MONTHLY SYSTEM OPERATOR AND SYSTEM PERFORMANCE REPORT

FOR THE ELECTRICITY AUTHORITY

Transpower New Zealand Limited

April 2021

Keeping the energy flowing

Transpower New Zealand Limited The National Grid

Report Purpose

This report is Transpower's review of its performance as system operator for April 2021, 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 continue to update participants on security of supply, providing transparency on the 'dry winter' preparations. This month we have:
  - published an outage watch list which defines outages that might be detrimental to national storage
  - been working with Transpower's Grid Delivery division to review any planned outages ahead of a formal request (at the 4% risk curve) to defer these
  - reviewed our rolling outage plans and validated assumptions with network companies (beginning with socialising with ENA and ERANZ)
  - provided regular fortnightly updates to participants via webinars.

  Next month we plan to publish a reduced gas demand flexibility scenario alongside the base case Electricity Risk Curves (ERCs) and Simulated Storage Trajectories (SSTs). The scenario will be provided each month.
- We held a briefing with regional stakeholders in the Hawkes Bay to present high level analysis of potential capacity issues in the region.
- The RTP project continues to progress well and track to time and budget. Phase 1 was successfully deployed on 13 May, three weeks ahead of schedule.
- The Code change consultation is underway for extended reserves (AUFLS) provision in the North Island.
- We are providing technical advisory support to the Authority to aid their response to the "G2" recommendation in the Electricity Pricing Review and will work with them to develop a scope that will deliver a multi-year work programme.
- The Reserve Management Tool (RMT) audit & Scheduling Pricing & Dispatch (SPD) audit were completed in April and sent to the Electricity Authority. The auditors found nothing of concern.
- We self-reported two breaches; one of which will be reported against our performance metric target.

2 Customers and other relationships

Security of Supply Stakeholder Engagement

As part of our 'dry winter' preparations in our role as system operator we published an outage watch list which defines outages that might be detrimental to national storage. The outages may either constrain off thermal, geothermal or wind generation, constrain on hydro generation, or put large non-hydro generation on N-security. We are working with Transpower's Grid Delivery division to review any planned outages ahead of a formal request (at the 4% risk curve) to defer these. We are reviewing our rolling outage plans and validating assumptions with network companies (beginning with socialising with ENA and ERANZ).

Code change consultation – Extended Reserves

Code change consultation is underway for extended reserves (AUFLS) provision in the North Island. These code changes will reverse the old extended reserves concept out of the Code and reinstate an essentially common mandate for AUFLS. It also includes

a requirement for providers to move from existing two block to proposed four block AUFLS scheme by July 2025.

Electricity Authority
The Electricity Authority has requested technical advisory support to aid their response to the "G2" recommendation in the Electricity Pricing Review (ie to consider security and resilience of power system in light of expected future changes). We are working to develop a scope that will deliver a multi-year work programme.

North Island Electricity Distributor Forum
We attended the quarterly forum with the North Island Distribution companies hosted by Counties Power. We used this forum to continue our education programme regarding system operator processes.

3 Risk & Assurance

COVID-19 Response
Our COVID-19 Operational incident management team (IMT) was not activated during April.

SOSPA audits
The Regional Contingency Planning audit was completed and deemed effective with three low risk findings identified for management to consider. The Event Management audit draft report was submitted for review and a management response to findings. The final audit on Managing and assessing Grid Owner offers is still on track to be completed by 30 June 2021.

The Reserve Management Tool (RMT) audit & Scheduling Pricing & Dispatch (SPD) audit were completed in April and sent to the Electricity Authority. The auditors found nothing of concern.

4 Compliance

We reported two system operator self-breaches in April.

The first related to the system operator incorrectly modelling the electricity risk curve calculation from March 2020 to March 2021. Under the Security of Supply Forecasting and Information Policy the system operator must include in its risk curve calculations a floor equal to (among other things) the amount of contingent hydro storage that represent higher levels of risk of future shortage. In modelling the 4% alert level risk curve the system operator did not include amount of contingent storage associated with the higher alert level (10%). There was no market or operational impact associated with the breach.

The second related to the Mangahao 33kV substation outage. The market model still had part of the bus that was disconnected as part of the outage. Because of this, the market solver set the price to $0 and discarded the metered load from its calculations. The market impact is difficult to determine however purchasers should have paid $770k more for electricity during the affected trading periods.

We have eight outstanding breaches with the Authority compliance team.

5 Impartiality of Transpower roles

No items were opened in the register during April.

We have five open items in the register that are being actively managed in accordance with our Conflict of Interest procedure.

System Operator Open Conflict of Interest Issues		
ID	Title	Managed by
29	**Preparing the Net Benefit test – system operator involvement:** The system operator is reviewing how it can provide information for use by the grid owner undertaking a Net Benefit Test.	Operations Planning Manager
31	**Discussions concerning Demand Response:** A system operator employee is part of a Transpower working group investigating the possible future use of the Transpower demand response platform. The system operator role is to provide the system operator perspective on any demand response proposals. Impartiality mitigations have been implemented to ensure the grid owner is not treated more favourably than any other participant with respect to demand response.	SO Market and Business Manager
39	**New SO Compliance & Impartiality Manager:** This relates to potential perception; the person filling this role also works for Transpower's legal team on a part-time basis. Workstreams will be allocated accordingly.	GM Operations
40	**General system operator/grid owner dual roles:** This is a general item that will remain permanently open to cover all employees with a dual system operator/grid owner role. The item documents the actions necessary to ensure impartiality in these circumstances; these items will be monitored to ensure their continue effectiveness.	SO Compliance & Impartiality Manager
41	**General relationship situation:** This is a general item that will remain permanently open to cover all potential conflicts of interest arising under a relationship situation. This item documents the actions necessary to prevent an actual conflict arising and will be monitored by the SO Compliance & Impartiality Manager to ensure their continued effectiveness.	SO Compliance & Impartiality Manager

6 Project updates

6.1 Market design and system enhancement project updates

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

Real Time Pricing (RTP)

The project continues to progress well and track to time and budget. Phase 1 was successfully deployed on 13 May, three weeks ahead of schedule. This release has no direct market impact and introduces only minor change to the system operator function but is a significant preparatory milestone in wider RTP project. All phase 1 testing has been completed and the initial deployment steps are in progress. Business preparation for phase 1 deployment is on schedule, training is under way and all procedure updates are on target for publication at deployment.

The focus of the bulk of the project team is now on working phase 2 with the majority of the design complete and development underway.

The system operator continues to support the Authority with their industry engagement for RTP and will be leading the discussion on scarcity modelling for the June/July engagement sessions.

Extended Reserves (AUFLS)
Details of the Code change consultation are included in the Customer relationship section of this report (section 2).

7 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.

8 Outage planning and coordination

Outage Planning – near real time
While we continued to see high volumes of work requiring outages over April, careful management and proactive actions ahead of potential weather-related issues kept unplanned outages low with no customer impacting incidents.

NZGB Analysis
Our April NZGB report identified no generation shortfalls forecast for the next six months. Applying low gas, no wind assumptions, N-1-G shortfalls were forecast for several dates in May, July, August and September. Generation balances have generally improved since the April Report, with a reduction in the number of forecast shortfall dates.

The system operator has adjusted NZGB so that it uses 2019 load data for all forecasts in the 2021 calendar year (instead of 2020 load data). This is to remove the impact of COVID-19 from the load profile.

The Grid Owner published its Annual Outage Plan for 2021-22 on 03 May 2021. NZGB now reflects this published plan.

9 Power systems investigations and reporting

Operational impact of Tiwai exit
The significant change in load in the Southland region following Tiwai's exit, results in new transient stability limits and challenges managing a bi-pole tripping. Draft reports outline these challenges and their potential likelihood of occurrence have been prepared and are now going through internal review with a target of sharing with industry by July.

10 Performance metrics and monitoring

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

This will be provided to the Authority in late 2021.

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

The declining trend in hydro lake levels paused as consistent small-scale inflows pushed storage sideways through much of April. As a result of material South Island inflows in early May, South Island hydro storage has since increased to 70% of average for the time of year. In contrast, North Island hydro storage decreased to 30% of average for the time of year.

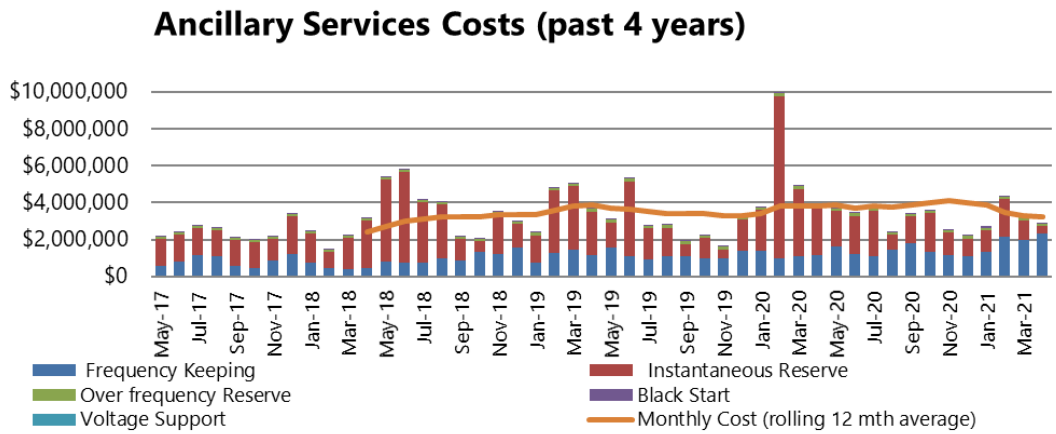
As per our policy, in instances where we think there is a reasonable chance of crossing the 1% risk curve, we activated specific actions including daily reporting, developing an outage watchlist and investigating potential grid reconfigurations. The ERCs have dropped following market response to the tight situation through improved coal supply chain, more efficient use of gas with a Nova/Contact tolling arrangement, small changes to the gas supply assumptions and an improved diesel supply chain to Whirinaki.

The security of supply situation remains tight, with NIWA anticipating normal or below rainfall for southern catchments and no major improvement to the gas situation expected until next year (likely after mid-2022). However, with further moderate inflows expected in catchment areas in mid-May, the chance of crossing the 1% risk curve has lessened and we expect to cease our daily reporting from 18 May. We will confirm this at our security of supply webinar on 18 May.

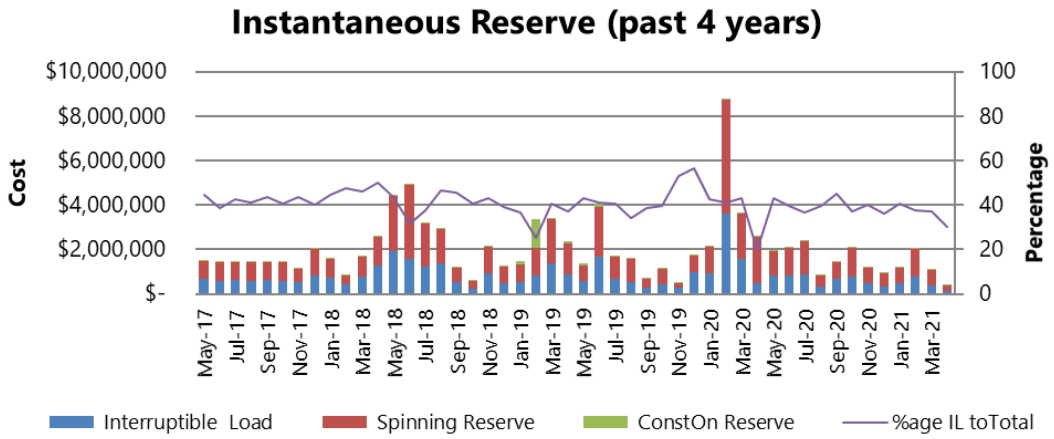
With Huntly 5 back from outage in late April, and with Contact's Taranaki combined cycle plant currently operating, we have seen a boost in thermal generation in May which is helping meet rising demand as winter approaches.

Next month we plan to publish a reduced gas demand flexibility scenario alongside the base case ERCs and SSTs. The scenario will be provided each month.

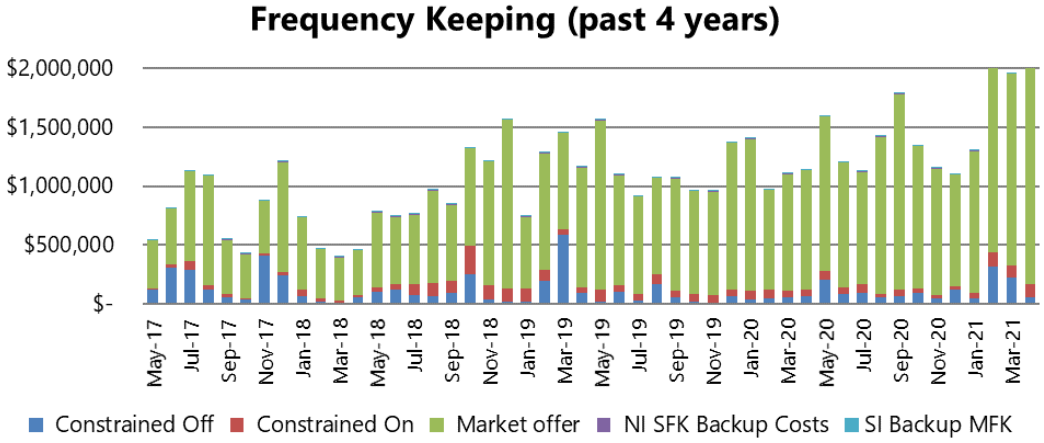
14 Ancillary services



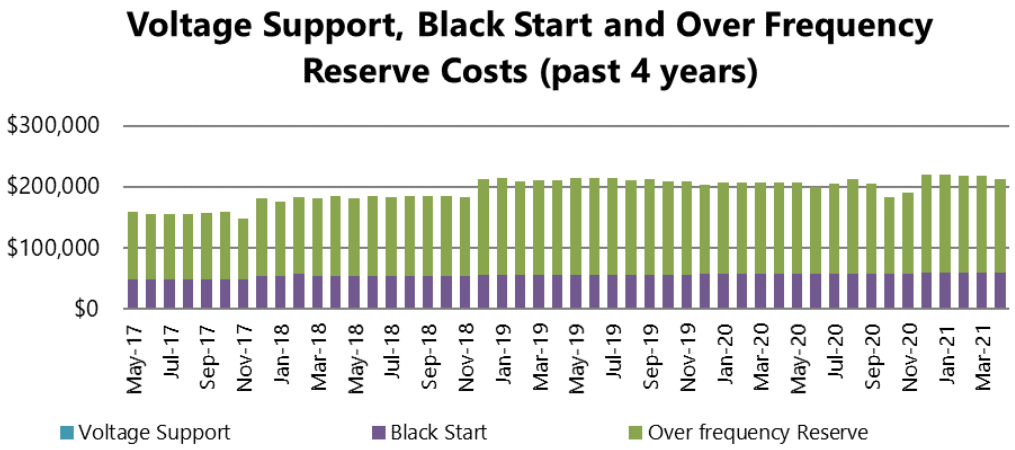
This month's ancillary services costs were $2.96 million, a decrease of $320k (10% decrease) from last month. This arose due to a significant decrease in instantaneous reserve costs.



This month's instantaneous reserve costs were $378k, a decrease of $669k (63% increase) from the previous month. $398k of this decrease is attributable to spinning reserves, and $274k to interruptible load; constrained on payments increased by $3k. This is a result of a decrease in both the quantity and price of reserves procured over the course of the month.



This month's frequency keeping costs were $2.3 million, an increase of $353k to the previous month (18% increase). The increase was due to a $511k (31%) increase in market costs, countered by a $161k (72%) decrease in constrained off payments. The costs incurred for frequency keeping in the South Island fell by $312k to $752k, while in the North Island they increased by $665k to $1.6 million.



The over frequency costs decreased slightly this month to $154k. Black start costs remained at $60k. There are currently no voltage support costs.

15 Commissioning and Testing

No new activity this month

16 Operational and system events

Hawkes Bay regional capacity issues

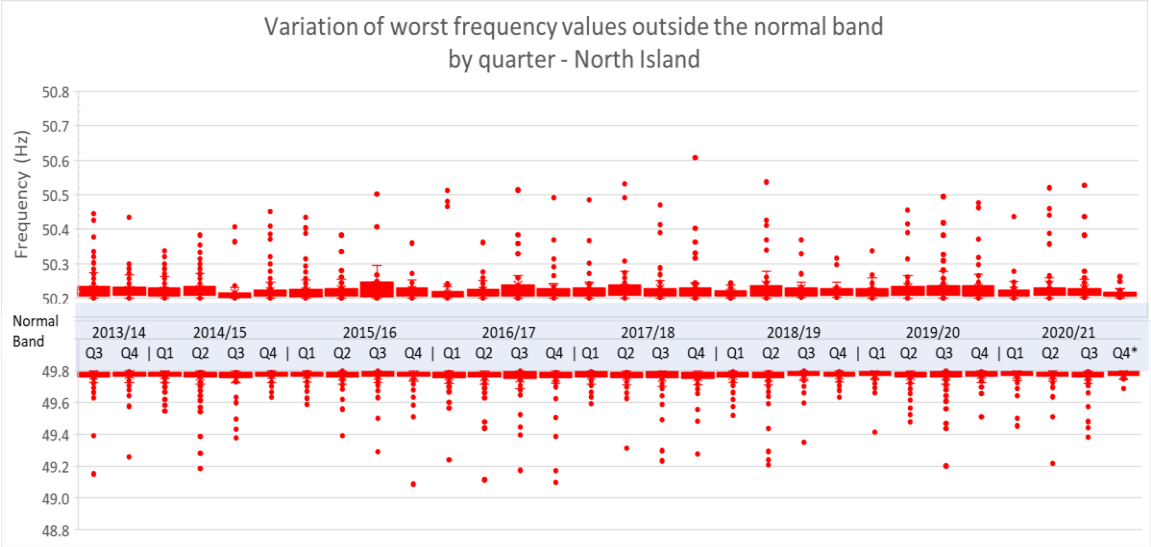
We held a briefing with regional stakeholders in the Hawkes Bay to present high level analysis of potential capacity issues in the region. We also communicated our operational management approach. Following this briefing we have continued to liaise particularly with Genesis on its generation capability from Waikaremoana and Unison and Eastland Electricity to establish options for load management in their area. We are also reassessing generation outages, distribution load shifting and transmission outages in the area and providing options and advice to assist asset owners to secure their outages. This included providing advice to Transpower's Grid Delivery division and Ventia on approaches to the commissioning of Fernhill and Woodville protection.

17 Frequency fluctuations

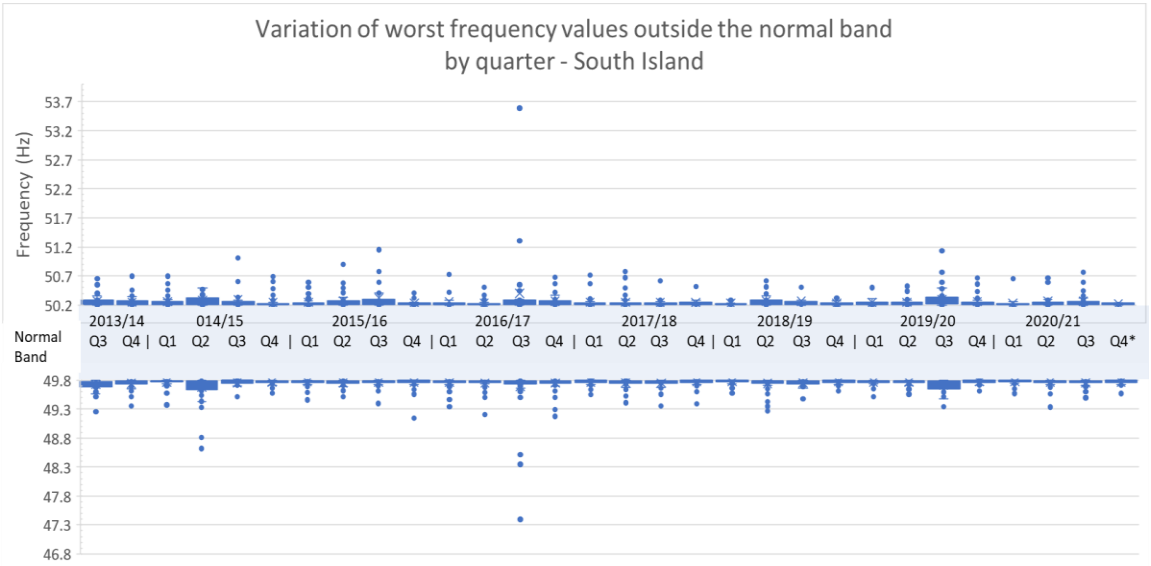
17.1 Maintain frequency in normal band (Frequency value)

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



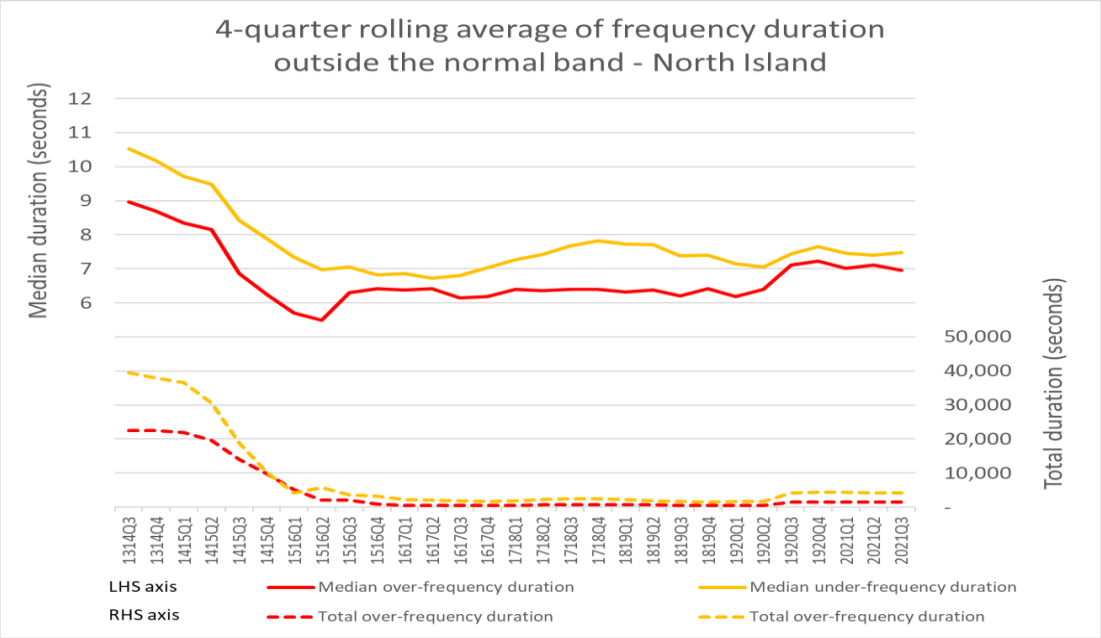
* 2020/21 Q4 contains data for April only

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.

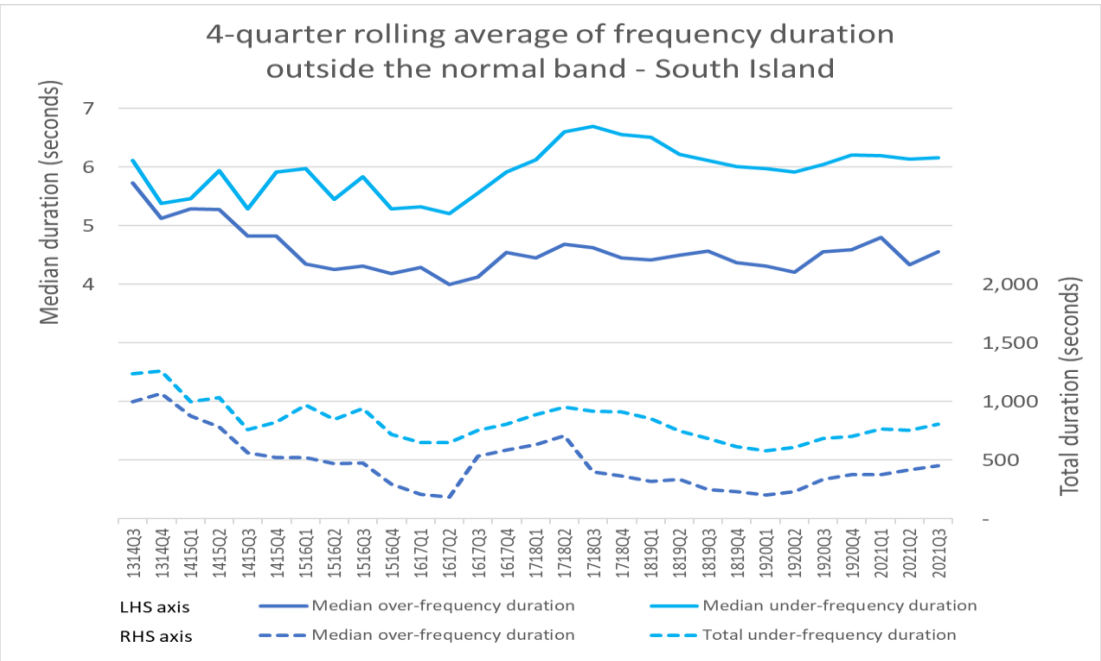
17.2 Recover quickly from a fluctuation (Time)

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

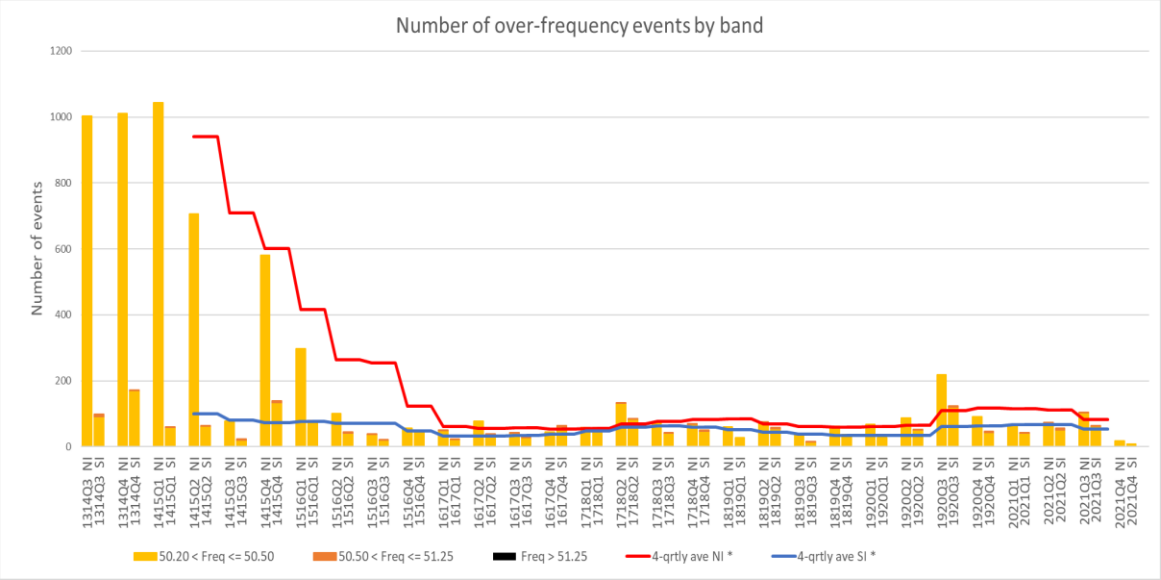


* These graphs have not been updated since 2020/21 Q3; they will only be updated at the end of each quarter

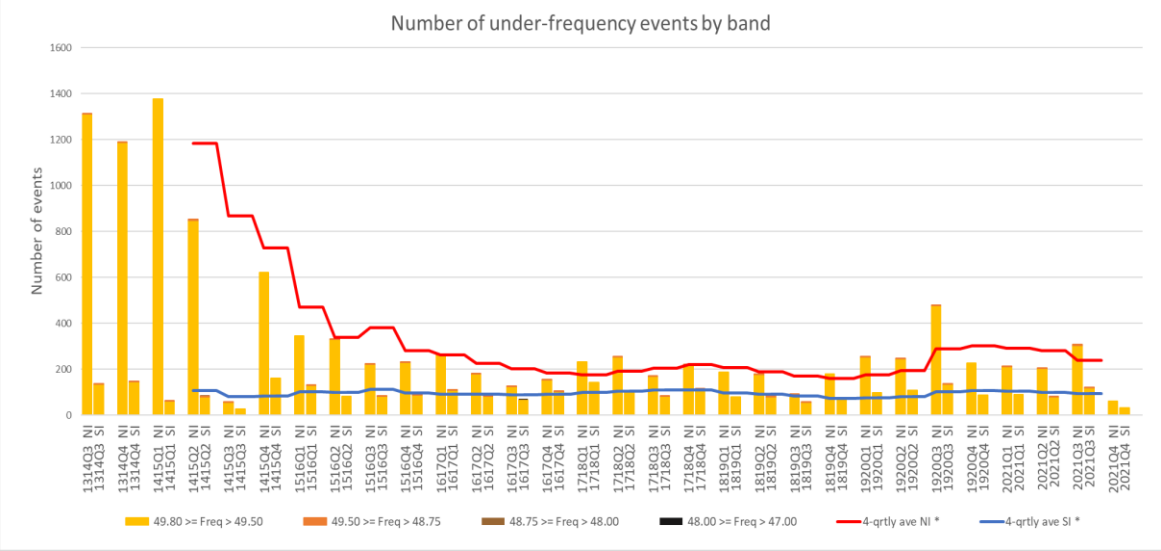
17.3 Manage frequency and limit rate of occurrences during momentary fluctuations (Number)

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 2020/21 Q4 contains data for April 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	May-20	Jun-20	Jul-20	Aug-20	Sep-20	Oct-20	Nov-20	Dec-20	Jan-21	Feb-21	Mar-21	Apr-21
Demand Allocation Notice	-	-	-	-	-	-	-	-	-	-	-	-
Grid Emergency Notice	-	1	-	-	-	1	-	2	-	1	1	-
Warning Notice	-	-	-	-	-	-	-	-	-	1	-	-
Customer Advice Notice	10	13	11	15	9	6	12	10	8	4	4	8

20 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
	None