TRANSPOWER

MONTHLY SYSTEM OPERATOR AND SYSTEM PERFORMANCE REPORT

FOR THE ELECTRICITY AUTHORITY

Transpower New Zealand Limited

October 2019

Keeping the energy flowing




TRANSPOWER

Transpower New Zealand Limited The National Grid

Report Purpose

This report is Transpower's review of its performance as system operator for October 2019, in accordance with clause 3.14 of the Electricity Industry Participation Code 2010 (the Code).

A detailed system performance report (Code obligated) is provided for the information of the Electricity Authority (Authority).

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System operator performance

1 Highlights this month

- We held a joint industry briefing with Transpower's grid owner on the HVDC outages. The system operator presented the forecast generation balance, security of supply, as well as an overview of communications participants can expect during the work.
- The reset of the extended reserves project was approved by the Authority Board this month.
- Dispatch Service Enhancements (DSE) work is focussed on transitioning Genesis to their new dispatch platform in November 2019.
- The first meeting for the POCP (Planned Outage Coordination Process) review was held on 11 October.
- A black start test was successfully conducted at the Clyde power station, with no major issues uncovered during the test.
- There was an outage of the SCADA system on 31 October, resulting in the declaration of a SCADA situation and assessed as a medium level incident. A system operator report will be prepared.

2 Customer

Orion voltage management

We collaborated with Orion to arrange for additional voltage management options for the South Island. This resulted in an agreement that Orion could remove some of their 66kV cable network on request in order to help keep the South Island voltage down overnight.

3 Risk & Assurance

We completed our control self-assessment process this month. It clearly demonstrated the growth in our risk maturity; with control accountability and improvement activities better reflecting our risk preparedness. Our risk management framework has been updated to incorporate these results.

4 Compliance

We reported five new system operator breaches to the Authority in October.

- 3809 - Over procurement of reserve at Whareroa during commissioning testing
- 3814 - Modelling error for a transformer at Stoke which appeared in real time
- 3806 - Incorrect constraints built to manage a special protection scheme at Coleridge-Hororata during an outage
- 3840 - Modelling error for a transformer at Mt Roskill, incorrect constraint applied in real time
- 3823 - Error in published schedule which included inaccurate real time prices

Two events had market impacts, 3809 - Whareroa (estimated at $7,451) and 3814 - Stoke (minor impact only, estimated at $6).

We have eight outstanding breaches with the Authority Compliance Team.

Appendix A shows instances where the system operator has applied discretion under 13.70 of the Code.

5 Separation of Transpower roles

The entries below are the open issues in the conflict of interest (COI) register. These issues are being handled in accordance with our policy for managing conflicts of interest.

There was one new COI issue recorded in October. A partner of a system operator employee has taken a role with the grid owner. In addition to explaining expectations around impartiality and maintaining confidentiality, where possible we will avoid putting these individuals in situations which conflict of interest could be challenging to manage.

System Operator Open Conflict of Interest Issues		
ID	Title	Managed by
9	HVDC Outages 2019/20	Operations Planning Manager
18	Recommendations from Conflict of Interest Review	Compliance and Risk Manager
21	Staff interest in generator commissioning	GM Operations
22	Security classifications for PI Vision database access	SO Power Systems Group Manager
26	Response to 14 December UFE recommendation	SO Power Systems Group Manager
27	SO employee partner to work for GO	SO Power Systems Group Manager

Greater detail on each of the open conflict of interest issues is provided in the next quarterly report.

6 HVDC 2020 outages

In October, we held a joint industry briefing with Transpower's grid owner on the HVDC 2020 outages. This was well attended with representatives from industry participants, the Electricity Authority, and OMV. Presentations covered the work that will be carried out, our forecast generation balance, security of supply, as well as an overview of communications participants can expect during the work. We published our November NZGB (New Zealand Generation Balance) report early in order to present the analysis at the briefing. This included a detailed analysis for a number of scenarios, including reduced thermal generation due to the Ahuroa and Pohokura outages, and the potential for unplanned outages during the Pohokura pipeline inspections scheduled. Analysis based on current outage information shows that N-1-G shortfalls may be possible during the Ahuroa outage, if we see reduced gas-fired generation. We are working with generators that have outages over this period to minimise the risk as much as possible.

The Electricity Authority has, in the last two weeks, commissioned an independent review of our generation balance assessments for the HVDC outages. We will be available to answer questions or assist the consultants as required.

7 Project updates

7.1 Market design and system enhancement project updates

Progress against high value, in-flight market design, service enhancement and service maintenance projects is included below along with details of any variances from the current Capex Plan.

Real Time Pricing (RTP)
Our work to identify business process impacts is nearing completion. The focus is now on the development of solution requirements. We have signed an additional TAS statement of work to explore the scope to co-optimise interruptible load and demand dispatch products.

Dispatch Service Enhancements (DSE)
Delivery of the additional functionality was deployed on 24 October. Work is now focussed on transitioning Genesis to their new dispatch platform in November 2019.

Wind Offer Arrangements
The wind offer arrangements project went live on 19 September (following deployment on 5 September). Post go-live, an issue was identified which impacted the way market system calculates price during trading periods where the system cuts over to stand-alone dispatch (this was identified during DSE project deployment on 24 October). A workaround is in place and IST is working to deploy a permanent fix as soon as possible.

Extended Reserve (AUFLS)
The reset of the extended reserves project was approved by the Authority Board this month. A TAS statement of work for the first phase, focusing on how to capture and validate existing AUFLS data, has been signed.

Situational Intelligence
The delivery business case has been drafted and is in the process of being approved.

Credible Event Review
The consultation for the busbar review was completed during the month. Three responses were received, from Mercury, Vector and Northpower. No major issues were raised in this consultation, and we will aim to publish a response to the feedback on our website during November.

The team is currently working on a preliminary review of the HVDC assets, with the intent to publish a brief paper addressing whether we will perform a full credible event review or if we will maintain the existing classifications at this point of time.

Energy Futures

An investigation business case is being developed to pilot a reactive technologies inertia monitoring system in New Zealand for six months to assess its suitability to support our system operator service.

New Generating Technology for Ancillary Services

We are finalising a TAS statement of work to develop a report verifying whether Battery Energy Storage Systems (BESS) and other inverter-controlled devices can offer into the market as instantaneous reserve (IR) using the existing IR offer types in the Code. The report will include recommendations for enabling changes to the Code and Procurement Plan, as well as rough order of magnitude of the costs for any changes required to market system.

7.2 Other projects

Operations "Big 4" – Lift, Deliver, Refresh, Future

Lift	Deliver	Refresh	Future
• Lift our capability through addressing recommendations from recent events and reviews	• Deliver Real Time Pricing - will change focus of energy dispatch, to be delivered by 2023	• Refresh with industry our external reports and engagement processes	• Future - implement new systems to achieve the real time operating vision

Lift:

- The Deloitte maturity check on risk and assurance was delivered in October. We are working through the actions.
- The procedure for the reporting of major incidents and near misses will published in November.

Deliver:

- The detail for the RTP project is included in section 7.1.

Refresh:

- This month we have updated the wind forecasting trial graphs with WITS (Wholesale information and trading system) data to improve our industry reports and interfaces. These are available on Transpower's website.

Future:

- The next phase investigation approval document for the Outage Planning Enhancements project is on schedule to be approved by the end of November.

Planned Outage Coordination Process (POCP) review

The first meeting for the POCP (Planned Outage Coordination Process) review was held on Friday 11 October. A cross-section of industry representatives is involved in the Technical Advisory Group. Topics discussed so far have included whether POCP

should remain voluntary or be mandatory and how to define an outage. Discussions on these points will continue at the group's next meeting on 15 November.

System Security Forecast (SSF) Minor December Update

We are currently working on a minor review and update of the SSF and intend to publish prior to the end of the year. This review will include very few changes compared to the previous revision when a lot of new asset commissioning was required to be incorporated.

8 Technical advisory hours and services.

Technical advisory hours and a summary of technical advisory services to which those hours related (SOSPA 12.3 (d) refers) will be provided in the next quarterly report.

9 Outage planning and coordination

Outage Planning

Workload is increasing as we start the spring maintenance season - there were 653 planned outages in October, around 18% of these are at short notice. Outage numbers for the next 10 weeks, going through spring are up at 130 per week. As system operators we assess all outages for system security issues.

We published an outage assessment for 13-15 November when there are concurrent outages of Te Mihi–Whakamaru 1, Huntly 5 and Taranaki combined cycle plant (TCC). The assessment was prudent due to potential N-1-G shortfalls during this period. We are talking to all three asset owners, and have started to monitor residual generation in the week ahead schedules. If there are low residuals (less than 200MW) we will publish a warning and communicate with participants.

10 Performance metrics

System operator performance against the performance metrics for the financial year as required by SOSPA 12.3 (a) will be provided in the next quarterly report.

11 Cost-of-services reporting

We will provide the Authority with a draft report on the cost-of-services for financial year 3 (2018/19) in mid-November, following the publication of Transpower's financial information disclosures.

12 Actions taken

A full list of actions taken regarding the system operator business plan, statutory objective work plan, participant survey responses and any remedial plan, as required by SOSPA 12.3 (b) will be provided in the next quarterly report.

System performance

13 Security of supply

Rainfall mid-month across the country resulted in increased hydro storage in both islands. New Zealand storage is now in a healthy position. At the end of October, hydro storage was 100% of average for this time of year and 58% of full.

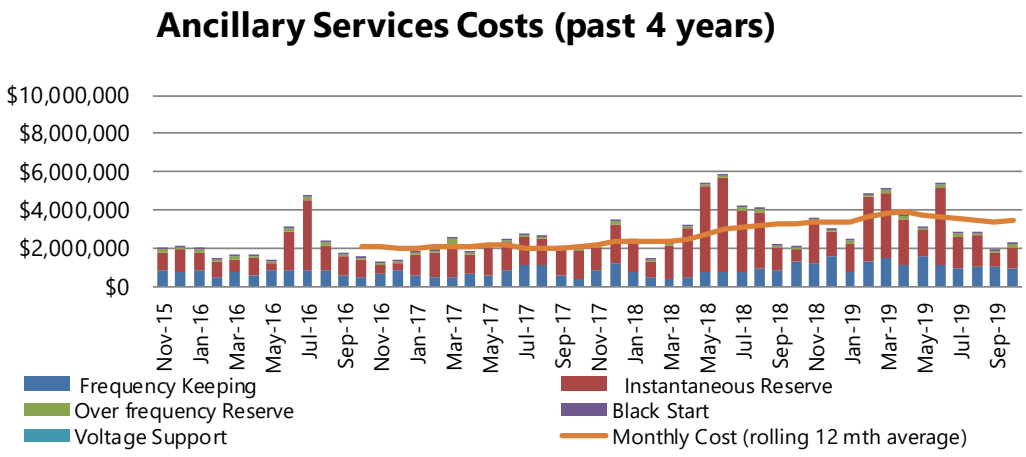
North Island storage is in a strong position. While North Island storage capacity accounts for about 15% of the national total, it is an area to watch ahead of the HVDC outages in the first quarter of 2020. These outages are likely to restrict the transfer of energy north at certain times, placing a greater reliance on North Island generators. In turn, this could have a large impact on market prices.

Kupe entered its month-long full production shut down on 30 October. This has not affected electricity supply security, though we have observed less gas-fuelled generation from Huntly as a result, replaced with increased coal-sourced generation. The outage is expected to end on 27 November.

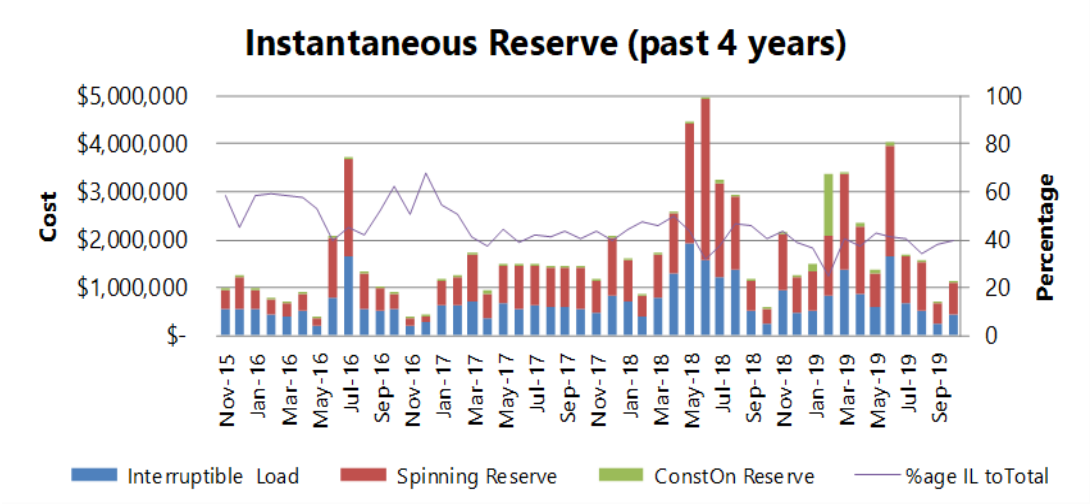
The Taranaki combined cycle plant (TCC) is back from its outage. But as is typical for this time of year, TCC is not offering into the market.

Looking ahead, the HVDC outage coupled with the March Pohokura outage is clearly impacting price expectations. The ASX future price for March at Otahuhu is $170/MWh, $40 higher than April. As we approach the outage, hydrology in both Islands are in a healthy position.

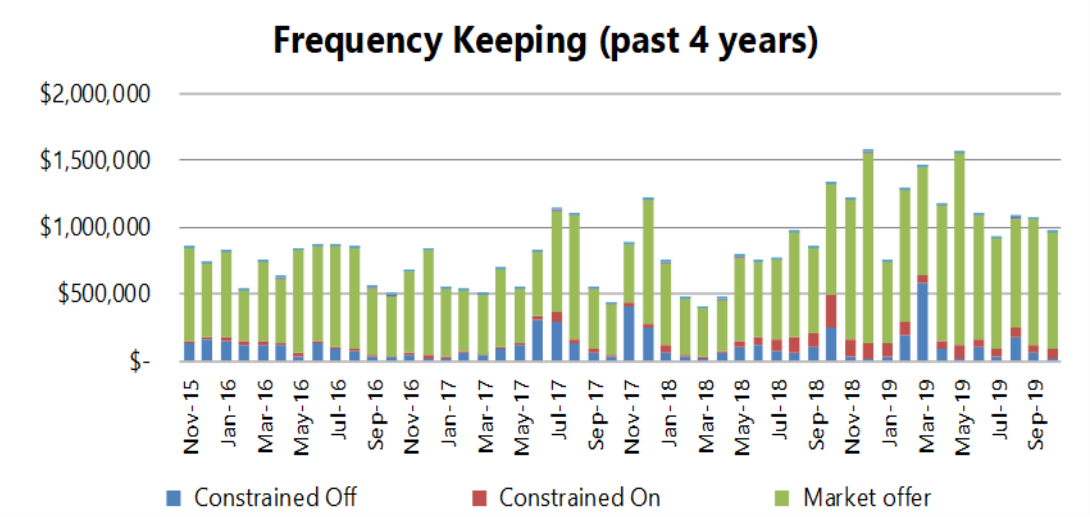
14 Ancillary services



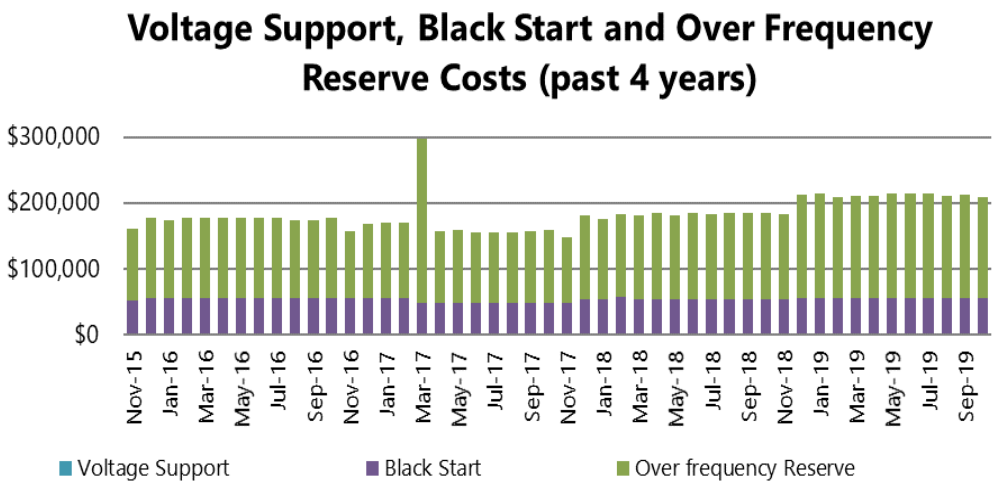
There was a slight increase in the overall ancillary service costs this month, driven by the increase in instantaneous reserve costs. The overall costs this month were $2.3 million.



Instantaneous Reserve costs increased this month by $442 k (65%) to $1.21 million. This reflects an increase in the costs for both spinning reserves and interruptible load and was driven by the increase in offered prices for this month compared to last.



This month's frequency keeping costs have decreased by $106.8 k to $964.5 k. The reduction was driven by lower constrained off and procurement costs this month.



This month the availability fee paid for Over Frequency Reserves was lower than the contracted value as one of the contracted Manapouri units was unavailable.

15 Commissioning and Testing

Generator commissioning

A black start test was successfully conducted at the Clyde power station, with no major issues uncovered during the test. We will receive the full test data in November and complete further analysis of the station's performance beyond what was initially apparent at the time of the test. A report compiling all the findings will be developed and shared with Contact Energy.

16 Operational and system events

SCADA outages

There was a brief SCADA outage around 4pm on Tuesday 29 October, followed by a more significant outage on Thursday 31 October. During the Thursday outage, SCADA was unstable for approximately 50 minutes, followed by a complete loss of service for 45 minutes. We responded by notifying connected parties and working with Transpower's grid team to prepare to send service providers to key sites. Market dispatch was maintained, we moved to a single frequency keeper (SFK) and a SCADA situation was declared for the respective trading periods. We are continuing to work with IST on the recovery of the SCADA system to full resilience.

This has been assessed as a medium level incident and a system operator report will be prepared.

Clyde-Cromwell-Twizel circuits fire

On 4 November, a scrub fire was reported under the Clyde-Cromwell-Twizel circuits, just across from the Cromwell substation at Cornish Point. Communication with the service provider on site to get direct information about the threat to the lines was

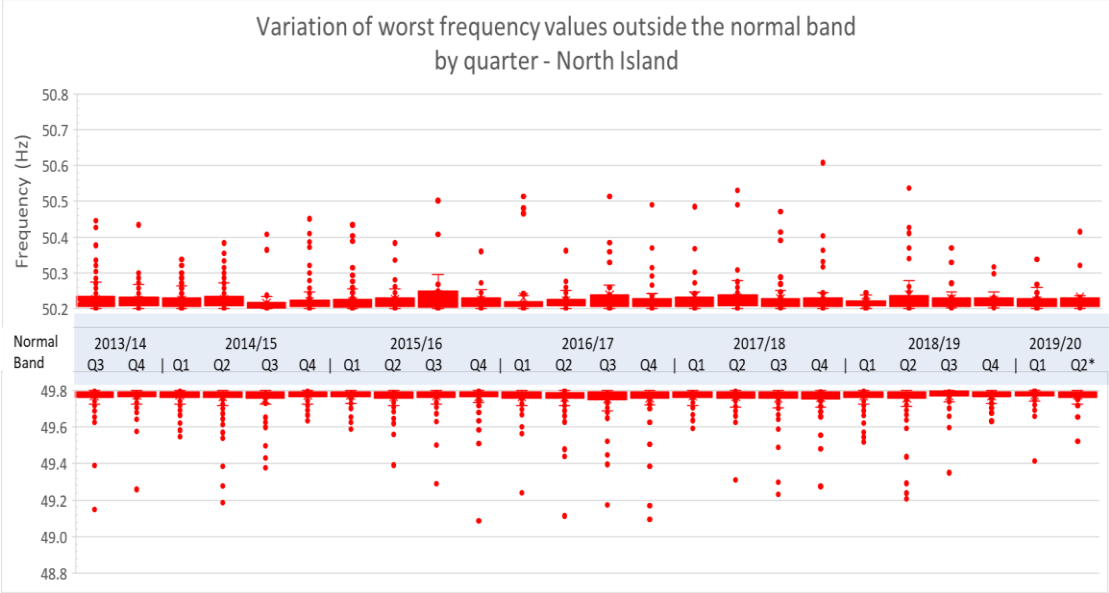
established. We were then able to consider the option of classifying these circuits as a single risk, which would have required Manapouri to be discretioned back by 345MW. We were able to determine that the risk to the lines was not sufficient to take this step.

17 Frequency fluctuations

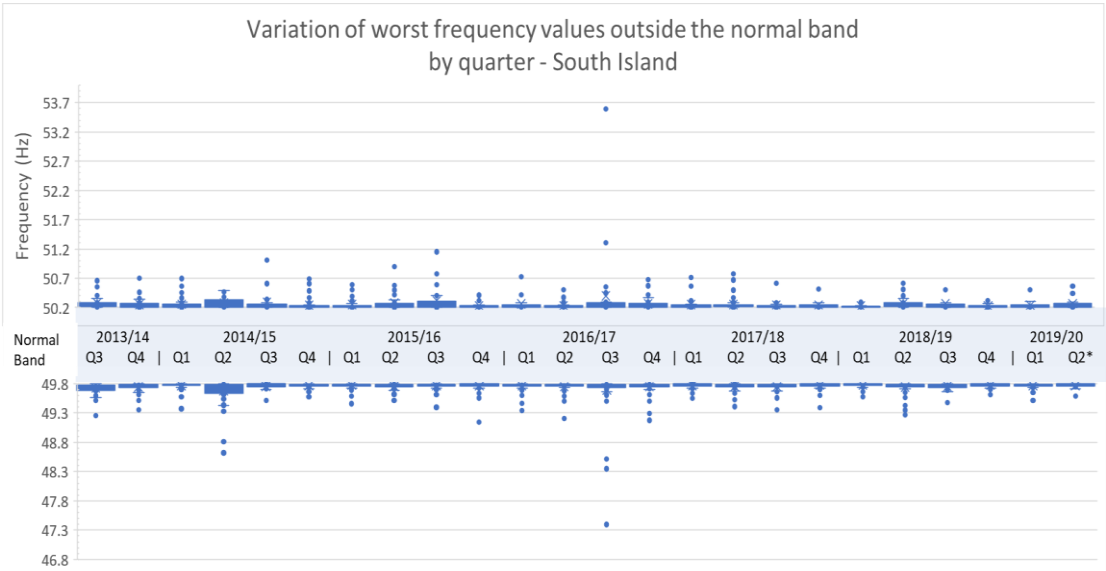
17.1 Maintain frequency in normal band (Frequency value)

The following charts show the distribution of the worst frequency excursion outside the normal band (49.8 to 50.2 Hz) during the reporting period.

North Island



South Island



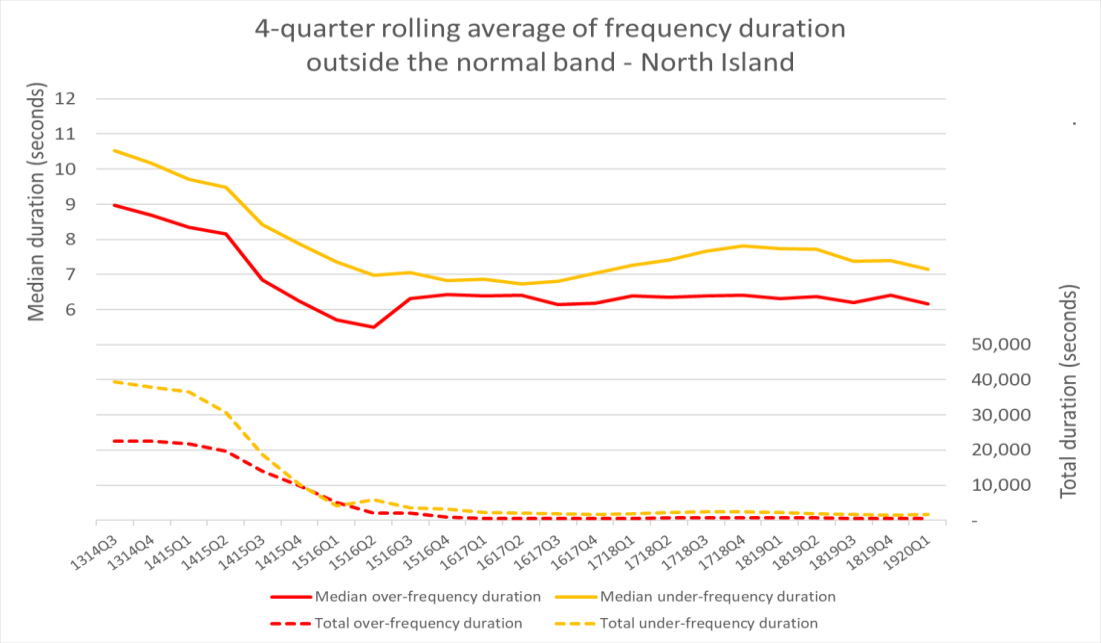
* 2019/20 Q2 contains data for October only

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.

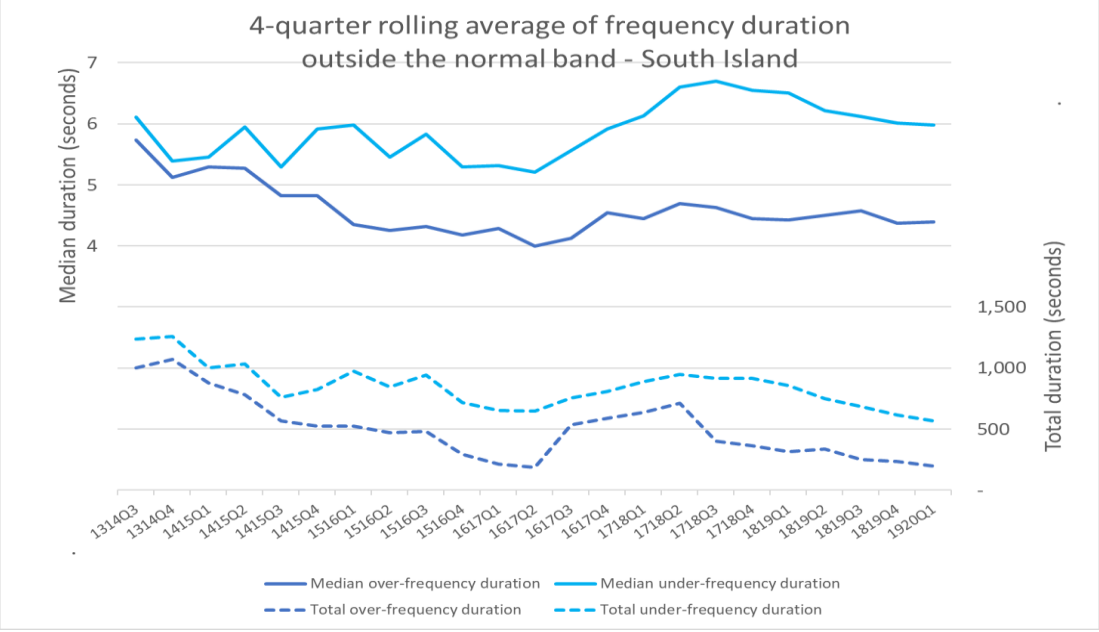
17.2 Recover quickly from a fluctuation (Time)

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



South Island

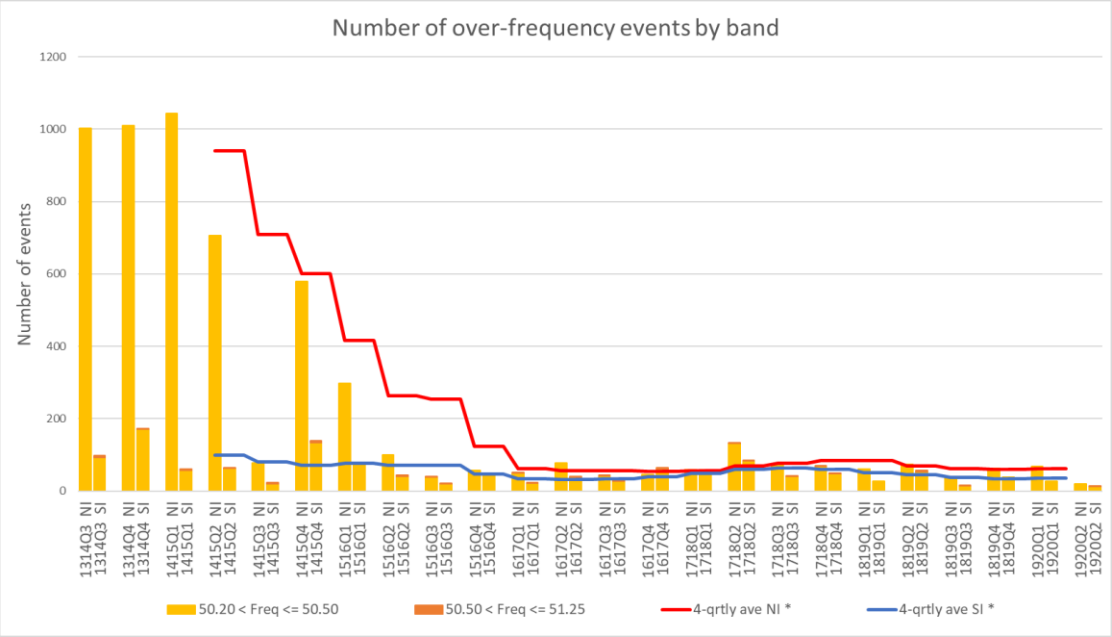


* These graphs have not been updated since 2019/20 Q1; they will only be updated at the end of each quarter

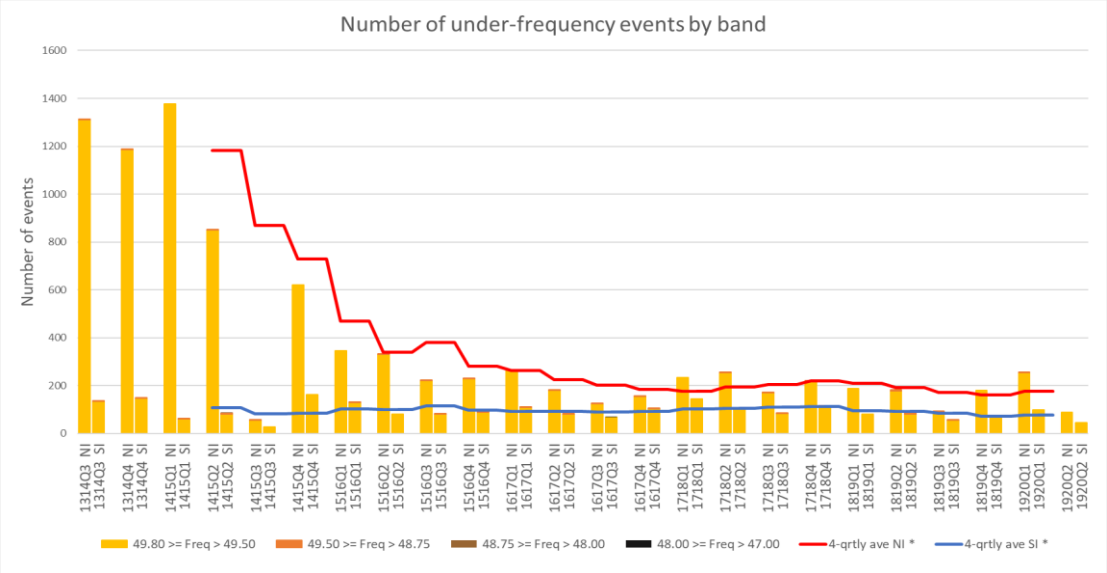
17.3 Manage frequency and limit rate of occurrences during momentary fluctuations (Number)

The following charts show the number of momentary fluctuations outside the frequency normal band, grouped by frequency band, for each quarter since 2014. The information is shown by island, including a 4-quarter rolling average to show the prevailing trend.

Over-frequency events



Under-frequency events



Note: The 2019/20 Q2 contains data for October only.

* 4-qtrly averages for NI and SI will only be updated at the end of each quarter

17.4 Manage time error and eliminate time error once per day

There were no time error violations in the reporting period.

18 Voltage management

Grid voltages did not exceed the Code voltage ranges during the reporting period.

19 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	Nov-18	Dec-18	Jan-19	Feb-19	Mar-19	Apr-19	May-19	Jun-19	Jul-19	Aug-19	Sep-19	Oct-19
Demand Allocation Notice	-	-	-	-	-	-	-	-	-	-	-	-
Grid Emergency Notice	-	-	-	-	1	-	-	-	-	1	-	1
Warning Notice	1	-	-	-	-	-	-	1	-	-	-	-
Customer Advice Notice	20	20	16	6	7	4	8	17	9	14	6	15

20 Grid emergencies

The following table shows grid emergencies declared by the system operator.

Date	Time	Summary Details	Island
15-Oct-19	18:48	A grid emergency was declared to enable the grid to be reconfigured to restore system security following the tripping of 220 kV Bream Bay – Huapai Circuit 1.	N

Appendix A: Discretion

Event Date and Time	Description
08-Oct-2019 17:13:19	KAW1101 KAG0: Kawerau Generation tripped. Required for secure dispatch solution Last Dispatched Mw: 3.42