MONTHLY SYSTEM OPERATOR AND SYSTEM PERFORMANCE REPORT

FOR THE ELECTRICITY AUTHORITY

Transpower New Zealand Limited
January 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 January 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).

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.

Market Prices and Assessment of Dry Lower South Island

Prices in the $150 and $250 range in December and January reflected the perceived hydrology risk going into winter. The HVDC was sending up to 500MW south overnight with low south transfer levels during the day leading to periods of price separation as reserve sharing became constrained.

Recent high inflows have alleviated the situation, although we had initiated studies analyse potential generation and load scenarios particularly in the lower South Island to identify any possible constraints and to determine mitigation options.

System operator performance

1 Compliance

No breaches of the Code were reported in January.

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 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 majority of the project is on hold pending the recommendation on options from the Authority Board, now due in March. In the meantime, Transpower continues to support the Authority as required with input and options assessment. System changes to the Reserves Management Tool were delivered in January to support the new four block extended reserves.

The approved capital project underway deviates from the current Capex Plan with an increased approved capital cost (approved $525k against Capex Plan of $195k). Although the approved completion date currently aligns with the Capex Plan, this is now at risk given the delays in confirming direction and options.

Real Time Pricing

Approval for the next phase of the project (to plan and produce a business case) has been provided by the Authority. This work will commence in February. Time and cost of this work aligns with the current Capex Plan.

Dispatch Service Enhancement

The solution requirements have been approved. The High-Level Design is under development. An industry workshop is planned for 15th February, at which the team will discuss what the changes will mean for current dispatch participants. After the workshop, the team will plan for the delivery phase with a business case planned for approval late March 2018. Time and cost of this work aligns with the current Capex Plan.

3 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.

4 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.

5 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 refers). This was completed in September last year and a proposed approach submitted to the Authority for their feedback.

6 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.

7 Separation of Transpower roles

As system operator, Transpower has not been materially affected by any other role or capacity Transpower has under the Code or under any agreement.

System performance

8 Operational and system events

Loss of supply events

During the morning peak on Thursday 25 January, a transformer at the Hamilton substation (T6) tripped while switching was being carried out for maintenance work on another transformer (T9). The cause of the tripping was identified as a fault with the protection relay on T6. This tripping resulted in a 160 MW loss of supply to most of the Waikato and Coromandel 110kV network. T9 was offered back into service immediately and the NCC and NGOC teams worked together to restore the network, with all load restored within 90 minutes of the tripping.

On the evening of Monday 22 January, a fire was reported in scrubland at Tiwai point. This fire threatened the four circuits supplying load at the Tiwai smelter. Coordinators studied the worst-case scenario of losing all four circuits, as loss of all Tiwai load would result in significant over frequency on the power system. All available over frequency reserves were armed to mitigate such an event were it to occur. We maintained open communication with the Power Supply Superintendent at Tiwai, who could relay valuable information about how close the fire was to our assets and how the firefighting effort was progressing. Ultimately, the fire did not require circuit de-energisation during the three-hour period during which the Fire Service was in action.

Outage planning

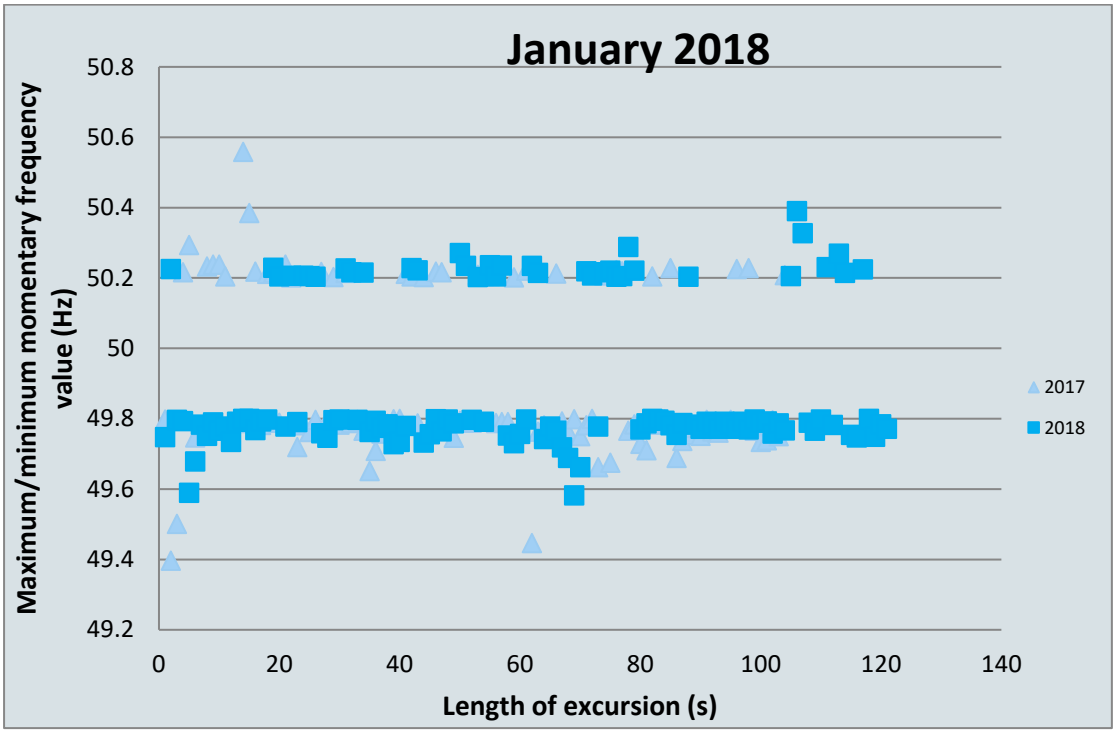
Workload and complexity in assessing requests for grid maintenance and project (outage planning) has increased and continues to do so over the summer period.

High irrigation load in the South Island put several outage requests at risk with the load at some GXPs almost 50 per cent more than in past years, requiring greater coordination with generation and distribution participants.

9 Frequency fluctuations

9.1 Maintain frequency in normal band and recover quickly from a fluctuation

The chart below shows the maximum or minimum frequency reached and length of each frequency excursion outside the normal band (49.8 to 50.2 Hz) during the reporting period.



9.2 Maintain frequency and limit rate occurrences during momentary fluctuations

The tables below show the total number of momentary fluctuations outside the frequency normal band, recorded in each island, for each month over the last 12 months and the 12 month cumulative totals, grouped by frequency band.

North Island

Frequency Band	Feb-17	Mar-17	Apr-17	May-17	Jun-17	Jul-17	Aug-17	Sep-17	Oct-17	Nov-17	Dec-17	Jan-18	Annual rate
55.00 > Freq >= 53.75													
53.75 > Freq >= 52.00													
52.00 > Freq >= 51.25													
51.25 > Freq >= 50.50											1		**1**
50.50 > Freq >= 50.20	11	10	8	16	22	6	22	31	41	85	5	23	**280**
50.20 > Freq > 49.80													
49.80 >= Freq > 49.50	30	52	55	59	42	52	92	89	91	135	27	53	**777**
49.50 >= Freq > 48.75		1			3						1		**5**
48.75 >= Freq > 48.00													
48.00 >= Freq > 47.00													
47.00 >= Freq > 45.00													

South Island

Frequency Band	Feb-17	Mar-17	Apr-17	May-17	Jun-17	Jul-17	Aug-17	Sep-17	Oct-17	Nov-17	Dec-17	Jan-18	Annual rate
55.00 > Freq >= 53.75													
53.75 > Freq >= 52.00		1											**1**
52.00 > Freq >= 51.25													
51.25 > Freq >= 50.50	1	1	1	1	1		2	1	1		1		**10**
50.50 > Freq >= 50.20	9	7	16	18	28	11	17	28	29	47	8	13	**231**
50.20 > Freq > 49.80													
49.80 >= Freq > 49.50	19	27	29	33	45	36	50	58	46	42	13	32	**430**
49.50 >= Freq > 48.75					2						1		**3**
48.75 >= Freq > 48.00		1											**1**
48.00 >= Freq > 47.00		1											**1**
47.00 >= Freq > 45.00													

Note: The frequency excursions for March include simultaneous over-frequencies and under-frequencies that occurred when the South Island was split into two electrical islands on 2 March.

9.3 Manage time error and eliminate time error once per day

There were no time error violations in the reporting period.

10 Voltage management

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

11 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-17	Mar-17	Apr-17	May-17	Jun-17	Jul-17	Aug-17	Sep-17	Oct-17	Nov-17	Dec-17	Jan-18
Demand Allocation Notice	-	-	-	-	-	-	-	-	-	-	-	-
Grid Emergency Notice	4	1	1	1	-	-	1	-	-	1	-	3
Warning Notice	-	-	-	-	-	-	-	2	-	-	1	-
Customer Advice Notice	7	24	10	16	23	2	6	6	1	8	1	3

12 Grid emergencies

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

Date	Time	Summary Details	Island
12-Jan-18	18:33	A grid emergency was declared to assist with restoration following the tripping of both 110 kV Woodville-Dannevirke-Waipawa and subsequent loss of supply to Dannevirke and Waipawa Substations.	N
25-Jan-18	07:56	A grid emergency was declared to assist with restoration following the tripping of Hamilton 220 / 110 kV inter-connecting transformer T6 and the subsequent loss of supply to the Coromandel and Waikato regions.	N
31-Jan-18	18:07	A grid emergency was declared to allow the reconfiguration of the Southland 110 kV network following the tripping of 110 kV Edendale-Invercargill Circuit 1.	S

13 Security of supply

During January, North Island inflows were 121% of average and South Island inflows were 70% of average.

National hydro storage decreased from 82% to 79% of average for the time of year over the month. The hydro risk status remains at ‘Normal’.

14 Ancillary services

December saw a $1M increase in Ancillary Services costs. This is due in part to an increased need for provision of a frequency keeping service during a Tekapo islanding situation. Other contributing factors are due to fast instantaneous reserve clearing at more than double the average price for both islands for some periods, as well as the procurement of an additional OFR provider in the North Island. The Ancillary Services availability costs for January 2018 have settled back towards the average cost.

The Procurement Plan[1] for Ancillary Services will be reviewed in 2018; this review is scheduled to begin in March. It will look at the definitions of ancillary services, the principles and processes applied in making net purchase quantity assessments, technical requirements and contracting terms.

Refer Appendix B for Ancillary Services Graphs.

[1] The Procurement Plan is available at https://www.ea.govt.nz/dmsdocument/21484

Appendix A: Discretion

Event Date & Time	Event Description
9/1/2018 12:00:18 PM	MAN2201 MAN0. Return of extended potline.
16/1/2018 2:35:21 PM	HWA1101 PTA2. Bona-fide change to offer claimed
18/1/2018 9:00:03 AM	MAT1101 MAT0. Late return of KAW_MAT 1 outage
25/1/2018 7:55:43 AM	KPO1101 KPO0. Required for restoration of Waikato region following HAM_T6 tripping
28/1/2018 5:48:36 PM	ROT1101 WHE0. ROT_WHE tripped

Appendix B: Ancillary Services Graphs