TRANSPOWER

MONTHLY SYSTEM OPERATOR AND SYSTEM PERFORMANCE REPORT

FOR THE ELECTRICITY AUTHORITY

Transpower New Zealand Limited

February 2020

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 February 2020, 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).

Table of Contents

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System operator performance

1 Highlights this month

- The HVDC outage work is continuing to plan. Following the successful control system equipment testing, Pole 2 was returned to full market operation on 23 February at 16:00, with careful management of communications to industry.
- Security of supply: Hydro storage in the South Island continues to be high with some spilling occurring during the month; in contrast there is a decline in North Island storage which is expected at this time of the year. In addition:
  - The Electricity Risk Curves (ERCs) have been updated for the changes in the modelling of Pukaki contingent storage.
  - We will shortly be releasing our Security of Supply Annual Assessment for consultation. It shows that new generation will be needed for by mid-2020, but there is enough generation consented to meet this need.
- We will be holding our first Transpower System Operations Committee (TP SOC) meeting on 18 March. Our agenda will cover context and background information on the SOSPA, strategy, performance and deliverables.
- Real Time Pricing project: We are working with the Electricity Authority to establish an industry engagement model that will ensure all affected and interested parties can be fully informed and ready for the changes.
- Situational awareness project: Preliminary activities for this future-focussed project started in early March 2020.
- We have been providing system operator support to Todd Generation Taranaki Limited who have begun commissioning their Junction Road gas turbines.
- Cognisant of our role as an essential service 'lifeline' service provider, we are actively preparing against the risk of a potential COVID-19 outbreak. Weekly updates are being provided to the Authority, the first of these was delivered on Friday 6 March. Unfortunately, as the evolving situation has meant that many of the same resources who planned to participate in the combined industry CIMs[1] exercise are heavily involved in managing the COVID-19 situation, we have decided to postpone the CIMs exercise.

2 Customers and other relationships

Rangitata Flooding Event – Islington–Livingston circuit outage

The industry appears comfortable with the information being provided on this event as we cancelled a proposed teleconference on the Rangitata work due to lack of interest and instead provided a CAN and webpage update. Should the construction of permanent line be delayed, our analysis shows that the temporary line is sufficient to meet upper South Island winter load peaks. Should it be delayed as far as December when summer ratings come into force and summer load picks up, the situation may

[1] Coordinated Incident Management System

get tighter. Transpower is considering possible temporary line rating options to address the issue.

Hawkes Bay security and outage issues
There are a number of generation and transmission outages in this area that are limiting the work that needs to be performed and presenting assessment challenges. We are reviewing with the outages where possible to determine whether there are possible options for rescheduling.

Transpower's System Operations Committee (TP SOC)
We have been preparing induction packs and papers for the first TP SOC meeting to be held on 18 March. This includes context and background information on the SOSPA, strategy, performance and deliverables.

3 Risk & Assurance

We are progressing two process audits under our annual audit plan: the 'Medium Term Load Forecast' process and the 'Outage Planning Policy'.

The scope for the audit for our change management process of the audited software, Reserve Management Tool (RMT) and Scheduling Pricing and Dispatch (SPD), was finalised in February, and the audit has begun.

Transpower in both its role as system operator and as grid owner has been actively preparing against the risk of a potential COVID-19 outbreak, in accordance with the latest Transpower pandemic plan. A Transpower CIMS team has been in place now for several weeks and is monitoring the situation, including meeting 2-3 times a week, or as required in response to evolving events. All planning is based on the most current advisory from the Ministry of Health, cognisant of our role as an essential service 'lifeline' service provider. Weekly updates are being provided to the Authority, the first of these was delivered on Friday 6 March.

We have been developing a combined industry CIMs exercise for 15 May working with the lower South Island generators, distributors and NZAS to practice working through contingency plans across multiple CIMs teams. Unfortunately, with the evolving COVID-19 situation in New Zealand impacting normal operations across the industry, we have decided to postpone the exercise. Many of the same resources who planned to participate in the exercise are heavily involved in managing this evolving situation. While the Ministry of Health states the chance of widespread community outbreak is expected to remain low, we believe it is prudent to err on the side of caution and limit travel and meetings of large groups at this time. The good work we have begun will be retained and participants will reconnect at an appropriate time.

4 Compliance

We reported one system operator breaches to the Authority in February. This had been noted in the January monthly report, but the formal notification was in February.

- 3929 – A network model error, incorrectly modelling Haywards 11 kV and 33 kV market nodes, was used in real-time.

No market impact occurred; this was achieved as a pricing error was claimed and delayed finalising the price. This allowed amended information to be used for final pricing.

We have five 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 register. These issues are being handled in accordance with our policy for managing conflicts of interest.

No new conflicts of interest were raised within the division over February.

We have eight open items in the register.

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	System operator employee partner to work for grid owner	SO Power Systems Group Manager
28	Investigation into loss of SCADA 31 Oct 2019	SO Power Systems Group Manager
29	Preparing the Net Benefit test – SO involvement	Operations Planning Manager

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

We will be adding one new conflict of interest to our register regarding the system operator's participation in discussions around Transpower's proposed plans for its demand response platform.

The Electricity Authority raised a concern over a perceived conflict of interest where the legal counsel engaged by the grid owner to refute the December 2018 Under Frequency Event causer decision was the same person used by the system operator to provide advice on our original causer recommendation. While the timings make it clear that any information provided to the system operator was in the public domain by the time the grid owner engaged their counsel, we acknowledge this was inappropriate in terms of demonstrating our management of impartiality. We are working with the legal team to establish a more formal process around appointing separate legal

counsel for the system operator and grid owner to avoid this happening in the future. We continue to engage with the Authority on this matter.

6 HVDC 2020 outages

The HVDC Pole 2 system testing (following the control system equipment (VBE) replacement) was carried out successfully and to plan. Pole 2 was returned to full market operation on 23 February at 16:00, with careful management of communications to industry. We will continue to monitor generation margins during and after the outages, as OMV full and partial outages are notified.

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)

Work continues into month five of a planned eight months focussed on detailed solution requirements and high-level design for the technical solution. In parallel with this, work continues preparing for the operational impacts of moving to real-time pricing in the system operations control room and system operator market support functions. The next milestone is completion of the delivery business case currently forecast to be submitted to the Electricity Authority mid-June. We are working with the Electricity Authority to establish an industry engagement model that will ensure all affected and interested parties can be fully informed and ready for the changes.

Dispatch Service Enhancements (DSE)

All participants have scheduled a time slot for transition onto new ICCP or web services dispatch platform between now and December 2020. The next three transitions are with Mercury, Trustpower and Genesis.

Situational Intelligence

As part of the first phase of this future-focussed project, we have started the detailed planning for the agile project sprints and are establishing contract with the vendor Qrious. Preliminary activities for this work began in early March.

Extended Reserves (AUFLS)

We have completed analysis for the technical advisory service report – which will make recommendations to baseline data for the extended reserves project. The due date for delivery has been extended June, at the Authority's request, to absorb underutilised baseline TAS hours in quarter four.

Reserve Management Tool (RMT)

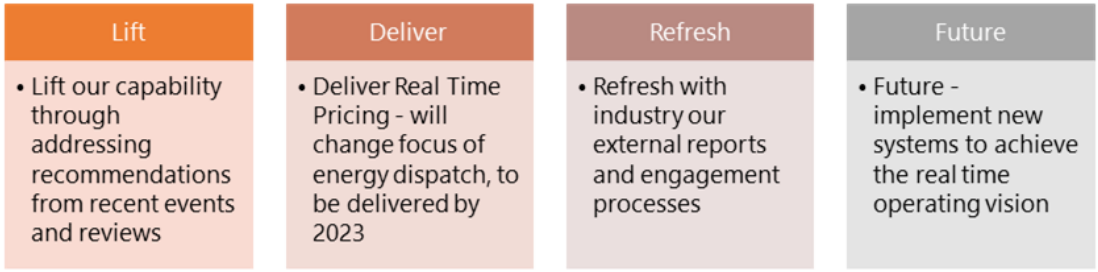
An investigation has begun to enhance RMT with a delivery business case scheduled for August 2020.

7.2 Other projects and initiatives

Energy Futures

The pilot inertial monitoring project for New Zealand's power system has started. Frequency monitoring equipment arrived in the last week of February and will be dispatched to sub-stations for testing in early March 2020.

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



- We have a developed a plan to work through our risks across all Operations teams. This work will inform the review of our risk bow ties, targeted for completion in July.
- The detail for the RTP project is included in section 7.1.
- The first phase of the Operations Customer Portal, the replacement of the System Operator Modelling Database (SOMD) went live into production on the 3 March 2020. This is an internally facing component. The planning for migration and the next phase, Asset Capability Statements (ACS) is underway.
- The fourth and final industry workshop for POCP was held on 14 February 2020.
- We have begun a second stage project to review the operational notifications.

Continuous business improvement initiatives

We have six improvement initiatives underway with three being added during the last period to review the operating control and assurance processes as well as an assessment of removal of operational fax. The operational fax initiative is currently being planned with a challenge of targeting removal of fax within the next 12 months.

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

2020/21 Outage Plan

We have been meeting with customers to discuss the 2020/21 annual outage plan ahead of the 2020 Annual Outage Planning Forum on 16 March. This year we are inviting customers and interested parties to take part in afternoon education sessions on how to use key tools such as the Planned Outage Coordination Process (POCP) tool and the New Zealand Generation Balance (NZGB) and overviews of the constraints and outage planning processes.

Near real time

Outage numbers in February were high, approaching 600, and March is expected to be higher. Whilst this time of year is the busiest part of the year, outage numbers are coming in higher than last year – we are taking a closer look at the workloads. There continue to be short term outage changes, although lower than February last year. There were also a high number of complex outages – with a similar number for March. All of these outages require assessment for system security.

10 Power systems investigations

United Kingdom power outage

We have completed our report on the 9 August 2019 significant power system event in the United Kingdom which was presented at the Security and Reliability Council in March. We are finalising the longer version of the report that we will publish a report on our website.

Moderate incident: SCADA failure 31 October 2019

We have delivered our report to the Authority on the 31 October 2019 SCADA failure in accordance with our new significant incident reporting process. This is the first 'moderate' incident identified under the new process and our final report was delivered to the Authority in early February 2020. We are currently waiting for feedback.

Moderate incident: Northland loss of supply 27 November 2019

We have delivered our report to the Authority on the 27 November 2019 Northland loss of supply in accordance with our new significant incident reporting process.

11 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.

12 Cost-of-services reporting

The cost-of-services for financial year 3 (2018/19) was provided to the Electricity Authority on 31 January 2020.

13 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

14 Security of supply

This month the inflows in the South Island have been higher than normal and the North Island inflows lower than normal. This, with the HVDC outage limiting South Island export and some high inflow events, has resulted in spill from some southern lakes. In the North Island, storage has decreased from 85 per cent of full at the start of the year to 55 per cent of full. The decline in North Island storage is expected, but is something we will continue to monitor. Once the HVDC outage is complete we expect the North Island hydro to back off to conserve hydro storage if needed.

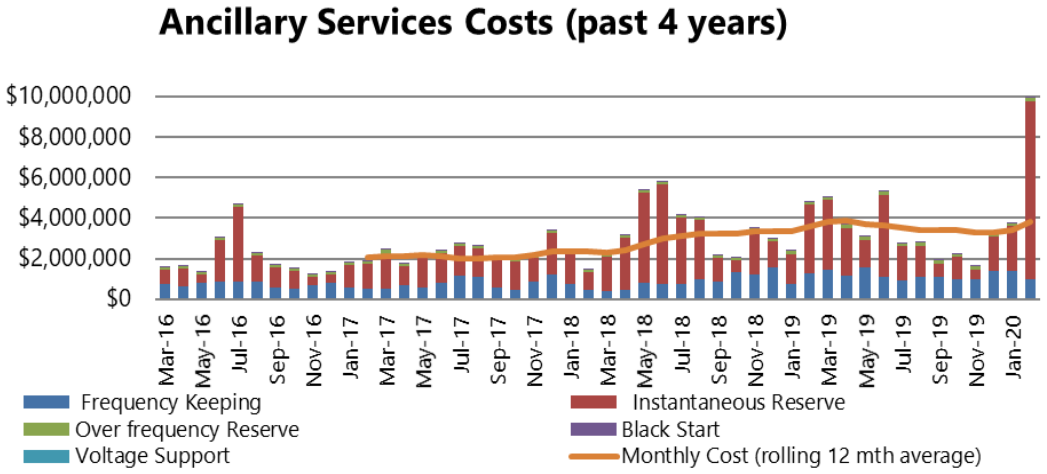
We have observed Genesis running Huntly hard during the month, but in the last few weeks of February output from the Rankine units reduced due to Waikato river heating (common at this time of year). At the same time, Stratford's TCC plant came online potentially indicating a Contact may be covering Genesis reduced output.

The Pohokura gas field has shut down all production from 11 March to 24 March to enable maintenance of the field's onshore production station. This has been modelled in the Electricity Risk Curves (ERCs), and due to the current high levels of hydrology represents no risk to security of supply.

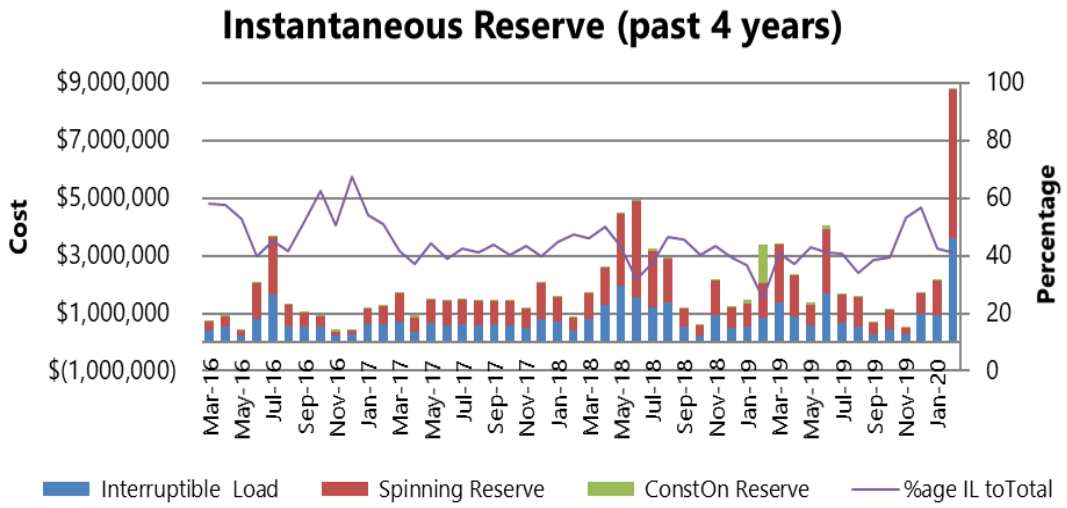
Other key updates in security of supply:

- The ERCs have been updated for the changes in the modelling of Pukaki contingent storage.
- The Security of Supply Annual Assessment has been circulated for internal review. It shows that new generation will be needed for by mid-2020, but there is enough generation consented to meet this need.

15 Ancillary services

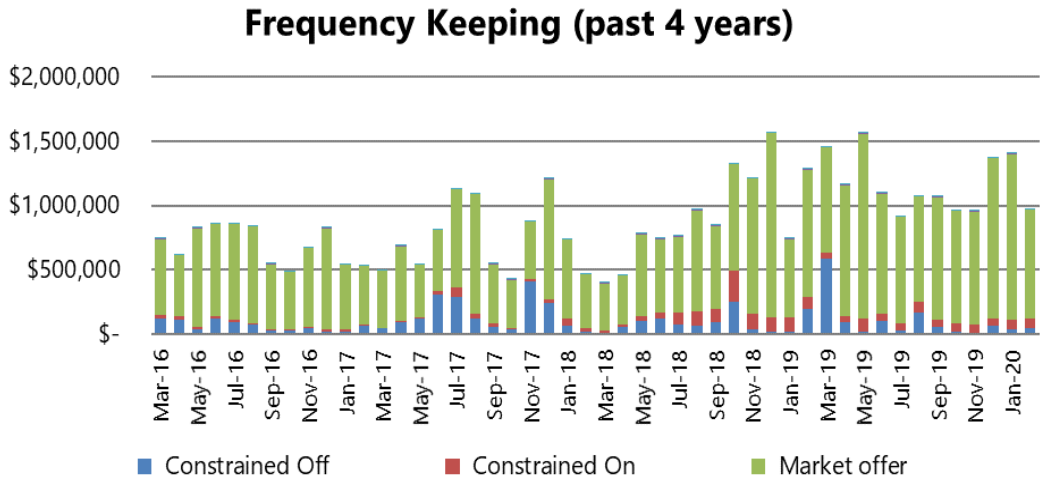


There has been a significant jump in ancillary services costs in February from $3.8 million in January to $10 million in February due to rising instantaneous reserves costs. This is as a result of the ongoing planned HVDC outages that have limited both the HVDC transfer capacity and the ability for reserves to be shared between islands.

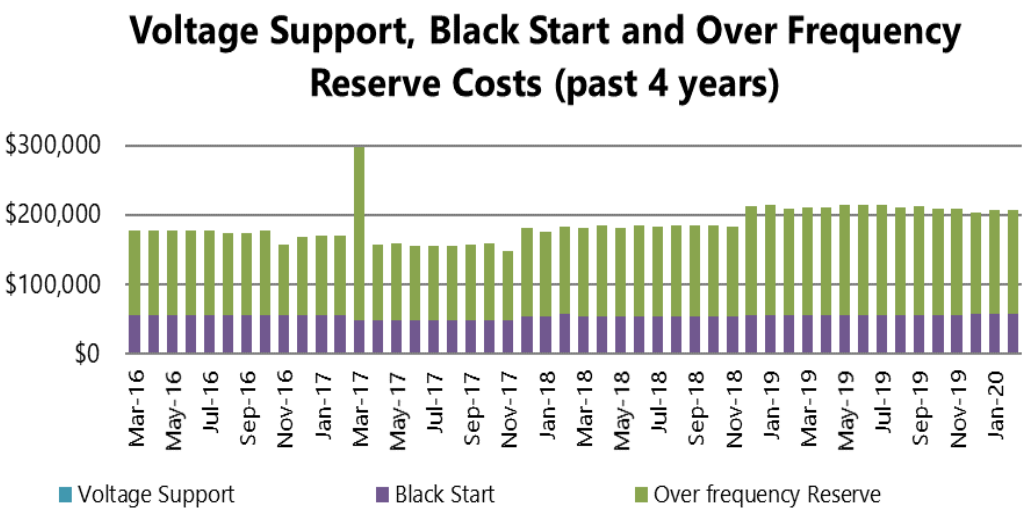


Instantaneous reserves costs jumped dramatically by $6.6 million to $8.8 million (304 per cent increase). With restricted transfer capacity on the HVDC due to a planned outage and exceptionally high South Island hydro lake levels, the HVDC was almost entirely in north transfer - setting a high North Island reserve requirement during the month. North Island Sustained Instantaneous Reserves (SIR) quantities increased by 15 per cent, while Fast Instantaneous Reserves (FIR) quantities increased by a larger 30 per cent. By comparison, South Island reserve quantities are decreasing month on month due to increased reserve sharing on the HVDC during north transfer.

Separation in reserve prices occurred between the islands with average North Island SIR prices increasing from $1.94/MWh to $3.23/MWh, while FIR prices jumped significantly from $9.57/MWh to $38.28/MWh (400 per cent increase). Average SIR and FIR prices in the South Island declined due to the abundance of generation capability. Procured quantities of South Island FIR and SIR decreased from January by 14 per cent and 22 per cent respectively.



Frequency keeping costs this month dropped by $440k from January (31 per cent).



There was a minor decrease in over frequency reserve costs this month.

There is no change in Black Start costs from January.

There are currently no voltage support costs.

16 Commissioning and Testing

Generator commissioning

Todd Generation Taranaki Limited have begun commissioning their Junction Road gas turbines. Testing is expected to continue into early March in order to fully complete commissioning. After that the generation will be available for normal market dispatch.

Work on the following generation commissioning projects scheduled to be completed in 2020 continues:

- Ngawha (30 MW geothermal into Kaikohe 110kV, August 2020)
- Turitea North (118 MW wind into Linton 220kV, August 2020)
- Waipipi (130 MW wind into Waverly 110kV, October 2020).

With similar commissioning dates being targeted by customers, care will be needed to manage their expectations should clashes occur for access to the grid for testing.

17 Operational and system events

There were no major operational and system events in February. However, it was a very busy month, managing a high workload of outages, and supporting the Junction Road commissioning.

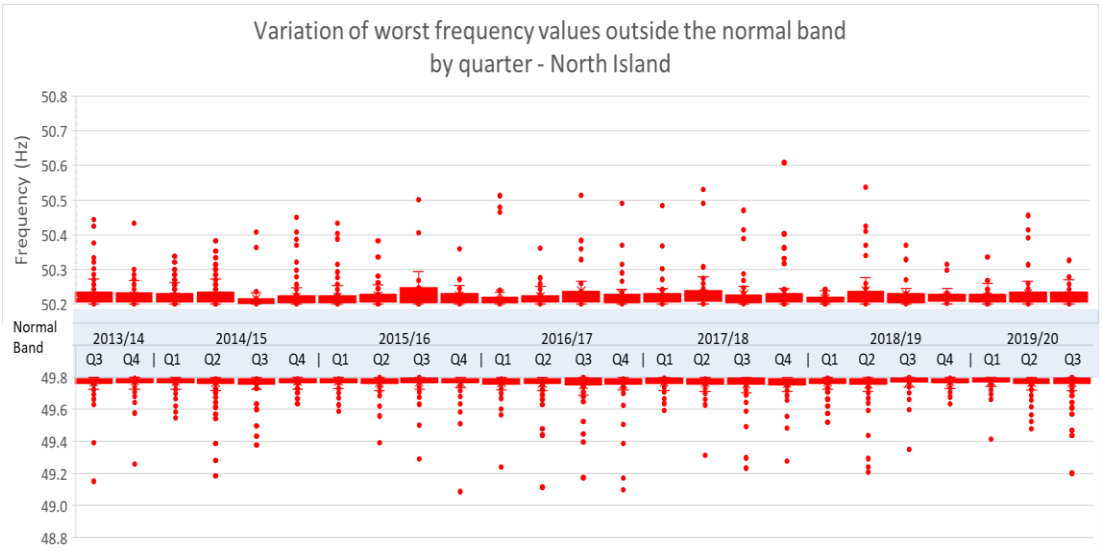
We will be initiating a moderate incident review in accordance with our significant incident reporting process regarding the Haywards loss of supply incident on 12 March.

18 Frequency fluctuations

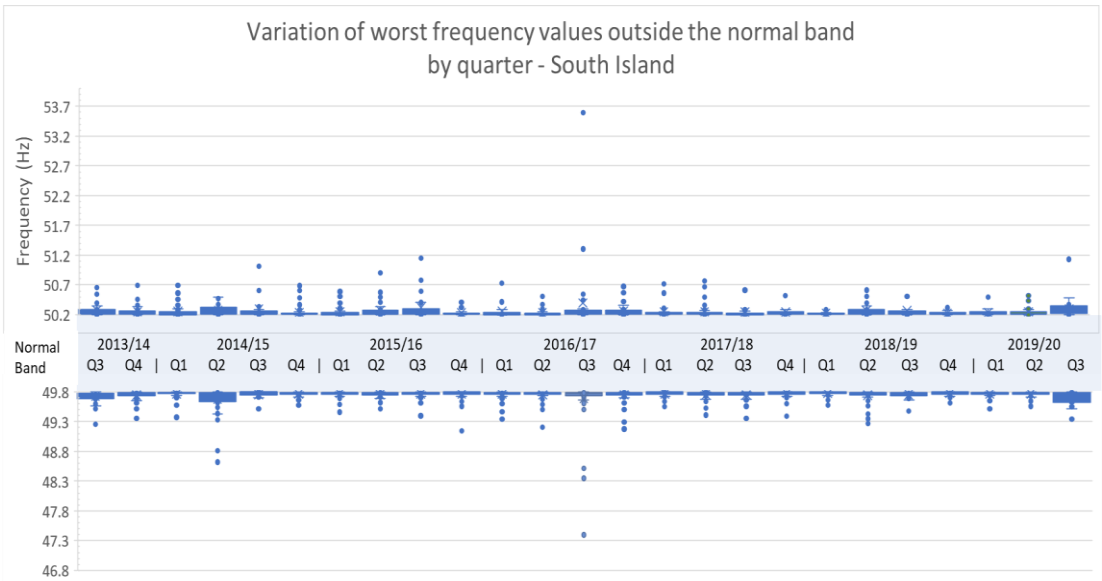
18.1 Maintain frequency in normal band (Frequency value)

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



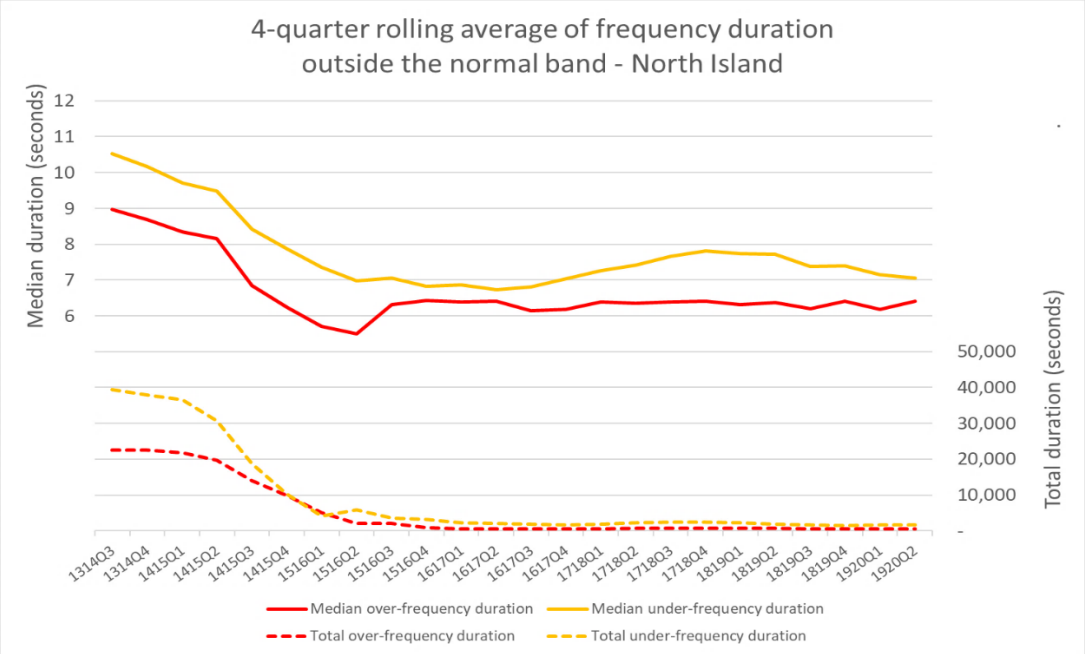
* 2019/20 Q3 contains data for January and February only
There is a possibility that some data has not been captured for February; this will be remedied for the March report

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.

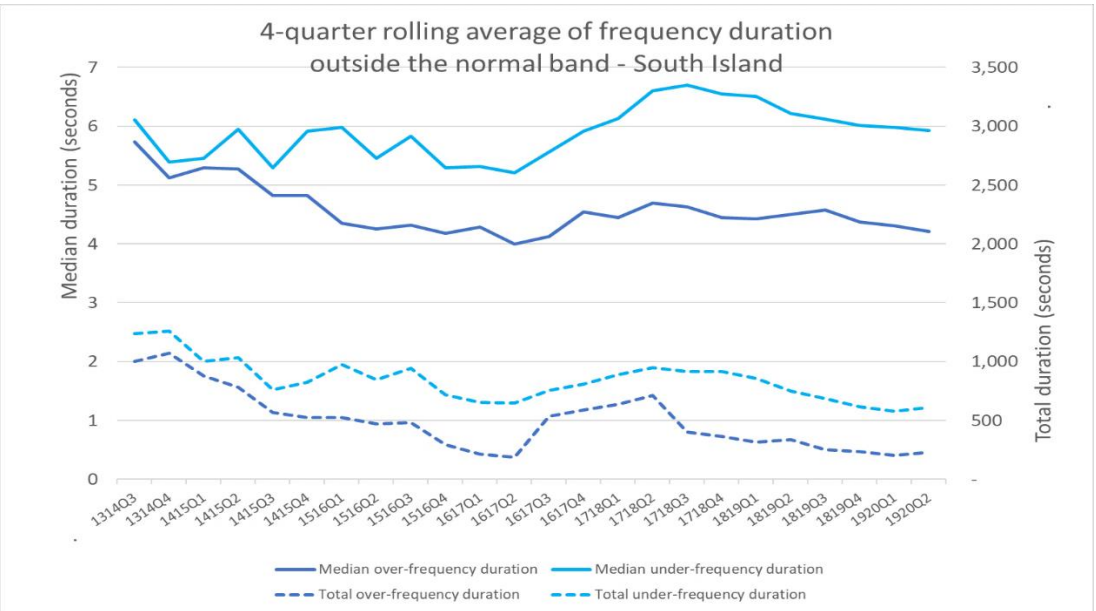
18.2 Recover quickly from a fluctuation (Time)

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

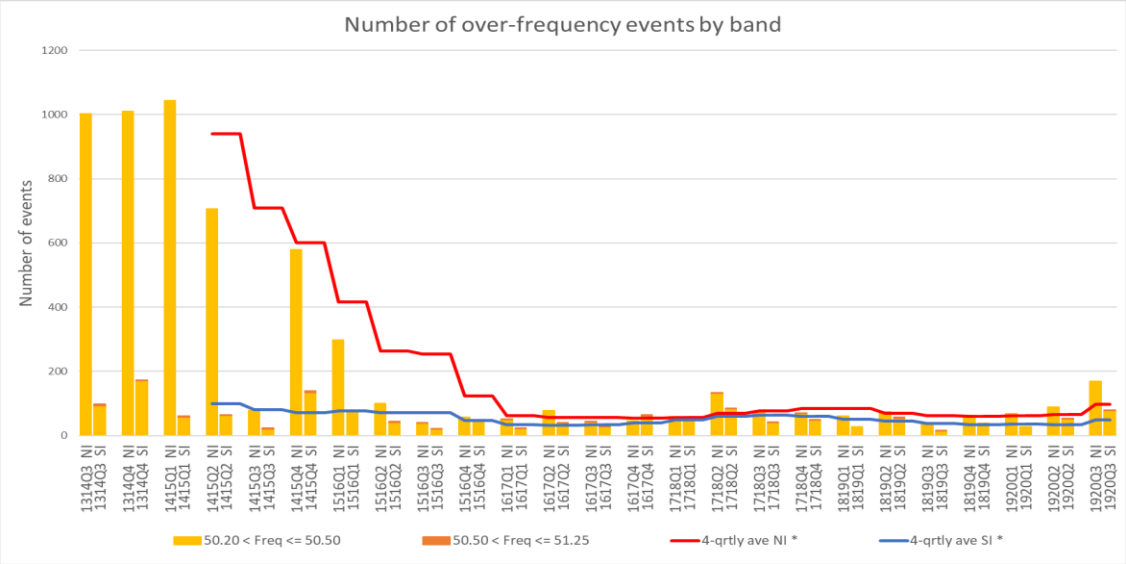


* These graphs have not been updated since 2019/20 Q2; they will only be updated at the end of each quarter

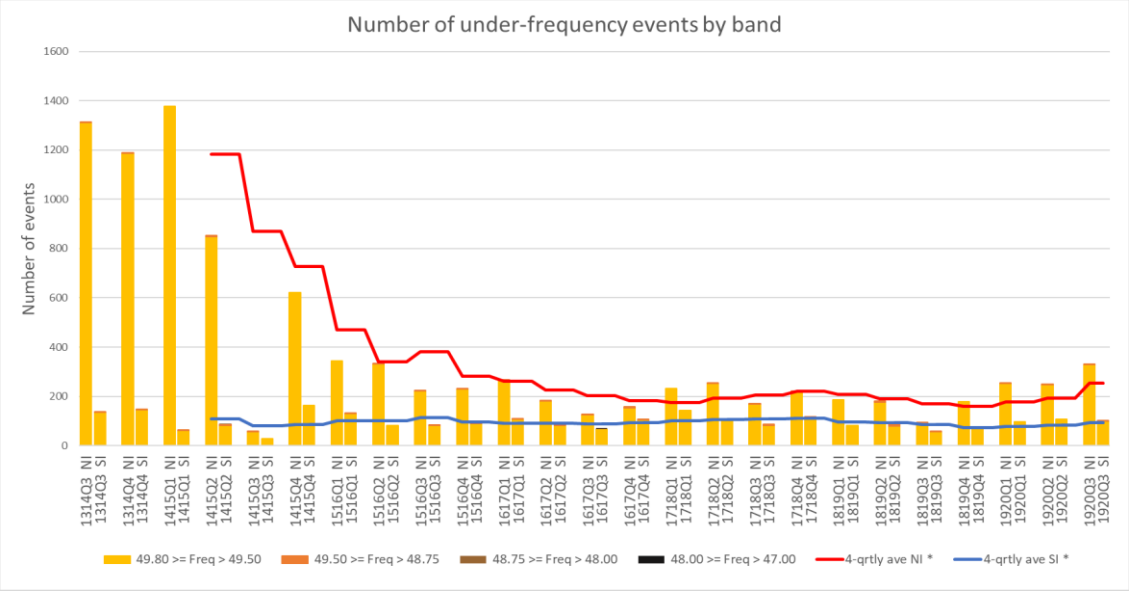
18.3 Manage frequency and limit rate of occurrences during momentary fluctuations (Number)

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 Q3 contains data for January and February only.
There is a possibility that some data has not been captured for February; this will be remedied for the March report

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

18.4 Manage time error and eliminate time error once per day

There were no time error violations in the reporting period.

19 Voltage management

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

20 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	Mar-19	Apr-19	May-19	Jun-19	Jul-19	Aug-19	Sep-19	Oct-19	Nov-19	Dec-19	Jan-20	Feb-20
Demand Allocation Notice	-	-	-	-	-	-	-	-	-	-	-	-
Grid Emergency Notice	1	-	-	-	-	1	-	1	3	-	-	-
Warning Notice	-	-	-	1	-	-	-	-	-	-	1	-
Customer Advice Notice	7	4	8	17	9	14	6	15	15	14	6	21

21 Grid emergencies

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

Date	**Time**	**Summary Details**	**Island**
		None	

Appendix A: Discretion

Event Date and Time	Description
8 February 13:10	SFD2201 SFD22: Security discretion to 0MW. Last Dispatched MW: 3.44
17 February 09:25	ARG1101 BRR0: Required off for ARG_BLN_1 outage (only for duration of switching). Last Dispatched MW: 6
21 February 16:00	ARG1101 BRR0: To return to service ARG_BLN_1. Last Dispatched MW: 6
28 February 15:32	ARG1101: For switching on return of ARG_KIK 1. Last Dispatched MW: 6