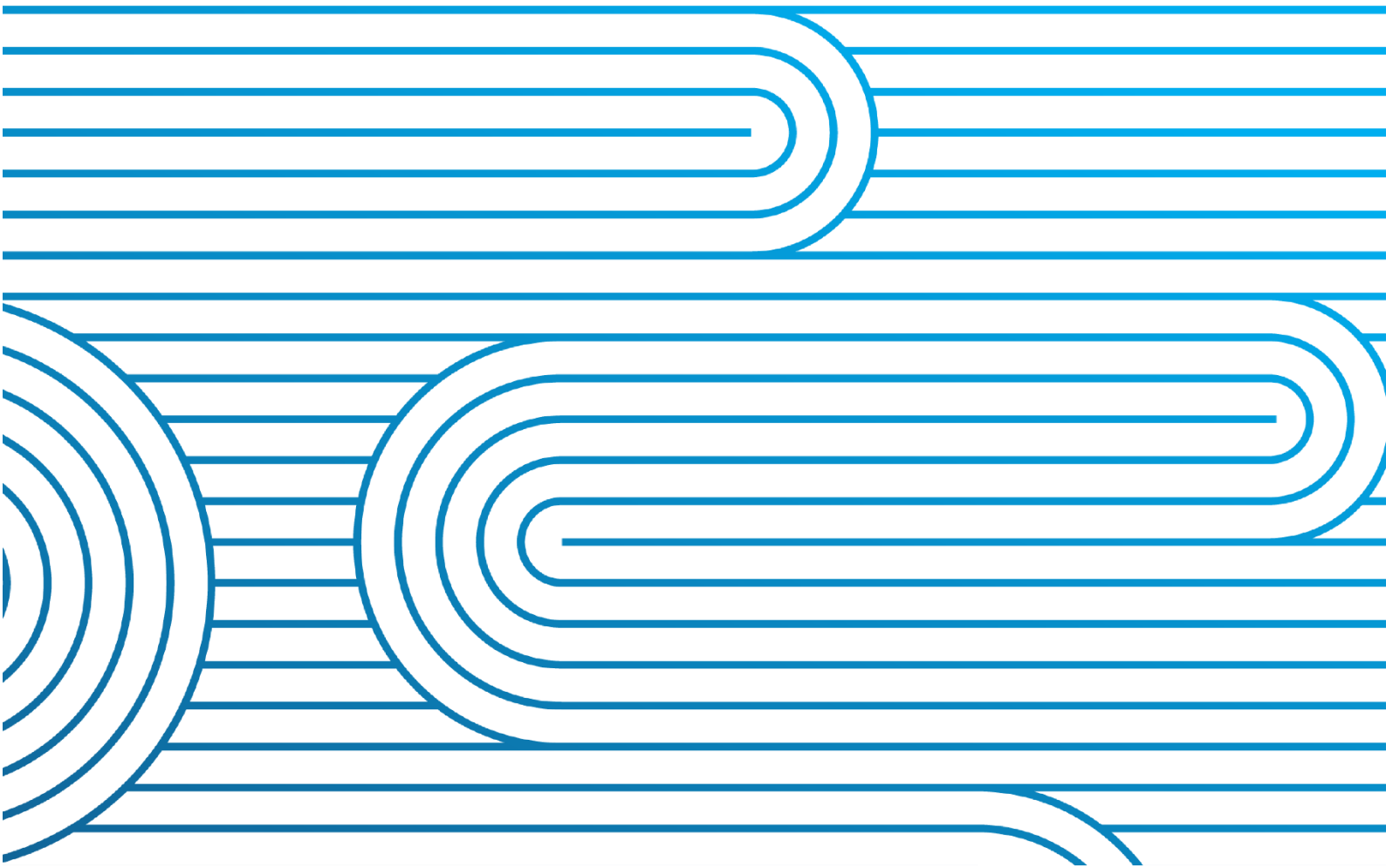
TRANSPOWER

Monthly System Operator and system performance report

for the Electricity Authority

July 2021



Report Purpose

This report is Transpower's review of its performance as system operator for July 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).

© Transpower New Zealand Limited. All rights reserved.

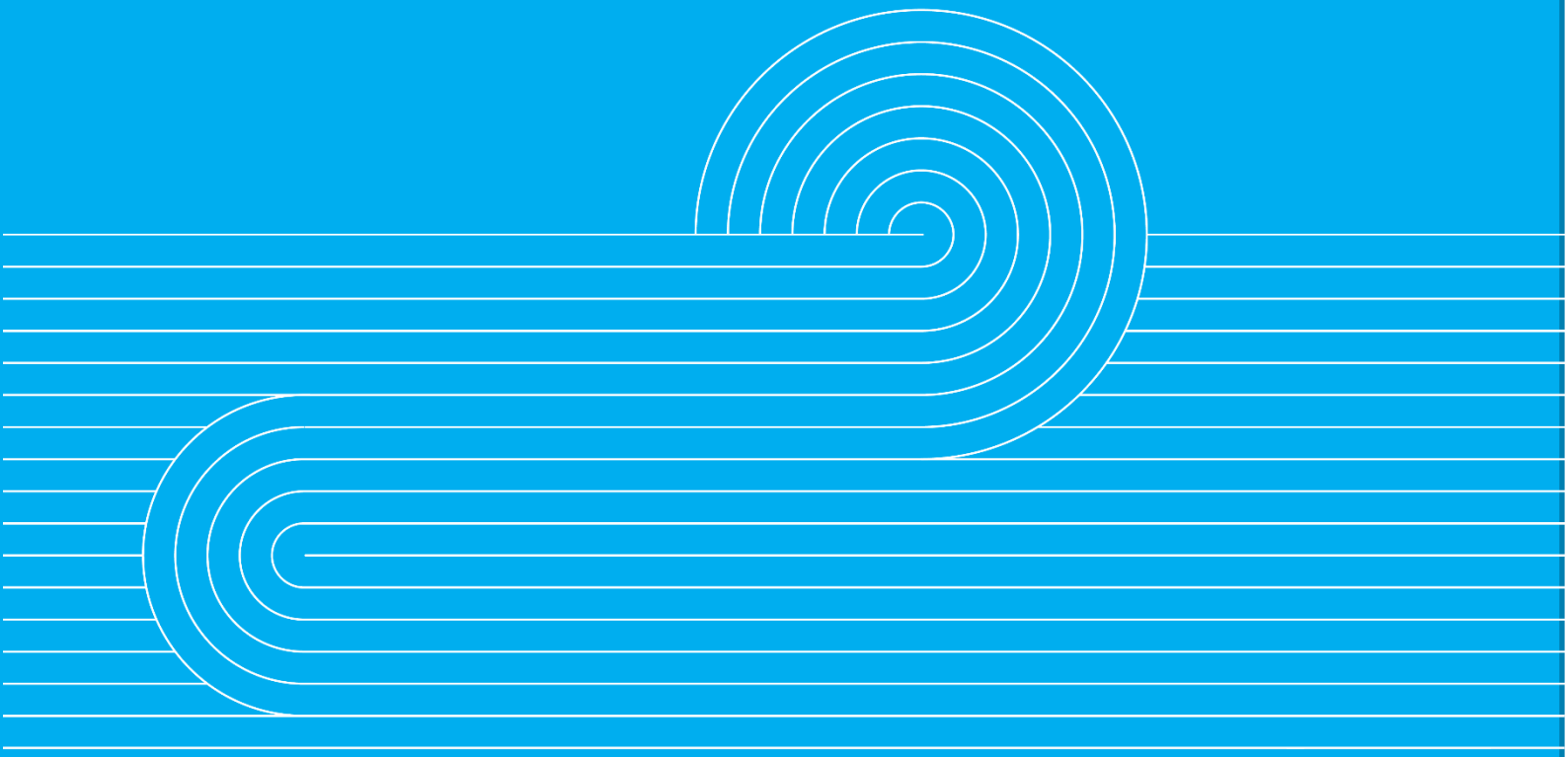
Contents

© Transpower New Zealand Limited. All rights reserved.

This page is intentionally blank.

© Transpower New Zealand Limited. All rights reserved.

System operator performance



1 Highlights this month

- Our performance metrics achieved a 100% result against the weighted metrics that contribute towards our incentive payment ($200k)
- We completed a survey and analysis to investigate possible increased peak demand which may occur if, or when, the RCPD incentive ends. Our analysis indicates we could see an increase of around 300 MW for peak demand periods where load would have previously been controlled. As a result, we will be adjusting the peak demand growth assumption in NZGB from 2% to 4%.
- RTP phase 2 in general continues to progress well. The project is seeing some complexity risk emerging specifically in the area of SDV (SCADA Data Validation) which is taking longer to get through than planned. This is under assessment and is now anticipated to complete later than the planned date of late July. It is not expected that this will impact on the project go live date.
- We launched the first application of our Customer Portal, the new Automatic Under-frequency Load Shedding (AUFLS) portal. This is used to gather yearly 2-block AUFLS feeder load data from North Island distributors, enabling both them and us to view their overall provision and compliance with obligations.
- New Zealand hydro storage now sits comfortably within the 90th percentile of historic averages following a month of heavy rainfall. South Island inflows have been particularly uncharacteristic for a time of year where we would generally expect to see less rain and more snow.
- Ahead of the severe storm warning for the weekend of 17 July, both control rooms worked proactively to prepare in the event of potential weather-related service interruptions. We responded to multiple alarms triggered by weather-related events in distribution networks, particularly in the Rotorua/Bay of Plenty region, and the West Coast of the South Island.
- We submitted a system operator self-breach report to the Authority on 21 July relating to when two values in the model change process were incorrectly swapped and the incorrect PAK_WKM2.2 was modelled in EMS SCADA and the market system from 17 March to 30 April 2021. The market impact in the aggregate was that generators were paid (and purchasers paid) $169,115.82 less than if the input value been correct. We have reviewed and updated the process document to include a new step which allows the gatekeeper to use automation to double check any data that has manually been entered into the ratings spreadsheet.

© Transpower New Zealand Limited. All rights reserved.

2 Customers and other relationships

SOSPA Management

On review of results from 20/21, we have confirmed with the Authority that our performance metrics achieved a 100% result against the weighted metrics that contribute towards our incentive payment ($200k).

We are currently drafting the Annual Self-Review of the system operator performance. This is due to the Authority by the end of August.

Changes to the Regional Coincident Regional Peak Demand (RCPD) incentive

We completed a survey and analysis to investigate possible increased peak demand which may occur if, or when, the RCPD incentive ends. The RCPD allocation method under the current Transmission Pricing Methodology creates an incentive for load to be managed across peak demand periods. Based on the current published timeframe of implementing the new proposed Transmission Pricing Methodology this incentive is expected to end on the 31 August 2021 creating the potential for an increase in peak demand from 1 September 2021 compared to historical demand. Our analysis indicates we could see an increase of around 300 MW for peak demand periods where load would have previously been controlled. As a result, we will be adjusting the peak demand growth assumption in the New Zealand Generation Balance (NZGB) reporting from 2% to 4%.

3 Risk & Assurance

We have commenced the first of our five business assurance audits for 2021/22, covering our process for determining causer recommendations related to Under Frequency Events.

4 Compliance

We submitted a system operator self-breach report to the Authority on 21 July. In February 2021 the Grid Owner advised a change in the PAK_WKM2.2 static limits and impedances. However, when modelling these changes in EMS SCADA and the Market System, the circuit's positive sequence reactance and zero sequence resistance values swapped places. This resulted in approximately 1.1 MW of generation per trading period being short-procured for the period 17 March to 30 April. The aggregate market impact was that generators were paid $169,115.82 less than what they would have been paid had the input value been correct, and aggregate load paid $169,115.82 less than what it should have had the input value been correct. The error was detected and corrected on 30 April. The existing process document was reviewed and updated in May 2021 to include a new step to improve the manual process. This new step allows the gatekeeper to use automated script to double check any data that has manually been entered into the ratings spreadsheet.

We submitted a system operator self-breach report to the Authority on 22 July. On 9 and 10 June, the 02:00 long non-response schedule (NRSL) solves took longer than expected to complete and publish, due to longer than usual solve times for the voltage

© Transpower New Zealand Limited. All rights reserved.

stability application. The corresponding price-responsive schedule (PRSL) was published within the prescribed timeframes and there was no market impact from the delay. The system operator configured a timer so the voltage stability solves fail after 5-minutes and do not try to re-solve, which prevents queued solves from failing after 10 minutes and then re-queuing to solve again. The voltage stability solves are not published and do not feed into any automatic constraint building process. The root cause of the slow voltage stability solves remains under investigation.

We submitted a system operator self-breach report to the Authority on 23 July. The report relates to a technical breach associated with the Market System failure on 15 May that was reported to the Authority as a Moderate Reportable Incident on 13 July. During the Market System failure, the 11:00 non-response and price-responsive short schedules (NRSS/PRSS) auto-triggered and started, were solved, but were not published due to issues associated with the market system switchover. The system operator's standalone dispatch (SAD) system uses the last published forward-looking schedules as an input to create dispatch instructions during a market system outage. Accordingly, there was no market impact from the 11:00 NRSS/PRSS schedules starting, solving, but not publishing, as SAD was still dispatching off earlier schedules.

5 Impartiality of Transpower roles

No items were opened in the register during July.

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

© Transpower New Zealand Limited. All rights reserved.

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 two work is in general progressing well. The project is seeing some complexity risk emerging specifically in the area of SDV (SCADA Data Validation) which is taking longer to get through than planned. This is under assessment and is now anticipated to complete later than the planned date of late July. It is not expected that this will impact on the project go live date.

The inter-project scheduling and environment conflict risks noted in last months' report have been reviewed and a draft plan has been formulated to minimise these. The impacts of this plan are still being worked through across the rest of the delivery programme.

Resourcing issues highlighted in last month's report have now been resolved.

Phase two business procedure reviews and updates continue to progress, and training development continued through July. Requirement validation in July focused on BI requirements. System functional requirement workshops recommenced in late July and will continue through August.

The next industry engagement session will be led by the NZX and cover changes to the WITS trading platform. Transpower is now focusing on the last two remaining webinars which will focus on demand side market changes.

AUFLS Customer Portal Launch
This month we launched the first application of our customer portal, which will eventually replace existing separate external databases with a single portal and single data source. The first application released is the new Automatic Under-frequency Load Shedding (AUFLS) portal. This will be used to gather yearly 2-block AUFLS feeder load data from North Island distributors, enabling both them and Transpower to view their overall provision and compliance with obligations. This provides a better view of how much AUFLS is armed at any given time, allowing adjustments to minimise the risk of over-tripping load. The data will also form a baseline for consideration when transitioning to the future 4-block AUFLS system. Two training sessions have been provided to distributors to date and were well received.

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.

© Transpower New Zealand Limited. All rights reserved.

8 Outage planning and coordination

Outage Planning – near real time

Outage numbers and consequent assessment volume have fallen as we enter the winter period.

NZGB Analysis

August's New Zealand Generation Balance Report forecasts no N-1-G generation shortfalls for the base scenario for the next six months. Applying low gas, no wind assumptions, minor N-1-G shortfalls are forecast in mid-August, early September and early October. The system operator has changed the load growth factor applied to NZGB for the period 1 September 2021 to 31 August 2022 from 2% to 4% to reflect possible changes to load management practices when RCPD incentives within the transmission pricing methodology are removed.

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

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.

© Transpower New Zealand Limited. All rights reserved.

System performance

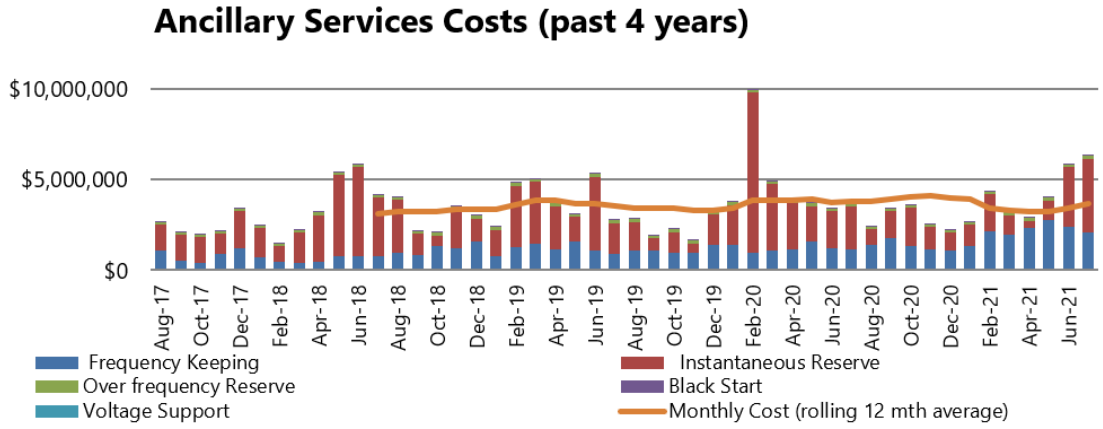
13 Security of supply

New Zealand hydro storage now sits comfortably within the 10th – 90th percentile of historic averages following a month of heavy rainfall. South Island inflows have been particularly uncharacteristic for a time of year where we would generally expect to see less rain and more snow. However, the situation is in line with NIWA's announcement that this June has been the warmest on record in New Zealand.

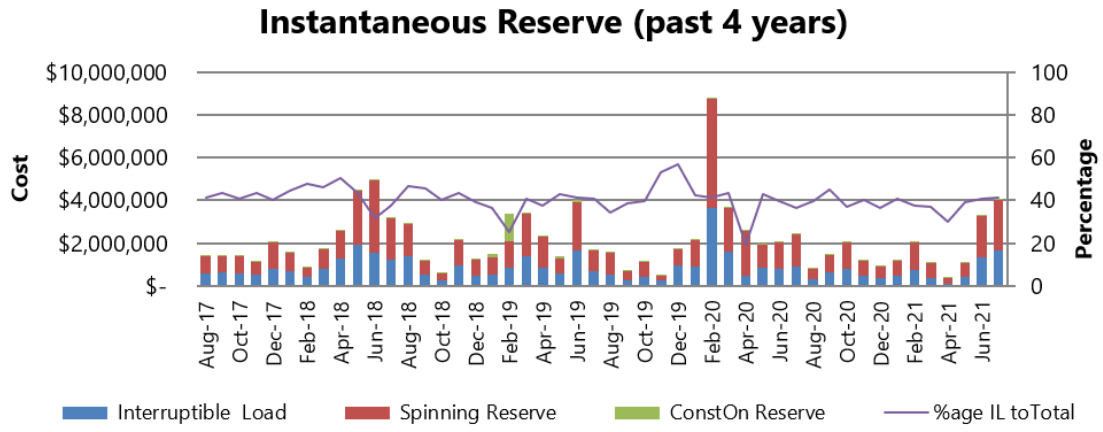
As a result of the utilisation of increased South Island hydro, very low southward transfer has been seen across the HVDC this month.

Demand has continued to climb throughout late June and July as cold weather has been experienced across the country. Demand peaked at 6,924 MW on 29 June – a record high for concurrent national demand.

14 Ancillary services

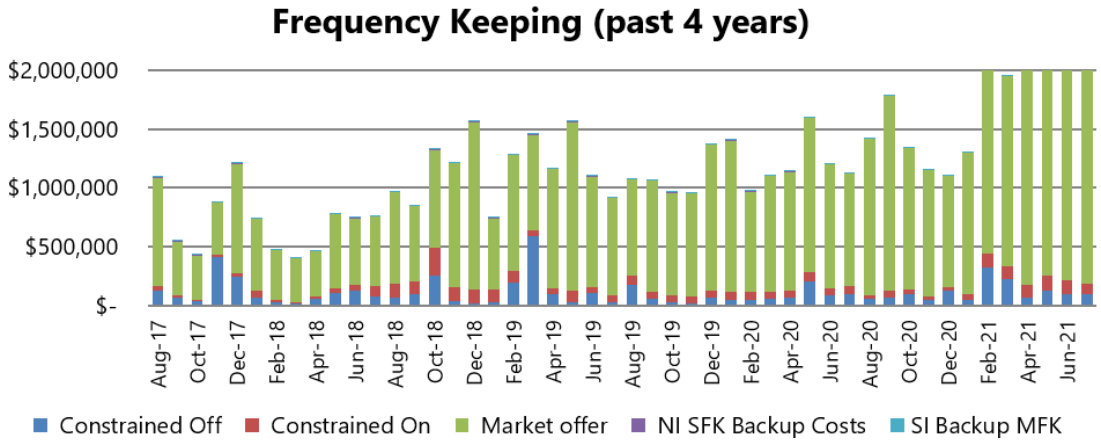


This month's ancillary services costs were $6,35 million, an increase of $450k (7.5% increase) from last month. While the cost of frequency keeping fell slightly, the overall costs rose due to a significant increase in costs associated with instantaneous reserves.

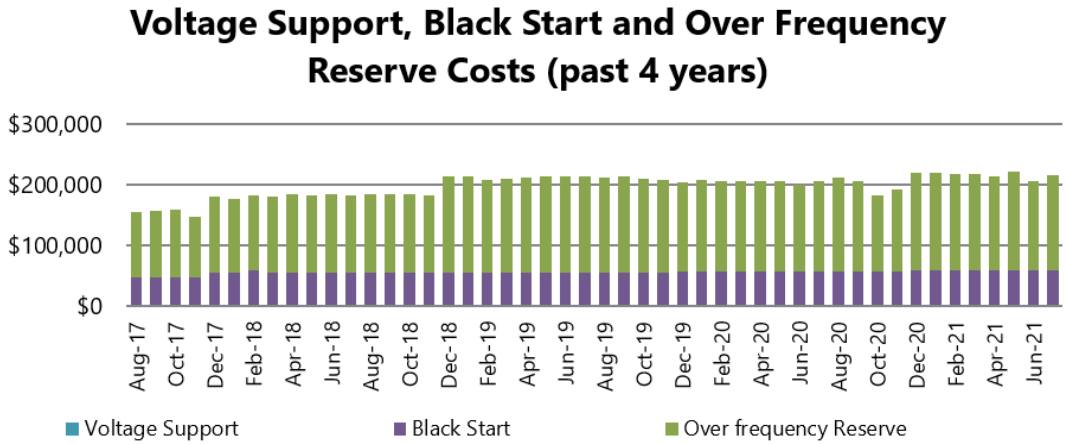


© Transpower New Zealand Limited. All rights reserved.

This month's instantaneous reserve costs were $4.02 million, an increase of $715k (22% increase) from the previous month. Despite a slight decrease in the quantity on instantaneous reserves procured, the major contributor to this month's increase was a significant jump in the average price for sustained instantaneous reserves in both the North and South Islands (an average increase of $4.9k in the North Island and $4.5k in the South Island).



This month's frequency keeping costs were $2.1 million, a decrease of $280k on the previous month (12% decrease). The decrease was due to a $500k (26%) decrease in South Island frequency keeping costs, despite a $230k (50% increase) in the North Island. Additionally, constrained on payments decreased by $33k (27% decrease) on the previous month.



The over frequency costs increased slightly this month to $155k. Black start costs remained at $60k. There are currently no voltage support costs.

© Transpower New Zealand Limited. All rights reserved.

15 Commissioning and Testing

Turitea Wind Farm commenced the commissioning of its first turbines at the end of July. It is expected commissioning of the full station (118 MW) will run through until November 2021.

16 Operational and system events

Ahead of the severe storm warning for the weekend of 17 July, both control rooms worked proactively to prepare in the event of potential weather-related service interruptions. We responded to multiple alarms triggered by weather-related events in distribution networks, particularly in the Rotorua/Bay of Plenty region, and the West Coast of the South Island.

Another event to note, although not directly related to the System Operator function, was the recent live test of the Transpower business continuity plan when an evacuation of the Auckland control centre was required as a result of an Uninterruptible Power Supply (UPS) fault and fire. The fire alarm activated on shift change and the Fire Service were automatically dispatched as soon as the alarm was triggered. Routine evacuation protocols were followed, and all operational duties were switched to Christchurch (the other control room operating in the same capacity). The Christchurch team switched over the phones and started to assess current state to enhance their situational awareness. The decision was made to call in support which meant we could carry out all planned work throughout the country while the UPS was isolated, power restored, and the Auckland Control Room made habitable (smoke extracted and surfaces cleaned down). This was a very good response from all the team involved. As always, there are a few things that can be learned and improvement opportunities identified, and these will be considered once we have completed our review.

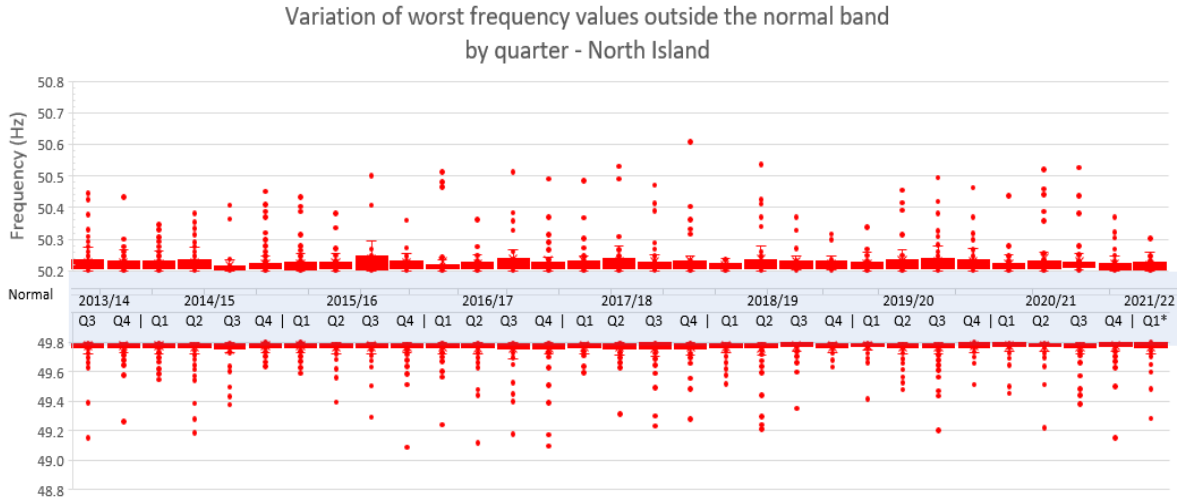
© Transpower New Zealand Limited. All rights reserved.

17 Frequency fluctuations

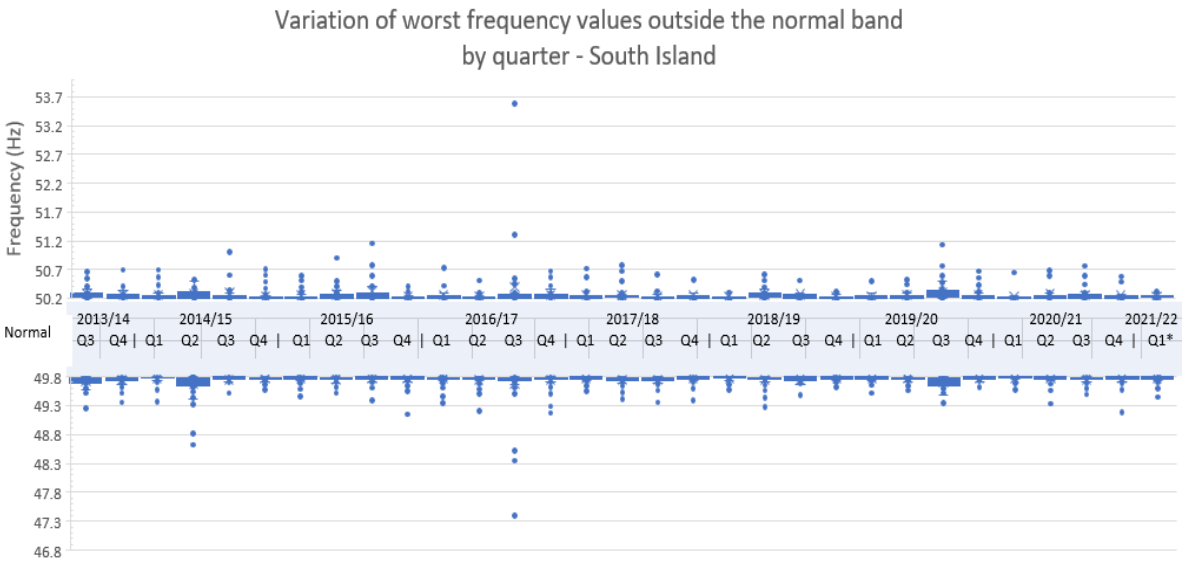
17.1 Maintain frequency in normal band (Frequency value)

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 Q1 contains data for July only

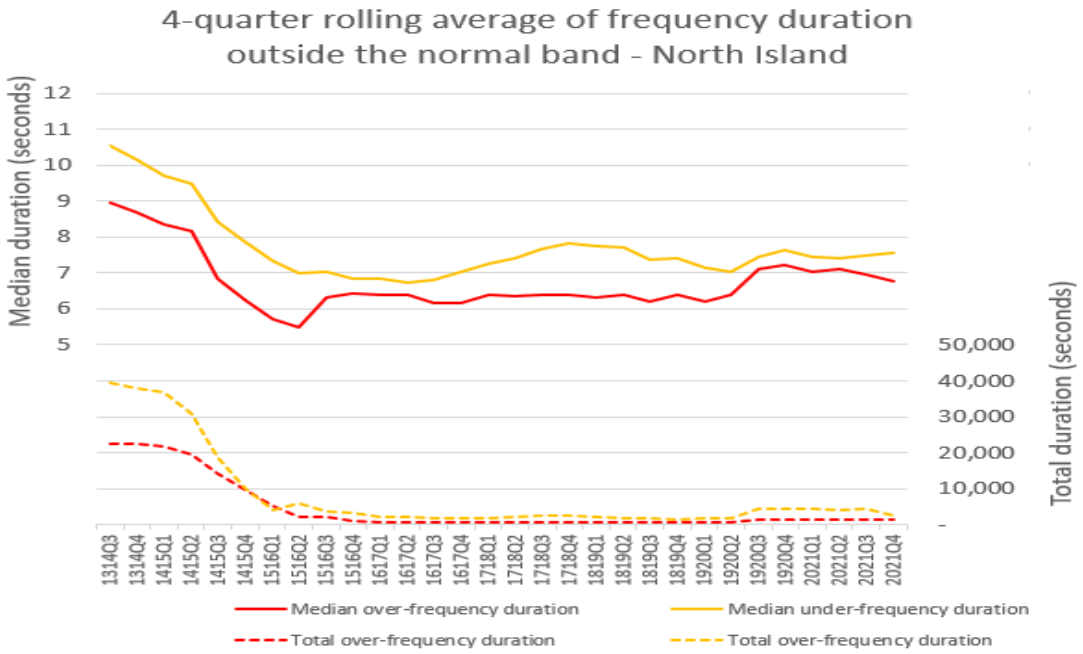
Note: These box and whisker charts show the distribution of data. The “box” represents the distribution of the middle 50% of the data, the “whiskers” indicate variability, and outliers are shown as single data points.

© Transpower New Zealand Limited. All rights reserved.

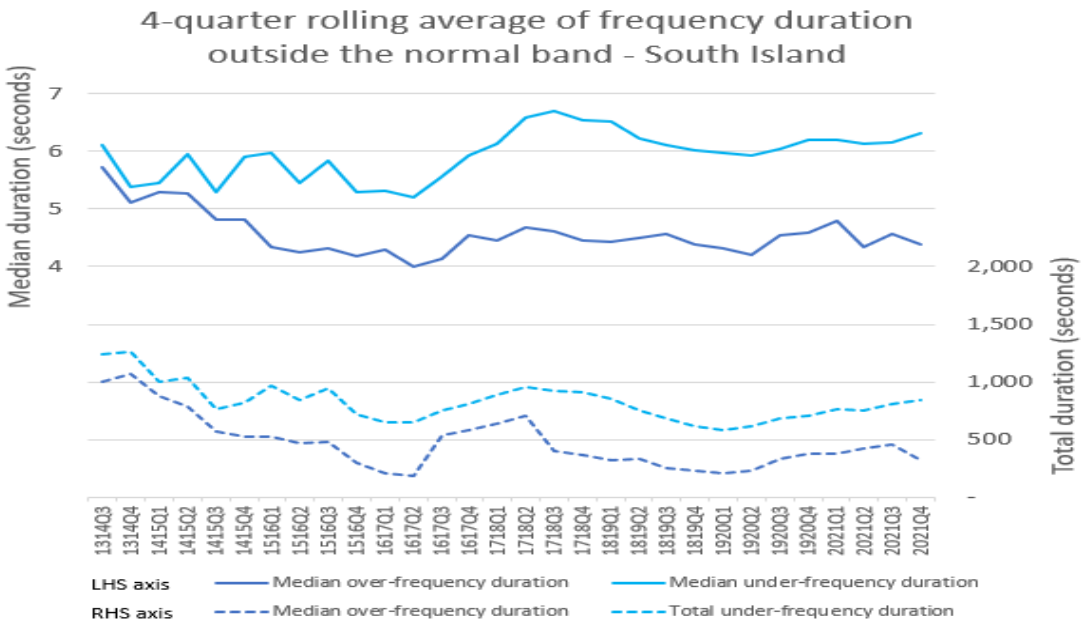
17.2 Recover quickly from a fluctuation (Time)

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



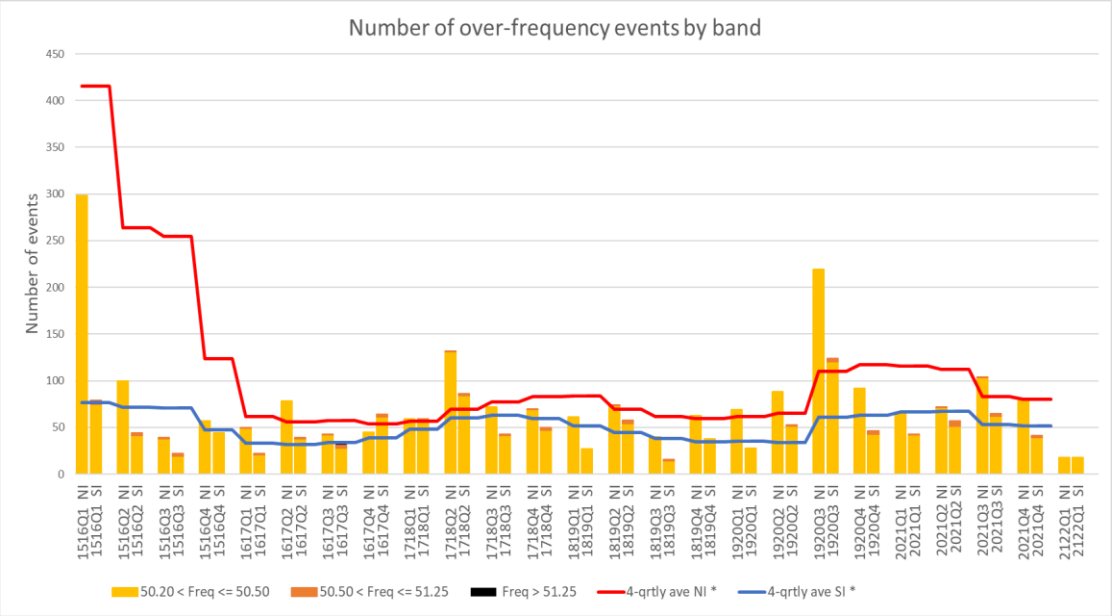
*These graphs have not been updated since 2020/21 Q4; they will only be updated at the end of each quarter

© Transpower New Zealand Limited. All rights reserved.

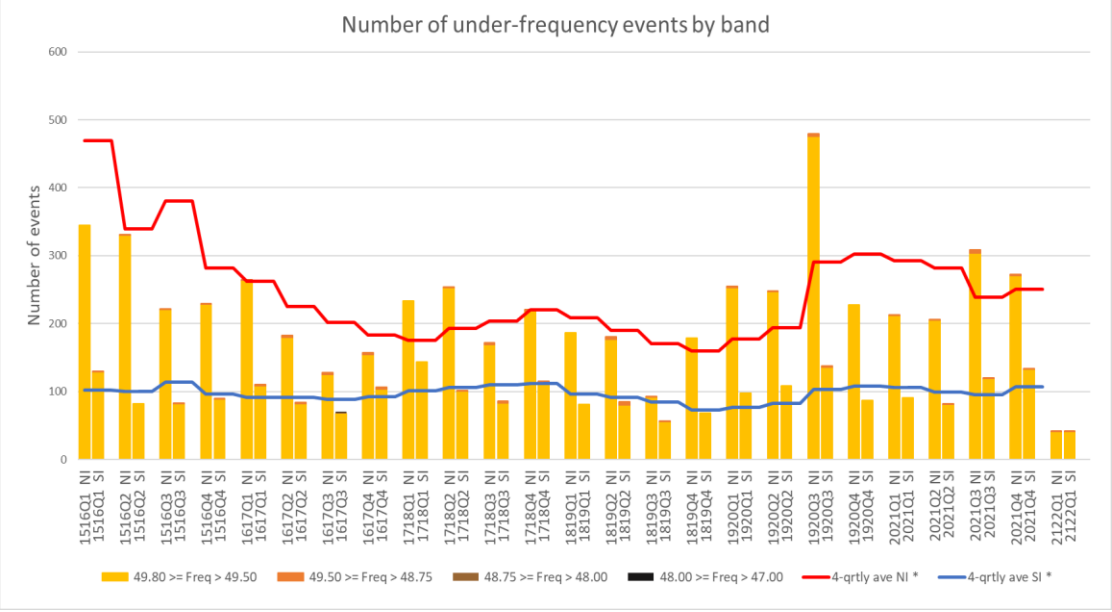
17.3 Manage frequency and limit rate of occurrences during momentary fluctuations (Number)

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 averages for NI and SI are only updated at the end of each quarter

© Transpower New Zealand Limited. All rights reserved.

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	Aug-20	Sep-20	Oct-20	Nov-20	Dec-20	Jan-21	Feb-21	Mar-21	Apr-21	May-21	Jun-21	Jul-21
Demand Allocation Notice	-	-	-	-	-	-	-	-	-	-	-	-
Grid Emergency Notice	-	-	1	-	2	-	1	1	-	-	1	-
Warning Notice	-	-	-	-	-	-	1	-	-	-	-	1
Customer Advice Notice	15	9	6	12	10	8	4	4	8	14	14	11

20 Grid emergencies

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

Date	Time	Summary Details	Island
		None	

© Transpower New Zealand Limited. All rights reserved.

Appendices

Appendix A: Discretion

Event Date and Time	Description
5/07/2021 2:01	MAN2201 MAN0 Discretion Max: 600 Discretion applied to MAN to allow room for TWI L3 185 MW restoration. Last Dispatched MW: 788
8/07/2021 0:57	MAN2201 MAN0 Discretion Max: 556 For the restoration of a TWI extended offload to return. Last Dispatched MW: 738
12/07/2021 2:02	MAN2201 MAN0 Max: 605 To manage TWI Line 3 Extended Offload Restoration. Last Dispatched MW: 788
15/07/2021 1:52	MAN2201 MAN0 Max: 554 Manage TWI Line 3 Extended Offload Last Dispatched MW: 738
17/07/2021 13:36	SFD2201 SPL0 Discretion Min: 160 Due to plant safety. Last Dispatched MW: 134
17/07/2021 20:04	SFD2201 SPL0 Discretion Min: 160 Claim 13.82 minimum running range 160 MW Last Dispatched MW: 126.92
19/07/2021 1:48	MAN2201 MAN0 Max: 555 For the restoration of a planned extended TWI offload to return. Last Dispatched Mw: 738
22/07/2021 3:00	MAN2201 MAN0 Discretion Max: 556 Restoration of TWI L3 Last Dispatched MW: 738
26/07/2021 14:23	HLY2201 HLY5 Discretion Min: 190 Rule Claim on 13.82a, breach of resource consents if running below 190 MW. Last Dispatched MW: 187.0. Discretioning HLY U5 on was the least cost market option as per SC market impact study. HLY U5 also currently importing approx 130 MVArs as part of Upper North Island reactive reserve support.

© Transpower New Zealand Limited. All rights reserved.