MONTHLY SYSTEM OPERATOR AND SYSTEM PERFORMANCE REPORT

FOR THE ELECTRICITY AUTHORITY

Transpower New Zealand Limited

November 2018

Keeping the energy flowing

TRANSPOWER

Transpower New Zealand Limited The National Grid

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Report Purpose

This report is Transpower's review of its performance as system operator for November 2018, 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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Commentary

This section highlights successful management of significant events and operational issues by the system operator. It provides additional commentary (not Code or SOSPA required) relating to aspects of system operator performance or system performance. The remainder of the report provides supporting detail (which is Code or SOSPA required) in two sections:

- System operator performance, and
- System performance.

HVDC scheduled maintenance outage – This year's annual six-day HVDC outage for scheduled maintenance was planned at its usual time in November. The grid owner modified the outage duration for each of the first two days to alleviate and address security issues for the morning peaks on those two days. Due to system operator concerns that similar security could not be ruled out for the last two days of the outage, the grid owner decided to complete only critical work and bring the HVDC fully back to service two days early. We expect the grid owner to lodge another one or two-day weekend outage of Pole 3 over the coming months, required to complete the less critical maintenance that was deferred.

Security of Supply - New Zealand has experienced gas supply constraints primarily due to a valve issue at the Pohokura offshore platform, restricting in gas generation. The significant inflows received in the South Island this month have enabled higher hydro generation to support demand while gas is restricted. We do not currently see a high risk to security of supply due to these conditions as we believe there would be sufficient thermal fuel for electricity generation during an emergency.

System Security Forecast (SSF) -The SSF was published to the industry, incorporating several improvements based on industry feedback such as consideration of a dry winter.

Major electrical storms - Risks associated with major electrical storms early in December led to proactive management to mitigate potential security concerns. While actions taken over the lighting in the South Island led to short term price separation, the UNIRPC assisted in the seamless management of the Upper North Island storm on 4 December.

Efficient Procurement of Extended Reserves -The Authority has advised that this project will remain on hold until further notice.

Dispatch Service Enhancement (DSE) - A DSE industry workshop with dispatch participants was held on 30 November, generating good discussion around the technical integration of the two dispatch solutions. The project is tracking to schedule with delivery planned for end June 2018.

Outage protocol compliance report -The outage protocol compliance report for 2017-18 was finalised and delivered to the Authority.

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System operator performance

1 Compliance

There were no breaches reported in November.

Appendix A shows instances where the system operator has applied discretion under 13.70 of the Code.

2 Market design and system enhancement project updates

Progress against high value, in-flight market design and service enhancement projects is included below along with details of any variances from the current Capex Plan.

Efficient Procurement of Extended Reserves

The Authority has advised that this project will remain on hold until further notice. John Rampton will be in touch with John Clarke when the Authority is ready to re-engage.

Real Time Pricing (RTP)

Transpower continues to engage with the Authority via TAS 82 to prepare papers for the December Authority Board ahead of the industry consultation planned for January/February 2019. Key inputs into the advice to the Board include: revising cost estimates for the project (based on CPI adjustments since the project was originally scoped in 2016); final definitions of market design concepts and assisting the Authority with reviews of the proposed amendments to the Electricity Industry Participation Code (the Code).

Dispatch Service Enhancement (DSE)

A DSE industry workshop with dispatch participants was held on 30 November at Transpower's Waikoukou building. Over 30 participants and representatives from the Authority attended. The workshop generated good discussion around the technical integration of the two dispatch solutions and the transition process planned by the project. The project team is now focussed on de-briefing this feedback and determining whether any further changes need to be made to the technical design. The project is tracking to schedule with delivery planned for end June 2018.

Wind Offer Arrangements

Work on the delivery phase is now well underway. The project team is focussed on the definition of solution requirements and establishing joint project governance with the Authority.

Situational Intelligence

The RFP for a situational intelligence technology platform has closed, and evaluation of responses has been completed. A decision on the preferred vendor will be made by the Project Advisory Team before Christmas, enabling the completion of a delivery business case February 2019.

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3 Power systems and outage planning reports

System Security Forecast (SSF)

The System Security Forecast was published to the industry, incorporating several improvements based on industry feedback such as consideration of a dry winter. The SSF has confirmed that we are able to continue to operate and maintain a secure, reliable power system over the next three years. We found that several existing transmission constraints have been or will be removed over the period due to investment in the power system. Some new transmission constraints were also identified but are generally limited to smaller regional issues associated with changing demand or grid investments and can be managed using the same types of operational measures we use today.

Outage protocol compliance report

The outage protocol compliance report for 2017-18 was finalised and delivered to the Authority.

4 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.

5 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.

6 Cost-of-services reporting

The feasibility study into implementing annual cost-of-services reporting to the Authority is required in financial year 2 (SOSPA 12.6). This was completed in September 2017 and a proposed approach submitted to the Authority. Based on feedback, we are working on developing a draft version of the reporting to present to the Authority.

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 Separation of Transpower roles

Since the creation of the Operations division and implementation of Transpower-wide training on role impartiality and conflict of interest, we have had a number of issues raised to the register. These issues are being handled in accordance with Transpower's policy for managing conflicts of interest.

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There have been no new issues raised in November.

A summary of the open items raised on the conflict of interest register is set out below:

- System operator staff involvement with grid owner project
- Outage planning policy (currently being consulted with industry)
- Ensuring consistent information provided for outage information
- Management of actions from role impartiality review
- Confidentiality of participant information

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System performance

9 Operational and system events

9.1 HVDC scheduled maintenance outage

This year's annual HVDC bipole outage for scheduled maintenance was planned at its usual time in November. The outage was signalled to the market by the grid owner in November 2017, which the system operator discussed with customers at the start of this year as part of the Annual Outage Plan. The system operator continued to assess the security implications of this outage, as well as all other outages both by Transpower and other asset owners.

On the day prior to the outage, the system operator's review of North Island generation offers; demand forecasts; and pre-dispatch schedules for 22 and 23 November indicated that the situation was manageable, given the system conditions.

On the first day of the outage (22 November), the system operator identified that for the coming morning peak there would be a security violation with insufficient reserves available to cover an event during the 7.30am and 8.00am trading periods. As such, the system operator followed the process to issue a warning notice (WRN) to the market to seek responses from participants to alleviate the security violation.

In response the grid owner assessed the recall time for the outage to be 1 hour and responded to the WRN by offering Pole 2 back into service on Thursday morning from 7.30am to 9.00am to cover the morning peak. The grid owner removed Pole 2 out of service again at 9.00am and work was carried out on Pole 2 during the day, ending at 7.00pm. The outage recommenced at 9:00am the next day to avoid security issues and a potential recall as had happened the previous day.

The grid owner's work proceeded with the full bi-pole outage on Saturday and Sunday. There were no security issues for the system operator with lower weekend electricity demand.

On Sunday morning, the grid owner sought an update on forecast system conditions from the system operator for Monday and Tuesday as their ability to respond to a short recall of the asset was limited. Based on the information provided, the grid owner decided to attempt to complete all critical Pole 3 work by late on Sunday, and the updated offer of Pole 3 was communicated to the market late on Sunday afternoon when the grid owner was able to confirm all critical work could be completed by Sunday.

The HVDC Bipole was fully available and in service on Monday and Tuesday. We expect the grid owner to lodge another one or two-day weekend outage of Pole 3 over the coming months, required to complete the less critical maintenance that was deferred. The outage will be notified to the industry through POCP as soon as a date is confirmed.

9.2 Other events

A series of factors, partly including the HVDC outages, combined in late November to create high voltage risks across the 220kV and 110kV network in the top of the South Island during low load periods overnight. Factors included a series of planned outages in the region and light night-time loads, particularly as the significant overnight irrigation load in Canterbury and Otago had dropped due to the sustained wet weather and flooding.

The team managed the issues in the top of the South Island with a combination of circuit removal and reduced generation dispatch. Had the situation escalated to having the top South Island on a single circuit (~80 MW on N Security) a Grid Emergency Notice (GEN) would have been issued. Communications with key customers were maintained throughout, including an open briefing call on 6 December 2018 to advise of the potential for the issue resulting in N security and a GEN. This issue will be largely resolved with the implementation of a reactor by the grid owner at Kikiwa, planned for commissioning in winter 2020.

Risks associated with major electrical storms early in December led to proactive management to mitigate potential security concerns. On 2 December, the reclassification of transmission assets led to short-term high prices and price separation. On 4 December, lightning events in the Upper North Island led to a series of trippings which, for the most part, were promptly reclosed and interruptions managed seamlessly by the UNIRPC which had been deployed in August 2018.

An independent audit has been undertaken regarding the process for communications involving the Security Co-ordinators. The scope includes the appropriateness of standards, training supplied, management and compliance of the process. We have received an initial draft which indicates an overall rating of “Effective” and some opportunities for further enhancement. The report is currently being socialised and a programme of actions will be developed and tracked.

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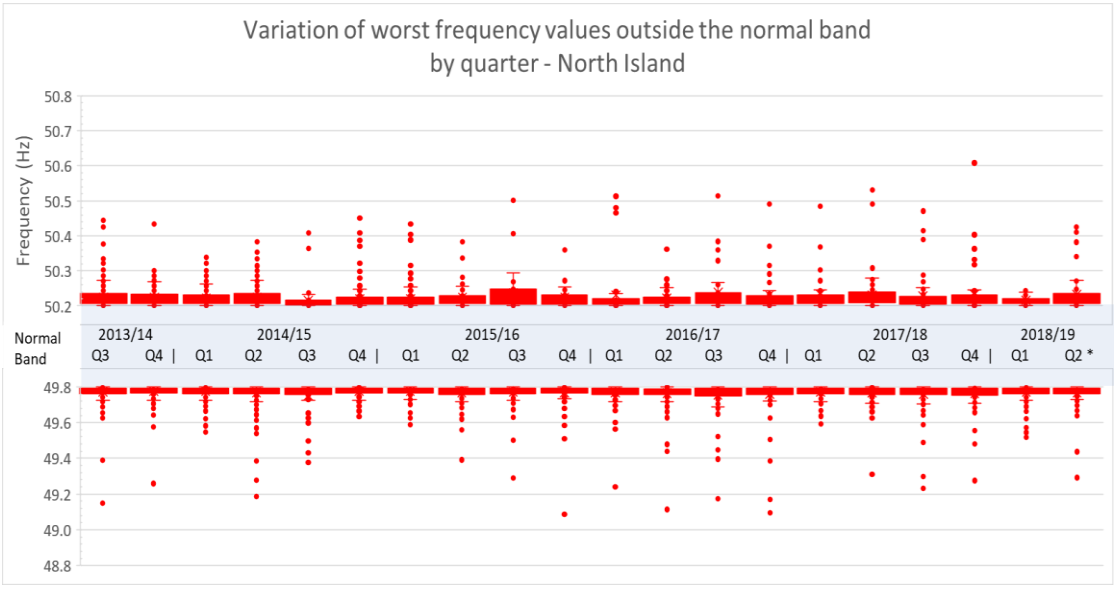
10 Frequency fluctuations

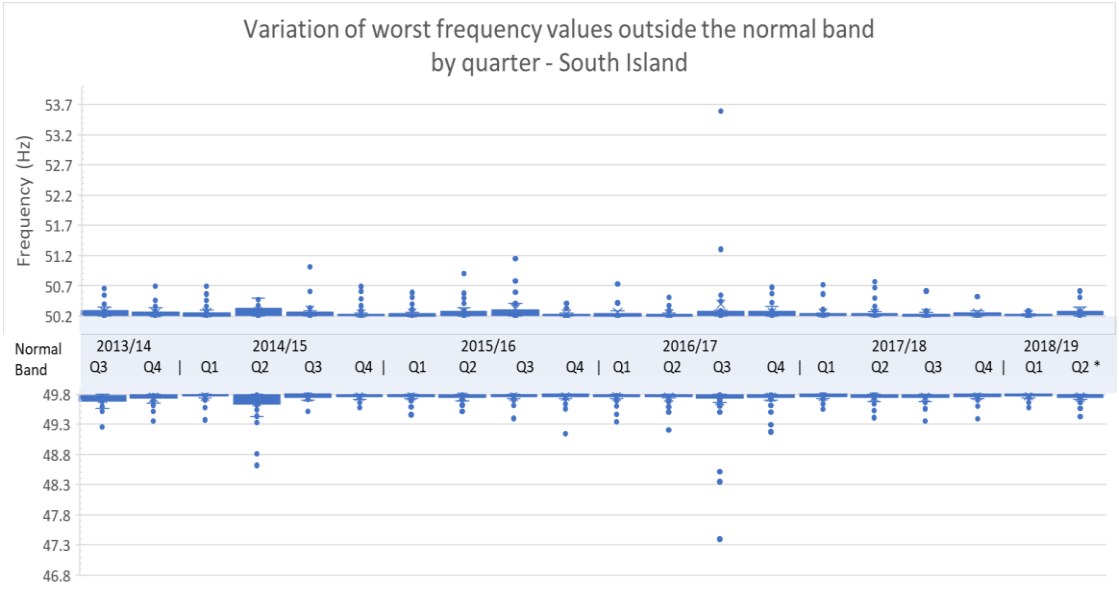
10.1 Maintain frequency in normal band (Frequency value)

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



* 2018/19 Q2 contains data for October and November 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.

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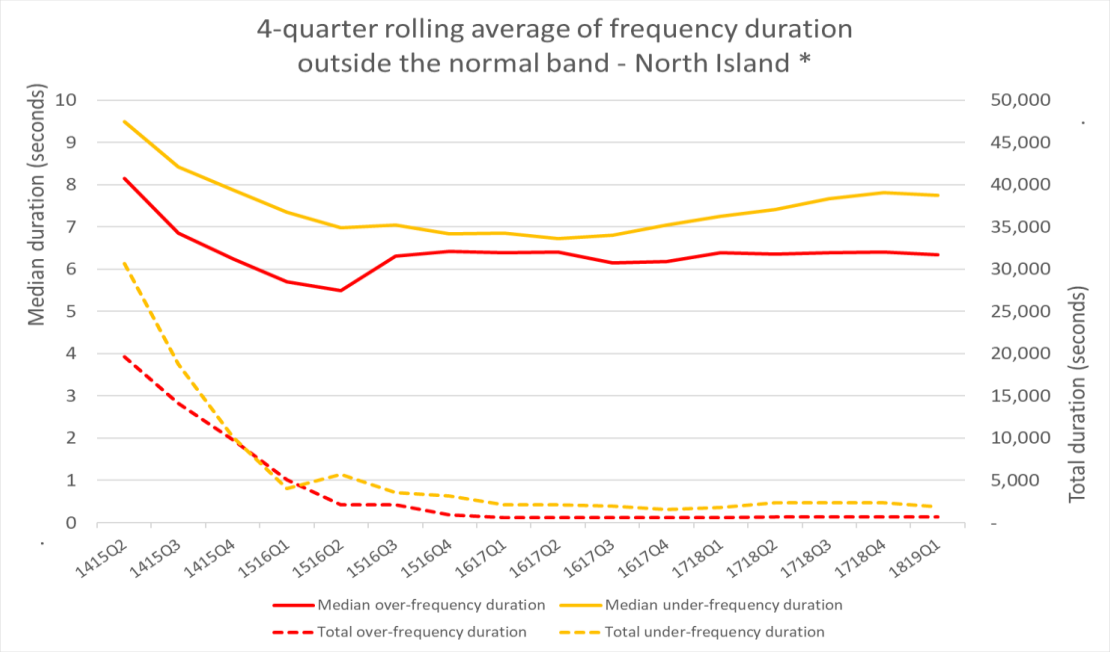
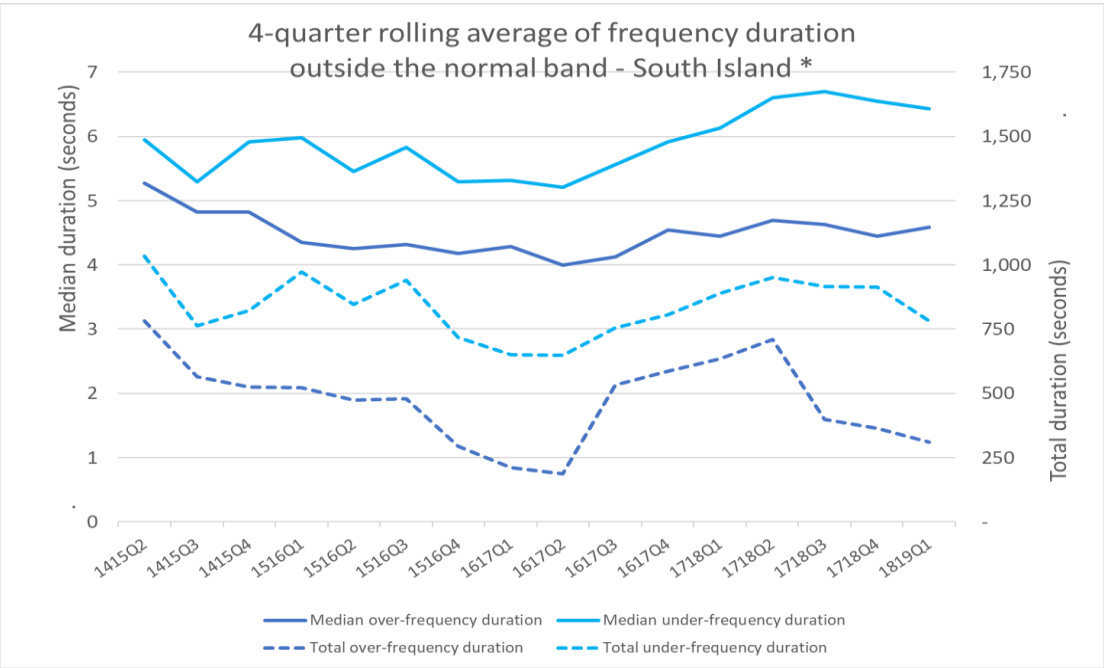
10.2 Recover quickly from a fluctuation (Time)

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 2018/19 Q1; they will only be updated at the end of each quarter

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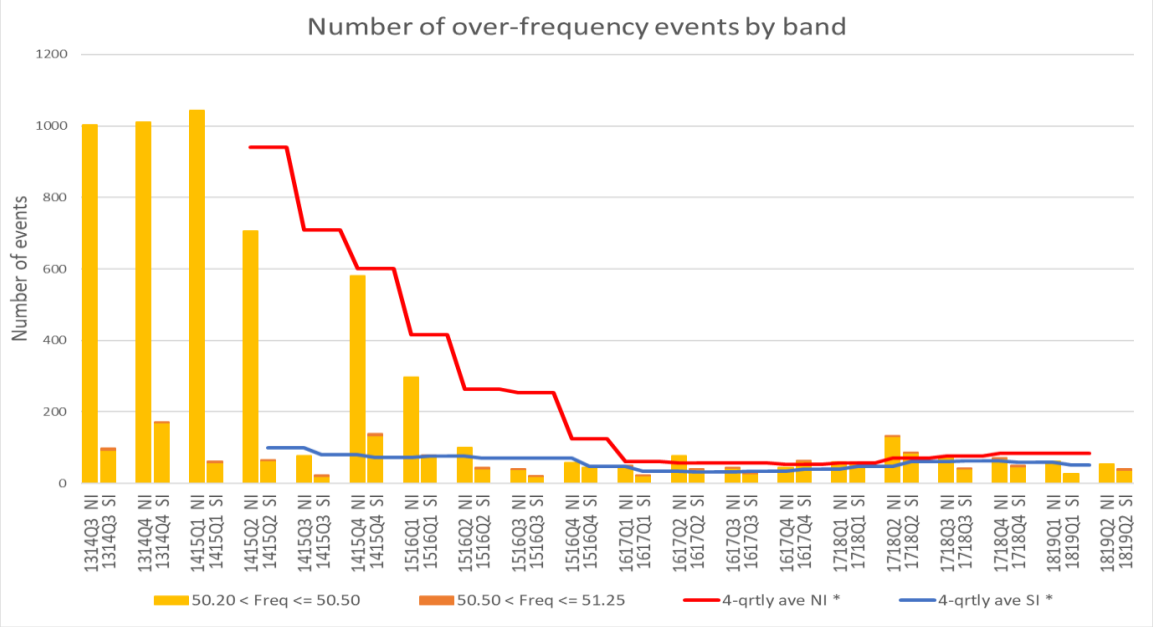
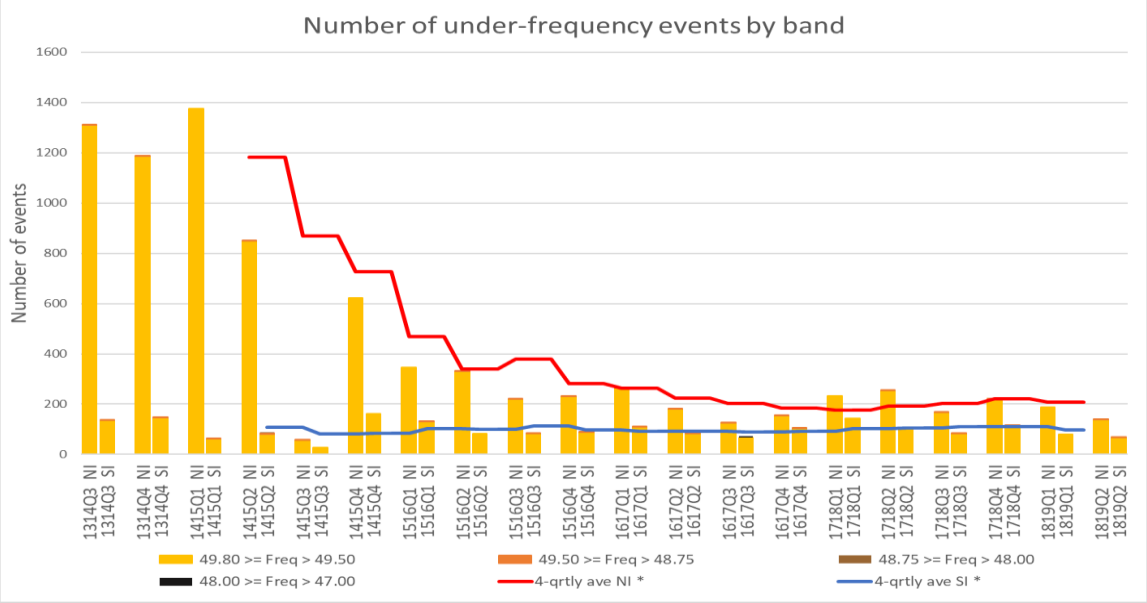
10.3 Manage frequency and limit rate of occurrences during momentary fluctuations (Number)

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 2018/19 Q2 contains data for October and November only.

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

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10.4 Manage time error and eliminate time error once per day

There were no time error violations in the reporting period.

11 Voltage management

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

12 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	Dec-17	Jan-18	Feb-18	Mar-18	Apr-18	May-18	Jun-18	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18
Demand Allocation Notice	-	-	-	-	-	-	-	-	-	-	-	-
Grid Emergency Notice	-	3	1	-	1	1	-	-	1	-	-	-
Warning Notice	1	-	-	-	-	-	1	1	-	-	-	1
Customer Advice Notice	1	3	6	4	10	12	4	2	9	9	6	20

13 Grid emergencies

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

Date	Time	Summary Details	Island
		None this month.	

14 Security of supply

Total New Zealand inflows for November were 109% of average for this time of year. National storage at the end of November was at 2,337 GWh (99% of the average for this time of year), which was higher than the start of the month (1,501 GWh).

New Zealand has experienced gas supply constraints primarily due to a valve issue at the Pohokura offshore platform. This has prompted restrictions in gas generation. The significant inflows received in the South Island this month have enabled higher hydro generation to support demand while gas is restricted, which has helped to lower electricity prices. We do not currently see a high risk to security of supply due to these conditions as we believe there would be sufficient thermal fuel for electricity generation during an emergency. The Pohokura offshore platform is expected to return to service by the end of the first week of December. We are closely monitoring the situation and have continued to keep industry informed of the current situation.

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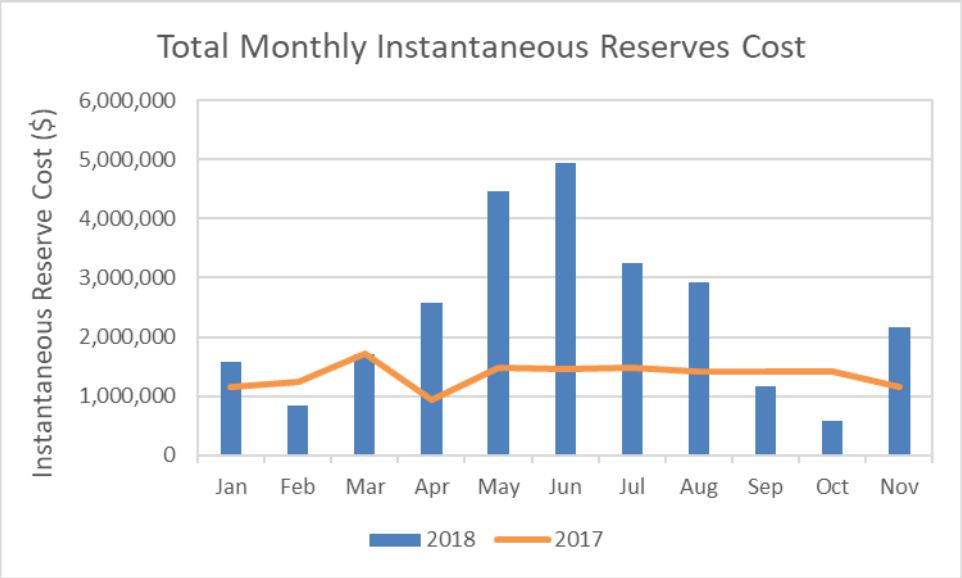
15 Ancillary services

The instantaneous reserves costs in November increased from the low levels of September and October but were still below the higher costs paid in the period from April through to August.

The main reason for the increased reserves costs for the month was the reserves required during the HVDC outage. In particular, 80% of this month's reserve costs occurred in the North Island during the Pole 2 outage on 22 and 23 November.



The new contracts for Over-Frequency Reserves in both the North and South Islands, and a Black Start provider in the South Island started on 1 December 2018.

Refer Appendix B for Ancillary Services Graphs.

Appendix A: Discretion

Event Date and Time	Event Description
6/11/2018 21:17	MAN2201 MAN0 : Emergency Potline 3 (180MW). Last Dispatched MW: 666
13/11/2018 9:58	ARG1101 BRR0 : 110kV circuit trip. No grid connection. Last Dispatched MW: 6
14/11/2018 12:42	MTI2201 MTI0 : Required as MTI_WKM circuit tripped Last Dispatched MW: 140
14/11/2018 12:42	WPA2201 WPA0 : Required as MTI_WKM circuit tripped Last Dispatched MW: 33
17/11/2018 1:01	HWB0331 WPI0 : GZ14_TWI VSAT 100% applied at request of security coordinator. Last Dispatched MW: 0
17/11/2018 3:21	HWB0331 WPI0 : GZ14_TWI VSAT 100% applied at request of security coordinator. Last Dispatched MW: 12
17/11/2018 8:05	ARG1101 BRR0 : As per switching for ARG_BLN_1 and ARG_KIK_1 Last Dispatched MW: 6
17/11/2018 15:28	ARG1101 BRR0 : Discretion for the return of ARG_BLN_1 Last Dispatched MW: 10
21/11/2018 5:59	WRK0331 RKA0 : Required as WRK T30 not available.
23/11/2018 8:50	Bipole max set to 630MW for the 8:55 dispatch to allow Pole 2 to be blocked at 09:00. This is to allow for a secure dispatch at 09:00 as the Bipole ECE could become the risk and create a reserve deficit at 09:00 if it was left at its current level of 755MW.
24/11/2018 4:50	DCN max applied of 280MW for start of Bipole outage.
24/11/2018 4:55	DCN max applied of 155MW for start of Bipole outage.
27/11/2018 3:02	KUM0661 KUM0 : Discretioned on due to high volts in Upper Sth Island. Trustpower verbally advised.
29/11/2018 15:09	MAN2201 MAN0 : Action due to lightning Last Dispatched MW: 607
30/11/2018 14:08	MAN2201 MAN0 : Instruction from security coordinator required due to lightning in the vicinity of the 220kV MAN cct

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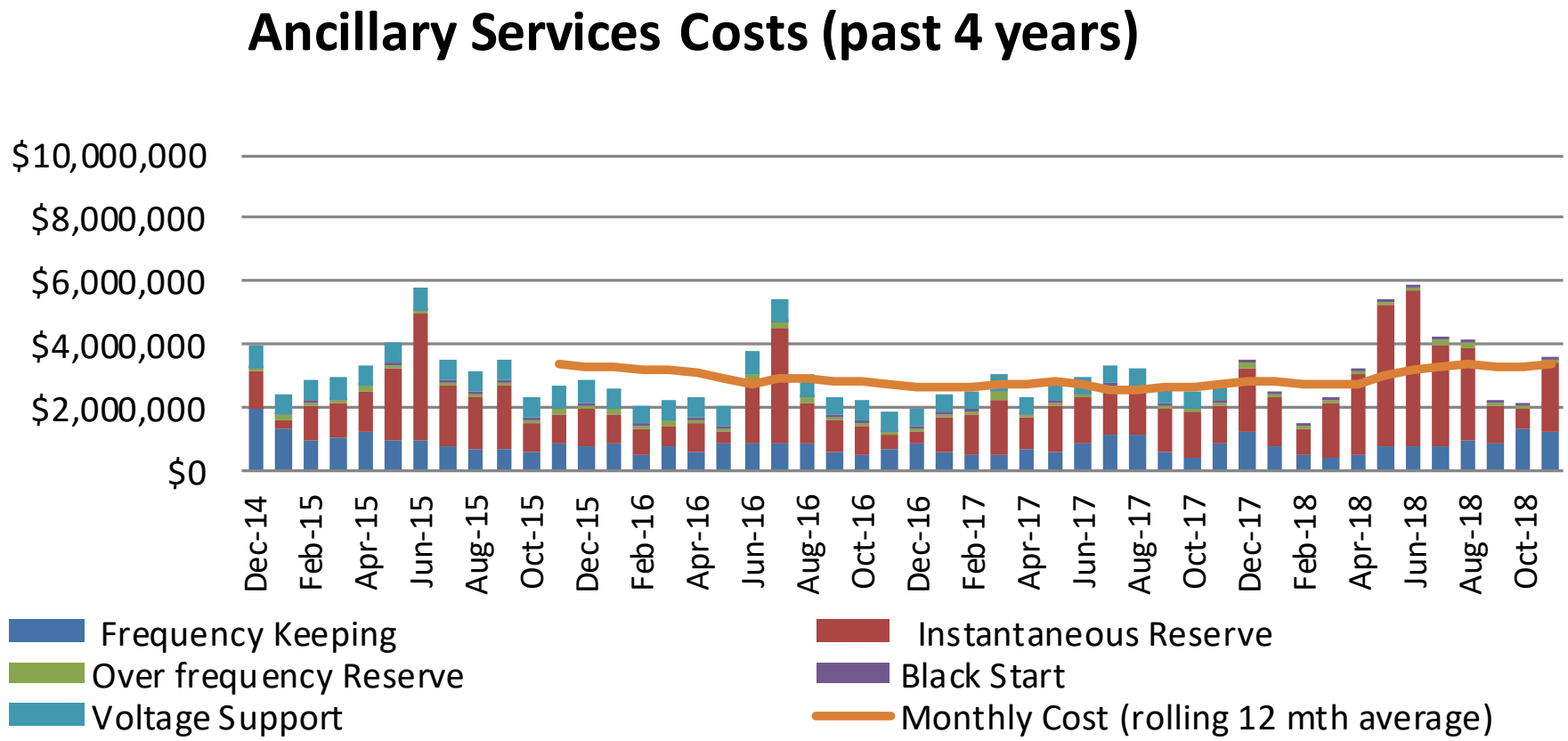
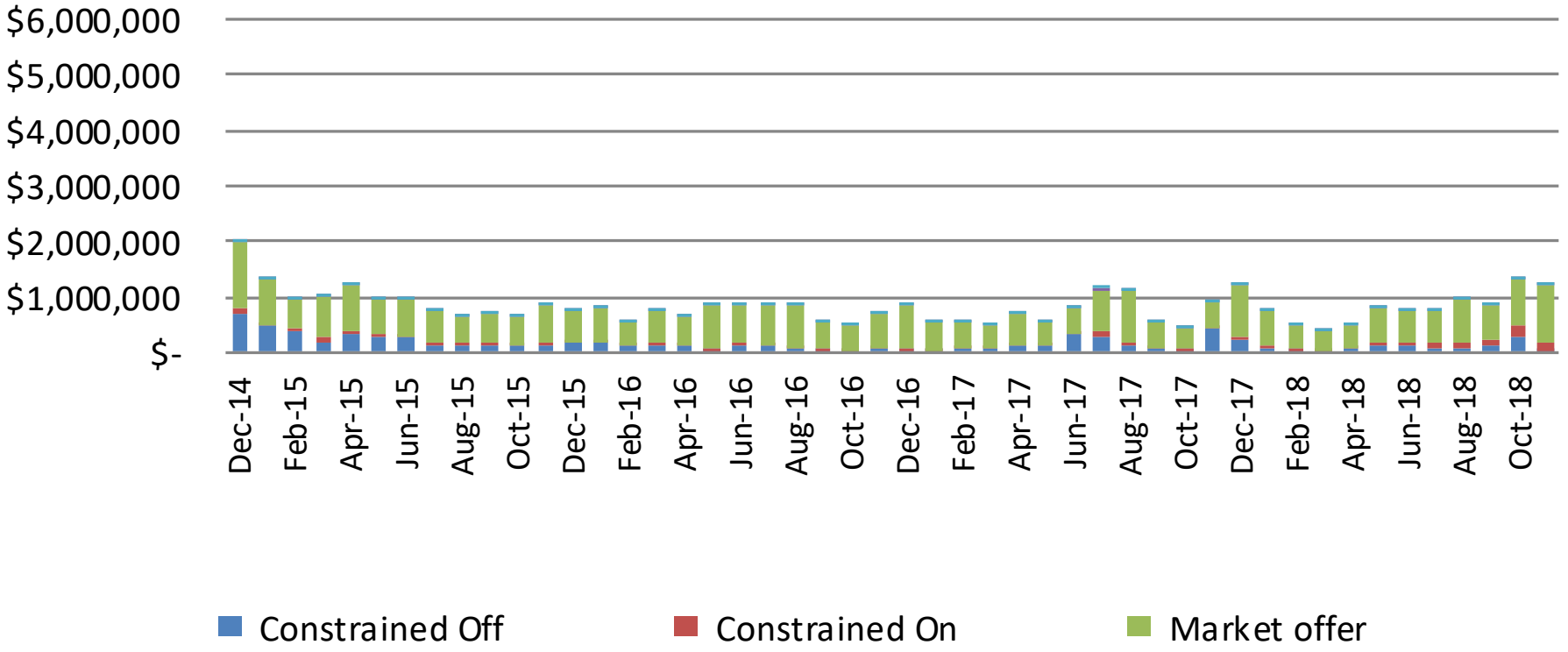
Appendix B: Ancillary Services Graphs



Frequency Keeping (past 4 years)



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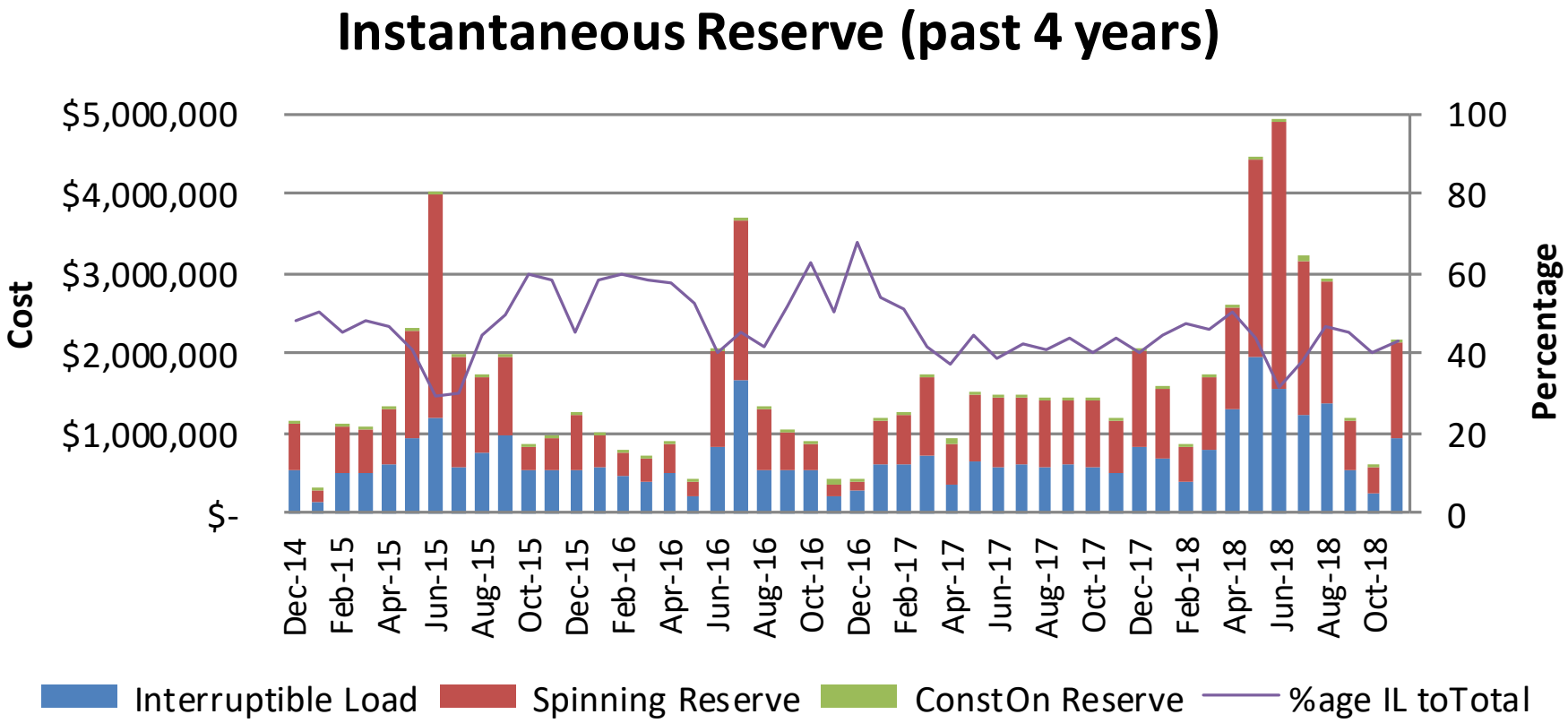
Instantaneous Reserve (past 4 years)
Cost
$5,000,000
$4,000,000
$3,000,000
$2,000,000
$1,000,000
$-
100
80
60
40
20
0
Percentage
Dec-14
Feb-15
Apr-15
Jun-15
Aug-15
Oct-15
Dec-15
Feb-16
Apr-16
Jun-16
Aug-16
Oct-16
Dec-16
Feb-17
Apr-17
Jun-17
Aug-17
Oct-17
Dec-17
Feb-18
Apr-18
Jun-18
Aug-18
Oct-18
Interruptible Load
Spinning Reserve
ConstOn Reserve
%age IL toTotal