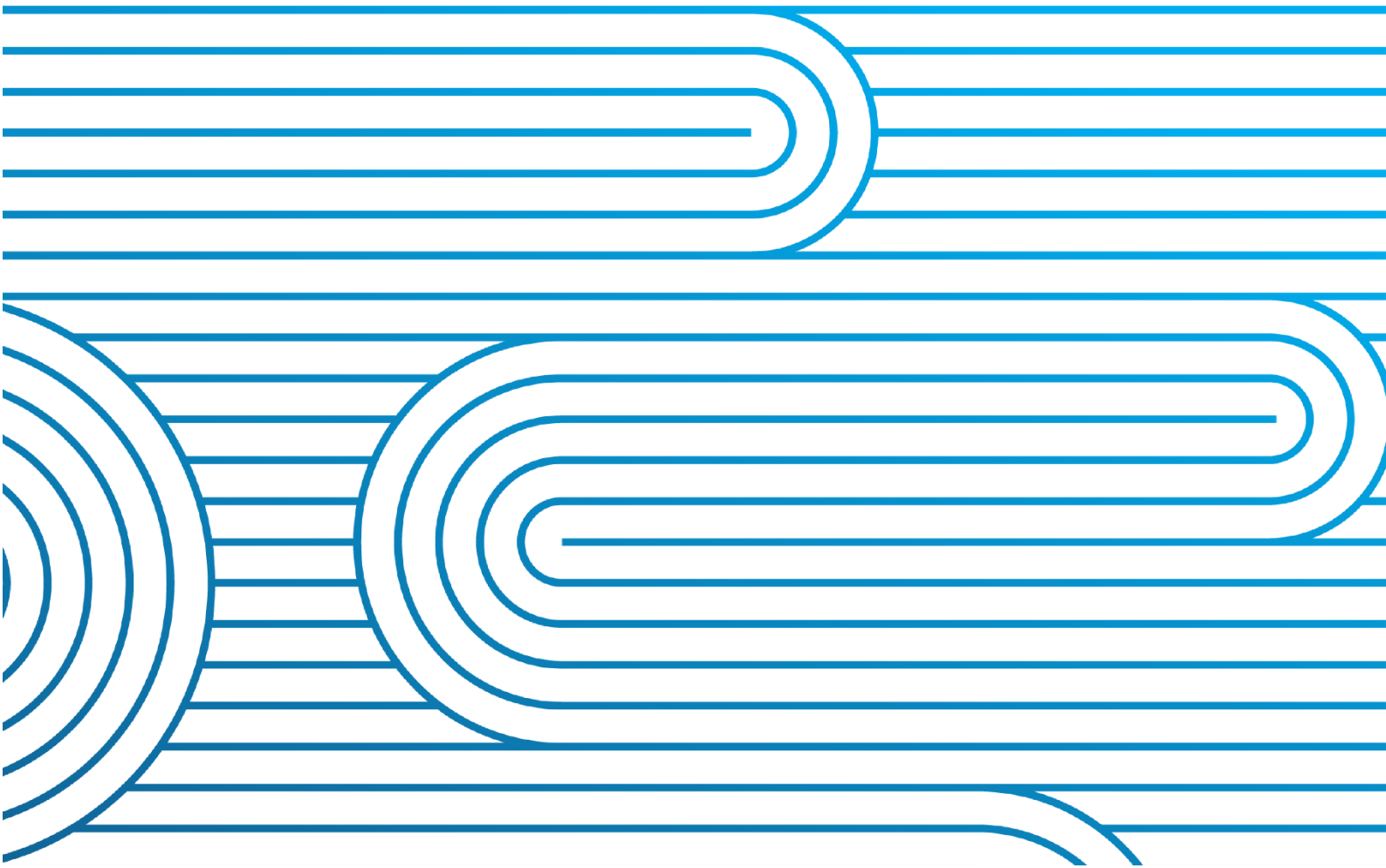
TRANSPOWER

Monthly System Operator and system performance report

for the Electricity Authority

February 2022



Report Purpose

This report is Transpower's review of its performance as System Operator for February 2022, 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).

Contents

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System Operator performance

1 Highlights this month

- Transpower and Authority actions following August 9 investigations are now focused on the longer-term and on supporting compliance investigations. Thursday 26 May has been set for the recommended industry exercise, and communications to participants are to begin mid-March 2022.
- Reserve Management Tool (RMT) Operational Change and Managing Conditional Offers audits are underway. Two remaining audits (Outage Block Mapping and Secondary Risk) will be completed before the end of the financial year in accordance with the SOSPA.
- The focus for the FSR programme of work over the last month has been on scoping the first two years' worth of work relating to updating technical requirements in the Code and other associated documents. Discussions to progress this work are underway with the Authority.
- The Real Time Pricing project is forecasting an overspend and the requirement for an extension to some milestone dates. Initial discussions have been held with the Authority and a change request is being drafted. The Phase 3 milestone which implements the primary scope of the project remains as November 2022.
- We aim to publish a consultation on changes to the SOSFIP and Emergency Management Policy (EMP) in mid-March 2022. This consultation follows the MartinJenkins 2021 dry year review. The consultation will be reviewed by the Authority ahead of wider communication, and responses will be collated so that the Authority can determine the changes to be implemented.
- Outage numbers were high in February and will continue at high levels through March. We are starting to see a small number of short-notice cancellations and delays to outages, as work crews are impacted by COVID-19.
- March's NZGB report forecasts three N-1-G generation shortfalls for 9, 15 and 16 August. Further, the N-1-G balance is generally very low between 15 and 28 June and again between 26 July and 23 August. These periods use the record 29 June and 9 August 2021 demands in their calculations.
- National hydro storage remains high - at approximately 90% of full; 108% of average for the time of year as at week ended 27 February 2022. Despite this, La Niña conditions have continued to dominate during February. Lower South Island lakes remain low with both Manapōuri and Te Anau operating close to or within their low operating ranges.
- A planned outage at the Maui gas production facility has been pushed out from April to May and will end on 10 June 2022. Following this we expect a material increase in gas production.
- We are treating two 10-30 MW solar farms as 'committed' projects despite not meeting all pre-requisites for System Operator involvement. Both have an intention to connect in the next 12 – 18 months. By taking this approach we are managing the risk of System Operator activities becoming the critical path during commissioning.
- Over the weekend of 12-13 February 2022 there where high levels of distribution feeder outages as a result of cyclone Dovi. The control room teams reacted quickly putting processes in place to effectively manage and triage workload.
- The HVDC bipole outage planned for 19-20 February 2022 was extended by the Grid Owner. Transpower held industry conference calls to communicate the situation to market participants.

2 Customers and other relationships

KPI refresh

We held the first of a series of internal workshops in February, which aim to gather and prioritise views about what matters most in delivering a successful System Operator service day-to-day. These are the critical success factors which will be shared with the Authority for comment, along with some indicative outcome areas which will feed into the collaborative process to determine the new performance metrics.

3 Risk & Assurance

COVID-19

Control Rooms have moved to align protocols with a three phase approach to operating under the red traffic light setting. N95-equivalent masks and RAT testing have been provided and are in use. There is work underway to clarify that we can operate under the “Test to Return” for asymptomatic critical workers who have been identified as close contacts. An internal COVID-IMT (Incident Management Team) and the Health Safety and Wellness team are providing support with further contingency planning for worst case scenarios and for a longer-term plan for working through pandemic situations.

9 August generation shortfall event

Transpower and Authority actions following investigations are now focused on the longer-term and on supporting compliance investigations. A joint Project Advisory Group has been convened with the Authority, to oversee the implementation and completion of remaining actions.

Thursday 26 May has been set for the recommended industry exercise, and communications to participants are to begin mid-March 2022.

Business Assurance audits

Reserve Management Tool (RMT) Operational Change and Managing Conditional Offers audits are underway. The remaining two audits (Outage Block Mapping and Secondary Risk) will be completed before the end of the financial year in accordance with the SOSPA.

Operational Excellence

The RFP for consultant support for our Operational Excellence programme has closed and we are working through the procurement process. The programme will review control room operating practices including processes, change management practices, training, resourcing and behaviours, to assure this part of operation is best prepared for a rapidly evolving future.

4 Compliance

We reported no new System Operator breaches in this reporting period.

5 Impartiality of Transpower roles

We have six open items in the Conflict of Interest Register (below). These 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
42	**Mercury KPO upgrade:** The Power Systems Engineer assigned to manage the KPO upgrade previously worked at Mercury. The employee will provide input into the commissioning/testing documentation and will prepare the final compliance documentation for SO sign-off. Controls have been implemented, including management oversight and sign-off of all commissioning/testing documentation.	Power Systems Engineering Assurance Manager

6 Project updates

6.1 Market design and service 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.

Future Security and Resilience (FSR) Programme

The focus for this programme has been on scoping the first two years' worth of work which relate to updating technical requirements in the Code and other associated documents. Discussions regarding progressing this work, including discussion of

funding, are being held with the Authority. The FSR roadmap is set to be shared at the Authority Board meeting on 8 March 2022.

Real-Time Pricing (RTP)
The Real Time Pricing project is forecasting an overspend and the requirement for an extension to some milestones. This results from higher than anticipated rates of resource turnover, rate increases in a heated market caused by closed boarders, and additional, unbudgeted workload. Initial discussions have been held with the Authority and a change request is being drafted. The Phase 3 milestone which implements the primary scope of the project remains as November 2022.

Industry consultation on the Security of Supply Forecasting and Information Policy (SOSFIP)
We aim to publish a consultation on changes to the SOSFIP and Emergency Management Policy (EMP) in mid-March 2022. Both are System Operator policy documents incorporated by reference into the Code. They set out how the System Operator prepares and publishes information regarding national hydro storage, including the Electricity Risk Curves (ERCs) which are the trigger for policy mechanisms such as Official Conservation Campaigns and the Customer Compensation Scheme. The consultation follows the MartinJenkins 2021 dry year review, and proposes to:

- Treat demand response for electricity and gas equally in the modelling by requiring evidence of formal contracts to support assumptions
- Publish risk curves but not “status” curves to avoid current industry confusion caused by publishing two sets of curves, requiring a medium probability demand forecast be used in the analysis
- Make other minor clarifications in terminology and triggers for daily reporting.

The consultation will be reviewed by the Authority before opening for wider feedback for four weeks. Responses will be collated for the Authority, so that they may make a decision on changes to be implemented in the SOSFIP and EMP.

7 Technical advisory hours and services

Technical advisory hours and a summary of all technical advisory services (TAS) 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

Outage numbers were high in February and will continue at high levels through March; with some weeks at around 200 transmission outages a week and additional generation outages. We are starting to see a small number of short notice cancellations or delays to outages as work crews are impacted by COVID-19.

New Zealand Generation Balance (NZGB) analysis

March’s NZGB report forecasts three N-1-G generation shortfalls for 9, 15 and 16 August. Further, the N-1-G balance is generally very low between 15 and 28 June and again between 26 July and 23 August. These periods use the record 29 June and 9 August 2021 demands in their calculations.

9 Power systems investigations and reporting

No items to report.

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

The cost of services reporting for 2020/21 was delivered to the Authority on 22 December 2021. The next cost of services reporting, for 2021/22 will be delivered to the Authority before the end of 2022.

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

National hydro storage remains high - at approximately 90% of full; 108% of average for the time of year as at week ended 27 February 2022. Despite this, La Niña conditions have continued to dominate during February. Material inflows were limited to:

- Ex-tropical Cyclone Dovi bringing torrential rainfall to the North Island, resulting in a step change in North Island hydro storage.
- A large rainfall event in the South Island, which saw Lake Pukaki move into its high operating range and Lake Tekapo to spill.

Lower South Island lakes remain low with both Manapōuri and Te Anau operating close to or within their low operating ranges.

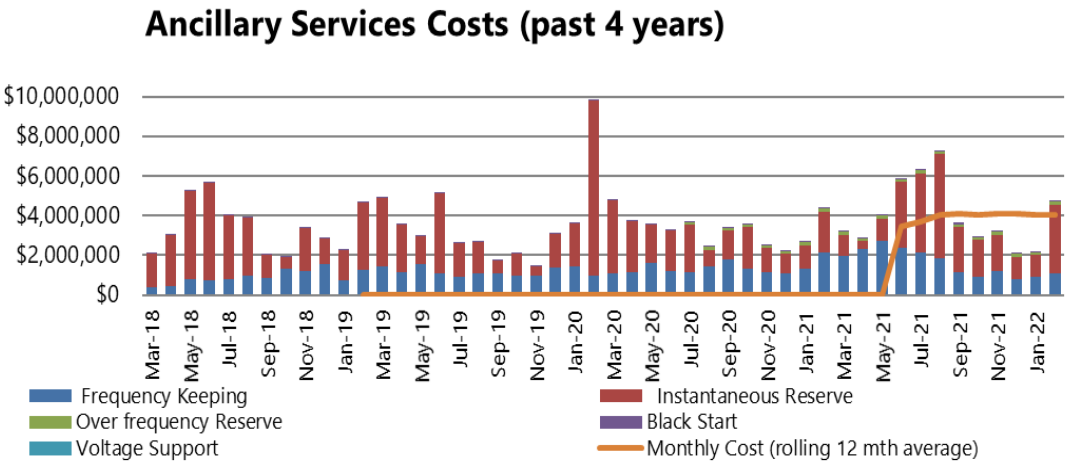
According to NIWA's outlook, climate signals indicate the gradual decay of La Niña conditions. Normal or above normal rainfall is expected for our hydro catchment areas until April 2022, with an elevated risk for atmospheric river and ex-tropical cyclone activity and the potential for more heavy rainfall in March.

Wind has contributed significantly throughout February, making up 8% of our total generation mix in the first week.

Near zero prices occurred throughout the month. The extended outage of the HVDC link resulted in price separation, with prices reaching over $500/MWh in the North Island and sitting at $0.03/MWh in the South Island on 17 February, and 19 - 21 February 2022.

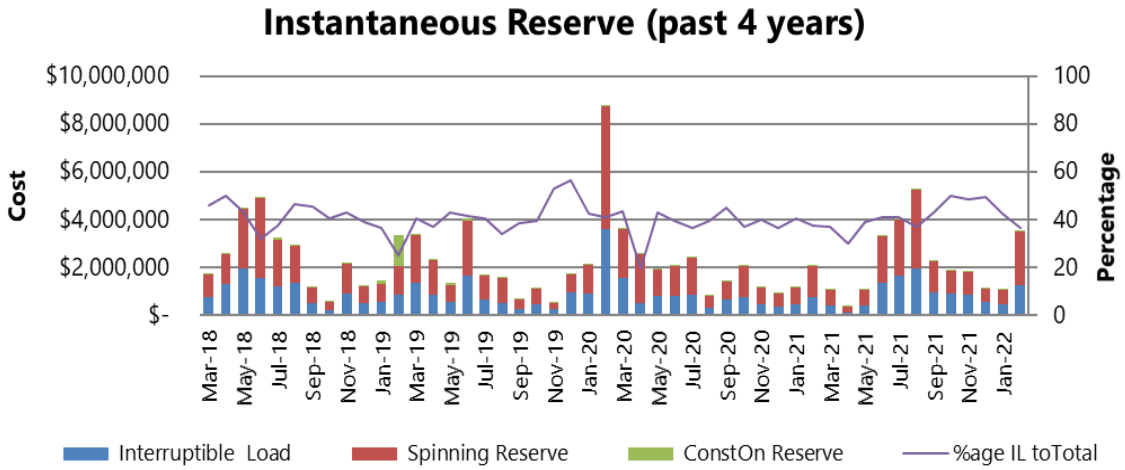
A planned outage of the Maui gas production facility has been pushed out from April to May and will end on 10 June 2022. Following this we expect a material increase in gas production.

14 Ancillary services

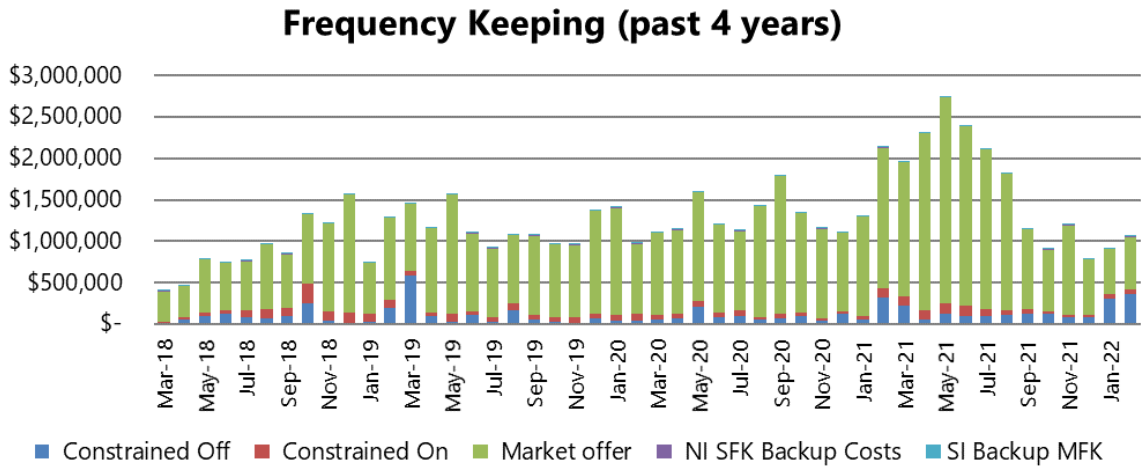


This month's ancillary services costs were $4.77 million, an increase of $2.55 million (115% increase) from the previous month. The cost of instantaneous reserves has

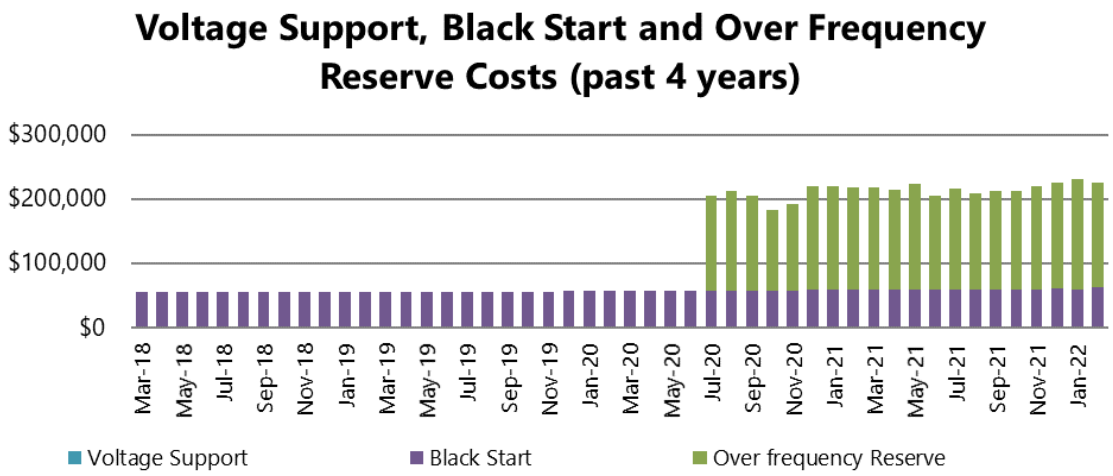
more than tripled compared to the previous month while frequency keeping costs increased by $148k (16% increase) compared to the previous month.



This month's instantaneous reserve costs were $3.49 million, an increase of $2.41 million (222% increase). Overall quantities of both fast and sustained reserves were higher than the previous month. The average prices per megawatt of North Island and South Island reserves were also higher than the previous month, the average price of fast reserves in both the North and South Islands and sustained reserves in the South Island more than doubled.



This month's frequency keeping costs were $1.06 million, an increase of $148k on the previous month (16% increase). This was the result of a $161k increase in North Island frequency costs which was slightly offset by a small reduction in North Island frequency keeping costs ($13k decrease).



Over frequency decreased slightly this month to $162k this month as there were less South Island over frequency reserves available required. Due to provide this service. Black start costs increased slightly to $62k from $60k because of increased availability costs in the North Island. There are currently no voltage support costs.

15 Commissioning and Testing

We are treating two 10-30 MW solar farms as 'committed' projects despite not meeting all pre-requisites for System Operator involvement. Both are planning on connecting behind Top Energy's distribution network. We are treating these in the same way as WEL's 35 MW battery connecting near Huntly.

Both have an intention to connect in the next 12 – 18 months. By taking this approach we are managing the risk of System Operator activities becoming the critical path during commissioning.

16 Operational and system events

Cyclone Dovi

Over the weekend of 12-13 February 2022 there where high levels of distribution feeder outages as a result of cyclone Dovi. The control room teams reacted quickly putting processes in place to effectively manage and triage workload.

HVDC Outage Extension

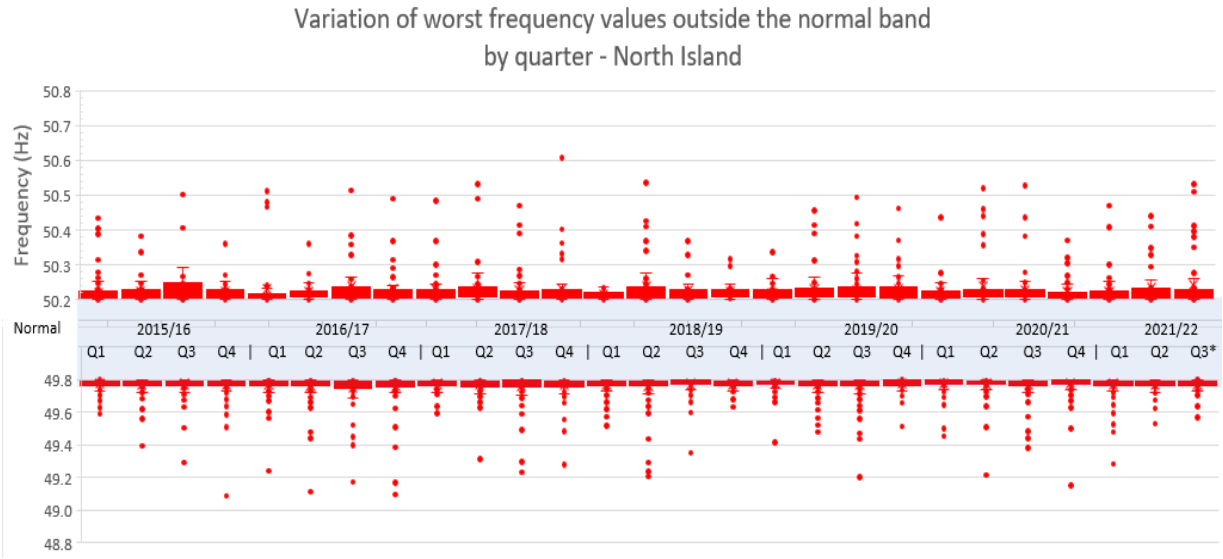
The HVDC bipole outage planned for 19-20 February 2022 was extended by the Grid Owner. Transpower held industry conference calls at 8pm on the Sunday and again at 11am on 21 February to communicate the situation to market participants.

17 Frequency fluctuations

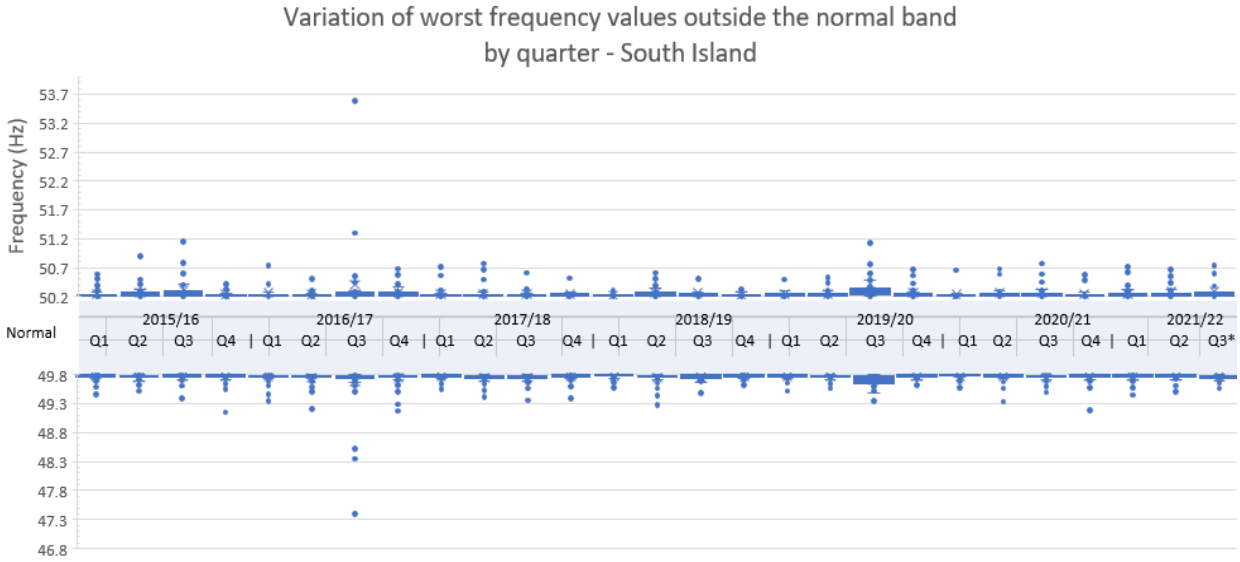
17.1 Maintain frequency in normal band (Frequency value)

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



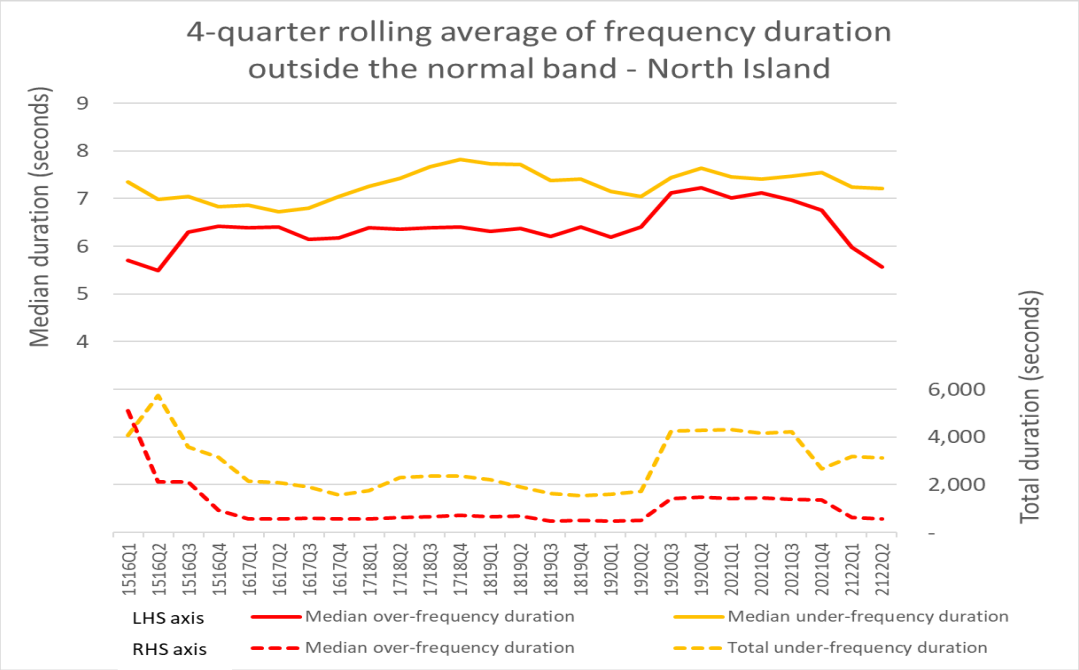
*2021/22 Q3 contains data for January and February only

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.

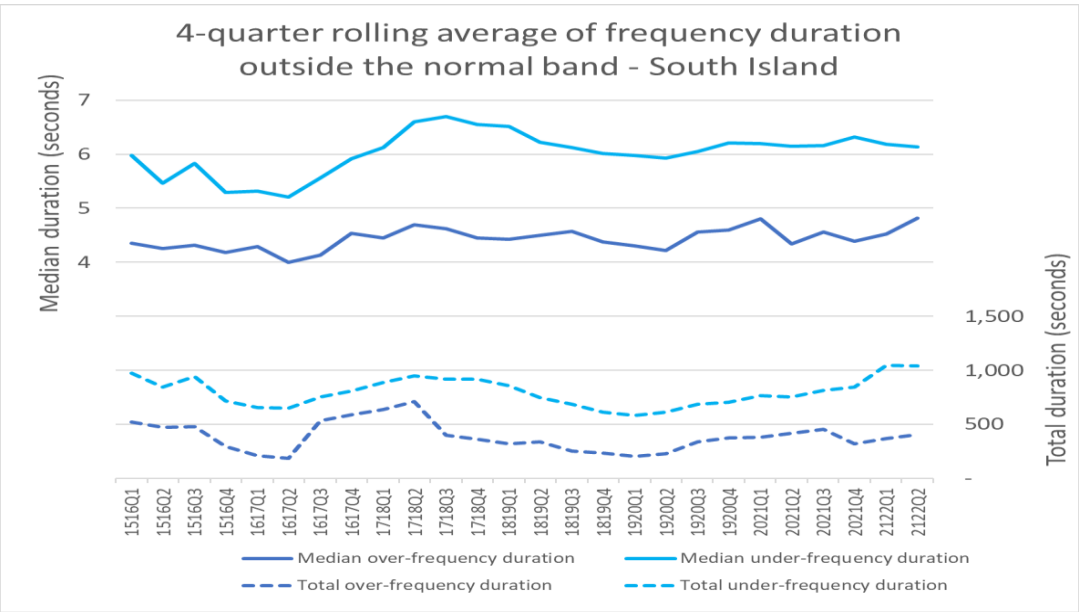
17.2 Recover quickly from a fluctuation (Time)

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

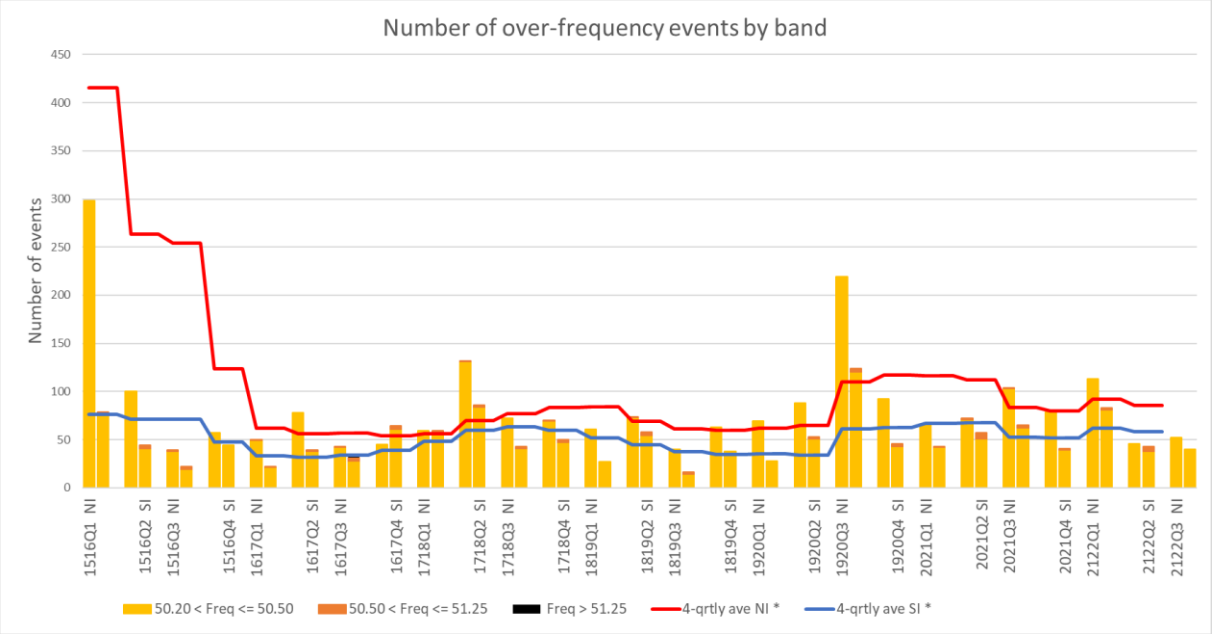


*These graphs have not been updated since 2021/22 Q2; they will only be updated at the end of each quarter

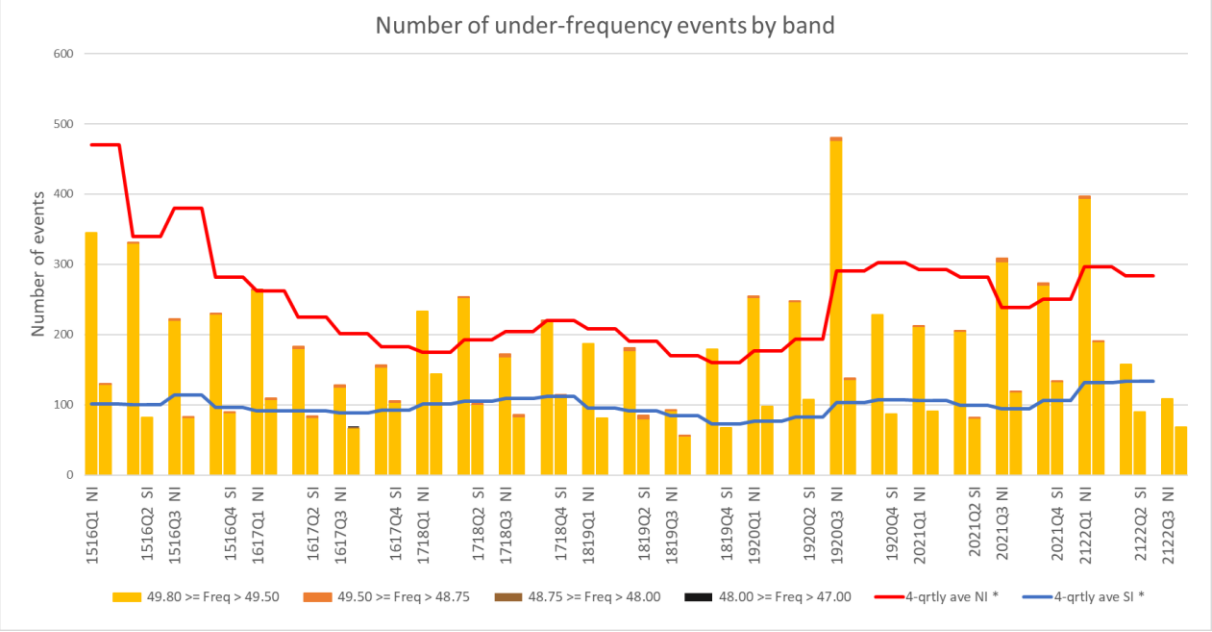
17.3 Manage frequency and limit rate of occurrences during momentary fluctuations (Number)

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

Over-frequency events



Under-frequency events



* 4-quarterly rolling averages for NI and SI are only 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	Jan-21	Feb-21	Mar-21	Apr-21	May-21	Jun-21	Jul-21	Aug-21	Sep-21	Oct-21	Nov-21	Dec-21	Jan-22	Feb-22
Demand Allocation Notice	-	-	-	-	-	-	-	1	-	--	--	-	-	-
Grid Emergency Notice	-	1	1	-	-	1	-	4	2	--	2	-	-	-
Warning Notice	-	1	-	-	-	-	1	4	-	--	--	-	-	-
Customer Advice Notice	8	4	4	8	14	14	11	42	34	9	7	5	7	9

20 Grid emergencies

None to report.

Appendices

Appendix A: Discretion

Event Date and Time	Description
3/02/2022 14:59	HLY2201 HLY5 Discretion Clause 13.70, Part 13 ENR Min : 200 Start: 04-Feb-2022 03:59 End: 04-Feb-2022 06:00 Notes: Unit 5 dispatched to 173.5MW, trader called to claim rule 13.82a exemption, resource consent breach. Had been discussed with SC who agreed Unit 5 required for security (UNI voltage management), 200 MW min discretion applied. Last Dispatched Mw: 173.45. Discretion ended at 05:27.
5/02/2022 10:03	HLY2201 HLY5 Discretion Clause 13.70, Part 13 EN Min : 190 Start: 05-Feb-2022 23:03 End: 05-Feb-2022 23:30 Notes: Genesis Trader claimed Rule 13.82 (a) due to resource consent breach. As per Rule 13.57, discretion applied to meet least cost dispatch. HLY U5 importing 100MVArs and required for voltage management as well. Last Dispatched Mw: 168.39
8/02/2022 4:37	COL0661 COL0 Discretion Clause 13.70, Part 13 ENR Max : 25 Start: 08-Feb-2022 17:37 End: 08-Feb-2022 18:30 Notes. Bus fault KUM. West Coast split: Last Dispatched Mw: 39
8/02/2022 4:47	COL0661 COL0 Discretion Clause 13.70, Part 13 ENR Max : 27 Start: 08-Feb-2022 17:47 End: 08-Feb-2022 18:30 Notes: Bus fault KUM, West Coast split. Last Dispatched Mw: 25.27
8/02/2022 5:58	KUM0661 KUM0 Discretion Clause 13.70, Part 13 ENR Max : 0 Start: 08-Feb-2022 18:58 End: 08-Feb-2022 19:30 Notes KUM Bus fault, West Coast split.: Last Dispatched Mw: 0
12/02/2022 21:04	KPA1101 KPI1 Discretion Clause 13.70, Part 13 ENR Max : 0 Start: 13-Feb-2022 10:04 End: 13-Feb-2022 10:30 Notes: OPK_KPI_SFD_2, KPI 92 & 32 tripped at 10:00 Last Dispatched Mw: 14
23/02/2022 1:30	LTN2201 TUR0 Discretion Clause 13.70, Part 13 ENR Max : 90 Start: 23-Feb-2022 14:30 End: 23-Feb-2022 16:30 Notes: To clear RTCA violation of LTN-T3 for a tripping of BPE-LTN-1. HAY-WIL-LTN-2 is on outage. Last Dispatched Mw: 91.8
23/02/2022 3:09	LTN2201 TUR0 Discretion Clause 13.70, Part 13 ENR Max : 95 Start: 23-Feb-2022 16:09 End: 23-Feb-2022 16:30 Notes: To clear RTCA violation of LTN-T3 for a tripping of BPE-LTN-1. HAY-WIL-LTN-2 is on outage. Last Dispatched Mw: 90
26/02/2022 13:49	HLY2201 HLY5 Discretion Clause 13.70, Part 13 ENR Min : 215 Start: 27-Feb-2022 02:49 End: 27-Feb-2022 03:00 Notes: Last Dispatched Mw: 167.85 Dispatched below running min. Trader claimed rule exemption. kept on for security.