System Operator Reports
March 2014

Contents

SYSTEM OPERATOR

TRANSPOWER

Keeping the energy flowing

System Operator Operational and System Performance Report to the Electricity Authority

Period from 1 March – 31 March 2014

Purpose of Report

This report summarises the results of the System Operator's review of its performance for the period 1 March – 31 March 2014, 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 Authority. A separate detailed System Performance report will be provided to Authority staff.

1. Summary of Month from an Operational and System Performance Perspective

1.1. Operational

The Clyde-Roxburgh asset protection scheme was enabled during March when the agreed scheme implementation criteria were met. The scheme is intended to assist with supporting flows into the south of the South Island, during periods of low southern lake levels, for planned outages of the CYD_ROX circuit.

The applicable asset protection scheme criteria were for:

- the daily average of Manapouri generation being scheduled below 420MW and forecast to remain below that level in the forward schedules; or
- where the NRSL schedules indicated binding or near binding constraints into the Southland region.

The scheme was enabled from 00:00 on 12th March through 14:05 on the 13th March. The next planned circuit outage is between 26th April and 06th June.

One frequency excursion occurred on 7th March at 15:36 when an emergency pot line trip occurred (at 180MW), sending South Island frequency to 50.55Hz.

One loss of supply event occurred on 31 March at Gisborne when, at 07:20, GIS_TUI_1 tripped, dropping 33.5MW of load. Circuit return to service was complete at 08:07.

1.2. Market

There were no outages to the Market system exceeding two hours during March.

2. Business Performance

Significant Project Update

	Status	Implementation date	Update
Dispatchable demand	On Track	**April 2014**	• The SO has prepared a document that assesses the impact of the change to the NRSS run time. It is a change to scope only and does not impact on project timeline or budget. This is awaiting EA approval. • Two submissions on the Policy Statement were received. These have been reviewed by the SO, and preparation of the SO's cross-submission has started. • The SO's DCLS approval process guidelines were released for consultation on 25 March.

3. Security of Supply Update

NZ aggregate storage levels are 75% 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.

4. Compliance Report

There were no breaches of the principal performance obligations by the System Operator during March.

There were two breaches of the Electricity Industry Participation Code (EIPC) reported to the Electricity Authority during the month of March. Both breaches involved the incorrect modelling of information, regarding asset configuration, in the market schedules. Both errors were identified and resolved before real time.

5. Ancillary Services

The System Operator entered into contracts for Multiple Frequency Keeping and Back-up Single Frequency Keeping in both the North and South Islands, commencing on 1 April 2014. The South Island contracts will come into effect when South Island MFK is implemented (currently planned for August).

Ancillary Service Costs

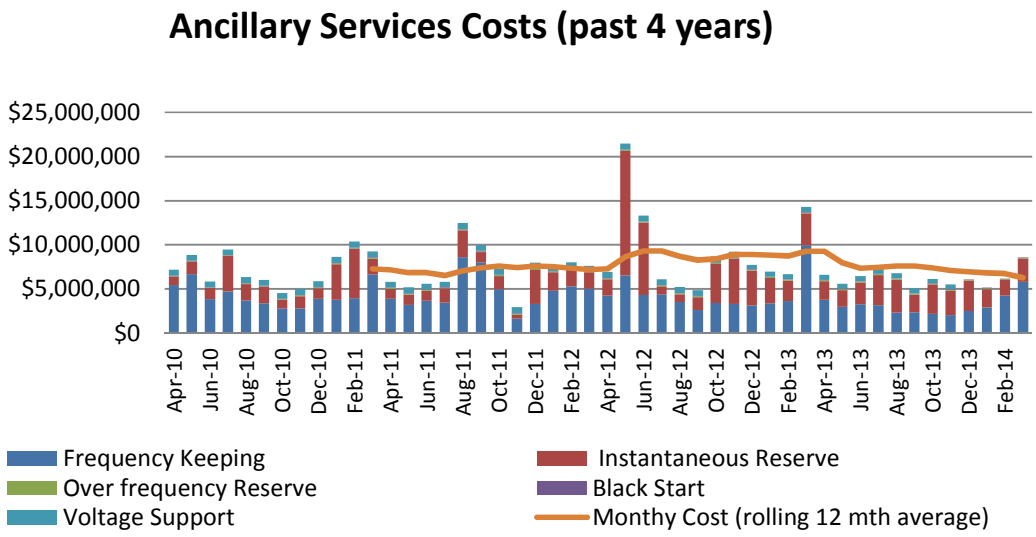
The costs of ancillary services for the month of March are set out in Appendix A (as required by clause 82.1 of the procurement plan). The increase in frequency keeping costs in March is similar to March last year and is the result of the hydrology situation in both islands influencing providers.

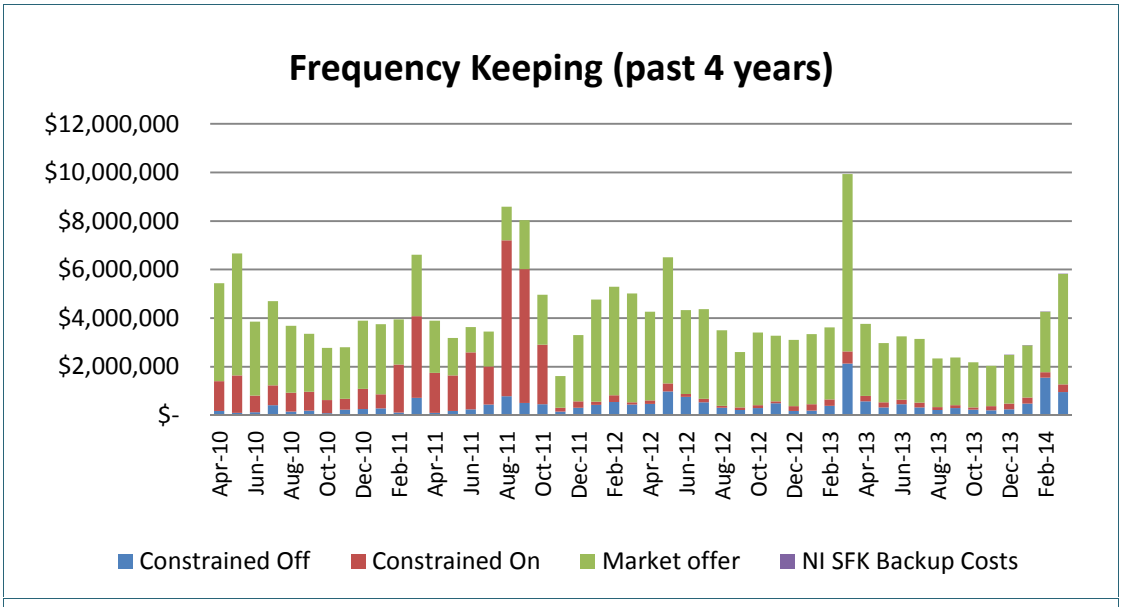
6. Code 7.10: Separation of Transpower Roles

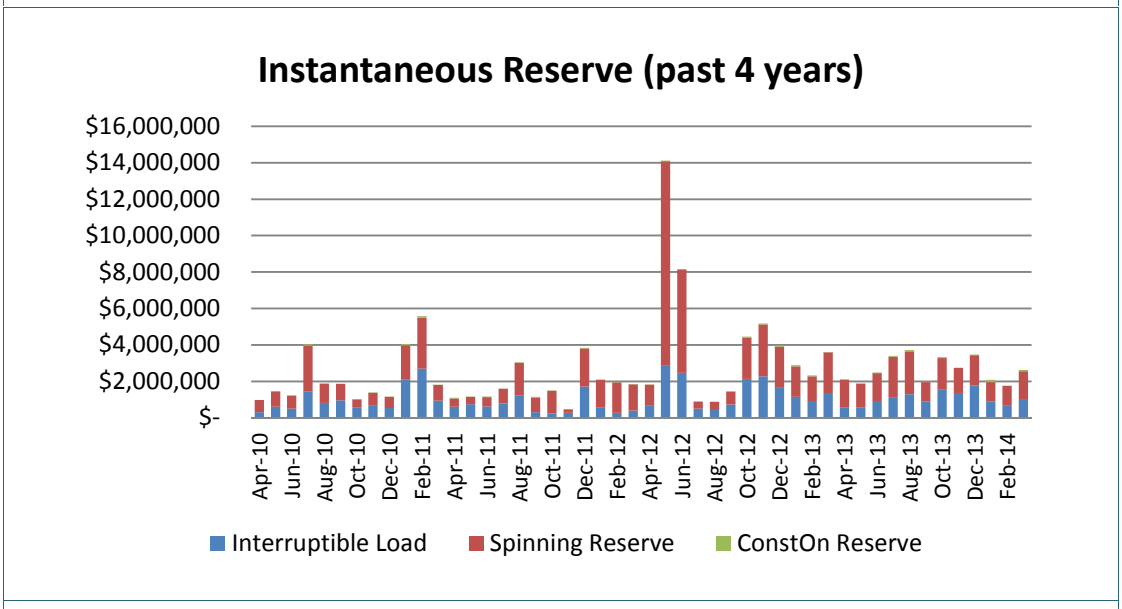
In performing its role as System Operator, Transpower has not been materially affected by any other role or capacity Transpower has under the Code or under any agreement.

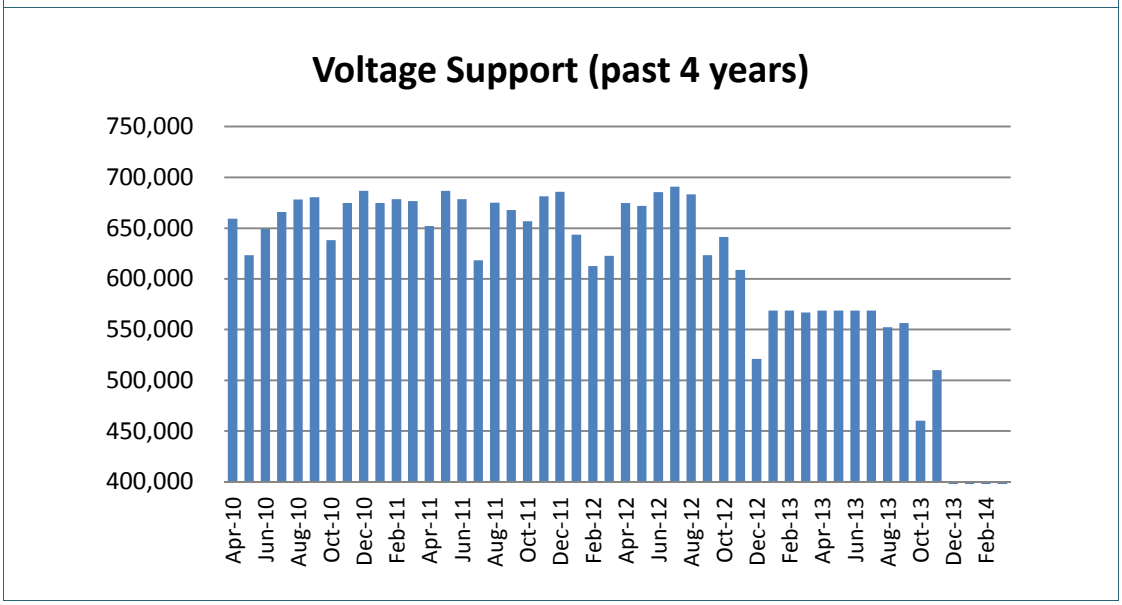
Appendix A – Ancillary Service Costs for March 2014

		Cost
Frequency Keeping	Constrained Off	$949,140
	Constrained On	$322,371
	Market offer	$4,543,714
	NI SFK Backup Costs	$1,667
	Total monthly Cost	**$5,816,892**
Instantaneous Reserve	Spinning reserve	$1,519,085
	Interruptible Load	$1,029,949
	Constrained On	$76,203
	Total monthly Cost	**$2,625,237**
Over Frequency Reserve	**Total monthly Cost**	**$103,209**
Black Start	**Total monthly Cost**	**$49,405**
Voltage Support	**Total monthly Cost**	**$ -**
All Ancillary Services	**Total monthly Cost**	**$8,594,743**




Frequency Keeping (past 4 years)
$12,000,000
$10,000,000
$8,000,000
$6,000,000
$4,000,000
$2,000,000
$-
Apr-10
Jun-10
Aug-10
Oct-10
Dec-10
Feb-11
Apr-11
Jun-11
Aug-11
Oct-11
Dec-11
Feb-12
Apr-12
Jun-12
Aug-12
Oct-12
Dec-12
Feb-13
Apr-13
Jun-13
Aug-13
Oct-13
Dec-13
Feb-14
Constrained Off
Constrained On
Market offer
NI SFK Backup Costs

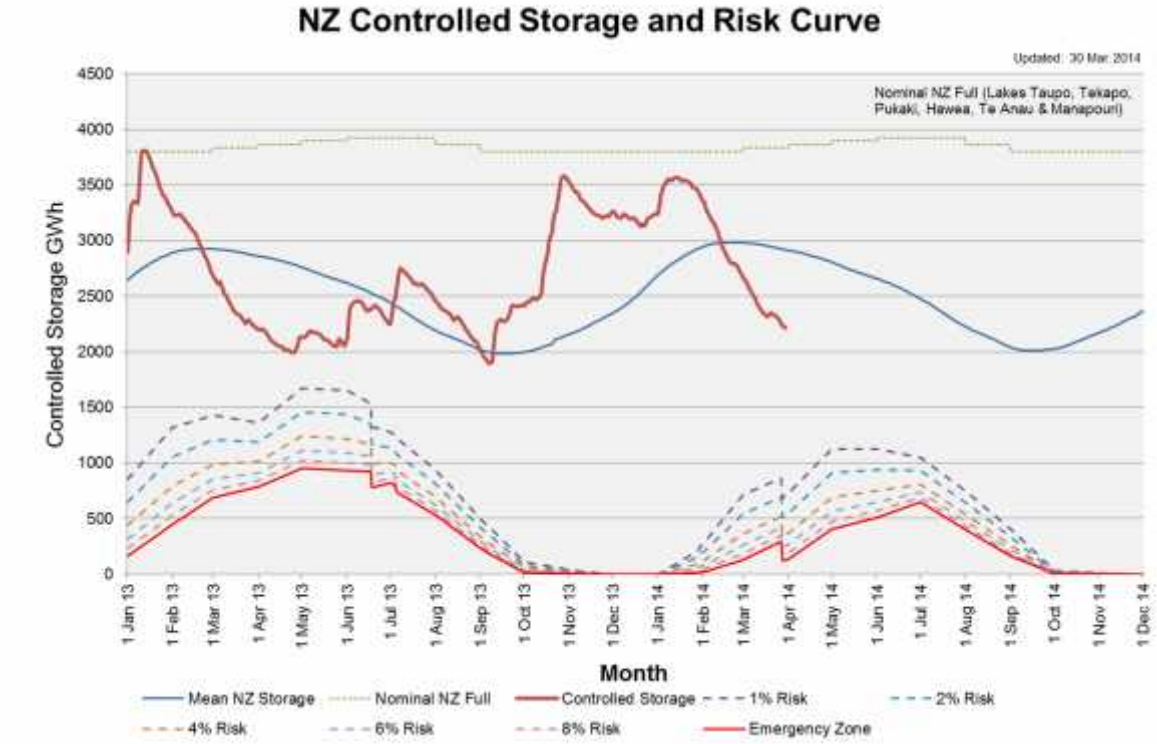

Instantaneous Reserve (past 4 years)
$16,000,000
$14,000,000
$12,000,000
$10,000,000
$8,000,000
$6,000,000
$4,000,000
$2,000,000
$-
Apr-10
Jun-10
Aug-10
Oct-10
Dec-10
Feb-11
Apr-11
Jun-11
Aug-11
Oct-11
Dec-11
Feb-12
Apr-12
Jun-12
Aug-12
Oct-12
Dec-12
Feb-13
Apr-13
Jun-13
Aug-13
Oct-13
Dec-13
Feb-14
Interruptible Load
Spinning Reserve
ConstOn Reserve


Voltage Support (past 4 years)
750,000
700,000
650,000
600,000
550,000
500,000
450,000
400,000
Apr-10
Jun-10
Aug-10
Oct-10
Dec-10
Feb-11
Apr-11
Jun-11
Aug-11
Oct-11
Dec-11
Feb-12
Apr-12
Jun-12
Aug-12
Oct-12
Dec-12
Feb-13
Apr-13
Jun-13
Aug-13
Oct-13
Dec-13
Feb-14

Appendix B – Security of Supply

New Zealand Hydro Storage and Hydro Risk Curves

Aggregate primary New Zealand storage is 75% of average for this time of year.
The graph below compares New Zealand hydro storage to the hydro risk curves.



Hydro Storage and Generation

North Island Inflows over the last calendar month have been 51% of average.
South Island Inflows over the last calendar month have been 56% of average.
Measurements are based on daily inflow values.

Over the last calendar month hydro generation has met 49% of demand.

System Performance Report

To the Electricity Authority

March 2014

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

Table of Contents

1. Summary of System Performance

This system performance report covers the month of March 2014.

Principal Performance Obligations

The System Operator met the Principal Performance Obligations during the reporting period.

System Events

On 7th March at 15:36 an emergency potline off-load at Tiwai Point Aluminium Smelter resulted in a momentary frequency rise in the South Island to 50.55 Hz.

On 24th March at 12:24, Huntly Unit 2 tripped resulting in a momentary drop in frequency in the North Island to 49.39 Hz.

On 31st March at 07:20, Gisborne – Tuai Circuit 1 (110kV) tripped during a planned outage of Gisborne – Tuai Circuit 2, causing a loss of supply to Gisborne Substation. Supply was restored after 47 minutes.

Other noteworthy events during the reporting period:

On 3rd March at 16:03 HVDC Pole 2 tripped. Pole 3 ramped up to cover the tripping.

On 21st March at 12:35 Kawerau 220 kV Bus B tripped. No load was lost.

2. Principal Performance Obligations

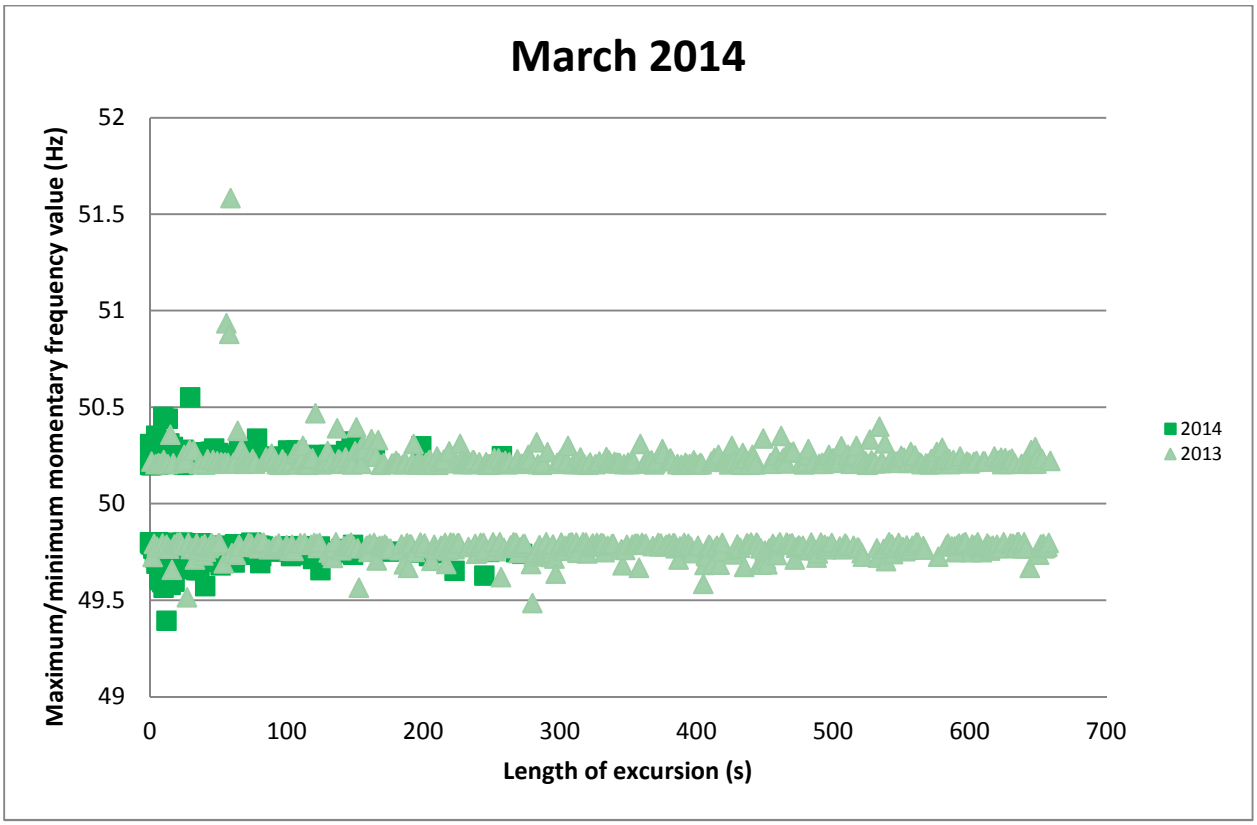
2.1 Avoid Cascade Failure

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 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	Apr - 13	May - 13	Jun - 13	jul - 13	Aug - 13	Sep - 13	Oct - 13	Nov - 13	Dec -13	Jan - 14	Feb - 14	Mar-14	Annual rate	PPO target
55.00 > Freq >= 53.75														**0.2***
53.75 > Freq >= 52.00		1	1					2					**4**	**2***
52.00 > Freq >= 51.25	2						2				3		**7**	**7**
51.25 > Freq >= 50.50	4	8	2		1	4	4	9	1	2		1	**36**	**50**
50.50 > Freq >= 50.20	541	419	221	404	656	709	797	582	267	364	333	398	**5691**	
50.20 > Freq > 49.80														
49.80 >= Freq > 49.50	484	401	208	385	652	692	789	605	396	450	386	610	**6058**	
49.50 >= Freq > 48.75	6	9	4			2	7	7	3		3	1	**42**	**60**
48.75 >= Freq > 48.00	1	1											**2**	**6**
48.00 >= Freq > 47.00		1						1					**2**	**0.2**
47.00 >= Freq > 45.00														**0.2**

* South Island7

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		Apr-13	May-13	Jun-13	jul-13	Aug-13	Sep-13	Oct-13	Nov-13	Dec-13	Jan-14	Feb-14	Mar-14
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	Apr-13	May-13	Jun-13	Jul-13	Aug-13	Sep-13	Oct-13	Nov-13	Dec-13	Jan-14	Feb-14	Mar-14
Demand Allocation Notice	-	-	-	-	-	-	-	-	-	-	-	-
Grid Emergency Notice	6	5	2	4	1	2	1	12	8	22	9	5
Warning Notice	-	3	2	3	1	-	-	2	-	-	-	-
Customer Advice Notice	43	67	41	27	15	31	63	86	48	18	12	18

3.2 Grid Emergencies

The following table shows grid emergencies declared by the System Operator in the reporting period.

Date	**Time**	**Summary Details**	**Island**
02/03/14	00:35	A grid emergency was declared to allow the 220 kV Pakuranga – Whakamaru Circuit 1 to be removed from service to assist with managing high voltages.	N
03/03/14	02:28		
17/03/14	00:22		
19/03/14	11:30	A grid emergency was declared to revert to a single frequency keeper in the North Island due to an unplanned outage affecting the Multiple Frequency keeping application.	N
23/03/14	17:26	A grid emergency was declared to allow the 110 kV Arapuni bus split to be closed due to lightning in the vicinity.	N

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

Island	Region	Apr-13	May-13	Jun-13	Jul-13	Aug-13	Sep-13	Oct-13	Nov-13	Dec-13	Jan-14	Feb-14	Mar-14	Total
North Island	Northland	-	-	-	-	-	-	-	-	-	-	-	-	**0**
	Auckland	-	-	1	-	-	-	-	-	-	-	-	-	**1**
	Zone 1	-	-	-	-	-	-	-	4	5	15	8	3	**35**
	Waikato	5	5	-	4	1	2	-	6	2	3	-	1	**29**
	Bay of Plenty	-	-	-	-	-	-	-	-	-	-	-	-	**0**
	Hawkes Bay	-	-	-	-	-	-	-	-	-	-	-	-	**0**
	Taranaki	-	-	-	-	-	-	-	-	-	-	-	-	**0**
	Bunnythorpe	-	-	-	-	-	-	1	-	-	1	-	-	**2**
	Wellington	1	-	-	-	-	-	-	-	-	-	-	-	**1**
	North Island (all)	-	-	1	-	-	-	-	2	1	1	1	1	**7**
South Island & HVDC	Nelson Marlborough	-	-	-	-	-	-	-	-	-	-	-	-	**0**
	West Coast	-	-	-	-	-	-	-	-	-	-	-	-	**0**
	Christchurch	-	-	-	-	-	-	-	-	-	-	-	-	**0**
	Canterbury	-	-	-	-	-	-	-	-	-	-	-	-	**0**
	Zone 3	-	-	-	-	-	-	-	-	-	1	-	-	**1**
	Otago	-	-	-	-	-	-	-	-	-	-	-	-	**0**
	Southland	-	-	-	-	-	-	-	-	-	-	-	-	**0**
	South Island (all)	-	-	-	-	-	-	-	-	1	-	-	-	**1**
	HVDC	-	-	-	-	-	-	-	-	-	-	-	-	**0**

3.3 Customer Advice Notices (CANs)

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

- Four advised of planned outages of HVDC Pole 2 & Pole 3;
- Four advised of AC Filter Bank outages that would impact the HVDC risk subtractor;
- Two advised of a planned synchronous condenser outage at Haywards that would impact HVDC transfer levels;
- Three provided updates on the status of the Roxburgh Import Overload Protection Scheme;
- Two advised a planned Market Systems outage on 12th April;
- One advised the restoration of full HVDC Pole 3 Capability that had been restricted since 19th February;
- One advised that the Haywards STATCOM was being removed from service for remedial work;
- And one advised of the scheduled change to the shoulder rating period on 15th March.

3.4 Standby Residual Check (SRC) notices

No SRC notices were issued during the reporting period based on the SDS (System Operator's own load forecasting tool).

3.5 Voltage Management

Grid voltages did not exceed the 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 that 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	Apr-13	May-13	Jun-13	Jul-13	Aug-13	Sep-13	Oct-13	Nov-13	Dec-13	Jan-14	Feb-14	Mar-14	Total
North Island	Northland	7	5	1	3	3	7	5	7	4	9	7	8	**66**
	Auckland	3	10	11	5	3	5	9	6	1	-	1	5	**59**
	Waikato	7	10	6	8	6	8	11	7	5	9	9	12	**98**
	Bay of Plenty	5	6	2	7	5	4	8	8	7	2	2	7	**63**
	Hawkes Bay	7	4	6	-	1	-	5	7	2	5	4	6	**47**
	Taranaki	6	1	3	-	-	-	3	2	3	5	5	4	**32**
	Bunnythorpe	3	3	4	1	3	3	5	6	6	7	6	7	**54**
	Wellington	13	11	9	4	4	9	8	9	4	10	13	13	**107**
Total		51	50	42	28	25	36	54	52	32	47	47	62	**526**
South Island	Nelson Marlborough	6	7	2	1	4	3	8	11	7	8	3	7	**67**
	West Coast	8	11	8	4	3	3	7	12	6	8	2	11	**83**
	Christchurch	7	3	2	3	2	4	8	7	3	7	3	4	**53**
	Canterbury	3	5	4	1	3	3	4	4	3	4	2	4	**40**
	Otago	4	5	-	2	4	5	2	1	-	-	-	3	**26**
	Southland	9	2	3	8	5	5	3	-	1	4	2	6	**48**
Total		37	33	19	18	21	23	32	35	20	31	12	35	**316**

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	Hawkes Bay	FHL_RDF2.1__RDF_TUI2.1__RDF_TUI2__RDF__LN	This is an SFT generated constraint. Its purpose is to protect Fernhill-Redclyffe 2 for a tripping of Redclyffe-Tuai 2.	4
		FHL_RDF1.1__FHL_RDF2.1__FHL_RDF2__RDF__LN	This is an SFT generated constraint. Its purpose is to protect Fernhill-Redclyffe 1 for a tripping of Fernhill-Redclyffe 2.	1
		RDF_T3&T4_M_P_1	The effect of this constraint is to manage flows through Redclyffe T3 & T4 to prevent the in service transformer from overloading for a contingency of the other transformer.	2
South Island & HVDC	Nelson	COB_STK2.2__COB_UTK1.1__COB_UTK1__COB__LN	This is an SFT generated constraint. Its purpose is to protect Cobb-Stoke 2 for a tripping of Cobb-Upper Takaka 1.	4
	Otago	LIV_NSY.1__CYD_ROX1.1__CYDROX1!__NSY__LN	This is an SFT generated constraint. Its purpose is to protect Livingston-Naseby 1 for a tripping of Clyde-Roxburgh 1.	27
		LIV_WTK.1__CYD_ROX1.1__CYDROX1!__WTK__LN	This is an SFT generated constraint. Its purpose is to protect Livingston-Waitaki 1 for a tripping of Clyde-Roxburgh 1.	3
		LIV_NSY.1__CYD_ROX1.1__CYDROX1#__NSY__LN	This is an SFT generated constraint. Its purpose is to protect Livingston-Naseby 1 for a tripping of Clyde-Roxburgh 1.	59
		LIV_WTK.1__CYD_ROX1.1__CYDROX1#__WTK__LN	This is an SFT generated constraint. Its purpose is to protect Livingston-Waitaki 1 for a tripping of Clyde-Roxburgh 1.	13
		AVI_WTK.1__CYD_ROX1.1__CYDROX1#__AVI__LN	This is an SFT generated constraint. Its purpose is to protect Aviemore-Waitaki 1 for a tripping of Clyde-Roxburgh 1.	8
		LIV_NSY.1__CYD_ROX1.1__:S__CYDROX1!__NSY__LN	This is an SFT generated constraint. Its purpose is to protect Livingston-Naseby 1 for a tripping of Clyde-Roxburgh 1.	2
		LIV_WTK.1__ASB_ISL1.1__ASBISL1#__WTK__LN	This is an SFT generated constraint. Its purpose is to protect Livingston-Waitaki 1 for a tripping of Ashburton-Islington 1.	6
	Southland	CYD_ROX1.1__CYD_ROX2.1__CYDROX2#__CYD__LN	This is an SFT generated constraint. Its purpose is to protect Clyde-Roxburgh 1 for a tripping of Clyde-Roxburgh 2.	1
		CYD_ROX_2_ROX_IMPORT_SCHEME_ENABLED_S_O_4	The effect of this constraint is to manage flows through Livingston - Naseby 1 for a contingency of Clyde - Roxburgh 1 during low Southland generation when Clyde - Roxburgh 2 is out of service and the Roxburgh Import Overload Protection Scheme is enabled.	1
		CYD_ROX_2_ROX_IMPORT_SCHEME_ENABLED_W_O_4	The effect of this constraint is to manage flows through Livingston - Naseby 1 for a contingency of Clyde - Roxburgh 1 during low Southland generation when Clyde - Roxburgh 2 is out of service and the Roxburgh Import Overload Protection Scheme is enabled.	5
	West Coast	COL_HOR3.1__COL_HOR2.1__COL_HOR2__COL__LN	This is an SFT generated constraint. Its purpose is to protect Coleridge-Hororata 3 for a tripping of Coleridge-Hororata 2	14
Grand Total				**150**

Constraints binding during last 12 months

The following table shows binding constraints, with duration of more than 4 trading periods, over the reporting period, and constraints binding for more than 48 trading periods during the previous 12 months.

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	Bunnythorpe	RPO_TNG1.1__THI_WKM1.1__THI_WKM1__RPO__LN	0	0.00%	133	0.76%
	Hawkes Bay	FHL_RDF2.1__RDF_TUI2.1__RDF_TUI2__RDF__LN	4	0.27%	1	0.01%
South Island & HVDC	Nelson	COB_STK2.2__COB_UTK1.1__COB_UTK1__COB__LN	4	0.27%	3	0.02%
	West Coast	COL_HOR3.1__COL_HOR2.1__COL_HOR2__COL__LN	14	0.94%	25	0.14%
	Otago	NSY_ROX.1__CYD_TWZ1.1__CYD_TWZ1__ROX__LN	0	0.00%	102	0.58%
		NSY_ROX.1__CYD_TWZ2.1__CYD_TWZ2__ROX__LN	0	0.00%	196	1.12%
		AVI_WTK.1__CYD_ROX1.1__CYDROX1#__AVI__LN	8	0.54%	8	0.05%
		LIV_NSY.1__CYD_ROX1.1__CYDROX1!__NSY__LN	27	1.81%	34	0.19%
		LIV_NSY.1__CYD_ROX1.1__CYDROX1#__NSY__LN	59	3.97%	10	0.06%
		LIV_WTK.1__CYD_ROX1.1__CYDROX1#__WTK__LN	13	0.87%	14	0.08%
		LIV_WTK.1__ASB_ISL1.1__ASBISL1#__WTK__LN	6	0.40%	0	0.00%
	Southland	CYD_ROX_2_ROX_IMPORT_SCHEME_ENABLED_W_O_4	5	0.34%	0	0.00%
	HVDC	BEN_HAYP2max	0	0.00%	132	0.75%
		BEN_HAYmax	0	0.00%	284	1.62%
		BEN_HAYP3max	0	0.00%	242	1.38%
		BEN_HAYP3min	0	0.00%	59	0.34%

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)
07/03/14	15:36	An emergency shutdown of a Tiwai potline resulted in a momentary rise in frequency in the South Island.	S	50.55 Hz
24/03/14	12:24	Huntly Unit 2 tripped resulting in a momentary drop in frequency in the North Island.	N	49.39 Hz

Connection point events

Date	Time	Summary Details	Generation / Load interrupted (MW)	Restoration time (minutes)
31/03/14	07:20	Gisborne-Tuai 1 tripped during a planned outage of Gisborne-Tuai 2 resulting in a loss of supply to Gisborne Substation.	34	47

4.2 System Events during reporting period

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

Contingent events

Event	Number	Summary
Loss of single AC transmission circuit	8	These related to trippings of • Edgecumbe-Kawerau 2 • Gisborne-Tuai 1 • Gore-Roxburgh 1 (auto reclose) • Halfway Bush-Palmerston 2 (auto reclose) • Invercargill-Roxburgh 2 (auto reclose) • Kawerau-Ohakuri 1 • Te Kaha-Waiotahi 1 (1 x auto reclose, 1 x trip)
HVDC Start/ Stop	1	This related to • HVDC Pole 2 tripped
Supply Transformer	0	
Loss of grid reactive plant	2	These related to trippings of • Haywards Static Synchronous Compensator STC31 • Islington Static Var Compensator SVC3
Loss of single generation units	11	These related to trippings of • Glenbrook Co-generation • Huntly U2 • Kinleith Co-generation • Kapuni generation • Rangipo G6 • Stratford CCGT steam turbine • Southdown GE105 • Tekapo B G2, G3 (3 x)
Total during reporting period	**22**	

Extended contingent events

Event	Number	Summary

Event	Number	Summary
Loss of both HVDC poles	0	
Loss of interconnecting transformer	0	
Loss of bus bar section	1	This related to tripping of • Kawerau 220 kV B Bus
Total during reporting period	**1**	

Other events

Event	Number	Summary
Loss of multiple AC transmission circuits	0	
Demand change	1	This related to tripping of • Tiwai NZAS Potline 1 (2 x)
Generation	0	
Total during reporting period	**1**	

Other disturbances

Event	Number	Summary
Feeder trippings	77	Various locations
Total during reporting period	**77**	

4.3 System Events – Trend

	Apr-13	May-13	Jun-13	Jul-13	Aug-13	Sep-13	Oct-13	Nov-13	Dec-13	Jan-14	Feb-14	Mar-14	Total	Average Events per month
Contingent Event – transmission	23	24	27	19	16	64	24	39	30	4	6	8	**284**	23.7
Contingent Event – generation	12	7	14	17	17	10	12	10	12	11	8	11	**141**	11.8
Contingent Event – Supply transformer	10	3	1	3	3	5	1	3	5	3	3	0	**40**	3.3
Contingent Event – Reactive plant	6	5	6	10	6	7	8	8	7	0	5	2	**70**	5.8
Contingent Event - HVDC	11	9	13	0	0	4	18	22	6	1	2	1	**87**	7.3
Extended Contingent Event HVDC	0	0	0	0	0	1	0	1	0	0	0	0	**2**	0.2
Extended Contingent Event Inter-connecting Transformers	1	0	0	1	0	0	0	1	1	1	0	0	**5**	0.5
Extended Contingent Event Busbar	2	0	1	0	0	3	0	0	1	1	1	1	**10**	0.8
Other Event – AC transmission	1	2	1	2	1	5	3	4	2	3	1	0	**25**	2.1
Other Event – Demand	1	0	2	2	1	1	1	1	0	2	2	1	**14**	1.2
Other Event – Generation	1	1	2	0	0	2	0	0	0	1	0	0	**7**	0.6