MONTHLY SYSTEM OPERATOR AND SYSTEM PERFORMANCE REPORT

FOR THE ELECTRICITY AUTHORITY

Transpower New Zealand Limited

January 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 January 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

- Given the deferral of Tiwai exit until December 2024, our Tiwai working group has reviewed its work programme, which will continue as planned and be paused to a later date. A further outcome of the announcement is that we anticipate more generation connection enquiries in the coming months.
- Reduced gas supplies from Pohokura and their effect on security of supply has been modelled in regular reports. We are also monitoring the extended run of low inflows in the South Island that has reduced South Island storage to below average for this time of the year. Despite these two situations, current modelling indicates that security of supply risk for this winter remains low.
- We are continuing our control room vigilance as part of the COVID-19 response and are confident that Level 4 protocols could be restored within 24 hours should this be required.
- On 28 January, we published the 2021/22 Draft Annual Outage Plan. We will follow this with customer and participant consultation, system operator assessment of the plan and the industry Outage Planning Forum on 24 March.
- Real Time Pricing is on time and on budget. Phase one development is complete; testing and training is underway and this phase is on target for deployment in May.
- As part of our commitment to understanding our customers' needs, we have visited participants to discuss commissioning, testing and assurance; and the extended reserves project.
- In January, the two remaining customers still to transfer from GENCO have been working with Transpower to plan their final transitions following delays. Both participants have submitted self-breaches to the Authority.
- We are investigating the fault ride through performance of assets after an event; this has been prompted by the circumstances on 20 January when several windfarms output dropped following an AC fault at Bunnythorpe.
- Planning for the SOSPA software audits for the Scheduling, Pricing and Dispatch tool (SPD) and the Reserves Management Tool (RMT) began in January.

2 Customers and other relationships

Meridian

We visited Meridian's Christchurch engineering staff in January to introduce recent changes in roles and responsibilities within the SO Power Systems Group regarding commissioning, testing and assurance. We also socialised potential changes and improvements to the operational test plan process, which were met with support.

Mercury

We had a similar catch-up session with Mercury along with discussions around their Turitea windfarm development.

Winstone Pulp International

We worked with the Electricity Authority to provide an update to this customer on the extended reserves project, particularly clarifying what automatic under-frequency load shedding (AUFLS) requirements are in force at present.

APEx - Association of Power Exchanges

Dr Jay attended an APEx board meeting. The group have arranged a webinar on the topic of market changes to enable storage in February, featuring an international panel.

3 Risk & Assurance

COVID-19 Response

We continue to remain vigilant regarding COVID-19. With the announcement of the community cases in Northland and Auckland in January we have reminded our Senior Leadership Team of when we would reactivate our incident management team and where to find all the latest supporting colleterial. The additional control room desks set up last year remain available should we need to instigate our COVID-19 shift protocols.

Business Assurance audits

During January, the next two SOSPA business assurance audits relating to Regional Contingency Planning and Event Management were planned and auditors engaged.

Software audits

Planning for the SOSPA software audits for the Scheduling, Pricing and Dispatch tool (SPD) and the Reserves Management Tool (RMT) began in January.

4 Compliance

We did not report any system operator self-breaches that cover the January period.

However, as reported in the October to December 2020 Quarterly report, in January we reported a self-breach relating to December. For the period 27 November 2020 to 15 December 2020, the system operator did not include Glenbrook power station's instantaneous MW injection values in the real time pricing (RTP) schedule. This resulted in Glenbrook's generation output being set to zero in the RTP schedules.

The RTP schedule sends a 5-minute price signal to the market via WITS, but is not used to dispatch, generate forecast schedules, or calculate final pricing. The error was caused by incomplete process documentation, which has now been updated.

We have eight outstanding breaches with the Authority compliance team.

5 Impartiality of Transpower roles

No items were opened in the register during January.

We have six 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
27	**System operator employee partner to work for grid owner:** The partner of a system operator employee started work with the grid owner. Confidentiality obligations have been explained to both employees and will be monitored to prevent a conflict of interest arising.	SO Power Systems Group Manager
29	**Preparing the Net Benefit test – system operator involvement:** The system operator is reviewing how it can	Operations Planning Manager

System Operator Open Conflict of Interest Issues		
ID	Title	Managed by
	provide information for use by the grid owner undertaking a Net Benefit Test.	
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
33	**Sharing working space during lockdown:** A staff member sharing workspace with their partner who works for another industry participant. Both parties are managing the conflict accordingly to maintain the confidentiality of information.	Grid and Systems Operations 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

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)

Phase one development is complete, testing is underway. Training development for phase one is slightly ahead of schedule, procedure updates will commence in late January. Phase one is on target for deployment in May.

Phase two preparatory work continues to specify the design and requirements. Design finalisation is continuing with some smaller design decisions to be finalised early in the new year.

Work has begun with the Electricity Authority on the next industry engagement session, which is planned for February. This will be third session of a planned series of nine in this phase of engagement. The focus for this next session will be how the power system effects price, or how does price creation relate to the real world.

Dispatch Service Enhancements (DSE)

In January, the two remaining customers still to transfer from GENCO have been working with Transpower to plan their final transitions following delays. Both participants have submitted self-breaches to the Authority.

One party has requested additional regression testing, which took place in early February; a new transition date is set for 23 February 2021.

The other participant has transitioned one site and are making final preparations for regression testing of Web Services sites; scheduled for mid-February. This will be followed by transitioning these sites into production 26 February 2021. Additionally, their sites transitioning to ICCP did so in early February.

Intermittent communications issues were observed in December and January, which are being investigated.

Situational Intelligence

A Test Exit Report for Release 3 was approved in December and the final release for the project was deployed on 26 January. Project closure activities are now underway.

Extended Reserves (AUFLS)

We held a formal project kick-off with all project team members and the high-level design was finalised with endorsement from the Community of Practise (COP). Sprint 0 which sets up the foundational components, is complete. Sprint 1 has started which includes building the front end and functional requirements of the Data Portal. Along with the Authority, we have started to develop a more detailed roadmap beyond the Data Portal build. We have also started high-level impacts assessments with stakeholders and have created a feature backlog. We are planning to hold an estimation/delivery checkpoint in February at the next Project Advisory Team meeting.

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

Although outage numbers for January have been low compared to the November peak as a result of the holiday break, we have seen some very high outage-weeks. Looking ahead we are also seeing high numbers during the weeks beginning 15 February and 1 March. These large weeks have put pressure particularly on our system security engineers who work close to real time.

Annual Outage Plan (2021/22)

On 28 January we published the 2021/22 Draft Annual Outage Plan. We will follow this with customer and participant consultation, system operator assessment of the plan and the industry Outage Planning Forum on 24 March. The final plan will be published by 19 May.

9 Power systems investigations and reporting

Operational Impact of Tiwai Exit

Following Rio Tinto's announcement on its plan to delay the closure of Tiwai until 2024, the Operations Tiwai exit working group has reviewed its work programme and decided what activities to pause and which to continue. Our engineering studies will continue, with results from the over frequency arming and transient angular stability studies being finalised over January and reports expected during February. We also started our small signal stability analysis work during January.

Credible Event Review

We have reviewed the classifications of several interconnecting transformer including new transformers at Stratford and Otahuhu and the classification of the existing Kikiwa and Stoke transformers considering the commissioning of the Kikiwa reactor. The review has not resulted in substantial changes to classifications and will be communicated to industry with a brief update to our existing reports in February.

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

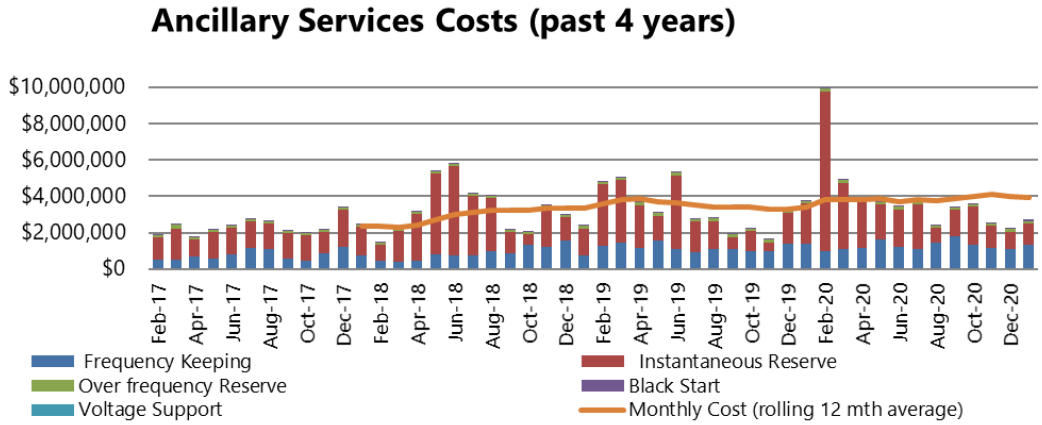
13 Security of supply

South Island hydro storage has continued to fall due to the extended run of low inflows and is below average for this time of the year. This was expected given the La Niña climate event called by NIWA late 2021 and analysed by the system operator[1]. As 87 per cent of hydro storage is located in the South Island, the result is that total national hydro storage is sitting at 85 per cent for this time of year. However, North Island inflows remain healthy, which, combined with a conservative generation pattern, has enabled North Island storage to be 102 per cent of average for this time of year.

Reduced gas supplies and their effect on security of supply has been modelled in regular reports[2]; current modelling indicates that despite below average gas storage, security of supply risk remains low. Our base case simulated storage trajectories do not currently forecast entering the watch or alert regions. In early February, we produced another scenario to test our assumption about the amount of gas released by large industrial consumers for electricity generation in a hydro shortage. Again, this scenario forecasts that no trajectories cross into the watch or alert region.

Prices climbed through January in response to tightening supply and averaged $180/MWh. This is a contrast to the $100/MWh average experienced at the same time last year (reflecting a much stronger storage position last year).

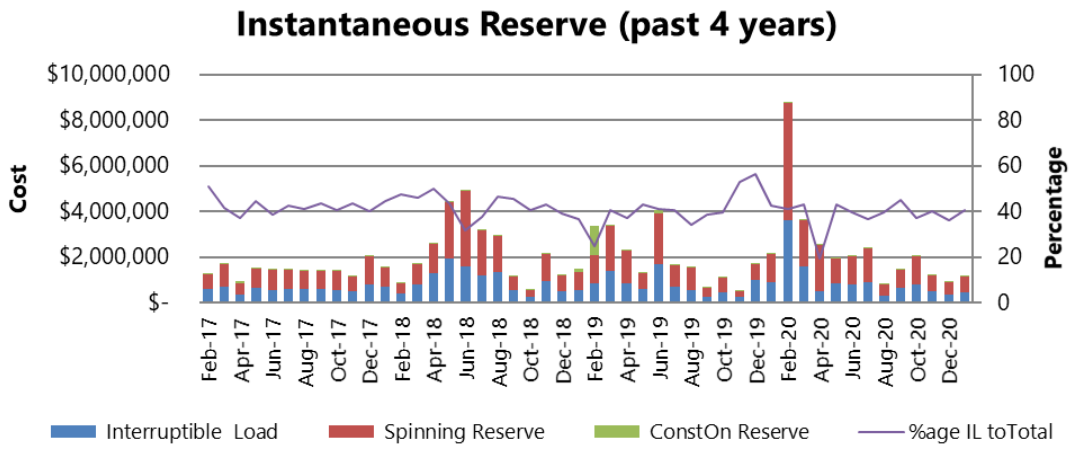
14 Ancillary services



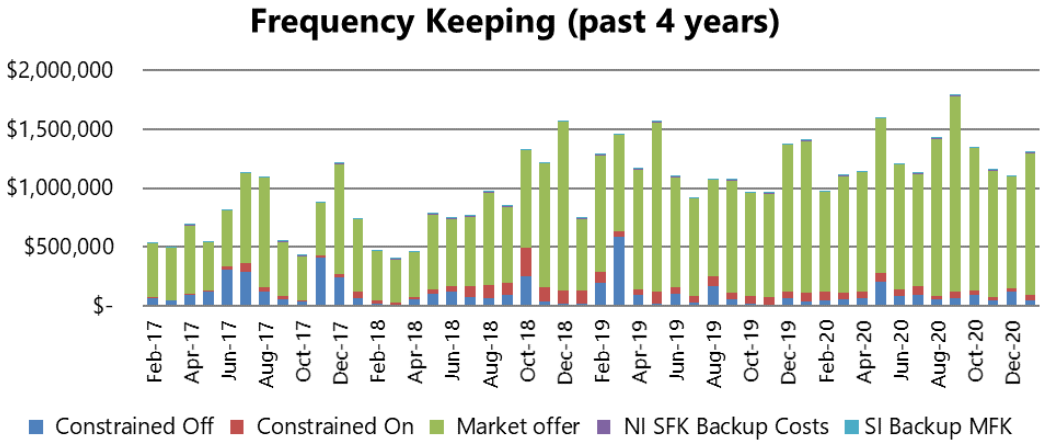
This month's ancillary services costs were $2.7 million, an increase of $432k (19 per cent increase) from last month. This arose from an increase in both instantaneous reserve costs and frequency keeping costs.

[1] https://www.transpower.co.nz/sites/default/files/bulk-upload/documents/La%20Nina%20%26%20El%20Nino.pdf

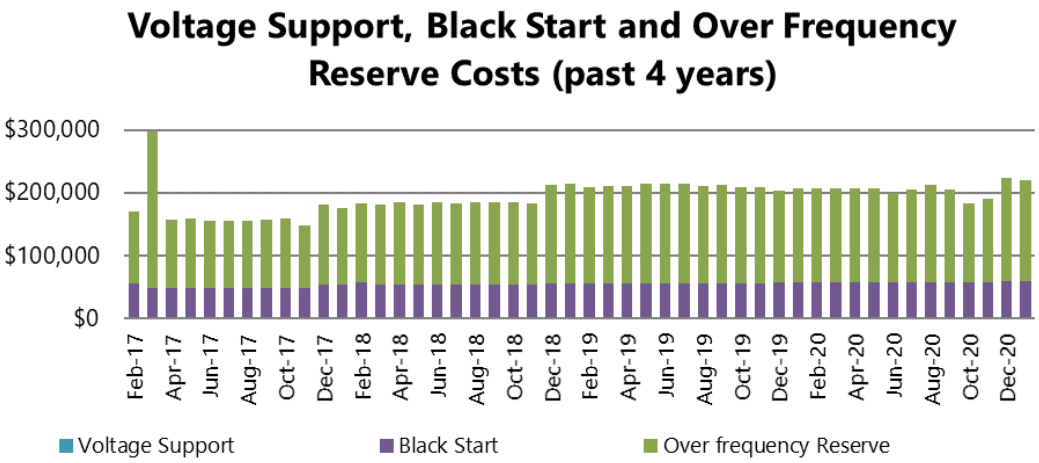
[2] https://www.transpower.co.nz/sites/default/files/bulk-upload/documents/Gas%20Outlook%20for%20Electricity%20Generation%20and%20Security%20of%20Supply%202021.pdf



This month's instantaneous reserve costs were $1.2 million, an increase of $235k (25 per cent increase) from the previous month. $121k of this increase is attributable to spinning reserves, and $134k to interruptible load; constrained on payments reduced by $19k. This is a result of an increase in both the quantity and price of reserves procured.



This month's frequency keeping costs were $1.3 million, an increase of $201k to the previous month (18 per cent increase). This increase was consistent across the whole month. A contributing factor for this increase was a shift in generation mix due to low hydrology, particularly in the South Island.



The over frequency costs decreased slightly this month to $160k. Black start costs remained at $60k. There are currently no voltage support costs.

15 Commissioning and Testing

Mercury's Turitea phase 1 (North) windfarm is due to connect to Linton in May 2021. Progress has been made during January clarifying asset owner performance obligations with the windfarm project team after seeking guidance from the Electricity Authority.

Tilt's Waipipi windfarm continued with commissioning activities and is still classified as a secondary extended contingent event.

With the news of Tiwai's delayed exit until 2024, we are expecting more connection enquiries in the coming months.

16 Operational and system events

Effect of AC fault at Bunnythorpe on windfarm output

On 20 January, after an AC fault at Bunnythorpe, the output of several windfarms was identified as dropping. The most notable windfarm was West Wind which dropped approximately 100 MW of generation after the AC fault. The system operator will investigate the fault ride through performance of assets after the event.

Tripping of recently completed commissioning

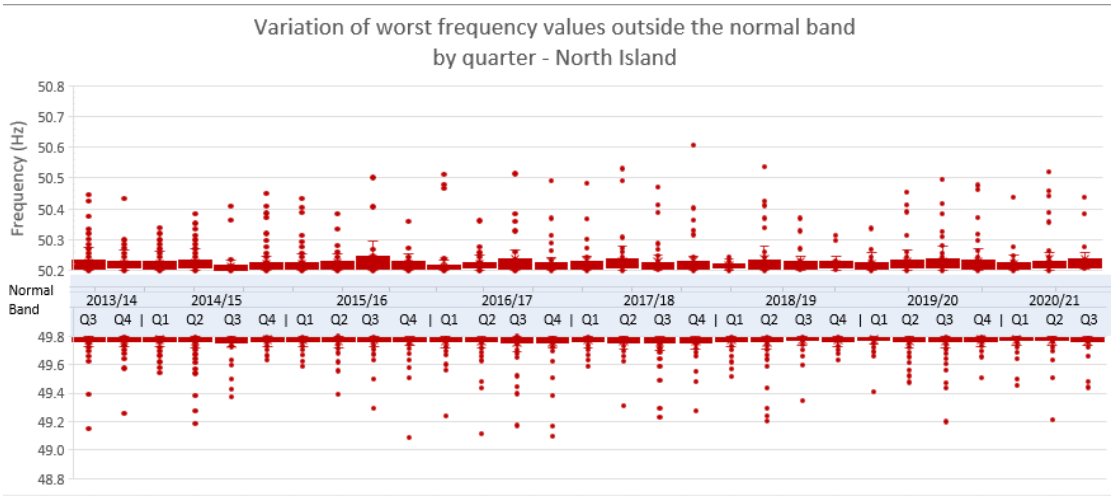
Several generation assets that are undergoing or have recently completed commissioning have been observed tripping. We will continue to monitor the situation, however these trippings do not appear to be related to any other events on the system at the time and are therefore already covered under our existing contingent event management processes for generators.

17 Frequency fluctuations

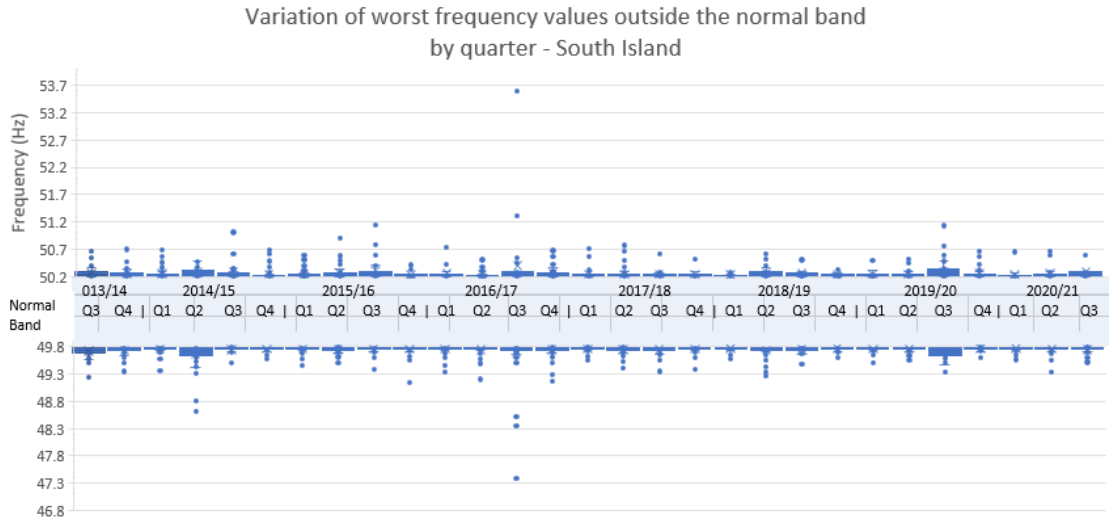
17.1 Maintain frequency in normal band (Frequency value)

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



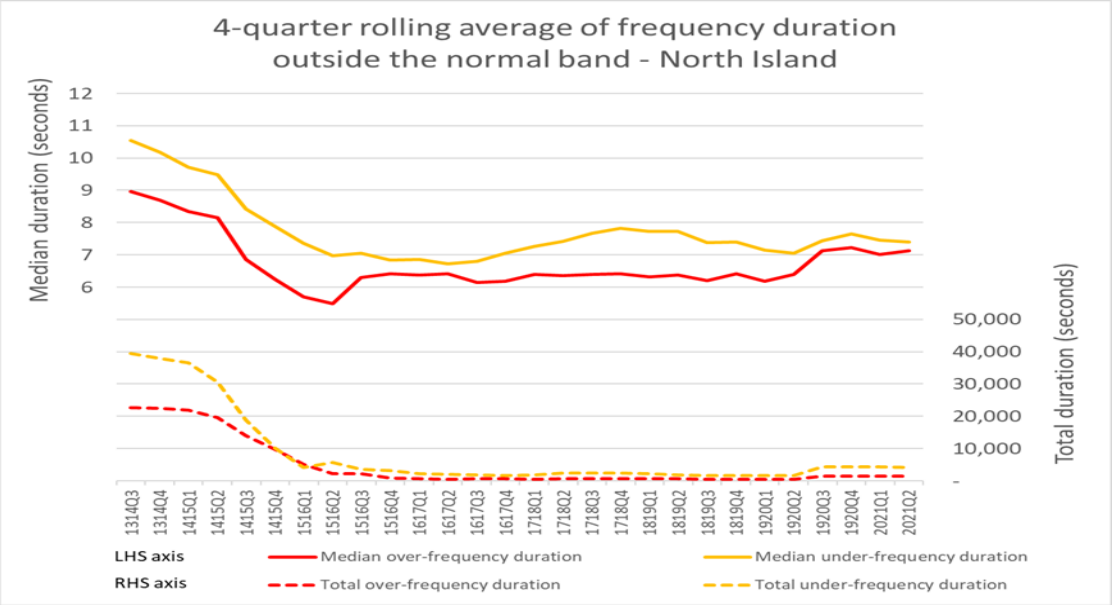
* 2020/21 Q3 contains data for January only

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.

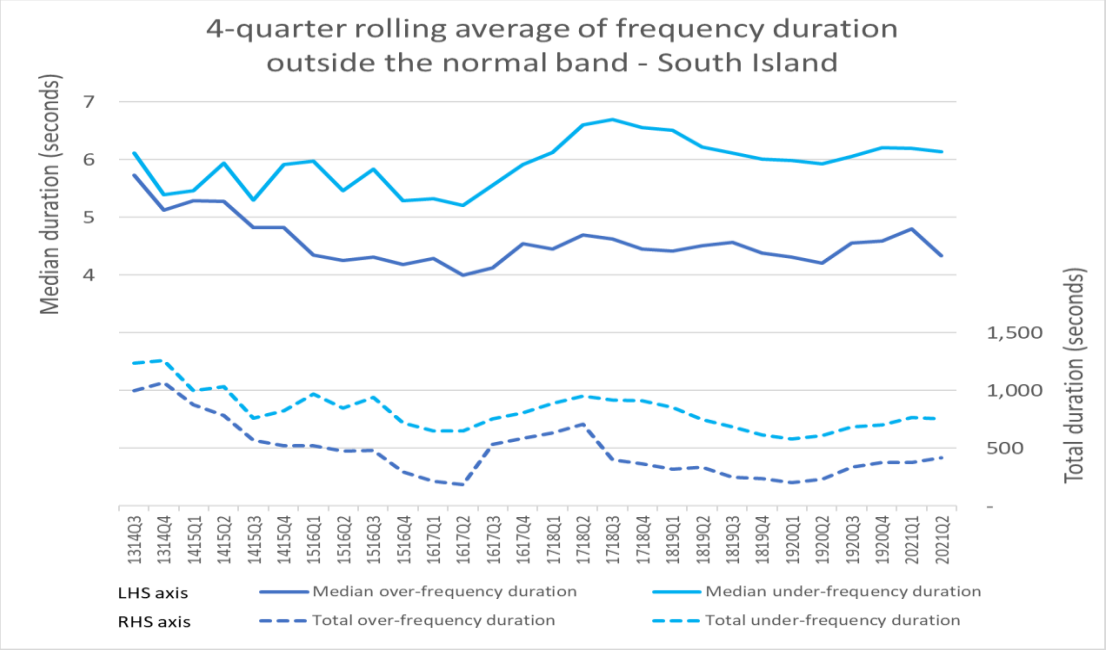
17.2 Recover quickly from a fluctuation (Time)

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

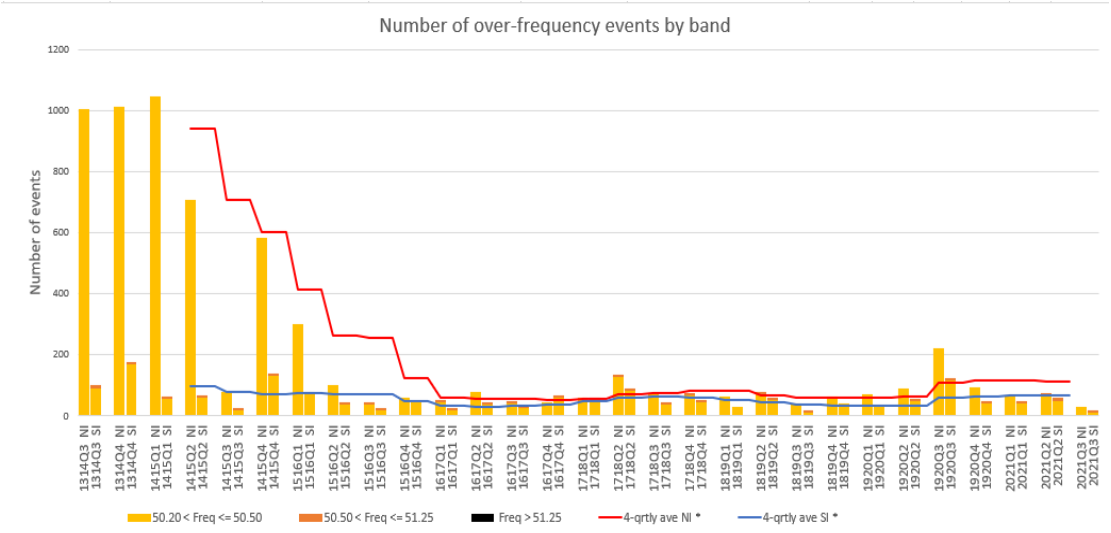


* These graphs have not been updated since 2020/21 Q2; they will only be updated at the end of each quarter

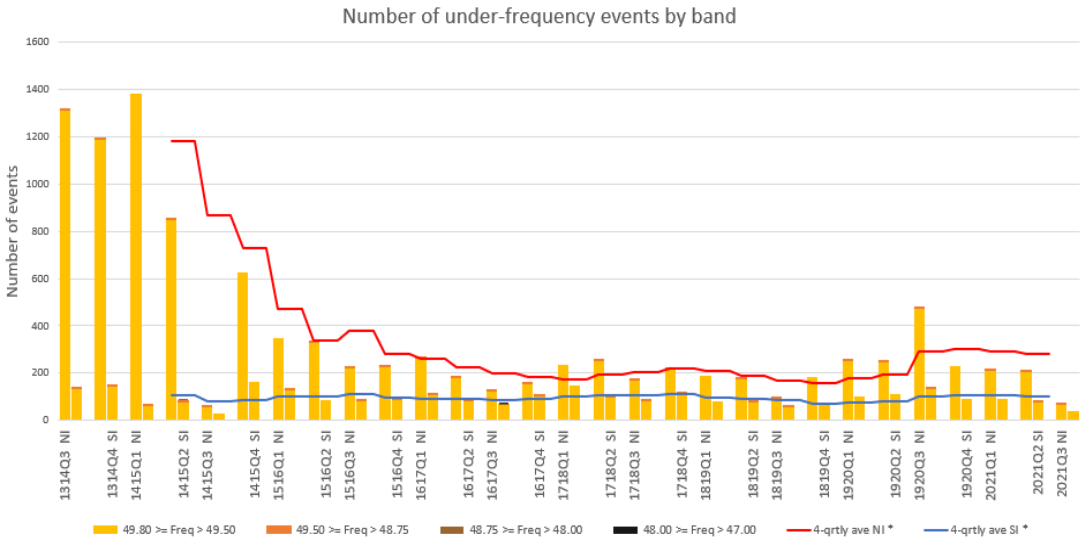
17.3 Manage frequency and limit rate of occurrences during momentary fluctuations (Number)

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 Q3 contains data for January 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	Feb-20	Mar-20	Apr-20	May-20	Jun-20	Jul-20	Aug-20	Sep-20	Oct-20	Nov-20	Dec-20	Jan-21
Demand Allocation Notice	-	-	-	-	-	-	-	-	-	-	-	-
Grid Emergency Notice	-	1	-	-	1	-	-	-	1	-	2	-
Warning Notice	-	2	-	-	-	-	-	-	-	-	-	-
Customer Advice Notice	21	14	13	10	13	11	15	9	6	12	10	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