System Operator Reports
October 2015

Contents

SYSTEM OPERATOR

TRANSPOWER

Keeping the energy flowing

System Operator Operational and System Performance Report to the Electricity Authority for October 2015

Purpose of Report

This report summarises Transpower's review of its performance as system operator for October 2015, as required under clause 3.14 of the Electricity Industry Participation Code 2010 (the Code).

Any relevant operational issues are also provided for the information of the Electricity Authority (Authority). A separate detailed System Performance report will be provided to Authority staff.

1. Business Plan Progress Update

The System Operator Business Plan outlines the key business initiatives to be undertaken in the 2015/16 financial year to enable us to meet the strategic goals set out in the System Operator Strategic Plan 2015-2020.

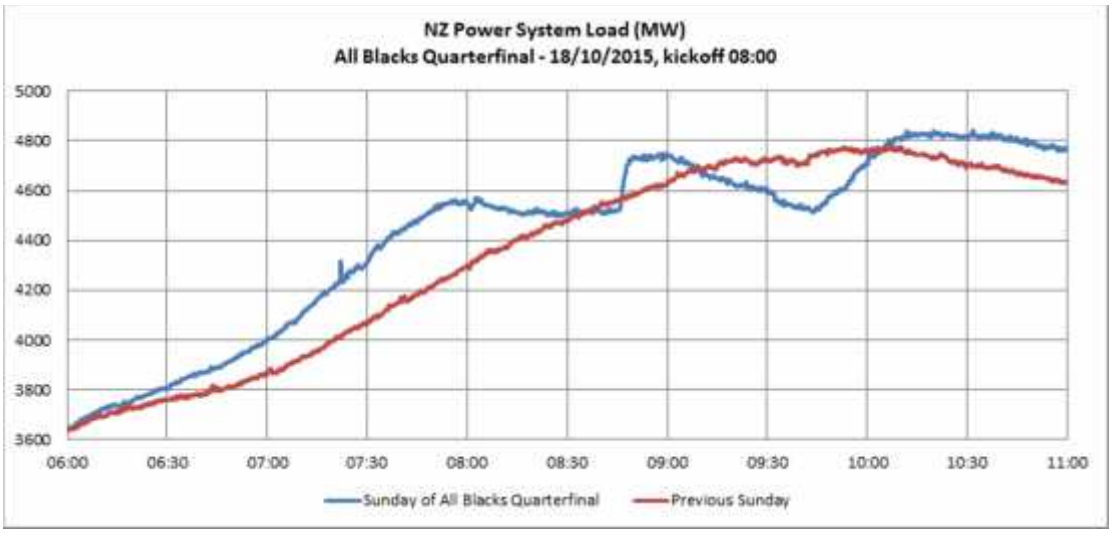
There are eight key business initiatives, each pertaining to one or more strategic goals, with a number of associated key performance indicators (KPIs). Performance to date is good with just over 90% (34/37) of the measurable 2015/16 KPI's forecast to be on track – this excludes 1 KPI as it is presently not being measured due to insufficient information. Performance on each key business initiative is summarised in Appendix A.

2. October Summary from an Operational and System Performance Perspective

Operational and System Performance

No system events of any significance occurred during the month.

Quarter and semi-final All Blacks' games in the Rugby World Cup resulted in observable changes in load, from forecast. This type of behaviour is rarely seen in New Zealand. The system load chart for the quarter final is below. While not presenting any system management concerns, the changes in load patterns were evident.



3. Market

There were no market systems outages exceeding two hours in duration in October.

4. Business Performance

Policy Statement Review

The system operator is currently reviewing its Policy Statement, as per its Code obligations (also key business initiative 1). The industry consultation paper and amended Policy Statement were published in mid-October, with consultation to close in early November. The system operator remains on target to provide a draft for consultation to the Authority in November/December 2015.

Significant Project Update – Reserves and Frequency Management Programme

The Reserves and Frequency Management (RFM) programme continued to progress per the schedule agreed between the system operator and the Authority. Industry collaboration is continuing with the next industry RFM Forum and the more targeted RFM Engagement Group both scheduled for November. The RFM programme forms part of key business initiative 4.

Programme component projects are progressing at different stages as follows:

- Inter-island Instantaneous Reserve Sharing Implementation – This project is being closed out following the successful deployment of interim SIR sharing in September.
- Normal Frequency Management Strategy (TASC SOW 049) – TASC SOW 49 was closed out in October. Based on the recommendations made, further work in this area is to be undertaken. A draft TASC SOW 55 is pending approval.
- National Market for Frequency Keeping – Work for this project has been on hold pending the outcomes of TASC SOW 049. With that now completed the status of the project will be reviewed at the next RFM Programme PAT, though it is anticipated the project will remain on hold pending findings of the new TASC SOW 55.
- National Market for Instantaneous Reserve – Solution requirements are nearing completion and high level design has commenced. Project phase completion (Delivery Business Case) remains on target for February 2016.
- RMT Study Tool – The detailed design document is being reviewed by the Transpower project team and the supplier, with development of Release 1 underway. The project is progressing to schedule.

Significant Project Update – Efficient Procurement of Extended Reserves Implementation

The system operator completed preparation work, regarding the testing of AUFLS systems, for the next set of workshops scheduled for early November.

Significant Project Update – PRISM

Transpower Board approval to change the commissioning date to 18 March 2016 has now been incorporated into the revised project schedule. A formal request associated with this change was raised with the Authority in October. User acceptance testing (UAT) and Operational Acceptance Testing (OAT) commenced on 12 October and will complete by 18 December 2015. Recent focus has involved re-planning the remaining tasks to secure the appropriate resources for the revised delivery schedule. Alstom are working to a target of resolving all outstanding critical defects.

Significant Project Update – Renewables Investigation Project (Stage 1)

The system operator has commenced work to investigate the impacts of emerging/new technologies on the NZ power system. The findings of this investigation will be modelled to undertake scenario studies. Initial project work will focus on solar PV generation to

determine the maximum solar PV the system can manage to maintain the generation-demand balance. In carrying out this work, the system operator is closely involved with the Smart Grid Forum and in contact with some of the distribution companies and the EPE Centre to draw upon collective industry knowledge.

5. Security of Supply Update

Storage increased during October as a result of good inflows in the South Island. High inflows are expected to continue as weather gets warmer and snow melt increases.

NZ aggregate storage levels are 108% of average for this time of year. The hydro risk meter is currently set at "normal". In the unlikely event of significant equipment failure, the security of supply status could change quickly.

Thermal Decommissioning Update

The system operator has been continuing work on the impacts of thermal de-commissioning. During October the system operator published a report on Upper North Island supply and power system limits that assesses the short term implications of Southdown and Otahuhu B closures on the operation of the power system, which has since been updated following discussion with industry participants.

The system operator is also preparing a report on the security of supply implications of thermal de-commissioning that is expected to be published at the end of November.

6. Compliance Report

There were no breaches of the principal performance obligations or breaches of the Code reported to the Authority during the month.

Two Authority investigations into system operator breaches have now been concluded, relating to:

- Event 2895 – Potline modelling error – discontinued.
- Event 2904 – HVDC filter modelling error – settled.

7. Ancillary Services

Tenders were submitted for provision of instantaneous reserve, multiple frequency keeping, back-up single frequency keeping, over frequency reserve and North Island black start on 16 October. These have been evaluated and decisions advised to all parties.

The system operator is now finalising contract terms with parties and preparing executable contracts for effect from 1 December 2015.

Ancillary Service Costs

The costs of ancillary services for the month are in Appendix B.

8. Code 7.10: Separation of Transpower Roles

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

Appendix A – Business Planning Update KPI Table

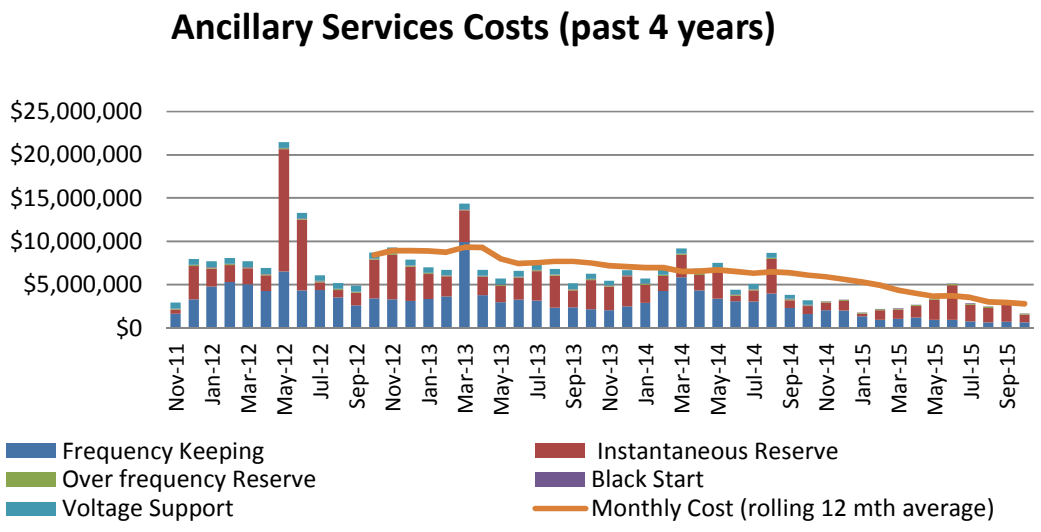
Key Business Initiative	# of KPIs	Complete	On track	At risk	NA	Missed	Comments
1. Assisting the Authority to meet its competition, reliability and efficiency objective (the CRE objective)	2	1	-	1	-	-	One KPI, relating to applying the CRE objective to 25% of our policies and procedures, has been completed ahead of schedule. However, we will continue to monitor progress. The other KPI, relating to releasing $1m of market benefits, is presently at risk due to resourcing issues affecting the determination of a CBA methodology.
2. Developing an efficient balance between risk, reliability and resilience	3	-	3	-	-	-	Work has commenced on all KPIs with all presently on track.
3. Seeking opportunities to add value through the provision of information to support an efficient market	3	-	2	-	1	-	Work has commenced on two KPIs with both of these on track. The third KPI, relating to publishing event reports within four weeks, is currently NA as there have been no events to report against in 2015/16 to date.
4. Improvements to deliver a system operator service that meets or exceeds expectations and represents value for money	6	1	4	1	-	-	One KPI, relating to recognising and addressing the Authority's concerns about increasing capital spend, has been completed ahead of schedule. One KPI, relating to determining additional economic capability, is presently at risk due to resourcing issues. Work is ongoing on the remaining four KPIs, with these all presently on track.
5. A transparent business and requirements roadmap for investments required to deliver the system operator service	2	1	1	-	-	-	One KPI, related to aligning our capital investments, is now complete following the completion of project Aardwolf. Completion was ahead of schedule. The second KPI remains on track.

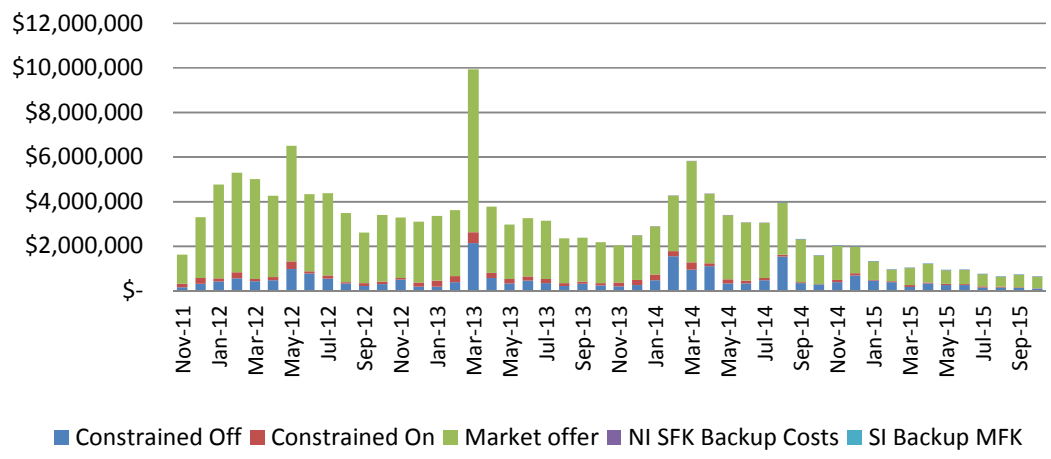
Key Business Initiative	# of KPIs	Complete	On track	At risk	NA	Missed	Comments
6. Building capability, and promoting a professional, responsive service culture	5	1	4	-	-	-	One KPI, relating to implementing a study version of vSPD for analyst use, has been completed ahead of schedule. Work has commenced on the remaining four KPIs, with all now on track.
7. Engaging with and understanding the Authority, market participants and consumers	5	1	4	-	-	-	One KPI, relating to the completion of a 'building connections' customer video, has now been completed ahead of schedule. Work has commenced the remaining four KPIs with all presently on track.
8. Maximising opportunities arising from being part of the wider Transpower business	12	3	8	1	-	-	Three KPIs, relating to an MOU for generator commissioning, a baseline for comparing future staff turnover, and an engineering progression programme, have been completed ahead of, or on, schedule. One KPI, relating to the development of a common fatigue management policy, remains at risk. Work has commenced, or is shortly planned to commence, on all other KPIs, with all presently on track.
Totals	**38**	**8**	**26**	**3**	**1**	**0**	

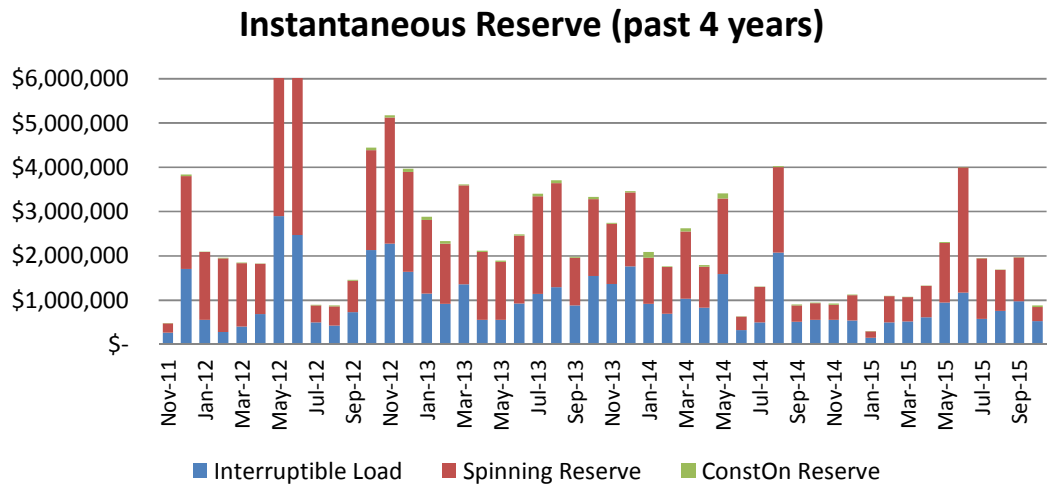
Appendix B – Ancillary Service Costs for October 2015

Note: The scale for the Instantaneous Reserve (Past 4 Years) graph has been reduced to clarify detail. Two months data, May and June 2012, overly influenced the graph scale.

		Cost	
Frequency Keeping	Constrained Off	$	95,973
	Constrained On	$	16,200
	Market offer	$	511,774
	NI SFK Backup Costs	$	2,716.67
	SI Backup MFK	$	2,232.00
	Total monthly Cost	**$**	**628,896**
Instantaneous Reserve	Spinning reserve	$	318,084
	Interruptible Load	$	526,406
	Constrained On	$	34,224
	Total monthly Cost	**$**	**878,714**
Over Frequency Reserve	**Total monthly Cost**	**$**	**107,828**
Black Start	**Total monthly Cost**	**$**	**52,487**
Voltage Support	**Total monthly Cost**	**$**	**-**
All Ancillary Services	**Total monthly Cost**	**$**	**1,667,925**







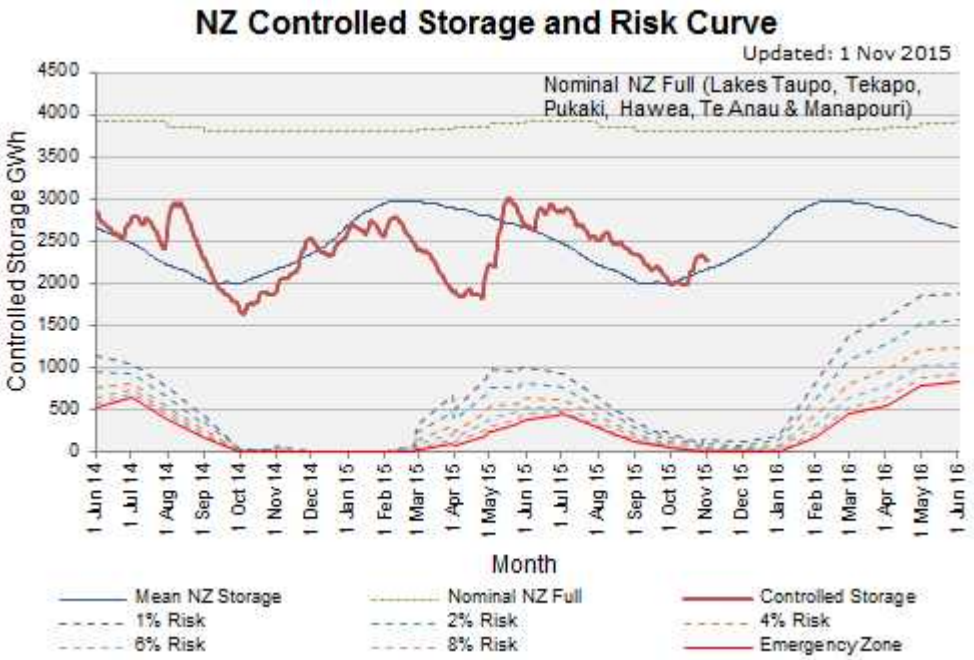
Note: IR Cost May 2012 = 14.129M, IR Cost Jun 2012 = 8.164M

Appendix C – Security of Supply

New Zealand Hydro Storage and Hydro Risk Curves

As at 1 November 2015, aggregate primary New Zealand storage was 108% of average.

The graph below compares New Zealand hydro storage to the hydro risk curves.



Hydro Storage and Generation in October

North Island inflows were 71% of average.

South Island inflows were 104% of average.

Measurements are based on daily inflow values.

Hydro generation met 65% of demand.

System Performance Report

To the Electricity Authority

October 2015

Purpose

This System Performance Report summarises power system performance each month. The detailed reporting of system events is intended to provide an understanding of the nature of system events that occur in the normal course of the real time co-ordination of security and to identify emerging issues in system operation.

SYSTEM OPERATOR

TRANSPOWER

Keeping the energy flowing

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1. Summary of System Performance

This system performance report covers the month of October 2015.

Principal Performance Obligations

- The system operator met the Principal Performance Obligations during the reporting period.

System Events

- On 2 October at 13:12, an emergency potline off-load at Tiwai Point Aluminium Smelter resulted in a momentary frequency rise in the South Island to 50.58 Hz.
- On 6 October at 11:10, 110 kV Central Park – West Wind – Wilton Circuits 2 & 3 tripped and auto-reclosed, resulting in a loss of connection to West Wind windfarm. Connection was restored after 280 minutes.
- On 7 October at 07:18, 110 kV Arapuni – Kinleith Circuit 1 tripped during a planned outage of the parallel circuit, disconnecting the Arapuni South Bus from the system. Connection was restored by closing the Arapuni Bus split after 24 minutes.
- On 9 October at 10:38, 110 kV Kaikohe – Maungatapere Circuits 1 & 2 tripped resulting in a loss of supply to Kaikohe Substation. Supply was restored after 155 minutes.

Other noteworthy events occurring during the reporting period:

- On 2 October at 16:16, the 220 kV New Plymouth 'West' bus tripped during restoration after a planned outage.

2. Principal Performance Obligations

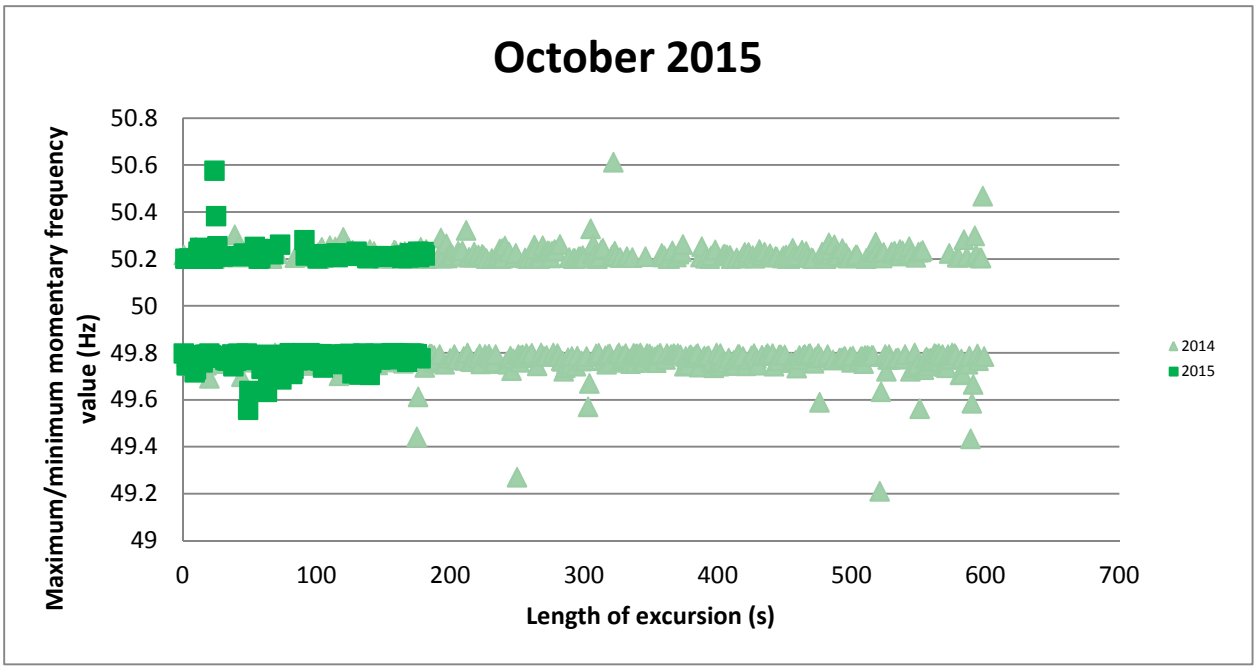
2.1 Avoid Cascade Failure

No instances of cascade failure occurred during the reporting period.

2.2 Frequency

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. The majority of excursions are within 0.4 Hz of the normal band and frequency typically returns to within the normal band within 2 minutes.



Maintain Frequency and limit rate occurrences during momentary fluctuations

The table below shows the total 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	Nov-14	Dec-14	Jan-15	Feb-15	Mar-15	Apr-15	May-15	Jun-15	Jul-15	Aug-15	Sep-15	Oct-15	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	2			1	2	1	1	4	2	2		1	**16**	**50**
50.50 > Freq >= 50.20	360	165	26	25	47	153	252	308	104	131	146	52	**1769**	
50.20 > Freq > 49.80														
49.80 >= Freq > 49.50	375	204	24	15	44	174	315	295	141	170	172	128	**2057**	
49.50 >= Freq > 48.75	5	2	1	1	1					1			**11**	**60**
48.75 >= Freq > 48.00	1												**1**	**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

The time error performance criteria are:

- time error must be managed within +/- 5 seconds.
- time error must be eliminated at least once every day.

Time Error Compliance Table		Nov-14	Dec-14	Jan-15	Feb-15	Mar-15	Apr-15	May-15	Jun-15	Jul-15	Aug-15	Sep-15	Oct-15
Time Error Management	NI	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	SI	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time Error Elimination	NI	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	SI	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

3. Operational Management

3.1 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	Nov-14	Dec-14	Jan-15	Feb-15	Mar-15	Apr-15	May-15	Jun-15	Jul-15	Aug-15	Sep-15	Oct-15
Demand Allocation Notice	-	-	-	-	-	-	-	-	-	-	-	-
Grid Emergency Notice	3	5	1	4	-	2	3	1	-	-	-	1
Warning Notice	11	23	29	27	31	10	12	-	-	1	-	3
Customer Advice Notice	22	20	11	12	12	13	32	11	5	6	10	7

3.2 GRID EMERGENCIES

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

Date	Time	Summary Details	Island
07/10/15	07:37	A grid emergency was declared to allow the Arapuni bus split to be closed to reconnect the South bus to the system following a circuit tripping.	N

A summary of grid emergencies that have occurred in the last 12 months is in the following table:

Island	Region	Nov-14	Dec-14	Jan-15	Feb-15	Mar-15	Apr-15	May-15	Jun-15	July-15	Aug-15	Sep-15	Oct-15	Total
North Island	Northland	-	-	-	-	-	-	-	-	-	-	-	-	**0**
	Auckland	-	-	-	-	-	-	-	-	-	-	-	-	**0**
	Zone 1	-	-	-	-	-	1	-	-	-	-	-	-	**1**
	Waikato	2	4	1	2	-	-	3	-	-	-	-	1	**13**
	Bay of Plenty	-	-	-	-	-	-	-	-	-	-	-	-	**0**
	Hawkes Bay	-	-	-	-	-	-	-	-	-	-	-	-	**0**
	Taranaki	-	-	-	-	-	-	-	-	-	-	-	-	**0**
	Bunnythorpe	-	-	-	-	-	-	-	-	-	-	-	-	**0**
	Wellington	-	-	-	-	-	-	-	-	-	-	-	-	**0**
	North Island (all)	-	-	-	-	-	-	-	-	-	-	-	-	**0**
	Lower North Island	-	-	-	-	-	-	-	-	-	-	-	-	**0**
North & South Islands		-	-	-	-	-	-	1	-	-	-	-	-	**1**
South Island & HVDC	Nelson Marlborough	-	-	-	-	-	-	-	-	-	-	-	-	**0**
	West Coast	-	-	-	-	-	-	-	-	-	-	-	-	**0**
	Christchurch	-	-	-	-	-	-	-	-	-	-	-	-	**0**
	Canterbury	-	-	-	-	-	-	-	-	-	-	-	-	**0**
	Zone 3	1	-	-	-	-	-	-	-	-	-	-	-	**1**
	Otago	-	-	-	1	-	-	-	-	-	-	-	-	**1**
	Southland	-	-	-	1	-	1	-	1	-	-	-	-	**3**
	South Island (all)	-	1	-	-	-	-	-	-	-	-	-	-	**1**
	HVDC	-	-	-	-	-	-	-	-	-	-	-	-	**0**

3.3 CUSTOMER ADVICE NOTICES (CANS)

Seven CANs (Customer Advice Notices) were issued in the reporting period:

- two related to an unplanned outage of the Market Systems on 5 October;
- two related to the change to the shoulder ratings period on 20 October;

- two related to changes in HVDC risk due to Haywards Harmonic Filter outages on 24 October; and
- one related to testing of augmentations to the Market Systems running from 21 October through to 27 November.

3.4 Forecast Standby Reserve Shortfall (SRS) notices

A total of forty-two SRS notices were issued during the reporting period based on the SDS (the system operator's own load forecasting tool). These SRS notices were in respect of trading periods on 14 – 15 and 20 October.

3.5 Voltage Management

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

3.6 Outage Management

The following table shows the number of outages over the last 12 months where operational measures (generation agreements, load management agreements or grid re-configurations) were required to allow the outage to proceed. Load agreements generally require the distributor to manage load at one or more grid exit points. Generation agreements are required to ensure sufficient regional generation is available to provide energy or reactive support during the outage to maintain security standards. Grid re-configurations typically involve splitting the network during the outage to manage post contingency power flows. Security of supply is sometimes reduced by grid re-configuration.

Island	Region	Nov-14	Dec-14	Jan-15	Feb-15	Mar-15	Apr-15	May-15	Jun-15	July-15	Aug-15	Sep-15	Oct-15	Total
North Island	Northland	3	3	3	7	6	12	8	7	-	3	3	5	**60**
	Auckland	3	1	1	6	4	8	11	5	3	7	9	5	**63**
	Waikato	9	3	4	10	9	8	11	7	4	6	9	5	**85**
	Bay of Plenty	7	6	3	4	4	6	4	4	3	2	5	2	**50**
	Hawkes Bay	2	2	2	4	6	6	7	3	-	-	3	2	**37**
	Taranaki	7	-	4	4	3	2	5	2	-	-	2	2	**31**
	Bunnythorpe	4	1	5	4	4	8	7	4	2	2	-	5	**46**
	Wellington	9	10	11	9	8	9	6	7	-	3	4	5	**81**
Total		44	26	33	48	44	59	59	39	12	23	35	31	**453**
South Island	Nelson Marlborough	14	8	7	6	4	6	8	3	2	2	4	4	**68**
	West Coast	11	8	8	8	6	5	10	7	6	3	3	5	**80**
	Christchurch	10	6	5	8	7	7	7	6	6	4	3	2	**71**
	Canterbury	7	4	4	5	2	2	6	1	2	2	3	1	**39**
	Otago	4	2	1	3	2	3	5	-	-	2	2	3	**27**
	Southland	3	3	1	2	4	5	3	1	4	2	1	4	**33**
Total		49	31	26	32	25	28	39	18	20	15	16	19	**318**

3.7 CONSTRAINTS

SUMMARY: Security constraints binding during the month

The following table shows the binding constraints during the reporting period.

Additional information on security constraints can be found on the following website address: *http://www.systemoperator.co.nz/security-management#cs-147305*. This information includes constraint equations and a brief summary of their purpose.

Island	Region	Branch	Description	Total
North Island	Hamilton	KIN_TRK1.2__KIN_TRK2.2__KIN_TRK2__TRK__LN	This is an SFT generated constraint. Its purpose is to protect Kinleith -Tarukenga 1 for a tripping of Kinleith -Tarukenga 2.	1
South Island & HVDC	Otago	NSY_ROX.1__CYD_TWZ1.1__CYD_TWZ1__ROX__LN	This is an SFT generated constraint. Its purpose is to protect Naseby-Roxburgh 1 for a tripping of Clyde-Twizel 1.	2
	Southland	EDN_INV.1__GOR_ROX.1__GOR_ROX1__INV__LN	This is an SFT generated constraint. Its purpose is to protect Edendale-Invercargill 1 for a tripping of Gore-Roxburgh 1.	6
Grand Total				**9**

Constraints binding during last 12 months

The following table shows constraints that bound during the reporting period for a duration of four or more trading periods, and those binding for more than 48 trading periods during the year.

Island	Region	Constraint	Reporting period		Previous 12 months	
			Number of trading periods that constraint bound	Percentage of trading periods	Number of trading periods that constraint bound	Percentage of Trading periods
North Island	Hawkes Bay	RDF_T3&T4_S_P_1	0	0.00%	87	0.50%
South Island & HVDC	West Coast	COL_HOR2.1__COL_HOR3.1__COL_HOR3__COL__LN	0	0.00%	62	0.35%
		COL_HOR3.1__COL_HOR2.1__COL_HOR2__COL__LN	0	0.00%	50	0.29%
		HOR_KBY_ISL1.2__HOR_KBY_ISL2.2__:S__HOR_ISL2__ISL__LN	0	0.00%	128	0.73%
	Otago	NSY_ROX.1__CYD_TWZ2.1__CYD_TWZ2__ROX__LN	0	0.00%	103	0.59%
	Southland	EDN_INV.1__GOR_ROX.1__GOR_ROX1__INV__LN	6	0.40%	0	0.00%

4. SYSTEM EVENTS

4.1 SIGNIFICANT SYSTEM EVENTS

The following table shows significant events (frequency excursions and connection point events) which occurred during the reporting period.

Significant frequency excursions

Date	Time	Summary Details	Island	Freq (Hz)
02/10/15	13:12	An emergency shutdown of a Tiwai potline resulted in a momentary rise in frequency in the South Island.	S	50.58

Connection point events

Date	Time	Summary Details	Generation / Load interrupted (MW)	Restoration time (minutes)
06/10/15	11:10	110 kV Central Park – West Wind – Wilton 2 & 3 tripped resulting in a loss of connection to West Wind windfarm.	101	280
07/10/15	07:18	110 kV Arapuni – Kinleith Circuit 1 tripped during a planned outage on the parallel circuit resulting in the disconnection of the Arapuni South Bus from the system.	63	24
09/10/15	10:38	110 kV Kaikohe – Maungatapere Circuits 1 & 2 tripped, resulting in a loss of supply to Kaikohe Substation.	23	155

4.2 SYSTEM EVENTS DURING REPORTING PERIOD

System events which occurred during the reporting period are summarised below:

Contingent events

Event	Number	Summary
Loss of single AC transmission circuit	6	These related to trippings of: • Arapuni-Kinleith 1 • Fernhill-Tuai 1 (auto reclose) • Hamilton-Piako-Waihou 1 • Kinleith-Tarukenga 1 • Opunake-Stratford 1 • Otahuhu-Whakamaru 2 (auto reclose)
HVDC Start/Stop		
Supply Transformer	1	This related to tripping of: • BPE T16
Loss of grid reactive plant	1	These related to trippings of: • Haywards Synchronous Condensers SC7
Loss of single generation units	19	These related to trippings of: • Kinleith Co-generation (3 x) • Kaimai generation • Karapiro G2, G3 • MOK generation (2 x) • Onepu generation (2 x) • Rotokawa generation (3 x) • Te Mihi generation • Te Rapa generation • Tuai G1, G2 • Wairakei G10, G12
Total during reporting period	**27**	

Extended contingent events

Event	Number	Summary
Loss of both HVDC poles	0	
Loss of interconnecting transformer	0	
Loss of bus bar section	1	This related to: • New Plymouth 220 kV 'West' bus tripped.
Total during reporting period	**1**	

Other events

Event	Number	Summary
Loss of multiple AC transmission circuits	2	These related to: • Central Park-West Wind-Wilton circuits 2 & 3 auto-reclosed, resulting in the loss of West Wind generation. • Kaikohe-Maungatapere 1 & 2 tripped.
Demand change	3	This related to tripping of: • Tiwai NZAS Standby Potline Emergency off-load • The connected party's network fed from Islington Substation • The connected party's network fed from Tuai Substation
Generation	0	
Total during reporting period	**6**	

Other disturbances

Event	Number	Summary
Feeder trippings	60	Various locations
Total during reporting period	**60**	

4.3 SYSTEM EVENTS – TREND

	Nov-14	Dec-14	Jan-15	Feb-15	Mar-15	Apr-15	May-15	Jun-15	Jul-15	Aug-15	Sep-15	Oct-15	Total	Average Events per month
Contingent Event – transmission	9	11	13	10	8	13	8	26	11	7	8	6	**130**	10.8
Contingent Event – generation	16	12	19	10	14	6	11	11	13	6	16	19	**153**	12.8
Contingent Event – Supply transformer	1	1	2	3	2	3	3	4	0	1	2	1	**23**	1.9
Contingent Event – Reactive plant	2	1	7	4	2	3	6	4	3	2	5	1	**40**	3.3
Contingent Event - HVDC	7	0	1	0	3	0	0	0	0	0	1	0	**12**	1.0
Extended Contingent Event HVDC	0	0	0	0	0	0	0	0	0	0	0	0	**0**	0.0
Extended Contingent Event Inter-connecting Transformers	0	0	0	0	1	0	2	0	0	0	0	0	**3**	0.3
Extended Contingent Event Busbar	0	1	0	0	1	2	1	2	0	1	0	1	**9**	0.8
Other Event – AC transmission	3	0	2	1	4	0	1	8	0	0	3	2	**24**	2.0
Other Event – Demand	5	0	1	2	1	1	2	5	2	3	0	3	**25**	2.1
Other Event – Generation	1	0	3	1	4	0	1	0	0	1	3	0	**14**	1.2