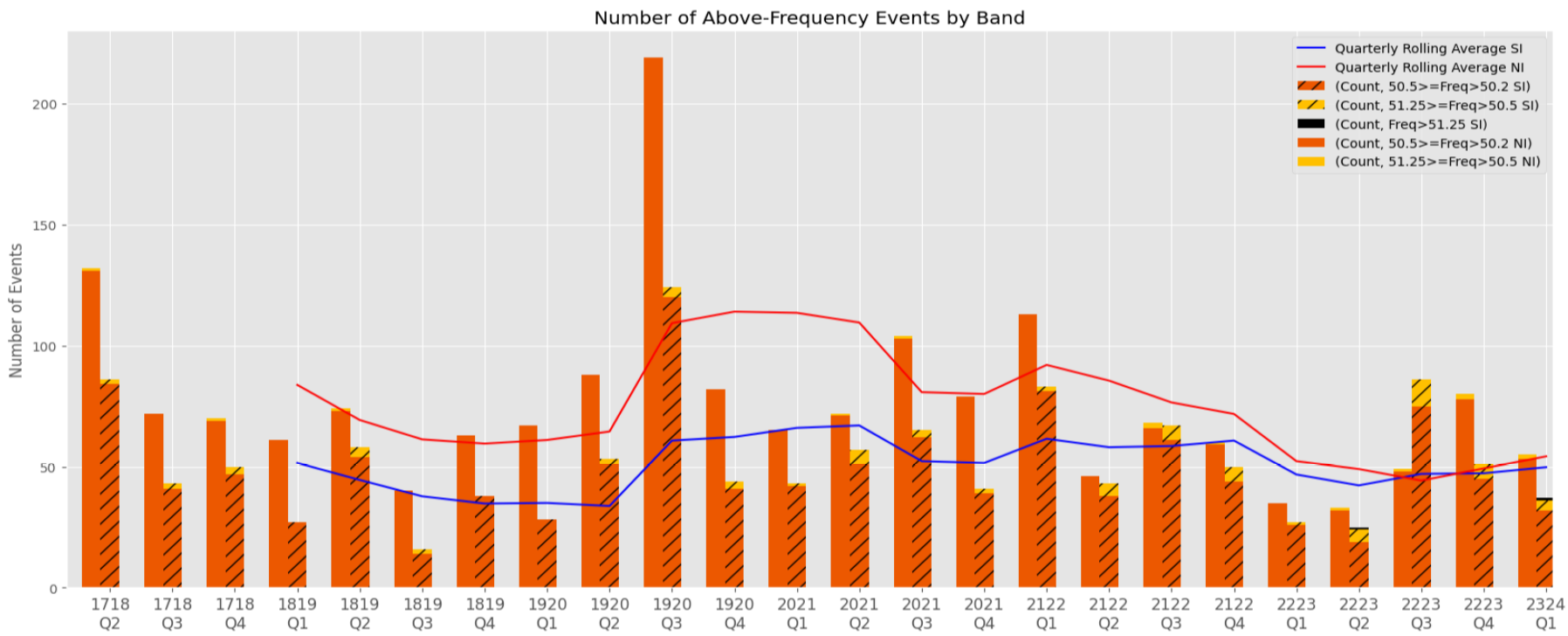
| August | Lightning storm with auto reclose on CYD_ROX 1 & 2, ~200MW of SI load lost due to voltage disturbance (S,N) – 2/8, 2x Tiwai Potline (S) – 13/8 and 24/8 | |
| September | No excursions | |

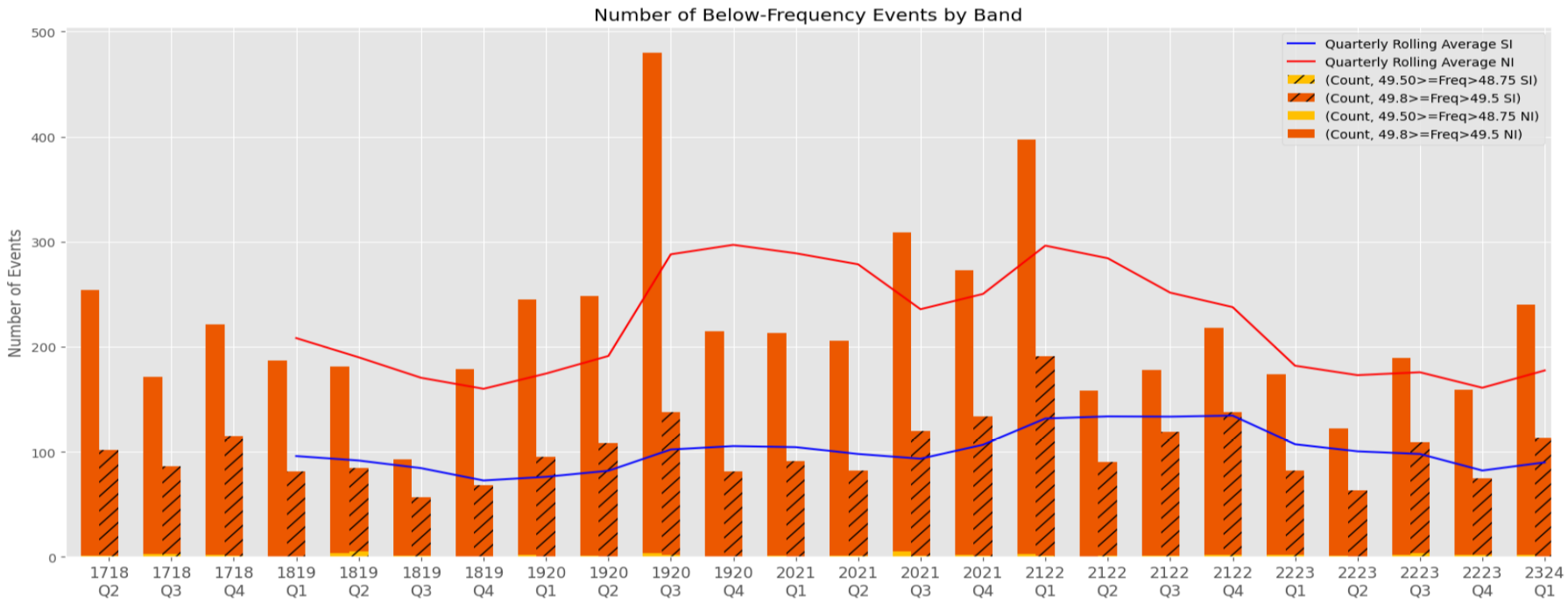
## 2.2 Manage frequency and limit rate of occurrences during momentary fluctuations (Number)

The following charts show the number of momentary fluctuations outside the frequency normal band, grouped by frequency band, for each quarter since Q1 2015/16. Information is shown by island, including a 4-quarter rolling average to show the prevailing trend.

**Over-frequency events**




**Under-frequency events**




Excursions outside the normal band this quarter:

| | Above | Below |
|---|---|---|
| July | 2 x Tiwai Potline (S) – 4/7 and 20/7, Load loss due to voltage disturbance (OHW_OTA 1 tripping) (N) – 12/7 | 2 x KAG tripped (N) – 7/7 and 9/7 |
| August | Lightning storm with auto reclose on CYD_ROX 1 & 2, ~200MW of SI load lost due to voltage disturbance (S,N) – 2/8, 2x Tiwai Potline (S) – 13/8 and 24/8 | |
| September | No excursions | |

Reporting against Code clause 7.2E:

| North Island | 52>**X**≥51.25 | 51.25>**X**≥50.5 | 49.5>**X**≥48.75 | 48.75>**X**≥48 | 48>**X**≥47 |
|---|---|---|---|---|---|
| **2022** | 0 | 1 | 2 | 0 | 0 |
| Jul | 0 | 0 | 0 | 0 | 0 |
| Aug | 0 | 0 | 0 | 0 | 0 |
| Sep | 0 | 0 | 1 | 0 | 0 |
| Oct | 0 | 1 | 1 | 0 | 0 |
| Nov | 0 | 0 | 0 | 0 | 0 |
| Dec | 0 | 6 | 8 | 0 | 0 |
| | | | | | |
| **2023** | 0 | 5 | 6 | 0 | 0 |
| Jan | 0 | 0 | 1 | 0 | 0 |
| Feb | 0 | 0 | 0 | 0 | 0 |
| Mar | 0 | 1 | 1 | 0 | 0 |
| Apr | 0 | 1 | 0 | 0 | 0 |
| May | 0 | 0 | 0 | 0 | 0 |
| Jun | 0 | 1 | 2 | 0 | 0 |
| Jul | 0 | 1 | 2 | 0 | 0 |
| Aug | 0 | 1 | 0 | 0 | 0 |
| Sep | 0 | 0 | 0 | 0 | 0 |

| South Island | 55>**X**≥53.75 | 53.75>**X**≥52 | 47>**X**≥45 |
|---|---|---|---|
| **2022** | | | |
| Jul | 0 | 0 | 0 |
| Aug | 0 | 0 | 0 |
| Sep | 0 | 0 | 0 |
| Oct | 0 | 0 | 0 |
| Nov | 0 | 0 | 0 |
| Dec | 0 | 0 | 0 |
| | | | |
| **2023** | | | |
| Jan | 0 | 0 | 0 |
| Feb | 0 | 0 | 0 |
| Mar | 0 | 0 | 0 |
| Apr | 0 | 0 | 0 |
| May | 0 | 0 | 0 |
| Jun | 0 | 0 | 0 |
| Jul | 0 | 0 | 0 |
| Aug | 0 | 0 | 0 |
| Sep | 0 | 0 | 0 |

# 3 Security notices

The following table shows the number of Warning Notices, Grid Emergency Notices and Customer Advice Notices issued over the last 12 months.

| Notices issued | Sep-22 | Oct-22 | Nov-22 | Dec-22 | Jan-23 | Feb-23 | Mar-23 | Apr-23 | May-23 | Jun-23 | Jul-23 | Aug-23 | Sep-23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Demand Allocation Notice | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Grid Emergency Notice | 1 | 1 | 1 | - | - | 1 | - | - | - | 1 | - | - | - |
| Warning Notice | - | 1 | - | - | - | - | - | - | - | - | - | - | - |
| Customer Advice Notice | 35 | 33 | 30 | 17 | 11 | 4 | 14 | 12 | 9 | 11 | 12 | 10 | 15 |
| | | | | | | | | | | | | | |

# 4 Grid emergencies

The following table shows grid emergencies declared by the System Operator July to September 2023.

| Date | Time | Summary Details | Island |
|---|---|---|---|
| | | None this quarter | |