

# SO QUARTERLY OPERATIONAL AND SYSTEM PERFORMANCE REPORT

FOR THE ELECTRICITY AUTHORITY

**Transpower New Zealand Limited**

October to December 2016

*Keeping the energy flowing*



TRANSPOWER





## Table of Contents

Report Purpose .....	iv
Monthly Report – December .....	1
1 Operational and system performance update .....	1
2 Market design and system enhancement project updates .....	2
3 Security of Supply update .....	3
4 Compliance update .....	3
5 Operational management .....	4
5.1 Frequency fluctuations .....	4
5.2 Voltage management .....	5
5.3 Security notices .....	6
5.4 Grid emergencies .....	6
6 Ancillary services .....	6
7 Separation of Transpower roles .....	6
Quarterly Report – Q2 (October to December) .....	7
1 Performance metrics .....	7
2 Actions taken .....	7
3 Cost-of-services reporting .....	8
4 Technical advisory hours and services .....	8
Appendix A: Ancillary Services Graphs .....	9
Appendix B: Discretion .....	10

## Report Purpose

This report is Transpower's review of its performance as system operator for Q2 (October to December) 2016, in accordance with clause 3.14 of the Electricity Industry Participation Code 2010 (the Code).

As this is the final self-review report of the quarter, additional information is included as per SOSPA clause 12.3. This includes performance against the performance metrics in the year to date, and actions taken in regards to the system operator business plan, statutory objective work plan, participant survey responses, and any remedial plan agreed under clause 14.1 (i). A summary of technical advisory services for the quarter is also provided.

Operational issues and a detailed system performance report (Code obligated) are provided for the information of the Electricity Authority (Authority).

## Monthly Report – December

### 1 Operational and system performance update

#### **Kaikoura earthquake**

Analysis of earthquake damage to a tower on the HVDC line (in Marlborough) identified the tower needed to be replaced. Though the tower is not at immediate risk it was determined that in the event of unusually high winds (which might further damage the tower) the system operator would reclassify HVDC operations as a CE risk for periods when winds were forecast above 80 km/h until tower replacement can occur. This change was notified to industry on 22 December. Tower replacement is scheduled for January.

#### **Kaikohe loss of supply**

At 00:24 on 8 December KOE\_MPE\_1 (Kaikohe-Maungatapere 1) tripped, followed by KOE\_MPE\_2 (Kaikohe-Maungatapere 2) at 02:54. As a result, Ngawha generation (24MW) tripped and 53MW of load to the top of Northland region was lost. The cause of the trip was related to deliberate damage to Transpower assets. A prolonged outage required repairs to damaged insulators with restoration commencing at 13:53 and completed by 17:37 (all load on and NGA generator connected).

#### **Gisborne loss of supply**

At 08:57 on 12 December GIS\_TUI 1 (Gisborne-Tuai 1) and GIS\_TUI 2 (Gisborne-Tuai 2) circuits tripped (a result of an aircraft colliding with the circuits). This line and related assets belong to Eastland Energy and resulted in a loss of supply to Gisborne and East Coast regions. Transpower assisted with restoration of supply which commenced at 17:38 on 13 December.

#### **Cyber security**

As part of our ongoing focus on cyber security a presentation was provided to the SRC and SOC of Transpower's analysis of cyber security risks associated with emerging technologies. We have also engaged with various participants to highlight these future threats to cyber security and understand their approach to control and management.

#### **National reserve market**

The system operator answered a number of queries from participants regarding market function and price separation across the HVDC as a result of the new market dynamics associated with the National Market for Instantaneous Reserves initiative.

Initial observations with NMIR is increased competition with volumes of shared reserve between the North and South Islands cleared in the market and an approximate 25% decrease in total purchased reserve. One participant offering demand as reserves appears to have changed their offer strategy from price takers

(1c offers) to active pricing of their reserve. The HVDC has been observed to be the binding risk more frequently in the North Island with the higher transfers during December and January. As a result, North Island participants have an increased opportunity to influence HVDC transfer through their reserve offer strategies and we have observed North Island participants experimenting with different reserve offer strategies to understand the impact of NMIR.

## 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.

**National Market for Instantaneous Reserves** – This is a key initiative under the Reserves and Frequency Management Programme. The project commissioned on schedule on 20 October with post go-live deployments completed by 8 December. Project close is underway.

**EDF Phase III** – This project will refresh the dispatch functionality within the market system to reduce barriers to entry and enable future dispatch products to be implemented. The investigation project completed with an initial business case and associated consultation paper delivered to the Authority. The appropriation approval process is now underway. The capital phase of the project is planned to commence in 2017/18.

**Efficient Procurement of Extended Reserves** – The project completed its consultation on the technical requirements schedule with industry, which including facilitating industry briefing sessions. Industry feedback was well received and comments were considered. The technical requirements schedule was updated and sent to the EA for comment. The project also provided comment on the draft and proposed selection methodologies completed by NZX.

**Gate Closure** – This project will reduce gate closure time from 2 hours to 1 hour in the market system. The investigation project continued. The business case has been approved and the capital project has commenced. Once approved the capital phase will commence with delivery expected on 30 June 2017.

**Real Time Pricing** – Work continues on development of the market and systems changes associated with Real Time Pricing (RTP). Stakeholder requirement workshops have been running through December and drafting of the report has commenced. A change request was raised to extend the cost (hours) of the current phase of work due to greater effort required in gathering requirements and additional effort forecast in the preparation of the report. There is no impact on the completion date.

### 3 Security of Supply update

Inflows have softened in the North and South Island over summer. However, South Island storage levels remain around average for this time of year, and North Island storage levels remain close to maximum. The hydro risk meter is set to normal.

For the month of December:

- North Island inflows were 85% of average<sup>1</sup>
- South Island inflows were 92% of average<sup>2</sup>
- hydro generation met 68% of demand.

As at 1 January aggregate primary New Zealand storage was 115% of average.

Preliminary findings from the draft 2017 Security of Supply Annual Assessment indicate that New Zealand winter energy margin is forecast to remain above or within the standard until 2019. Both the South Island winter energy margin and North Island winter capacity margin are forecast to drop below the security standard after 2022 with the decommissioning of the Huntly Rankine units, assuming the Tiwai smelter remains.

### 4 Compliance update

Transpower as the system operator reported one breach of the Code in December, related to an error in modelling of an outage at Hawera substation in September. Hawera is currently undergoing significant work and multiple outages of equipment. In this instance the outage was extended in real time, requiring manual overrides to be applied in the market system. These overrides failed to automatically end with the outage, resulting in the modelling error. There was no operational or market impact as a result.

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

---

<sup>1</sup> Measurements are based on daily inflow values.

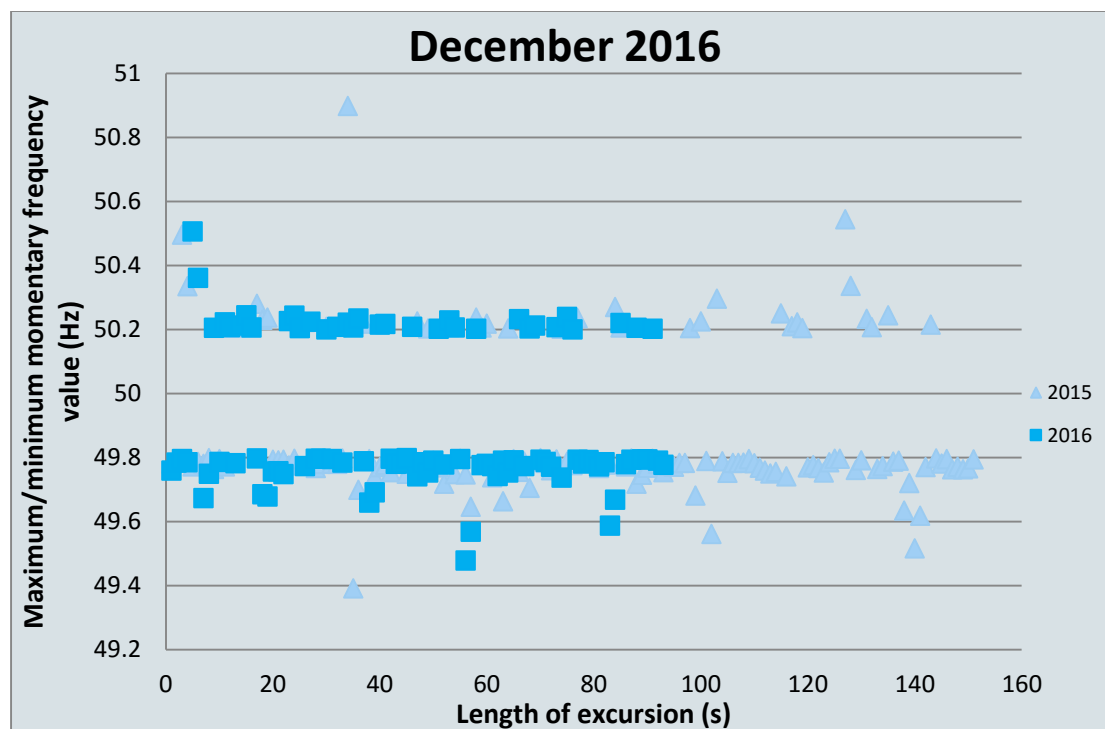
<sup>2</sup> Measurements are based on daily inflow values.

## 5 Operational management

### 5.1 Frequency fluctuations

#### 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.





### Maintain frequency and limit rate occurrences during momentary fluctuations

The table below shows the total number of momentary fluctuations outside the frequency normal band, recorded in both islands, over the last 12 months. The 12 month cumulative totals, grouped by frequency band, are compared to the frequency performance objective (PPO).

Frequency Band	Jan-16	Feb-16	Mar-16	Apr-16	May-16	Jun-16	Jul-16	Aug-16	Sep-16	Oct-16	Nov-16	Dec-16	Annual rate	PPO target
55.00 > Freq >= 53.75														0.2*
53.75 > Freq >= 52.00														2*
52.00 > Freq >= 51.25														7
51.25 > Freq >= 50.50		1	3						2			1	7	50
50.50 > Freq >= 50.20	10	18	31	30	42	29	25	13	32	39	45	32	346	
50.20 > Freq > 49.80														
49.80 >= Freq > 49.50	84	101	118	125	106	89	128	102	153	101	101	59	1267	
49.50 >= Freq > 48.75	1		1		2		1		2	2	3	1	13	60
48.75 >= Freq > 48.00														6
48.00 >= Freq > 47.00														0.2
47.00 >= Freq > 45.00														0.2

\* South Island

### Manage time error and eliminate time error once per day

There were no time error violations in the reporting period.

## 5.2 Voltage management

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

## 5.3 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-16	Feb-16	Mar-16	Apr-16	May-16	Jun-16	Jul-16	Aug-16	Sep-16	Oct-16	Nov-16	Dec-16
Demand Allocation Notice	-	-	-	-	-	-	-	-	-	-	-	-
Grid Emergency Notice	4	2	2	2	5	2	3	2	1	2	-	-
Warning Notice	-	-	-	-	3	2	2	5	1	-	-	-
Customer Advice Notice	3	7	19	11	12	3	8	7	5	12	26	7

## 5.4 Grid emergencies

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

Date	Time	Summary Details	Island
		None.	

## 6 Ancillary services

Nothing significant to report.

Refer Appendix A for Ancillary Services Graphs.

## 7 Separation of Transpower roles

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

## Quarterly Report – Q2 (October to December)

### 1 Performance metrics

The following table shows system operator performance against the performance metrics for the financial year during Q2 as required by SOSPA 12.3 (a).

Performance Metric	Q2 Progress
Released at least \$1 million of market benefits through the application of the CRE objective and/or implementing new capital investments:	<ul style="list-style-type: none"> <li>three potential initiatives have been identified for measurement – selection of the initiative (or initiatives) for analysis will depend on relative benefits</li> <li>independent peer reviewer engaged</li> <li>scoping paper completed and under review.</li> </ul>
77.5% of the participants responding to the annual participant survey rate the system operator's performance as 'good' or better:	<ul style="list-style-type: none"> <li>participant survey was completed and analysis of findings is underway.</li> </ul>

### 2 Actions taken

The following table contains a full list of actions taken during Q2 in regard to the system operator business plan, statutory objective work plan, participant survey responses, and any remedial plan, as required by SOSPA 12.3 (b).

Item of interest	Actions taken
(i) To give effect to the <b>system operator business plan</b> :	<ul style="list-style-type: none"> <li>two business assurance audits completed and planning underway for a third (external) audit</li> <li>three capital projects from the Capex Plan have been commissioned on time and within budget</li> <li>ongoing identification and record of trends to predict and reduce overall number of events</li> <li>commenced development of a benefits register</li> <li>incorporated SOSPA changes into the business continuity plan and back-up procedures.</li> </ul>
(ii) To comply with the <b>statutory objective work plan</b> :	<p><b>Policy and procedure alignment with CRE</b></p> <p>Ongoing checks being undertaken for CRE as part of document review process.</p> <p><b>Review of Contingent Storage under SOSFIP</b></p> <p>Scoping commenced.</p> <p><b>Review of the Security Policy – Busbars</b></p> <p>The project team finalised a draft report summarising the</p>

	<p>revised classification methodology. The revised methodology was presented to the Authority and the initial draft report shared for comment. Consultation with industry is planned for early 2017. The SO is planning the completion of the remaining busbar assessments.</p> <p><b>Develop a suite of performance metrics</b></p> <p>Peer research completed. Strategy mapping and balanced scorecard development underway.</p>
(iii) In response to participant responses to any <b>participant survey</b> :	N/A – Participant survey responses yet to be analysed.
(iv) To comply with any <b>remedial plan</b> agreed by the parties under SOSPA 14.1 (i):	N/A – No remedial plan in place.

### 3 Cost-of-services reporting

The feasibility study into implementing annual cost-of-services reporting to the Authority is not required until financial year 2 (SOSPA 12.6 refers). Planning is underway.

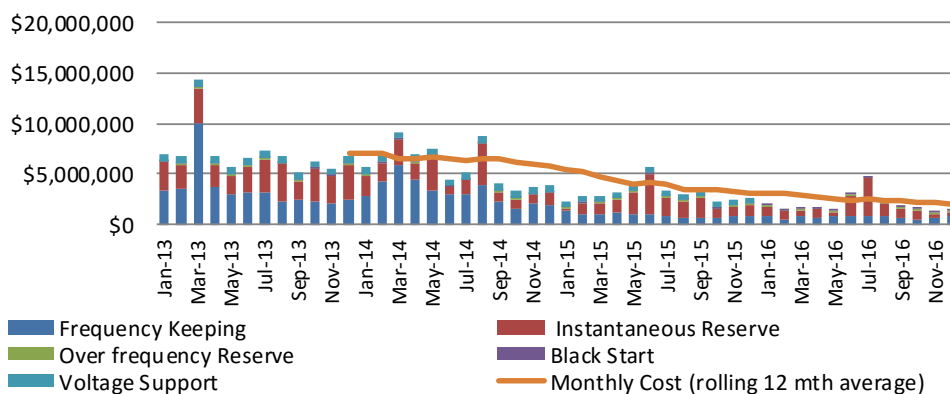
### 4 Technical advisory hours and services

The following table provides the technical advisory hours for Q2 and a summary of technical advisory services to which those hours related (SOSPA 12.3 (d) refers).

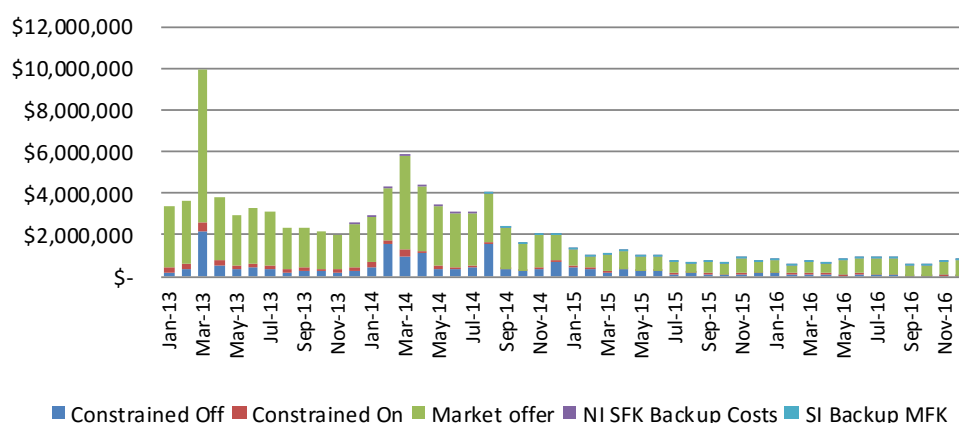
TAS Statement of Work (SOW)	Status	Hours worked during Q2
TAS SOW 58 – Governor Response Metric	Closed	26.00
TAS SOW 60 – Real Time Pricing	In Progress	752.50
TAS SOW 61 – Review of Wholesale Market Trading Arrangements	Closed	88.00
TAS SOW 62 – Wind Generation Offers	In Progress	167.25
TAS SOW 63 – Establishing Amendment to Code for RTP	In Progress	50.00
TAS SOW 64 – ESB for NZX	In Progress	13.50
<b>Total hours</b>		<b>1097.25</b>

## Appendix A: Ancillary Services Graphs

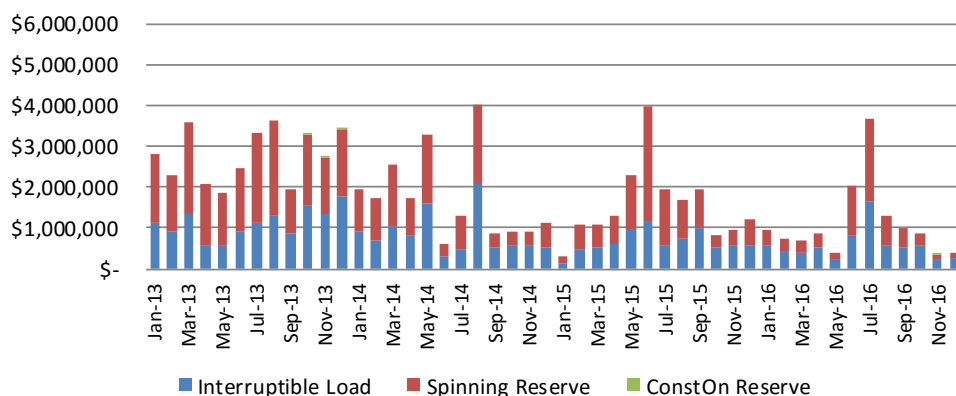
### Ancillary Services Costs (past 4 years)



### Frequency Keeping (past 4 years)



### Instantaneous Reserve (past 4 years)



**Note:** IR Cost May 2012 = 14.129M, IR Cost Jun 2012 = 8.164M

## Appendix B: Discretion

Event Date & Time	Subject	Event Description
6/12/2016 9:17:24 AM	DISCRETION	MAN2201 MAN0 Discretion Clause 13.70, Part 13 EN Max : 524.7 Start: 06-Dec-2016 09:17 End: 06-Dec-2016 09:30 Notes: Return of Extended Potline Last Dispatched Mw: 711.69
12/12/2016 3:35:43 AM	DISCRETION	MAN2201 MAN0 Discretion Clause 13.70, Part 13 ENR Max : 650 Start: 12-Dec-2016 03:35 End: 12-Dec-2016 04:00 Notes: CYD_TWZ double circuit contingency. Last Dispatched Mw: 737.26
12/12/2016 3:39:42 AM	DISCRETION	MAN2201 MAN0 Discretion Clause 13.70, Part 13 ENR Max : 600 Start: 12-Dec-2016 03:39 End: 12-Dec-2016 04:00 Notes: CYD_TWZ double circuit contingency. Last Dispatched Mw: 650
12/12/2016 3:40:47 AM	DISCRETION	ROX1101 ROX0 Discretion Clause 13.70, Part 13 ENR Max : 50 Start: 12-Dec-2016 03:40 End: 12-Dec-2016 04:00 Notes: Last Dispatched Mw: 60. CYD_TWZ double circuit contingency.
12/12/2016 3:41:46 AM	DISCRETION	CYD2201 CYD0 Discretion Clause 13.70, Part 13 ENR Max : 227 Start: 12-Dec-2016 03:41 End: 12-Dec-2016 04:00 Notes: Last Dispatched Mw: 279. CYD_TWZ double circuit contingency.
12/12/2016 3:48:02 AM	DISCRETION	MAN2201 MAN0 Discretion Clause 13.70, Part 13 ENR Max : 525 Start: 12-Dec-2016 03:48 End: 12-Dec-2016 04:30 Notes: CYD_TWZ double circuit contingency. Last Dispatched Mw: 600
12/12/2016 3:48:35 AM	DISCRETION	MAN2201 MAN0 Discretion Clause 13.70, Part 13 ENR Max : 600 Start: 12-Dec-2016 03:48 End: 12-Dec-2016 04:00 Notes: CYD_TWZ double circuit contingency. Last Dispatched Mw: 600