
Electricity Distribution Services Default Price-Quality Path Determination 2012

# Annual Compliance Statement

## 29 May 2015

Assessment as at 31 March 2015

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# 1. INTRODUCTION

## 1.1. Background

1.1.1 This Annual Compliance Statement ("the Statement") is submitted by Vector Limited ("Vector") pursuant to *clause 11* of the Electricity Distribution Services Default Price-Quality Path Determination 2012 ("the Determination").

1.1.2 The Determination is issued pursuant to Part 4 of the Commerce Act 1986 and requires non-exempt suppliers of lines services ("EDB's") to provide information to the Commerce Commission ("the Commission") relevant to the assessment of their performance against the price path and quality standards.

1.1.3 Under *clause 8* of the Determination an EDB's notional revenue must not exceed the allowable notional revenue during the current assessment period.

1.1.4 Under *clause 9* of the Determination an EDB's assessed reliability values either must not exceed the reliability limits for the current assessment period or must not have exceeded the reliability limit for either of the two immediately preceding extant assessment periods.

1.1.5 The Statement has been prepared on 29 May 2015. In the Statement, references to Vector relate only to Vector's electricity distribution business.

## 1.2. Statement of compliance

1.2.1 As required by *clause 11.2(a)* of the Determination, this Statement confirms Vector's compliance with the price path in *clause 8* and Vector's non-compliance with the quality standards in *clause 9* in respect of the assessment period ending on 31 March 2015.

1.2.2 As required by *clause 11.3(j)(i)* of the Determination this statement confirms that *clauses 10.1, 10.2, 10.3* and *10.4* did not apply in respect of the assessment period ending on 31 March 2015.

1.2.3 With reference to *clause 11.3(k)* of the Determination, it is confirmed that no System Fixed Assets were transferred from Transpower to Vector during this assessment period.

## 1.3. Disclaimer

1.3.1 The information contained in this Statement has been prepared for the express purpose of complying with the requirements of *clause 11* of the Determination. This statement has not been prepared for any other purpose. Vector expressly disclaims any liability to any other party who may rely on this statement for any other purpose.

1.3.2 For presentation purposes some numbers in this document have been rounded. In most cases calculations are based on more detailed numbers. This may cause small discrepancies or rounding inconsistencies when aggregating some of the information presented in this document. These discrepancies do not affect the overall compliance calculations which are based on the more detailed information.

# 2. PRICE PATH

## 2.1. Introduction

2.1.1 In this section Vector demonstrates that it has complied with the price path requirements (*clause 8*) of the Determination. Vector has provided information to support the statement of compliance including: the amount of allowable notional revenue, the amount of notional revenue, prices, quantities, units of measurement associated with all numeric data, the actual amount of pass-through and recoverable costs, the amount of forecast pass-through and recoverable costs used when setting prices, an explanation of variances between forecast and actual pass-through and recoverable costs and an illustration of an alternative compliance calculation based on updated recoverable cost values for 2013/14.

## 2.2. Price path (*clause 8* of the Determination)

2.2.1 As required by *clause 8* of the Determination, in order to demonstrate compliance with the price path, EDB's must demonstrate that their notional revenue during the assessment period has not exceeded the allowable notional revenue for the assessment period. The current assessment period is the fifth assessment period and covers the 12 months to 31 March 2015.

2.2.2 As outlined in the calculation below, Vector complies with the price path:

$$NR_t \leq R_t$$

$$NR_{2014/15} \leq R_{2014/15}$$

$$\$395,648,920 \leq \$395,755,282$$

2.2.3 Notional revenue for the 2015 assessment period:

$$NR_t = \sum P_{i,t} Q_{i,t-2} - K_t - V_t$$

$$NR_{2014/15} = \sum P_{i,2014/15} Q_{i,2012/13} - K_{2014/15} - V_{2014/15}$$

$$NR_{2014/15} = \$606,715,263 - \$12,000,899 - \$199,065,443$$

$$NR_{2014/15} = \$395,648,920$$

a) Details of $\sum P_{i,2014/15} Q_{i,2012/13}$ are included in Appendices 1 to 5

b) Details of $K_{2014/15}$ and $V_{2014/15}$ are included in Section 2.4

2.2.4 Allowable notional revenue for the 2015 assessment period is set out in Equation 3 of Schedule 1D of the Determination:

$$R_{2014/15} = (\Sigma P_{i,2013/14} Q_{i,2012/13} - K_{2013/14} - V_{2013/14} + (R_{2013/14} - NR_{2013/14}))(1 + \Delta CPI_{2014/15})(1 - X)$$

$$R_{2014/15} = (\$585,108,128 - \$9,683,096 - \$183,464,906 + (\$396,704,998 - \$396,694,157))(1 + 0.009655)(1 - 0)$$

$$R_{2014/15} = \$395,755,282$$

a) Details of $\Sigma P_{i,2013/14} Q_{i,2012/13}$ are included in Appendices 6 to 10
b) Details of $K_{2013/14}$ and $V_{2013/14}$ are included in Section 2.4
c) Details of $R_{2013/14}$ and $NR_{2013/14}$ are included in Vector's 2014 Annual Compliance Statement
d) Details of $\Delta CPI_{2014/15}$ are included in Appendix 11
e) X is the rate of change for the fifth assessment period, and is specified as 0% in Schedule 1B of the Determination.

2.2.5 Information relating to prices including all relevant quantities and units of measurement is included in Appendices 1 to 10.

## 2.3. Restructuring of prices

2.3.1 Vector has not restructured the prices that apply during the 2015 assessment period. Vector restructured the prices that applied during the 2014 assessment period. Vector has used the same approach as described in the 2014 Annual Compliance Statement to determine the quantities that apply to restructured prices.

## 2.4. Pass-through and recoverable costs

2.4.1 Table 1 below provides the breakdown of pass-through and recoverable costs for the 2015 assessment period. Vector has included the amounts for $K_{2013/14}$ and $V_{2013/14}$ from Vector's 2014 Annual Compliance Statement.

**Table 1: Summary of $K_{2013/14}$, $K_{2014/15}$, $V_{2013/14}$ and $V_{2014/15}$ for the 2015 assessment period**

| | $K_{2013/14}$ | $K_{2014/15}$ |
|---|---|---|
| **Sum** | **$ 9,683,096** | **$ 12,000,899** |

**Pass through costs**

| Description | $K_{2013/14}$ | $K_{2014/15}$ |
|---|---|---|
| Rates | $ 7,005,502 | $ 8,532,131 |
| Electricity Authority | $ 1,032,541 | $ 1,708,910 |
| Commerce Act Levies | $ 1,431,310 | $ 1,552,381 |
| EGCC Levies | $ 213,744 | $ 207,477 |

| | $V_{2013/14}$ | $V_{2014/15}$ |
|---|---|---|
| **Sum** | **$183,464,906** | **$ 199,065,443** |

**Recoverable costs**

| Description | $V_{2013/14}$ | $V_{2014/15}$ |
|---|---|---|
| Transmission charges | $ 183,464,906 | $ 214,845,706 |
| Clawback | $ - | $ (15,780,263) |

2.4.2 Table 2 below provides a comparison between the forecast pass-through and recoverable costs when prices were determined in December 2013 ($K_{2014/15,forecast}$ and $V_{2014/15,forecast}$) and actual pass-through and recoverable costs ($K_{2014/15}$ and $V_{2014/15}$) for the 2015 assessment period.

**Table 2: Summary of $K_{2014/15,forecast}$, $K_{2014/15}$ , $V_{2014/15,forecast}$ and $V_{2014/15}$ for the 2015 assessment period**

| | $K_{2014/15,\ forecast}$ | $K_{2014/15}$ |
|---|---|---|
| **Sum** | **$ 11,551,309** | **$ 12,000,899** |

**Pass through costs**

| Description | $K_{2014/15,\ forecast}$ | $K_{2014/15}$ |
|---|---|---|
| Rates | $ 8,384,963 | $ 8,532,131 |
| Electricity Authority | $ 1,330,109 | $ 1,708,910 |
| Commerce Act Levies | $ 1,615,145 | $ 1,552,381 |
| EGCC Levies | $ 221,092 | $ 207,477 |

| | $V_{2014/15,\ forecast}$ | $V_{2014/15}$ |
|---|---|---|
| **Sum** | **$199,144,540** | **$ 199,065,443** |

**Recoverable costs**

| Description | $V_{2014/15,\ forecast}$ | $V_{2014/15}$ |
|---|---|---|
| Transmission charges | $ 214,924,803 | $ 214,845,706 |
| Clawback | $ (15,780,263) | $ (15,780,263) |

2.4.3 Variances between pass-through and recoverable costs used to set prices ($K_{2014/15,forecast}$ and $V_{2014/15,forecast}$ respectively) and the same costs measured at the end of the assessment period ($K_{2014/15}$ and $V_{2014/15}$ respectively) arise due to the need to forecast these costs, ex-ante, but the actual costs are determined ex-post. None of the costs are fully fixed and variances will naturally occur. We set out the main reason for these variances further below.

2.4.4 Variances in rates primarily arise due to the rates payable at the Hobson Street and Wairau Road GXPs. There was a larger increase in capital values for these

properties resulting in greater than expected rates for these properties. Further variance results from the end of contractual mechanisms that affected the timing of rate payments. This resulted in a rates wash-up in the 2014/15 year.

2.4.5 Variances in Electricity Authority levies arise due to an unexpected increase in the 'Registry and Consumer' levy after 2014/15 prices were set. Vector's forecast was based on the Authority's appropriations paper[1], published in September 2013. The actual invoiced levy rate was much higher than proposed in the appropriations paper due to the actual costs associated with the Registry being higher than anticipated.

2.4.6 Variances in 2014/15 Commerce Act levies arise because the actual levy amount granted to the Commission was less than Vector's forecast. Vector's forecast was based on the Commission's final funding review paper[2], published in September 2013. This was adjusted to allow for variances in previous amounts granted to the Commission when compared with previous amounts requested.

2.4.7 Commerce Act levies for the year ending 31 March 2010 have been included in $K_{2015}$ consistent with *clause 8.7* of the Determination. The amount of the Commerce Act levies that has been included is $281,527, which is 1/5 of the 2010 total of $1,407,633.

2.4.8 Variances in Electricity and Gas Complaints Commission levies arise due to the difference in the final levy rate (per 10,000 ICPs). Vector's forecast assumed an increase to the 2013/14 levy of CPI whereas the actual 2014/15 levy rate decreased due to a lower than forecast case load during 2013/14.

2.4.9 Variances in transmission charges result from changes to accruals in anticipation of transmission costs Vector expected to pay at the time prices were set. A contractual position has now been determined making it clear the costs will not be incurred.

2.4.10 Claw-back has been calculated in accordance with Equation 4 as set out in Schedule 1E of the Determination. The information used to determine the amount of claw back has been sourced from the Determination, information disclosed pursuant to the relevant information disclosure determination for the

[1] 2014/15 Levy-Funded Appropriations, Electricity Authority Work Programme, and EECA Work Programme - Consultation Paper, 10 September 2013. See http://www.ea.govt.nz/dmsdocument/15705

[2] Commerce Act Part 4 Funding review paper, September 2013. See http://www.comcom.govt.nz/regulated-industries/pan-industry-projects/part-4-baseline-review

disclosure year 2013 and actual Pass-through and actual Recoverable costs and Indirect Transmission Charges for 2012/13 determined in accordance with the Electricity Distribution Services Input Methodologies Determination 2012.

## 2.5. Changes to 2013/14 pass-through and recoverable costs

2.5.1 Vector's compliance position as presented in Section 2.2.2 above assumes that the pass-through and recoverable costs for 2013/14 are as disclosed in Vector's 2014 Annual Compliance Statement. However since the 2014 Annual Compliance Statement was submitted to the Commission, there has been several potential changes to 2013/14 recoverable costs.

2.5.2 Vector excluded approximately $3.3m of costs relating to the early (staged) commissioning of assets at Transpower's Wairau Road and Albany GXPs from the 2014 Annual Compliance Statement due to a dispute. In November 2014, the High Court ruled against Vector in respect of the disputed costs. The court ruling meant the disputed costs could have been included in the 2014 Annual Compliance Statement as recoverable costs. This would impact Vector's 2014/15 compliance position by decreasing Allowable Notional Revenue for 2014/15 by $107,947. Vector has lodged an appeal of the High Court's decision in the Court of Appeal, however we do not expect the appeal to be heard until late in the 2015 calendar year.

2.5.3 Consistent with the forecast variance described in paragraph 2.4.9, the same issue has arisen for the 2013/14 transmission costs and would result in a reduction in 2013/14 recoverable costs of $119,881. This would impact Vector's 2014/15 compliance position by increasing Allowable Notional Revenue for 2014/15 by $3,980.

2.5.4 For completeness, we illustrate the effect of these historical changes in recoverable costs in Appendix 12 to demonstrate that they would not have resulted in any breach of the price path had they been considered at the time, or subsequently.

# 3. QUALITY STANDARDS

## 3.1. Introduction

3.1.1 In this section Vector demonstrates that it has not complied with the quality standards, *clause 9* of the Determination. Vector has provided information to illustrate the statement of non-compliance including: assessed values and reliability limits for the assessment period, the annual reliability assessment for the two immediately preceding extant assessment periods, relevant SAIDI and SAIFI statistics and calculations, and a description of the policies and procedures for recording SAIDI and SAIFI statistics for the assessment period.

## 3.2. Quality standards (*clause 9* of the Determination)

3.2.1 As required by *clause 9* of the Determination, in order to demonstrate compliance with the quality standards in respect of each assessment period, EDB's must demonstrate per *clause 9.1* that their quality standards either:

a) Comply with the annual reliability assessment specified in *clause 9.2* for that assessment period; or

b) Have complied with those annual reliability assessments for the two immediately preceding extant assessment periods.

3.2.2 Vector does not comply with either of the quality standards in *clause 9.1*. As outlined in the calculations below, Vector has exceeded the annual reliability assessment requirement for SAIDI specified in *clause 9.2* of the Determination for the 2015 assessment period. Vector also exceeded this annual reliability assessment requirement for SAIDI for the previous assessment period, which ended on 31 March 2014.

## 3.3. Assessed values

3.3.1 SAIDI and SAIFI values were calculated for the 2015 assessment period, incorporating Class B and Class C interruption types (planned interruptions and unplanned interruptions originating within the system fixed assets) per connection point served during the period. Average connection point numbers for the year were used in the calculation.

3.3.2 During the assessment period, an incident occurred at the Penrose grid exit point substation which is the subject of an inquiry by the Electricity Authority (EA). Vector's disclosed SAIDI and SAIFI figures include this incident, but remain subject to the outcome of that inquiry.

| Period | Non-Normalised Class B&C SAIDI | Non-Normalised Class B&C SAIFI |
|---|---|---|
| 2015 | 496 | 1.87 |

3.3.3 Normalisation of the SAIDI assessment data set was then completed, as four instances[3] of daily SAIDI exceeded $B_{SAIDI}$ during the assessment period. For these instances, the major event SAIDI value was replaced with $B_{SAIDI}$.

3.3.4 Normalisation of the SAIFI assessment data set was completed, as one instance of daily SAIFI occurred (between 10 - 13 June 2014) where both $B_{SAIDI}$ and $B_{SAIFI}$ were exceeded. An explanation of the reasons for exceeding the SAIDI and SAIFI (in one instance) boundary value is provided in Appendix 13.

| Major Events detailing the SAIDI / SAIFI values replaced by the Boundary Value | | | | | |
|---|---|---|---|---|---|
| Date | SAIDI | $B_{SAIDI}$ | SAIFI | $B_{SAIFI}$ | Comment |
| 17 – 18 April 2014 | 30.5 | 8.91 | | | $B_{SAIFI}$ not exceeded |
| 10 – 13 June 2014 | 93.1 | 8.91 | 0.213 | 0.181 | $B_{SAIFI}$ exceeded |
| 08 – 11 July 2014 | 34.6 | 8.91 | | | $B_{SAIFI}$ not exceeded |
| 05 - 07 October 2014[4] | 218.4 | 8.91 | | | $B_{SAIFI}$ not exceeded |

3.3.5 Normalised results of this assessment period and previous assessment periods are summarised below. An explanation of the reasons for exceeding the SAIDI reliability limit for the 2015 assessment period is provided in Appendix 14. As described in Section 3.3.2, the incident at the Penrose grid exit point substation is the subject of an inquiry by the Electricity Authority (EA). Vector's disclosed SAIDI and SAIFI figures include this incident, but remain subject to the outcome of that inquiry.

| Period | Normalised $SAIDI_{ASSESS}$ | $SAIDI_{LIMIT}$ | SAIDI Outcome | Normalised $SAIFI_{ASSESS}$ | $SAIFI_{LIMIT}$ | SAIFI Outcome |
|---|---|---|---|---|---|---|
| 2011 | 113.8 | 127 | Not Exceeded | 1.24 | 1.86 | Not Exceeded |
| 2012 | 95.7 | 127 | Not Exceeded | 1.12 | 1.86 | Not Exceeded |
| 2013 | 95.8 | 127 | Not Exceeded | 1.01 | 1.86 | Not Exceeded |

[3] The fourth instance refers to the Penrose incident. Refer to 3.3.2 for more information.

[4] Refers to the Penrose Incident. Refer to 3.3.2 for more information.

| | | | | | | |
|---|---|---|---|---|---|---|
| 2014 | 141 | 127 | **Exceeded** | 1.45 | 1.86 | Not Exceeded |
| 2015 | 155 | 127 | **Exceeded** | 1.84 | 1.86 | Not Exceeded |

## 3.4. SAIDI reliability limit calculation

3.4.1 For the purposes of assessing compliance with the quality standards, Vector has calculated reliability limits and assessed values for SAIDI consistent with the process set out in S*chedule 2* of the Determination.

3.4.2 The non-zero dataset was constructed from those days where SAIDI value was greater than zero, using the reference dataset from 1 April 2004 to 31 March 2009:

| Year | Sum of SAIDI |
|---|---|
| 04/05 | 96.3 |
| 05/06 | 145.7 |
| 06/07 | 141.0 |
| 07/08 | 252.1 |
| 08/09 | 153.4 |

3.4.3 Vector's boundary values were calculated in accordance with the following formula:

$$B_{SAIDI} = e^{(\alpha SAIDI + 2.5\beta SAIDI)}$$

$$B_{SAIDI} = e^{(-2.15+4.34)}$$

$$B_{SAIDI} = 8.91$$

3.4.4 Vector's reference dataset was then normalised to account for the following days where the daily SAIDI value was greater than $B_{SAIDI}$:

| Year | Event Date | SAIDI |
|---|---|---|
| 05/06 | 8/10/2005<br>24/01/2006 | 16.5<br>21.5 |
| 05/06 Total | | 38.0 |
| 06/07 | 12/06/2006<br>9/11/2006 | 18.3<br>12.4 |
| 06/07 Total | | 30.7 |
| 07/08 | 10/07/2007 | 150.4 |
| 07/08 Total | | 150.4 |
| 08/09 | 26/07/2008 | 52.8 |
| 08/09 Total | | 52.8 |

3.4.5 Vector's reliability limits were calculated in accordance with the following formula:

$$SAIDI_{LIMIT} = \mu_{SAIDI} + \sigma_{SAIDI}$$

$SAIDI_{LIMIT} = 114+13.3$

$SAIDI_{LIMIT} = 127$

3.4.6 $\mu_{SAIDI}$ was calculated in accordance with the following formula:

$\mu_{SAIDI}$ = ∑normalised daily SAIDI in reference data set / 5

$\mu_{SAIDI}$ = 570/5

$\mu_{SAIDI}$ = 114

3.4.7 $\sigma_{SAIDI}$ was calculated in accordance with the following formula:

$\sigma_{SAIDI}$ = standard deviation of daily SAIDI in reference data set × √365

$\sigma_{SAIDI}$ = 0.699×19.1

$\sigma_{SAIDI}$ = 13.3

## 3.5. SAIFI reliability limit calculation

3.5.1 For the purposes of assessing compliance with the quality standards, Vector has calculated reliability limits and assessed values for SAIFI consistent with the process set out in S*chedule 2* of the Determination.

3.5.2 The non-zero dataset was constructed from those days where SAIFI value was greater than zero, using the reference dataset from 1 April 2004 to 31 March 2009:

| Year | Sum of SAIFI |
|---|---|
| 04/05 | 1.39 |
| 05/06 | 1.84 |
| 06/07 | 1.66 |
| 07/08 | 1.80 |
| 08/09 | 1.68 |

3.5.3 Vector's boundary values were calculated in accordance with the following formula:

$B_{SAIFI} = e^{(\alpha SAIFI+2.5\beta SAIFI)}$

$B_{SAIFI} = e^{(-6.50+4.80)}$

$B_{SAIFI}$ = 0.181

3.5.4 Vector's reference dataset was then normalised to account for the following days where the daily SAIDI value was greater than $B_{SAIDI}$ (see 3.4.3) and the daily SAIFI value was greater than $B_{SAIFI}$ (see 3.5.3):

| Year | Event Date | SAIDI | SAIFI |
|---|---|---|---|
| 07/08 | 10/07/2007 | 150 | 0.254 |
| 07/08 Total | | 150 | 0.254 |
| 08/09 | 26/07/2008 | 52.8 | 0.205 |
| 08/09 Total | | 52.8 | 0.205 |

3.5.5 Vector's reliability limits were calculated in accordance with the following formula:

$$SAIFI_{LIMIT} = \mu_{SAIFI} + \sigma_{SAIFI}$$

$$SAIFI_{LIMIT} = 1.66 + 0.203$$

$$SAIFI_{LIMIT} = 1.86$$

3.5.6 $\mu_{SAIFI}$ was calculated in accordance with the following formula:

$$\mu_{SAIFI} = \sum \text{normalised daily SAIFI in reference data set} / 5$$

$$\mu_{SAIFI} = 8.28/5$$

$$\mu_{SAIFI} = 1.66$$

3.5.7 $\sigma_{SAIFI}$ was calculated in accordance with the following formula:

$\sigma_{SAIFI}$ = standard deviation of daily SAIFI in reference data set × $\sqrt{365}$

$\sigma_{SAIFI}$ = 0.011×19.10

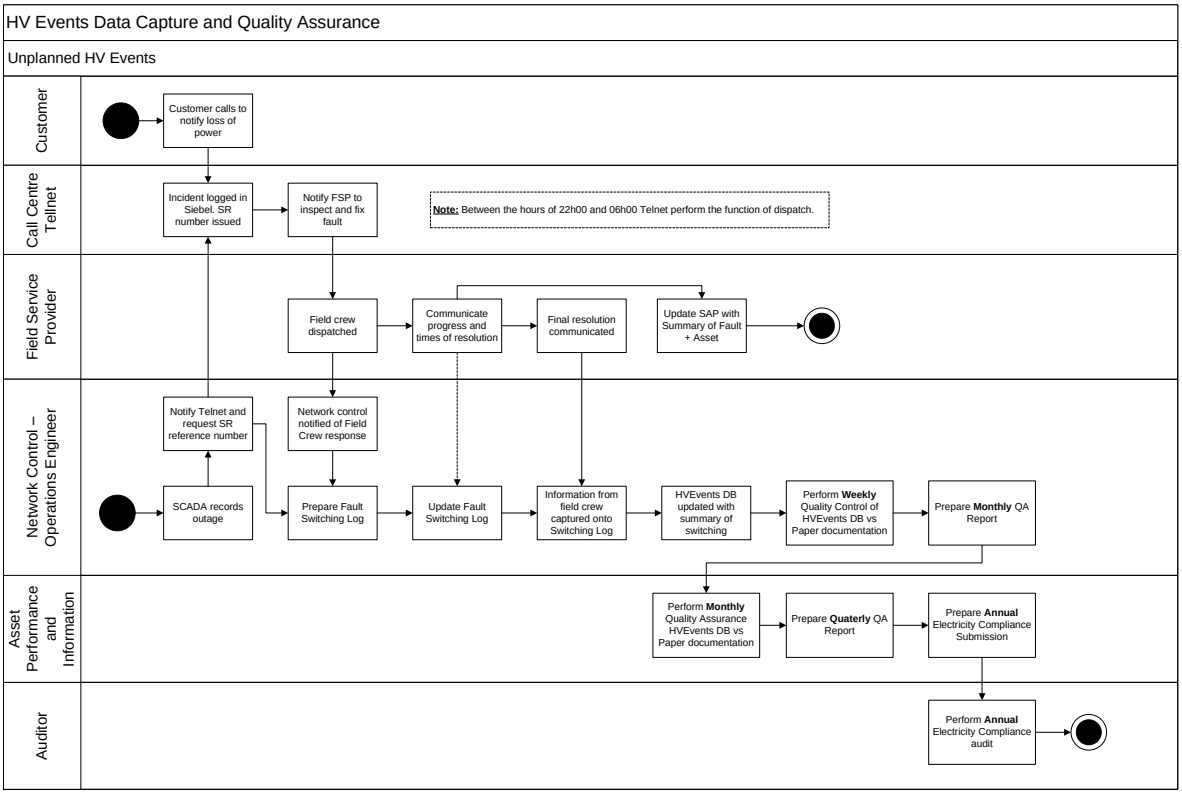
$\sigma_{SAIFI}$ = 0.203

## 3.6. Policies and procedures for recording SAIDI and SAIFI

3.6.1 Vector's Electricity Operations Centre (EOC) is responsible for managing the electricity network. Resolution of planned and unplanned events is under direction of the duty control room engineer. The EOC also manages the network in accordance with Vector's standard ENG-0051 'Electricity network guidelines: HV Events data capture and quality assurance'. This standard defines the end-to-end process for capturing and reporting reliability performance data.

3.6.2 The majority of medium voltage and high voltage interruptions are monitored and controlled in real-time by the EOC through Vector's SCADA system. Where equipment is involved that is not SCADA enabled, it is operated by Vector's service providers, with communication to the EOC by radio. All planned and unplanned records are captured by the network control engineer both in hard copy (electricity fault switching log) and electronically (the HVEvents database described below). All interruptions are also logged and tracked separately in Vector's Customer Management System by Vector's customer services team.

3.6.3 Vector maintains a bespoke system for recording interruptions, HVEvents, which holds a replica of Vector's high voltage and medium voltage network structure, including customer numbers. The EOC engineers record details of all network interruptions, in accordance with the standard ENG-0051. For each interruption, the event type, location, duration and number of customers affected is identified. HVEvents is also used to prioritise network reconfiguration and restoration after an event. The figure below illustrates the HVEvents data capture process and the quality assurance carried out on outage information.




3.6.4 SAIDI and SAIFI are calculated in HVEvents for each interruption, and the data retained in a database for reporting and analysis.

3.6.5 Network performance and quality assurance is provided through ongoing review of all the data captured in HVEvents by the network performance team, comprising representatives from Asset Investment, Customer Services and Network Operations. Significant equipment-related incidents are cross-checked with the relevant asset engineer in order to identify root causes of incidents, and to put in place corrective actions as appropriate.

3.6.6 At year-end the period's average network customer base is calculated using the Gentrack billing and revenue system (averaging customers at the start and end of the year). The following reliability metrics are extracted from the HVEvents database for disclosure reporting:

- Interruption frequency and duration by class;
- Interruption frequency and duration by cause;
- Interruption frequency and duration by main equipment involved; and
- SAIDI/SAIFI/CAIDI (calculated using average customer count).

# 4. APPENDICES

## Appendix 1: Summary of $P_{i,2014/15}Q_{i,2012/13}$ for the 2015 assessment period

| | $P_{i,2014/15}Q_{i,2012/13}$ |
|---|---|
| **Sum** | **$ 606,715,263** |

| | $P_{i,2014/15}Q_{i,2012/13}$ |
|---|---|
| Northern published charges between 1 April 2014 to 31 March 2015 | $ 202,202,055 |
| Auckland published charges between 1 April 2014 to 31 March 2015 | $ 376,093,524 |
| Northern non-standard charges between 1 April 2014 to 31 March 2015 | $ 1,979,504 |
| Auckland non-standard charges between 1 April 2014 to 31 March 2015 | $ 26,440,179 |

# Appendix 2: Northern published charges from 1 April 2014

| | $P_{i,2014/15} Q_{i,2012/13}$ |
|---|---|
| **Sum** | **$ 202,202,055** |

**Residential**

| Price plan | Code | Description | Units | $P_{i,2014/15}$ | $Q_{i,2012/13}$ | $P_{i,2014/15} Q_{i,2012/13}$ |
|---|---|---|---|---|---|---|
| WRCL | WRCL-FIXD | Fixed | $/day | 0.1500 | 37,404,977 | $ 5,610,747 |
| WRCL | WRCL-AICO | Variable, controlled | $/kWh | 0.0930 | 523,315,378 | $ 48,668,330 |
| WRUL | WRUL-FIXD | Fixed | $/day | 0.1500 | 5,752,136 | $ 862,820 |
| WRUL | WRUL-24UC | Variable, uncontrolled | $/kWh | 0.1022 | 74,303,607 | $ 7,593,829 |
| WRCS | WRCS-FIXD | Fixed | $/day | 0.8500 | 23,015,937 | $ 19,563,546 |
| WRCS | WRCS-AICO | Variable, controlled | $/kWh | 0.0611 | 733,985,636 | $ 44,846,522 |
| WRUS | WRUS-FIXD | Fixed | $/day | 0.8500 | 2,630,441 | $ 2,235,875 |
| WRUS | WRUS-24UC | Variable, uncontrolled | $/kWh | 0.0703 | 89,589,545 | $ 6,298,145 |
| WRHL | WRHL-FIXD | Fixed | $/day | 0.1500 | - | $ - |
| WRHL | WRHL-OFPK | Variable, off peak | $/kWh | 0.0818 | - | $ - |
| WRHL | WRHL-SHLD | Variable, shoulder | $/kWh | 0.1022 | - | $ - |
| WRHL | WRHL-PEAK | Variable, peak | $/kWh | 0.1363 | - | $ - |
| WRHS | WRHS-FIXD | Fixed | $/day | 0.8500 | - | $ - |
| WRHS | WRHS-OFPK | Variable, off peak | $/kWh | 0.0562 | - | $ - |
| WRHS | WRHS-SHLD | Variable, shoulder | $/kWh | 0.0703 | - | $ - |
| WRHS | WRHS-PEAK | Variable, peak | $/kWh | 0.0937 | - | $ - |

**Business**

| Price plan | Code | Description | Units | $P_{i,2014/15}$ | $Q_{i,2012/13}$ | $P_{i,2014/15} Q_{i,2012/13}$ |
|---|---|---|---|---|---|---|
| WBSU | WBSU-FIXD | Fixed | $/day/fitting | 0.1400 | 12,637,145 | $ 1,769,200 |
| WBSU | WBSU-24UC | Variable | $/kWh | 0.0835 | 18,758,867 | $ 1,566,365 |
| WBSN | WBSN-FIXD | Fixed | $/day | 0.8500 | 7,716,604 | $ 6,559,113 |
| WBSN | WBSN-24UC | Variable | $/kWh | 0.0703 | 390,872,303 | $ 27,478,323 |

**Low voltage**

| Price plan | Code | Description | Units | $P_{i,2014/15}$ | $Q_{i,2012/13}$ | $P_{i,2014/15} Q_{i,2012/13}$ |
|---|---|---|---|---|---|---|
| WLVN | WLVN-FIXD | Fixed | $/day | 5.5000 | 287,006 | $ 1,578,533 |
| WLVN | WLVN-24UC | Variable | $/kWh | 0.0464 | 151,679,511 | $ 7,037,929 |
| WLVN | WLVN-CAPY | Capacity | $/kVA/day | 0.0190 | 41,624,400 | $ 790,864 |
| WLVN | WLVN-PWRF | Power Factor | $/kVAr/day | 0.2917 | 738,678 | $ 215,472 |
| WLVH | WLVH-FIXD | Fixed | $/day | 10.3800 | 42,806 | $ 444,326 |
| WLVH | WLVH-24UC | Variable | $/kVAr/day | 0.0060 | 74,285,706 | $ 445,714 |
| WLVH | WLVH-CAPY | Capacity | $/kVA/day | 0.0190 | 11,737,022 | $ 223,003 |
| WLVH | WLVH-DAMD | Demand | $/kVA/day | 0.2819 | 5,607,027 | $ 1,580,621 |
| WLVH | WLVH-PWRF | Power Factor | $/kVAr/day | 0.2917 | 618,905 | $ 180,534 |

**Transformer**

| Price plan | Code | Description | Units | $P_{i,2014/15}$ | $Q_{i,2012/13}$ | $P_{i,2014/15} Q_{i,2012/13}$ |
|---|---|---|---|---|---|---|
| WTXN | WTXN-FIXD | Fixed | $/day | 4.9500 | 61,588 | $ 304,861 |
| WTXN | WTXN-24UC | Variable | $/kWh | 0.0418 | 58,606,256 | $ 2,449,741 |
| WTXN | WTXN-CAPY | Capacity | $/kVA/day | 0.0171 | 16,365,930 | $ 279,857 |
| WTXN | WTXN-PWRF | Power Factor | $/kVAr/day | 0.2917 | 601,536 | $ 175,468 |
| WTXH | WTXH-FIXD | Fixed | $/day | 9.3400 | 72,003 | $ 672,508 |
| WTXH | WTXH-24UC | Variable | $/kVAr/day | 0.0060 | 320,148,426 | $ 1,920,891 |
| WTXH | WTXH-CAPY | Capacity | $/kVA/day | 0.0171 | 61,151,370 | $ 1,045,688 |
| WTXH | WTXH-DAMD | Demand | $/kVA/day | 0.2734 | 25,768,742 | $ 7,045,174 |
| WTXH | WTXH-PWRF | Power Factor | $/kVAr/day | 0.2917 | 1,570,444 | $ 458,099 |

**High voltage**

| Price plan | Code | Description | Units | $P_{i,2014/15}$ | $Q_{i,2012/13}$ | $P_{i,2014/15} Q_{i,2012/13}$ |
|---|---|---|---|---|---|---|
| WHVN | WHVN-FIXD | Fixed | $/day | 4.8000 | - | $ - |
| WHVN | WHVN-24UC | Variable | $/kWh | 0.0405 | - | $ - |
| WHVN | WHVN-CAPY | Capacity | $/kVA/day | 0.0166 | - | $ - |
| WHVN | WHVN-PWRF | Power Factor | $/kVAr/day | 0.2917 | - | $ - |
| WHVH | WHVH-FIXD | Fixed | $/day | 9.0600 | 5,054 | $ 45,789 |
| WHVH | WHVH-24UC | Variable | $/kVAr/day | 0.0060 | 81,913,193 | $ 491,479 |
| WHVH | WHVH-CAPY | Capacity | $/kVA/day | 0.0166 | 10,571,850 | $ 175,493 |
| WHVH | WHVH-DAMD | Demand | $/kVA/day | 0.2652 | 5,664,938 | $ 1,502,342 |
| WHVH | WHVH-DEXA | Excess demand | $/kVA/day | 0.6633 | 1,712 | $ 1,135 |
| WHVH | WHVH-PWRF | Power Factor | $/kVAr/day | 0.2917 | 286,994 | $ 83,716 |

# Appendix 3: Auckland published charges from 1 April 2014

| | $P_{i,2014/15}Q_{i,2012/13}$ |
|---|---|
| **Sum** | **$ 376,093,524** |

**Residential**

| Price plan | Code | Description | Units | $P_{i,2014/15}$ | $Q_{i,2012/13}$ | $P_{i,2014/15}Q_{i,2012/13}$ |
|---|---|---|---|---|---|---|
| ARCL | ARCL-FIXD | Fixed | $/day | 0.1500 | 51,260,981 | $ 7,689,147 |
| ARCL | ARCL-AICO | Variable, controlled | $/kWh | 0.0911 | 712,698,602 | $ 64,926,843 |
| ARUL | ARUL-FIXD | Fixed | $/day | 0.1500 | 15,524,959 | $ 2,328,744 |
| ARUL | ARUL-24UC | Variable, uncontrolled | $/kWh | 0.1002 | 170,295,853 | $ 17,063,645 |
| ARCS | ARCS-FIXD | Fixed | $/day | 0.8500 | 28,959,643 | $ 24,615,697 |
| ARCS | ARCS-AICO | Variable, controlled | $/kWh | 0.0592 | 911,803,699 | $ 53,978,779 |
| ARUS | ARUS-FIXD | Fixed | $/day | 0.8500 | 4,541,521 | $ 3,860,293 |
| ARUS | ARUS-24UC | Variable, uncontrolled | $/kWh | 0.0683 | 157,605,013 | $ 10,764,422 |
| ARHL | ARHL-FIXD | Fixed | $/day | 0.1500 | - | $ - |
| ARHL | ARHL-OFPK | Variable, off peak | $/kWh | 0.0802 | - | $ - |
| ARHL | ARHL-SHLD | Variable, shoulder | $/kWh | 0.1002 | - | $ - |
| ARHL | ARHL-PEAK | Variable, peak | $/kWh | 0.1336 | - | $ - |
| ARHS | ARHS-FIXD | Fixed | $/day | 0.8500 | - | $ - |
| ARHS | ARHS-OFPK | Variable, off peak | $/kWh | 0.0546 | - | $ - |
| ARHS | ARHS-SHLD | Variable, shoulder | $/kWh | 0.0683 | - | $ - |
| ARHS | ARHS-PEAK | Variable, peak | $/kWh | 0.0911 | - | $ - |

**Business**

| Price plan | Code | Description | Units | $P_{i,2014/15}$ | $Q_{i,2012/13}$ | $P_{i,2014/15}Q_{i,2012/13}$ |
|---|---|---|---|---|---|---|
| ABSU | ABSU-FIXD | Fixed | $/day/fitting | 0.1400 | 21,664,573 | $ 3,033,040 |
| ABSU | ABSU-24UC | Variable | $/kWh | 0.0752 | 34,639,859 | $ 2,604,917 |
| ABSN | ABSN-FIXD | Fixed | $/day | 0.8500 | 12,551,230 | $ 10,668,546 |
| ABSN | ABSN-24UC | Variable | $/kWh | 0.0683 | 770,483,718 | $ 52,624,038 |

**Low voltage**

| Price plan | Code | Description | Units | $P_{i,2014/15}$ | $Q_{i,2012/13}$ | $P_{i,2014/15}Q_{i,2012/13}$ |
|---|---|---|---|---|---|---|
| ALVN | ALVN-FIXD | Fixed | $/day | 1.5600 | 611,848 | $ 954,483 |
| ALVN | ALVN-24UC | Variable | $/kWh | 0.0661 | 211,389,495 | $ 13,972,846 |
| ALVN | ALVN-CAPY | Capacity | $/kVA/day | 0.0332 | 92,185,897 | $ 3,060,572 |
| ALVN | ALVN-PWRF | Power Factor | $/kVAr/day | 0.2917 | 141,094 | $ 41,157 |
| ALVH | ALVH-SMDY | Variable, summer day | $/kWh | 0.0213 | 242,495,183 | $ 5,165,147 |
| ALVH | ALVH-SMNT | Variable, summer night | $/kWh | 0.0084 | 87,594,615 | $ 735,795 |
| ALVH | ALVH-WNDY | Variable, winter day | $/kWh | 0.0213 | 179,932,382 | $ 3,832,560 |
| ALVH | ALVH-WNNT | Variable, winter night | $/kWh | 0.0084 | 65,616,065 | $ 551,175 |
| ALVH | ALVH-CAPY | Capacity | $/kVA/day | 0.0332 | 132,177,467 | $ 4,388,292 |
| ALVH | ALVH-DAMD | Demand | $/kVA/day | 0.3063 | 52,734,307 | $ 16,152,518 |
| ALVH | ALVH-PWRF | Power Factor | $/kVAr/day | 0.2917 | 8,008,650 | $ 2,336,123 |

**Transformer**

| Price plan | Code | Description | Units | $P_{i,2014/15}$ | $Q_{i,2012/13}$ | $P_{i,2014/15}Q_{i,2012/13}$ |
|---|---|---|---|---|---|---|
| ATXN | ATXN-FIXD | Fixed | $/day | 1.5100 | 48,672 | $ 73,495 |
| ATXN | ATXN-24UC | Variable | $/kWh | 0.0641 | 17,390,445 | $ 1,114,728 |
| ATXN | ATXN-CAPY | Capacity | $/kVA/day | 0.0322 | 11,205,041 | $ 360,802 |
| ATXN | ATXN-PWRF | Power Factor | $/kVAr/day | 0.2917 | 9,862 | $ 2,877 |
| ATXH | ATXH-SMDY | Variable, summer day | $/kWh | 0.0208 | 418,736,052 | $ 8,709,710 |
| ATXH | ATXH-SMNT | Variable, summer night | $/kWh | 0.0083 | 172,020,755 | $ 1,427,772 |
| ATXH | ATXH-WNDY | Variable, winter day | $/kWh | 0.0208 | 305,116,851 | $ 6,346,430 |
| ATXH | ATXH-WNNT | Variable, winter night | $/kWh | 0.0083 | 125,865,708 | $ 1,044,685 |
| ATXH | ATXH-CAPY | Capacity | $/kVA/day | 0.0322 | 190,543,642 | $ 6,135,505 |
| ATXH | ATXH-DAMD | Demand | $/kVA/day | 0.2978 | 83,513,217 | $ 24,870,236 |
| ATXH | ATXH-PWRF | Power Factor | $/kVAr/day | 0.2917 | 8,133,364 | $ 2,372,502 |

**High voltage**

| Price plan | Code | Description | Units | $P_{i,2014/15}$ | $Q_{i,2012/13}$ | $P_{i,2014/15}Q_{i,2012/13}$ |
|---|---|---|---|---|---|---|
| AHVN | AHVN-FIXD | Fixed | $/day | 1.4600 | 1,228 | $ 1,793 |
| AHVN | AHVN-24UC | Variable | $/kWh | 0.0622 | 395,654 | $ 24,610 |
| AHVN | AHVN-CAPY | Capacity | $/kVA/day | 0.0312 | 455,320 | $ 14,206 |
| AHVN | AHVN-PWRF | Power Factor | $/kVAr/day | 0.2917 | - | $ - |
| AHVH | AHVH-SMDY | Variable, summer day | $/kWh | 0.0204 | 164,176,871 | $ 3,349,208 |
| AHVH | AHVH-SMNT | Variable, summer night | $/kWh | 0.0082 | 73,352,816 | $ 601,493 |
| AHVH | AHVH-WNDY | Variable, winter day | $/kWh | 0.0204 | 120,598,779 | $ 2,460,215 |
| AHVH | AHVH-WNNT | Variable, winter night | $/kWh | 0.0082 | 54,024,940 | $ 443,005 |
| AHVH | AHVH-CAPY | Capacity | $/kVA/day | 0.0312 | 48,989,235 | $ 1,528,464 |
| AHVH | AHVH-DAMD | Demand | $/kVA/day | 0.2896 | 31,586,660 | $ 9,147,497 |
| AHVH | AHVH-DEXA | Excess demand | $/kVA/day | 0.6633 | 117,698 | $ 78,069 |
| AHVH | AHVH-PWRF | Power Factor | $/kVAr/day | 0.2917 | 2,185,273 | $ 637,444 |

# Appendix 4: Northern non-standard charges from 1 April 2014

| | $P_{I,2014/15} Q_{I,2012/13}$ |
|---|---|
| **Sum** | **$ 1,979,504** |

**Non-standard**

| Price plan | Code | Description | Units | $P_{I,2014/15}$ | $Q_{I,2012/13}$ | $P_{I,2014/15} Q_{I,2012/13}$ |
|---|---|---|---|---|---|---|
| WN01 | | | $/year | 383,550 | 1 | $ 383,550 |
| WN02 | | | $/year | 118,721 | 1 | $ 118,721 |
| WN03 | | | $/year | 200,024 | 1 | $ 200,024 |
| WN04 | | | $/year | 467,624 | 1 | $ 467,624 |
| WN05 | | | $/year | - | 1 | $ - |
| WN06 | | | $/year | - | 1 | $ - |
| WN07 | | | $/year | 44,947 | 1 | $ 44,947 |
| WN08 | | | $/year | 30,172 | 1 | $ 30,172 |
| WN09 | | | $/year | 758,023 | 1 | $ 758,023 |
| WPR1 | | | $/year | (23,558) | 1 | $ (23,558) |

# Appendix 5: Auckland non-standard charges from 1 April 2014

| | $P_{i,2014/15}Q_{i,2012/13}$ |
|---|---|
| **Sum** | **$ 26,440,179** |

**Non-standard**

| Price plan | Code | Description | Units | $P_{i,2014/15}$ | $Q_{i,2012/13}$ | $P_{i,2014/15}Q_{i,2012/13}$ |
|---|---|---|---|---|---|---|
| AN01 | | | $/year | 472,407 | 1 | $ 472,407 |
| AN02 | | | $/year | - | 1 | $ - |
| AN03 | | | $/year | 536,512 | 1 | $ 536,512 |
| AN04 | | | $/year | 104,468 | 1 | $ 104,468 |
| AN05 | | | $/year | 921,015 | 1 | $ 921,015 |
| AN06 | | | $/year | 2,740,509 | 1 | $ 2,740,509 |
| AN07 | | | $/year | - | 1 | $ - |
| AN08 | | | $/year | 153,382 | 1 | $ 153,382 |
| AN09 | | | $/year | 155,629 | 1 | $ 155,629 |
| AN10 | | | $/year | 573,597 | 1 | $ 573,597 |
| AN11 | | | $/year | 1,092,171 | 1 | $ 1,092,171 |
| AN12 | | | $/year | 447,262 | 1 | $ 447,262 |
| AN13 | | | $/year | 181,675 | 1 | $ 181,675 |
| AN14 | | | $/year | 987,447 | 1 | $ 987,447 |
| AN15 | | | $/year | - | 1 | $ - |
| AN19 | | | $/year | 91,061 | 1 | $ 91,061 |
| AN20 | | | $/year | 568,609 | 1 | $ 568,609 |
| AN21 | | | $/year | 634,973 | 1 | $ 634,973 |
| AN22 | | | $/year | 270,165 | 1 | $ 270,165 |
| AN23 | | | $/year | 1,673,138 | 1 | $ 1,673,138 |
| AN24 | | | $/year | 187,172 | 1 | $ 187,172 |
| AN25 | | | $/year | 1,099,420 | 1 | $ 1,099,420 |
| AN26 | | | $/year | - | 1 | $ - |
| AN27 | | | $/year | 282,607 | 1 | $ 282,607 |
| AN28 | | | $/year | 661,264 | 1 | $ 661,264 |
| AN29 | | | $/year | 555,967 | 1 | $ 555,967 |
| AN30 | | | $/year | 1,405,043 | 1 | $ 1,405,043 |
| AN31 | | | $/year | 35,312 | 1 | $ 35,312 |
| AN32 | | | $/year | 4,421,429 | 1 | $ 4,421,429 |
| AN33 | | | $/year | 135,398 | 1 | $ 135,398 |
| AN34 | | | $/year | 642,914 | 1 | $ 642,914 |
| AN35 | | | $/year | 205,324 | 1 | $ 205,324 |
| AN36 | | | $/year | 240,354 | 1 | $ 240,354 |
| AN37 | | | $/year | 203,505 | 1 | $ 203,505 |
| AN38 | | | $/year | 969,879 | 1 | $ 969,879 |
| AN39 | | | $/year | 409,259 | 1 | $ 409,259 |
| AN40 | | | $/year | 311,813 | 1 | $ 311,813 |
| AN41 | | | $/year | 318,276 | 1 | $ 318,276 |
| AN42 | | | $/year | 229,923 | 1 | $ 229,923 |
| AN43 | | | $/year | - | 1 | $ - |
| AN44 | | | $/year | 1,484,302 | 1 | $ 1,484,302 |
| AN45 | | | $/year | 861,712 | 1 | $ 861,712 |
| AN46 | | | $/year | 48,586 | 1 | $ 48,586 |
| AN47 | | | $/year | 173,144 | 1 | $ 173,144 |
| AN48 | | | $/year | - | 1 | $ - |
| AN49 | | | $/year | - | 1 | $ - |
| APR1 | | | $/year | (46,442) | 1 | $ (46,442) |

## Appendix 6: Summary of $P_{i,2013/14}Q_{i,2012/13}$ for the 2015 assessment period

| | $P_{i,2013/14}Q_{i,2012/13}$ |
|---|---|
| **Sum** | **$ 585,108,128** |

| | $P_{i,2013/14}Q_{i,2012/13}$ |
|---|---|
| Northern published charges between 1 April 2013 to 31 March 2014 | $ 198,829,857 |
| Auckland published charges between 1 April 2013 to 31 March 2014 | $ 359,642,431 |
| Northern non-standard charges between 1 April 2013 to 31 March 2014 | $ 1,829,577 |
| Auckland non-standard charges between 1 April 2013 to 31 March 2014 | $ 24,806,263 |

# Appendix 7: Northern published charges from 1 April 2013

| | $P_{i,2013/14} Q_{i,2012/13}$ |
|---|---|
| **Sum** | **$ 198,829,857** |

**Residential**

| Price plan | Code | Description | Units | $P_{i,2013/14}$ | $Q_{i,2012/13}$ | $P_{i,2013/14} Q_{i,2012/13}$ |
|---|---|---|---|---|---|---|
| WRCL | WRCL-FIXD | Fixed | $/day | 0.1500 | 37,404,977 | $ 5,610,747 |
| WRCL | WRCL-AICO | Variable, controlled | $/kWh | 0.0913 | 523,315,378 | $ 47,778,694 |
| WRUL | WRUL-FIXD | Fixed | $/day | 0.1500 | 5,752,136 | $ 862,820 |
| WRUL | WRUL-24UC | Variable, uncontrolled | $/kWh | 0.1004 | 74,303,607 | $ 7,460,082 |
| WRCS | WRCS-FIXD | Fixed | $/day | 0.8000 | 23,015,937 | $ 18,412,750 |
| WRCS | WRCS-AICO | Variable, controlled | $/kWh | 0.0617 | 733,985,636 | $ 45,286,914 |
| WRUS | WRUS-FIXD | Fixed | $/day | 0.8000 | 2,630,441 | $ 2,104,353 |
| WRUS | WRUS-24UC | Variable, uncontrolled | $/kWh | 0.0708 | 89,589,545 | $ 6,342,940 |
| WRCH | WRCH-FIXD | Fixed | $/day | 0.8000 | - | $ - |
| WRCH | WRCH-OFPK | Variable, off peak (controlled) | $/kWh | 0.0494 | - | $ - |
| WRCH | WRCH-SHLD | Variable, shoulder (controlled) | $/kWh | 0.0617 | - | $ - |
| WRCH | WRCH-PEAK | Variable, peak (controlled) | $/kWh | 0.0815 | - | $ - |
| WRUH | WRUH-FIXD | Fixed | $/day | 0.8000 | - | $ - |
| WRUH | WRUH-OFPK | Variable, off peak (uncontrolled) | $/kWh | 0.0566 | - | $ - |
| WRUH | WRUH-SHLD | Variable, shoulder (uncontrolled) | $/kWh | 0.0708 | - | $ - |
| WRUH | WRUH-PEAK | Variable, peak (uncontrolled) | $/kWh | 0.0935 | - | $ - |

**Business**

| Price plan | Code | Description | Units | $P_{i,2013/14}$ | $Q_{i,2012/13}$ | $P_{i,2013/14} Q_{i,2012/13}$ |
|---|---|---|---|---|---|---|
| WBSU | WBSU-FIXD | Fixed | $/day/fitting | 0.1300 | 12,637,145 | $ 1,642,829 |
| WBSU | WBSU-24UC | Variable | $/kWh | 0.0873 | 18,758,867 | $ 1,637,649 |
| WBSN | WBSN-FIXD | Fixed | $/day | 0.8000 | 7,716,604 | $ 6,173,283 |
| WBSN | WBSN-24UC | Variable | $/kWh | 0.0708 | 390,872,303 | $ 27,673,759 |

**Low voltage**

| Price plan | Code | Description | Units | $P_{i,2013/14}$ | $Q_{i,2012/13}$ | $P_{i,2013/14} Q_{i,2012/13}$ |
|---|---|---|---|---|---|---|
| WLVC | WLVC-FIXD | Fixed | $/day | 6.0000 | 56,455 | $ 338,730 |
| WLVC | WLVC-24UC | Variable | $/kWh | 0.0389 | 56,630,503 | $ 2,202,927 |
| WLVC | WLVC-CAPY | Capacity | $/kVA/day | 0.0183 | 12,258,861 | $ 224,337 |
| WLVC | WLVC-PWRF | Power Factor | $/kVAr/day | 0.0658 | 349,304 | $ 22,984 |
| WLVN | WLVN-FIXD | Fixed | $/day | 5.0000 | 230,551 | $ 1,152,755 |
| WLVN | WLVN-24UC | Variable | $/kWh | 0.0573 | 95,049,008 | $ 5,446,308 |
| WLVN | WLVN-CAPY | Capacity | $/kVA/day | 0.0183 | 29,365,539 | $ 537,389 |
| WLVN | WLVN-PWRF | Power Factor | $/kVAr/day | 0.0658 | 389,373 | $ 25,621 |
| WLVH | WLVH-FIXD | Fixed | $/day | 10.0000 | 42,806 | $ 428,060 |
| WLVH | WLVH-24UC | Variable | $/kWh | 0.0062 | 74,285,706 | $ 460,571 |
| WLVH | WLVH-CAPY | Capacity | $/kVA/day | 0.0183 | 11,737,022 | $ 214,788 |
| WLVH | WLVH-DAMD | Demand | $/kVA/day | 0.2716 | 5,607,027 | $ 1,522,868 |
| WLVH | WLVH-PWRF | Power Factor | $/kVAr/day | 0.0658 | 618,905 | $ 40,724 |

**Transformer**

| Price plan | Code | Description | Units | $P_{i,2013/14}$ | $Q_{i,2012/13}$ | $P_{i,2013/14} Q_{i,2012/13}$ |
|---|---|---|---|---|---|---|
| WTXC | WTXC-FIXD | Fixed | $/day | 5.4000 | 50,797 | $ 274,304 |
| WTXC | WTXC-24UC | Variable | $/kWh | 0.0350 | 54,119,454 | $ 1,894,181 |
| WTXC | WTXC-CAPY | Capacity | $/kVA/day | 0.0165 | 12,571,390 | $ 207,428 |
| WTXC | WTXC-PWRF | Power Factor | $/kVAr/day | 0.0658 | 510,691 | $ 33,603 |
| WTXN | WTXN-FIXD | Fixed | $/day | 4.5000 | 10,791 | $ 48,560 |
| WTXN | WTXN-24UC | Variable | $/kWh | 0.0516 | 4,486,802 | $ 231,519 |
| WTXN | WTXN-CAPY | Capacity | $/kVA/day | 0.0165 | 3,794,540 | $ 62,610 |
| WTXN | WTXN-PWRF | Power Factor | $/kVAr/day | 0.0658 | 90,846 | $ 5,978 |
| WTXH | WTXH-FIXD | Fixed | $/day | 9.0000 | 72,003 | $ 648,027 |
| WTXH | WTXH-24UC | Variable | $/kWh | 0.0056 | 320,148,426 | $ 1,792,831 |
| WTXH | WTXH-CAPY | Capacity | $/kVA/day | 0.0165 | 61,151,370 | $ 1,008,998 |
| WTXH | WTXH-DAMD | Demand | $/kVA/day | 0.2635 | 25,768,742 | $ 6,790,064 |
| WTXH | WTXH-PWRF | Power Factor | $/kVAr/day | 0.0658 | 1,570,444 | $ 103,335 |

**High voltage**

| Price plan | Code | Description | Units | $P_{i,2013/14}$ | $Q_{i,2012/13}$ | $P_{i,2013/14} Q_{i,2012/13}$ |
|---|---|---|---|---|---|---|
| WHVN | WHVN-FIXD | Fixed | $/day | 4.3700 | - | $ - |
| WHVN | WHVN-24UC | Variable | $/kWh | 0.0501 | - | $ - |
| WHVN | WHVN-CAPY | Capacity | $/kVA/day | 0.0160 | - | $ - |
| WHVN | WHVN-PWRF | Power Factor | $/kVAr/day | 0.0658 | - | $ - |
| WHVH | WHVH-FIXD | Fixed | $/day | 8.7300 | 5,054 | $ 44,121 |
| WHVH | WHVH-24UC | Variable | $/kWh | 0.0054 | 81,913,193 | $ 442,331 |
| WHVH | WHVH-CAPY | Capacity | $/kVA/day | 0.0160 | 10,571,850 | $ 169,150 |
| WHVH | WHVH-DAMD | Demand | $/kVA/day | 0.2556 | 5,664,938 | $ 1,447,958 |
| WHVH | WHVH-DEXA | Excess demand | $/kVA/day | 0.6390 | 1,712 | $ 1,094 |
| WHVH | WHVH-PWRF | Power Factor | $/kVAr/day | 0.0658 | 286,994 | $ 18,884 |

# Appendix 8: Auckland published charges from 1 April 2013

| | $P_{i,2013/14}Q_{i,2012/13}$ |
|---|---|
| **Sum** | **$ 359,642,431** |

**Residential**

| Price plan | Code | Description | Units | $P_{i,2013/14}$ | $Q_{i,2012/13}$ | $P_{i,2013/14}Q_{i,2012/13}$ |
|---|---|---|---|---|---|---|
| ARCL | ARCL-FIXD | Fixed | $/day | 0.1500 | 51,260,981 | $ 7,689,147 |
| ARCL | ARCL-AICO | Variable, controlled | $/kWh | 0.0878 | 712,698,602 | $ 62,574,937 |
| ARUL | ARUL-FIXD | Fixed | $/day | 0.1500 | 15,524,959 | $ 2,328,744 |
| ARUL | ARUL-24UC | Variable, uncontrolled | $/kWh | 0.0966 | 170,295,853 | $ 16,450,579 |
| ARCS | ARCS-FIXD | Fixed | $/day | 0.8000 | 28,959,643 | $ 23,167,714 |
| ARCS | ARCS-AICO | Variable, controlled | $/kWh | 0.0582 | 911,803,699 | $ 53,066,975 |
| ARUS | ARUS-FIXD | Fixed | $/day | 0.8000 | 4,541,521 | $ 3,633,217 |
| ARUS | ARUS-24UC | Variable, uncontrolled | $/kWh | 0.0670 | 157,605,013 | $ 10,559,536 |
| ARCH | ARCH-FIXD | Fixed | $/day | 0.8000 | - | $ - |
| ARCH | ARCH-OFPK | Variable, off peak (controlled) | $/kWh | 0.0466 | - | $ - |
| ARCH | ARCH-SHLD | Variable, shoulder (controlled) | $/kWh | 0.0582 | - | $ - |
| ARCH | ARCH-PEAK | Variable, peak (controlled) | $/kWh | 0.0769 | - | $ - |
| ARUH | ARUH-FIXD | Fixed | $/day | 0.8000 | - | $ - |
| ARUH | ARUH-OFPK | Variable, off peak (uncontrolled) | $/kWh | 0.0536 | - | $ - |
| ARUH | ARUH-SHLD | Variable, shoulder (uncontrolled) | $/kWh | 0.0670 | - | $ - |
| ARUH | ARUH-PEAK | Variable, peak (uncontrolled) | $/kWh | 0.0885 | - | $ - |

**Business**

| Price plan | Code | Description | Units | $P_{i,2013/14}$ | $Q_{i,2012/13}$ | $P_{i,2013/14}Q_{i,2012/13}$ |
|---|---|---|---|---|---|---|
| ABSU | ABSU-FIXD | Fixed | $/day/fitting | 0.1300 | 21,664,573 | $ 2,816,394 |
| ABSU | ABSU-24UC | Variable | $/kWh | 0.0733 | 34,639,859 | $ 2,539,102 |
| ABSN | ABSN-FIXD | Fixed | $/day | 0.8000 | 12,551,230 | $ 10,040,984 |
| ABSN | ABSN-24UC | Variable | $/kWh | 0.0670 | 770,483,718 | $ 51,622,409 |

**Low voltage**

| Price plan | Code | Description | Units | $P_{i,2013/14}$ | $Q_{i,2012/13}$ | $P_{i,2013/14}Q_{i,2012/13}$ |
|---|---|---|---|---|---|---|
| ALVN | ALVN-FIXD | Fixed | $/day | 1.5000 | 611,848 | $ 917,772 |
| ALVN | ALVN-24UC | Variable | $/kWh | 0.0637 | 211,389,495 | $ 13,465,511 |
| ALVN | ALVN-CAPY | Capacity | $/kVA/day | 0.0320 | 92,185,897 | $ 2,949,949 |
| ALVN | ALVN-PWRF | Power Factor | $/kVAr/day | 0.0658 | 141,094 | $ 9,284 |
| ALVH | ALVH-SMDY | Variable, summer day | $/kWh | 0.0147 | 242,495,183 | $ 3,564,679 |
| ALVH | ALVH-SMNT | Variable, summer night | $/kWh | 0.0023 | 87,594,615 | $ 201,468 |
| ALVH | ALVH-WNDY | Variable, winter day | $/kWh | 0.0405 | 179,932,382 | $ 7,287,261 |
| ALVH | ALVH-WNNT | Variable, winter night | $/kWh | 0.0023 | 65,616,065 | $ 150,917 |
| ALVH | ALVH-CAPY | Capacity | $/kVA/day | 0.0320 | 132,177,467 | $ 4,229,679 |
| ALVH | ALVH-DAMD | Demand | $/kVA/day | 0.2716 | 52,734,307 | $ 14,322,638 |
| ALVH | ALVH-PWRF | Power Factor | $/kVAr/day | 0.0658 | 8,008,650 | $ 526,969 |

**Transformer**

| Price plan | Code | Description | Units | $P_{i,2013/14}$ | $Q_{i,2012/13}$ | $P_{i,2013/14}Q_{i,2012/13}$ |
|---|---|---|---|---|---|---|
| ATXN | ATXN-FIXD | Fixed | $/day | 1.4600 | 48,672 | $ 71,061 |
| ATXN | ATXN-24UC | Variable | $/kWh | 0.0618 | 17,390,445 | $ 1,074,729 |
| ATXN | ATXN-CAPY | Capacity | $/kVA/day | 0.0310 | 11,205,041 | $ 347,356 |
| ATXN | ATXN-PWRF | Power Factor | $/kVAr/day | 0.0658 | 9,862 | $ 649 |
| ATXH | ATXH-SMDY | Variable, summer day | $/kWh | 0.0143 | 418,736,052 | $ 5,987,926 |
| ATXH | ATXH-SMNT | Variable, summer night | $/kWh | 0.0022 | 172,020,755 | $ 378,446 |
| ATXH | ATXH-WNDY | Variable, winter day | $/kWh | 0.0393 | 305,116,851 | $ 11,991,092 |
| ATXH | ATXH-WNNT | Variable, winter night | $/kWh | 0.0022 | 125,865,708 | $ 276,905 |
| ATXH | ATXH-CAPY | Capacity | $/kVA/day | 0.0310 | 190,543,642 | $ 5,906,853 |
| ATXH | ATXH-DAMD | Demand | $/kVA/day | 0.2635 | 83,513,217 | $ 22,005,733 |
| ATXH | ATXH-PWRF | Power Factor | $/kVAr/day | 0.0658 | 8,133,364 | $ 535,175 |

**High voltage**

| Price plan | Code | Description | Units | $P_{i,2013/14}$ | $Q_{i,2012/13}$ | $P_{i,2013/14}Q_{i,2012/13}$ |
|---|---|---|---|---|---|---|
| AHVN | AHVN-FIXD | Fixed | $/day | 1.4200 | 1,228 | $ 1,744 |
| AHVN | AHVN-24UC | Variable | $/kWh | 0.0599 | 395,654 | $ 23,700 |
| AHVN | AHVN-CAPY | Capacity | $/kVA/day | 0.0301 | 455,320 | $ 13,705 |
| AHVN | AHVN-PWRF | Power Factor | $/kVAr/day | 0.0658 | - | $ - |
| AHVH | AHVH-SMDY | Variable, summer day | $/kWh | 0.0139 | 164,176,871 | $ 2,282,059 |
| AHVH | AHVH-SMNT | Variable, summer night | $/kWh | 0.0021 | 73,352,816 | $ 154,041 |
| AHVH | AHVH-WNDY | Variable, winter day | $/kWh | 0.0381 | 120,598,779 | $ 4,594,813 |
| AHVH | AHVH-WNNT | Variable, winter night | $/kWh | 0.0021 | 54,024,940 | $ 113,452 |
| AHVH | AHVH-CAPY | Capacity | $/kVA/day | 0.0301 | 48,989,235 | $ 1,474,576 |
| AHVH | AHVH-DAMD | Demand | $/kVA/day | 0.2556 | 31,586,660 | $ 8,073,550 |
| AHVH | AHVH-DEXA | Excess demand | $/kVA/day | 0.6390 | 117,698 | $ 75,209 |
| AHVH | AHVH-PWRF | Power Factor | $/kVAr/day | 0.0658 | 2,185,273 | $ 143,791 |

# Appendix 9: Northern non-standard charges from 1 April 2013

| | $P_{i,2013/14} Q_{i,2012/13}$ |
|---|---|
| **Sum** | **$ 1,829,577** |

**Non-standard**

| Price plan | Code | Description | Units | $P_{i,2013/14}$ | $Q_{i,2012/13}$ | $P_{i,2013/14} Q_{i,2012/13}$ |
|---|---|---|---|---|---|---|
| WN01 | | | $/year | 376,740 | 1 | $ 376,740 |
| WN02 | | | $/year | 203,585 | 1 | $ 203,585 |
| WN03 | | | $/year | 195,439 | 1 | $ 195,439 |
| WN04 | | | $/year | 464,435 | 1 | $ 464,435 |
| WN05 | | | $/year | - | 1 | $ - |
| WN06 | | | $/year | - | 1 | $ - |
| WN07 | | | $/year | 55,697 | 1 | $ 55,697 |
| WN08 | | | $/year | 24,960 | 1 | $ 24,960 |
| WN09 | | | $/year | 668,111 | 1 | $ 668,111 |
| WPR1 | | | $/year | (159,389) | 1 | $ (159,389) |

# Appendix 10: Auckland non-standard charges from 1 April 2013

| | $P_{i,2013/14} Q_{i,2012/13}$ |
|---|---|
| **Sum** | **$ 24,806,263** |

**Non-standard**

| Price plan | Code | Description | Units | $P_{i,2013/14}$ | $Q_{i,2012/13}$ | $P_{i,2013/14} Q_{i,2012/13}$ |
|---|---|---|---|---|---|---|
| AN01 | | | $/year | 624,426 | 1 | $ 624,426 |
| AN02 | | | $/year | - | 1 | $ - |
| AN03 | | | $/year | 524,515 | 1 | $ 524,515 |
| AN04 | | | $/year | 104,600 | 1 | $ 104,600 |
| AN05 | | | $/year | 922,049 | 1 | $ 922,049 |
| AN06 | | | $/year | 2,592,470 | 1 | $ 2,592,470 |
| AN07 | | | $/year | - | 1 | $ - |
| AN08 | | | $/year | 159,073 | 1 | $ 159,073 |
| AN09 | | | $/year | 132,239 | 1 | $ 132,239 |
| AN10 | | | $/year | 399,617 | 1 | $ 399,617 |
| AN11 | | | $/year | 972,485 | 1 | $ 972,485 |
| AN12 | | | $/year | 423,643 | 1 | $ 423,643 |
| AN13 | | | $/year | 163,101 | 1 | $ 163,101 |
| AN14 | | | $/year | 817,374 | 1 | $ 817,374 |
| AN15 | | | $/year | - | 1 | $ - |
| AN19 | | | $/year | 83,771 | 1 | $ 83,771 |
| AN20 | | | $/year | 590,809 | 1 | $ 590,809 |
| AN21 | | | $/year | 542,836 | 1 | $ 542,836 |
| AN22 | | | $/year | 249,563 | 1 | $ 249,563 |
| AN23 | | | $/year | 1,549,927 | 1 | $ 1,549,927 |
| AN24 | | | $/year | 209,053 | 1 | $ 209,053 |
| AN25 | | | $/year | 1,097,846 | 1 | $ 1,097,846 |
| AN26 | | | $/year | - | 1 | $ - |
| AN27 | | | $/year | 344,933 | 1 | $ 344,933 |
| AN28 | | | $/year | 641,867 | 1 | $ 641,867 |
| AN29 | | | $/year | 498,655 | 1 | $ 498,655 |
| AN30 | | | $/year | 1,189,186 | 1 | $ 1,189,186 |
| AN31 | | | $/year | 35,018 | 1 | $ 35,018 |
| AN32 | | | $/year | 4,485,069 | 1 | $ 4,485,069 |
| AN33 | | | $/year | 140,788 | 1 | $ 140,788 |
| AN34 | | | $/year | 587,491 | 1 | $ 587,491 |
| AN35 | | | $/year | 206,913 | 1 | $ 206,913 |
| AN36 | | | $/year | 249,580 | 1 | $ 249,580 |
| AN37 | | | $/year | 217,431 | 1 | $ 217,431 |
| AN38 | | | $/year | 848,284 | 1 | $ 848,284 |
| AN39 | | | $/year | 401,789 | 1 | $ 401,789 |
| AN40 | | | $/year | 329,345 | 1 | $ 329,345 |
| AN41 | | | $/year | 292,193 | 1 | $ 292,193 |
| AN42 | | | $/year | 294,182 | 1 | $ 294,182 |
| AN43 | | | $/year | - | 1 | $ - |
| AN44 | | | $/year | 1,198,086 | 1 | $ 1,198,086 |
| AN45 | | | $/year | 783,850 | 1 | $ 783,850 |
| AN46 | | | $/year | 45,011 | 1 | $ 45,011 |
| AN47 | | | $/year | 163,665 | 1 | $ 163,665 |
| AN48 | | | $/year | - | 1 | $ - |
| AN49 | | | $/year | - | 1 | $ - |
| APR1 | | | $/year | (306,468) | 1 | $ (306,468) |

## Appendix 11: Consumer price index

Tradables, non-tradables, and all groups – index numbers and percentage changes[1][2]
Base: June 2006 quarter (=1000)

| | Tradables[3][4] | | | Non-tradables[5] | | | All groups[3][6][7] | | |
|---|---|---|---|---|---|---|---|---|---|
| | Index | Percentage change | | Index | Percentage change | | Index | Percentage change | |
| | | From previous quarter | From same quarter of previous year | | From previous quarter | From same quarter of previous year | | From previous quarter | From same quarter of previous year |
| Series ref: CPIQ | SE9NS6000 | | | SE9NS6500 | | | SE9A | | |
| 2009 Mar | 1037 | -0.4 | 1.7 | 1107 | 0.7 | 3.8 | 1075 | 0.3 | 3.0 |
| Jun | 1045 | 0.8 | 0.2 | 1112 | 0.5 | 3.3 | 1081 | 0.6 | 1.9 |
| Sep | 1062 | 1.6 | -0.1 | 1123 | 1.0 | 3.0 | 1095 | 1.3 | 1.7 |
| Dec | 1057 | -0.5 | 1.5 | 1124 | 0.1 | 2.3 | 1093 | -0.2 | 2.0 |
| 2010 Mar | 1058 | 0.1 | 2.0 | 1130 | 0.5 | 2.1 | 1097 | 0.4 | 2.0 |
| Jun | 1055 | -0.3 | 1.0 | 1137 | 0.6 | 2.2 | 1099 | 0.2 | 1.7 |
| Sep | 1065 | 0.9 | 0.3 | 1151 | 1.2 | 2.5 | 1111 | 1.1 | 1.5 |
| Dec | 1092 | 2.5 | 3.3 | 1176 | 2.2 | 4.6 | 1137 | 2.3 | 4.0 |
| 2011 Mar | 1097 | 0.5 | 3.7 | 1189 | 1.1 | 5.2 | 1146 | 0.8 | 4.5 |
| Jun | 1113 | 1.5 | 5.5 | 1196 | 0.6 | 5.2 | 1157 | 1.0 | 5.3 |
| Sep | 1114 | 0.1 | 4.6 | 1203 | 0.6 | 4.5 | 1162 | 0.4 | 4.6 |
| Dec | 1104 | -0.9 | 1.1 | 1205 | 0.2 | 2.5 | 1158 | -0.3 | 1.8 |
| 2012 Mar | 1100 | -0.4 | 0.3 | 1219 | 1.2 | 2.5 | 1164 | 0.5 | 1.6 |
| Jun | 1101 | 0.1 | -1.1 | 1225 | 0.5 | 2.4 | 1168 | 0.3 | 1.0 |
| Sep | 1101 | 0.0 | -1.2 | 1231 | 0.5 | 2.3 | 1171 | 0.3 | 0.8 |
| Dec | 1093 | -0.7 | -1.0 | 1235 | 0.3 | 2.5 | 1169 | -0.2 | 0.9 |
| 2013 Mar | 1088 | -0.5 | -1.1 | 1248 | 1.1 | 2.4 | 1174 | 0.4 | 0.9 |
| Jun | 1083 | -0.5 | -1.6 | 1256 | 0.6 | 2.5 | 1176 | 0.2 | 0.7 |
| Sep | 1096 | 1.2 | -0.5 | 1265 | 0.7 | 2.8 | 1187 | 0.9 | 1.4 |
| Dec | 1090 | -0.5 | -0.3 | 1271 | 0.5 | 2.9 | 1188 | 0.1 | 1.6 |
| 2014 Mar | 1082 | -0.7 | -0.6 | 1285 | 1.1 | 3.0 | 1192 | 0.3 | 1.5 |
| Jun | 1084 | 0.2 | 0.1 | 1290 | 0.4 | 2.7 | 1195 | 0.3 | 1.6 |
| Sep | 1085 | 0.1 | -1.0 | 1297 | 0.5 | 2.5 | 1199 | 0.3 | 1.0 |
| Dec | 1076 | -0.8 | -1.3 | 1301 | 0.3 | 2.4 | 1197 | -0.2 | 0.8 |
| 2015 Mar | 1052 | -2.2 | -2.8 | 1315 | 1.1 | 2.3 | 1193 | -0.3 | 0.1 |

1. Percentage changes are calculated from index numbers that are not rounded until the June 2006 quarter.
2. Five decimal places are retained before the June 2006 quarter, to preserve percentage changes that were originally published on earlier expression bases.
3. From the September 2006 quarter, prices for fresh fruit and vegetables are not seasonally adjusted. They were seasonally adjusted until the June 2006 quarter.
4. Tradables are goods and services that are imported or are in competition with foreign goods and services, either in domestic or foreign markets.
5. Non-tradables are goods and services that do not face foreign competition.
6. From September 1999 quarter, residential sections and interest are excluded.
7. The approach used to calculate CPI weights changed in 1974 from a consumption approach to an expenditure-based system.

**Source:** Statistics New Zealand

$$\Delta CPI_{2014/15} = \frac{CPI_{Dec,2012} + CPI_{Mar,2013} + CPI_{Jun,2013} + CPI_{Sep,2013}}{CPI_{Dec,2011} + CPI_{Mar,2012} + CPI_{Jun,2012} + CPI_{Sep,2012}} - 1$$

$$\Delta CPI_{2014/15} = \frac{1169+1174+1176+1187}{1158+1164+1168+1171} - 1$$

$$\Delta CPI_{2014/15} = 0.009655$$

## Appendix 12: Alternative Compliance Calculation

The compliance position demonstrated in Section 2.2 above assumes 2013/14 pass-through and recoverable costs are sourced from the 2014 Annual Compliance Statement. Further to Section 2.5, below we illustrate that Vector would comply with the price path if we included updated 2013/14 recoverable cost information that has become available after the 2014 Annual Compliance Statement was submitted to the Commission.

$$NR_t \leq R_t$$

$$NR_{2014/15} \leq R_{2014/15}$$

$$\$395,648,920 \leq \$395,651,315$$

Notional Revenue for the 2014/15 assessment period:

$$NR_t = \sum P_{i,t} Q_{i,t-2} - K_t - V_t$$

$$NR_{2014/15} = \sum P_{i,2014/15} Q_{i,2012/13} - K_{2014/15} - V_{2014/15}$$

$$NR_{2014/15} = \$606,715,263 - \$12,000,899 - \$199,065,443$$

$$NR_{2014/15} = \$395,648,920$$

a) Details of $\sum P_{i,2014/15} Q_{i,2012/13}$ are included in Appendices 1 to 5
b) Details of $K_{2014/15}$ are included in Section 2.4
c) Details of $V_{2014/15}$ are included in Section 2.4

Allowable Notional Revenue for the 2014/15 assessment period is set out in Equation 3 of Schedule 1D of the Determination:

$$R_{2014/15} = (\sum P_{i,2013/14} Q_{i,2012/13} - K_{2013/14} - V_{2013/14} + (R_{2013/14} - NR_{2013/14}))(1 + \Delta CPI_{2014/15})(1 - X)$$

$$R_{2014/15} = (\$585,108,128 - \$9,683,096 - \$186,596,489 + (\$396,602,025 - \$393,562,574))(1 + 0.009655)(1 - 0)$$

$$R_{2014/15} = \$395,651,315$$

a) Details of $\sum P_{i,2013/14} Q_{i,2012/13}$ are included in Appendices 6 to 10
b) Details of $K_{2013/14}$ and $V_{2013/14}$ are included in Section 2.4. $V_{2013/14}$ has been adjusted for changes to transmission charges as described in Section 2.5
c) Details of $R_{2013/14}$ and $NR_{2013/14}$ are included in Vector's 2014 Annual Compliance Statement. These values have been updated to reflect the impact of the adjustment to $V_{2013/14}$
d) Details of $\Delta CPI_{2014/15}$ are included in Appendix 11
e) X is the rate of change for the fifth assessment period, and is specified as 0% in Schedule 1B of the Determination.

## Appendix 13: Major Event Day Explanations

In accordance with Commerce Commission definitions, the following events qualify as major event days, with the reliability impact (for quality regulation purposes) normalised to 8.9 minutes.

The major event day qualification considers both the impact from the initiating event day (which must exceed Vector's calculated SAIDI boundary value of 8.9 minutes), as well as supporting evidence to justify inclusion of additional days as an extension of the extreme event[5] (defined as a multi-day event). Vector includes additional days when it can be demonstrated that in subsequent days following a major event day, the response to new faults is heavily resource constrained due to the event, requiring resources over and above what are considered reasonable for normal operations. This normally occurs where all available resources are already attending to the repair and restoration of faults from the initial day's interruptions, or are affected by safe working stand-down requirements driven by fatigue management protocols or ongoing unsafe working conditions (e.g. high winds) associated with the extreme event.

### Event Description – Storm Event April 2014

The strong winds associated with Tropical Cyclone Ita during the period 17-18 April 2014 resulted in severe damage to Vector's electricity network. Sustained wind gusts, with speeds exceeding gale force strength, struck the network early on Thursday morning (17 April), and during the peak of the storm 65 circuits were coincidentally affected causing 36,000 customers to be without power.

In Figure 1, the development and impact of the storm is graphically illustrated. The impact of the gale force wind speeds on the network performance is clearly evident.

[5] As allowed under clause 48(e) of the Commerce Commission's "Supplementary Guidelines for Investigating Breaches of the Reliability Criterion of the Quality Threshold", dated 2 November 2007.

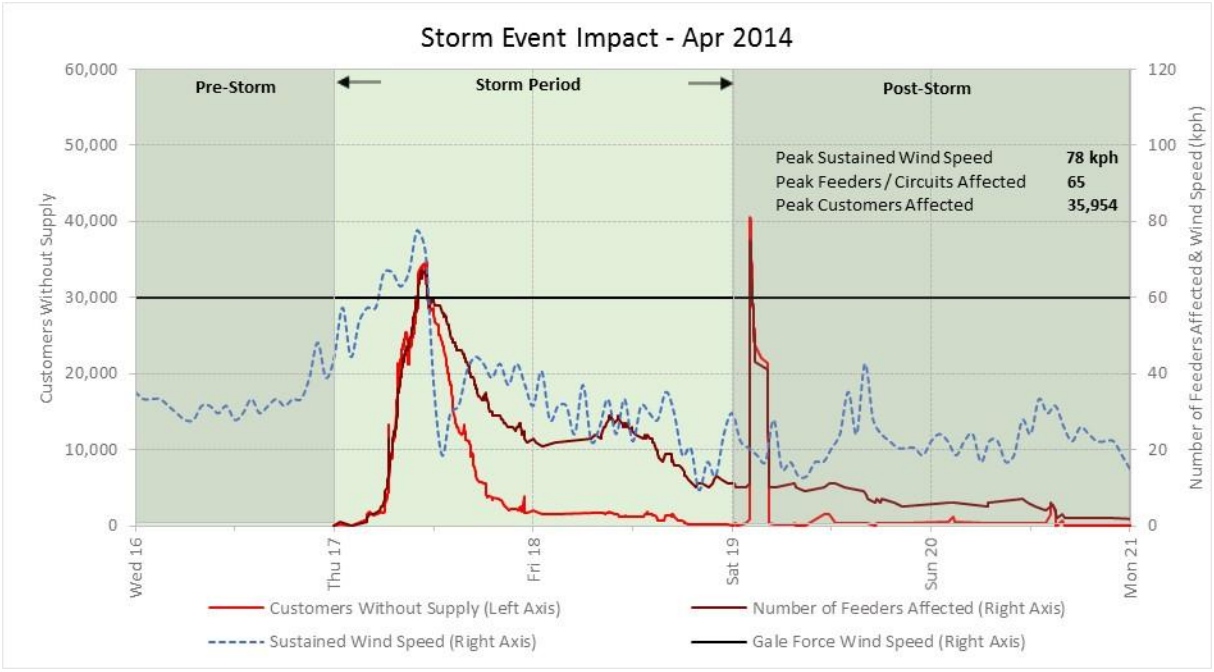



*Figure 1 – April Storm Event Customer Impact*

The multi-day quality impact is presented in Table 1 below, in non-normalised terms.

| Date Range | SAIDI | SAIFI |
|---|---|---|
| 17/04/2014 | 29.7 | 0.110 |
| 18/04/2014 | 0.8 | 0.005 |

*Table 1 – Multi-day Event Impact*

All available resources and fault crews were used to respond to the storm, and activities were coordinated via Vector's 'Major Incident Team'. The majority of customer supplies were restored within 24 hours of the event initiation and by 19 April crews were no longer operating under storm response mode[6] and extended hours / shifts in relation to the HV event were no longer required. It has therefore been classified as a two day multi-day event.

The network suffered severe damage, with a significant portion arising from vegetation debris blown through lines, and felled trees bringing lines down.

A further major outage occurred on 19 April, when the grid supply at Albany grid exit point was lost to a large part of Vector's subtransmission network. This was the result of Vector's electrical protection system not picking up a high-impedance fault before the Transpower

[6] When operating under storm response mode crews are instructed to focus solely on the event at hand and to postpone any planned work or non-critical activities.

protection system operated. Although it is probable that the fault was caused from tree damage as a result of the storm, because working conditions for field crews were back to normal levels by 19 April, we have classified this as a separate event and have not included it as part of the multi-day event.

**Event Description – Storm Event June 2014**

Civil Defence warned residents to stay indoors as very strong winds struck the North Island on 10-11 June 2014. The sustained wind gusts exceeded severe gale force strength, peaking at 104 kph and resulting in wide spread network damage with corresponding extensive power loss.

The extreme winds struck the network with full force late on Tuesday evening (10 June), by day break the next morning the full impact of the weather event was being felt. At peak 117 circuits were coincidentally affected, impacting around 70,000 customers.

In Figure 2, the development and impact of the storm is graphically illustrated. Once again, the impact of the gale force wind speeds on the network performance is clearly evident.

Vector's crews were operating under storm response mode with extended hours / shifts (relating to the HV event) from the 10–13 June to undertake repair work and restore the HV network integrity. This event was therefore classified as a four day multi-day event.

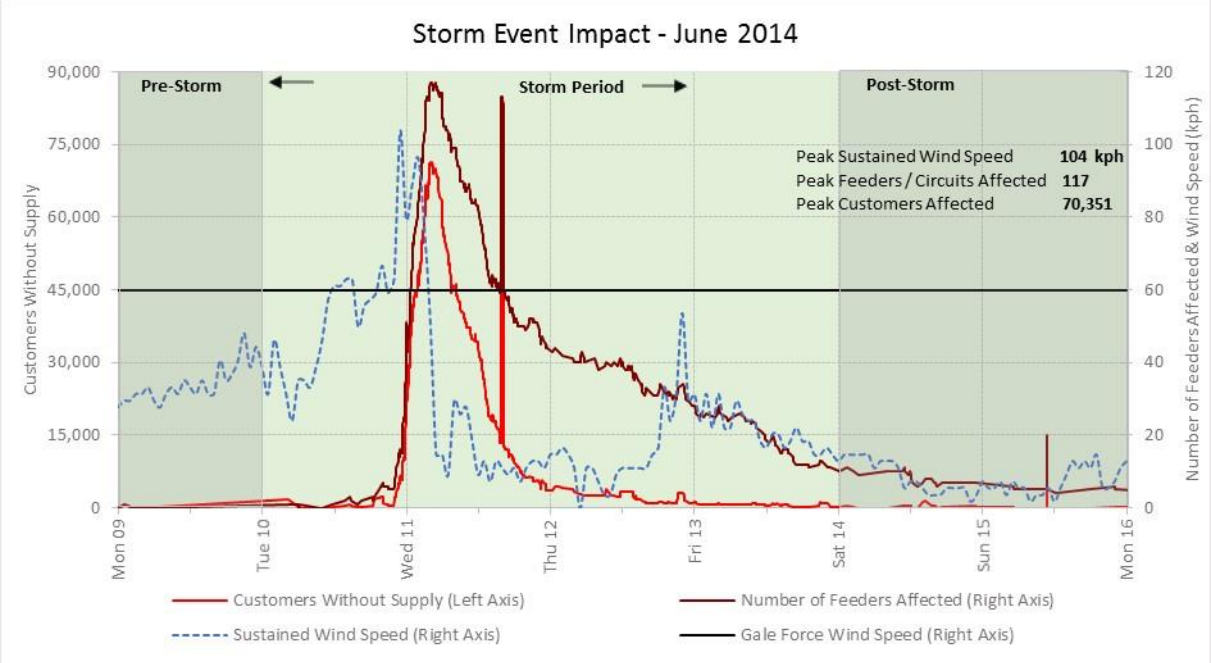



*Figure 2 – June Storm Event Customer Impact*

The multi-day event impact is presented in Table 2 below, in non-normalised terms.

| Date Range | SAIDI | SAIFI |
|---|---|---|
| 10/06/2014 | 24.8 | 0.066 |
| 11/06/2014 | 65.8 | 0.198 |
| 12/06/2014 | 2.0 | 0.011 |
| 13/06/2014 | 0.5 | 0.004 |

*Table 2 – Multi-day Event Impact*

**Event Description – Storm Event July 2014**

On 8 July, damaging north-easterly winds accompanied by heavy rains enveloped the upper North Island, this prolonged weather event spanning from 8-11 July resulted in significant asset damage mostly due to blown debris and downed trees. By mid-afternoon on Tuesday (8 July) the sustained wind gusts pushed past gale force strength toward 95 kph by the end of the day, at that stage the peak number of customers affected being around 16,500 customers without power.

In Figure 3, the prolonged nature and impact of the storm is graphically illustrated. Once again, the impact of the gale force wind speeds on the network performance is clearly evident.

Vector's crews were operating under storm response mode with extended hours / shifts (relating to the HV event) from the 8–11 July to undertake repair work and restore the HV network integrity. This event was therefore classified as a four day multi-day event.

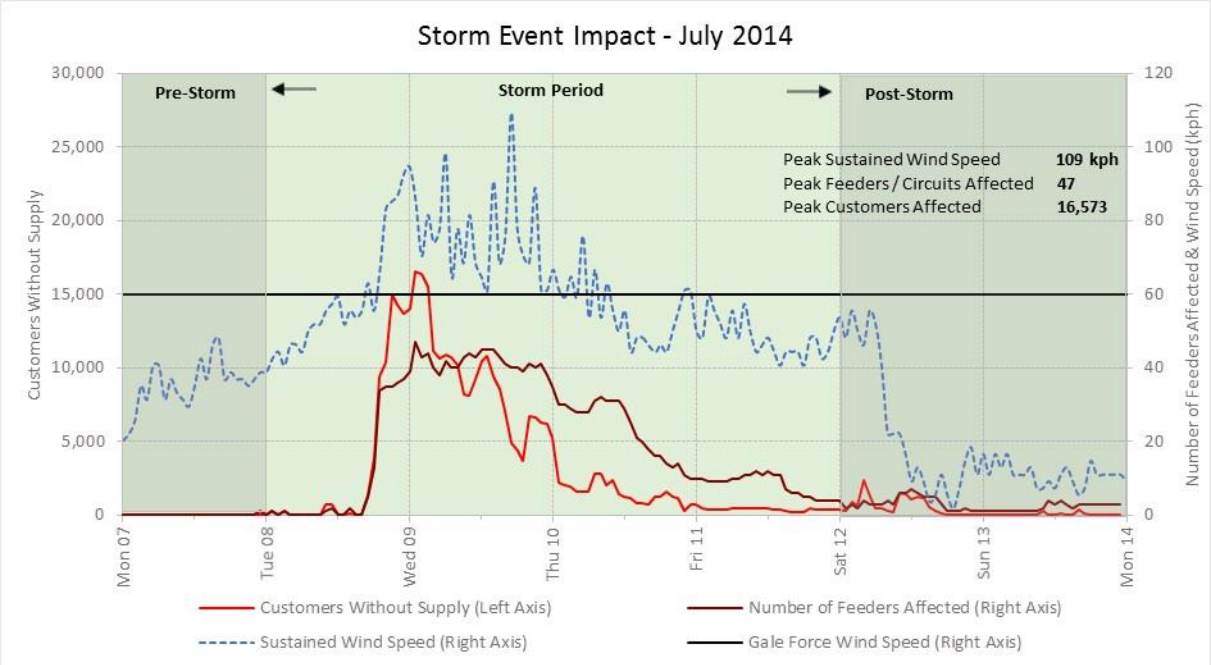



*Figure 3 – July Storm Event Customer Impact*

The multi-day event impact is presented in Table 3 below, in non-normalised terms.

| Date Range | SAIDI | SAIFI |
|---|---|---|
| 08/07/2014 | 25.3 | 0.040 |
| 09/07/2014 | 7.7 | 0.046 |
| 10/07/2014 | 1.3 | 0.009 |
| 11/07/2014 | 0.3 | 0.001 |

*Table 3 – Multi-day Event Impact*

**Event Description – Penrose GXP Event Oct 2014**

On Sunday 5 October 2014, a fire occurred at the Penrose grid exit point substation (GXP) which is the subject of an inquiry by the Electricity Authority (EA). Vector and Transpower are assisting the EA with its inquiry.

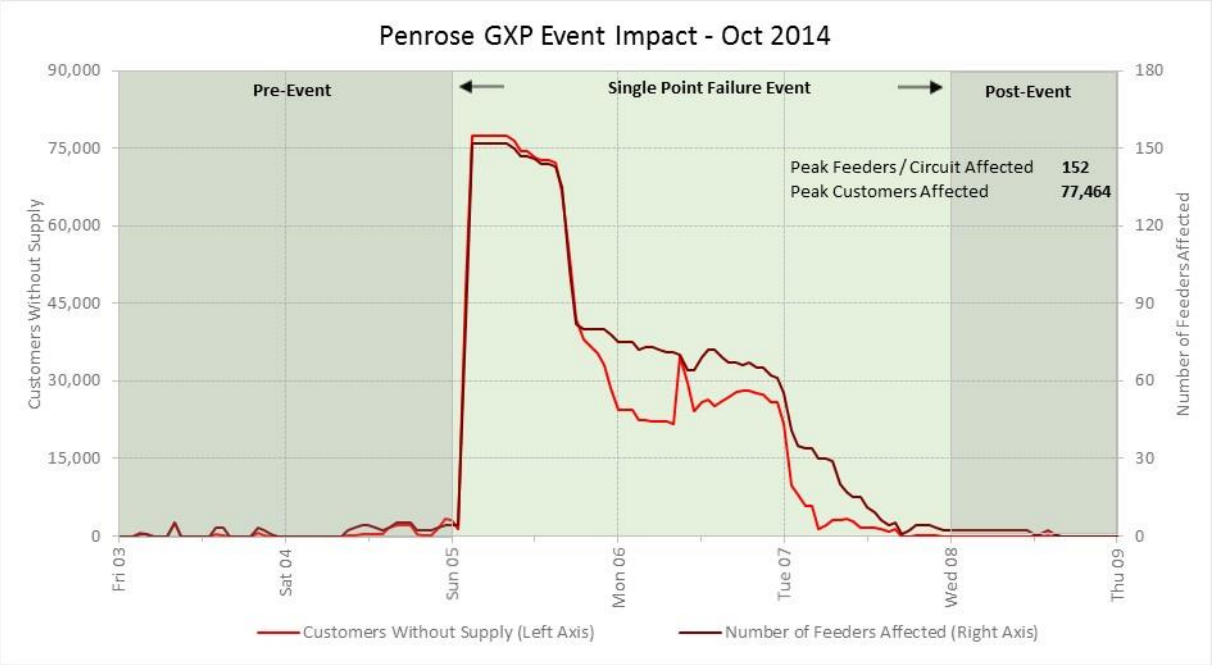



*Figure 4 – Penrose GXP Event Impact*

The multi-day event impact is presented in Table 4 below, in non-normalised terms.

| Date Range | SAIDI | SAIFI |
|---|---|---|
| 05/10/2014 | 216.7 | 0.147 |
| 06/10/2014 | 1.5 | 0.011 |
| 07/10/2014 | 0.2 | 0.002 |

*Table 4 – Multi-day Event Impact*

The incident proceeded over the next two days. By daybreak on Tuesday (7 October), the number of affected customers was reduced to around 2,000 and supply was finally restored to all customers by 14:00. Although field crews were still operating under extended shifts for a number of additional days to repair surrounding HV network infrastructure (not normally required for storm events), this multi-day event was deemed to finish on 7 October 2014, when all customers were restored[7].

[7] This was achieved through a combination of LV generation and backfeed (on the 11kV network).

## Appendix 14: Explanation for Exceeding 2015 Reliability Limit

During RY15, Vector exceeded the annual regulatory SAIDI reliability limit for the second year in a row. This constitutes a breach of *clause 9.1* of the Determination.

From Figure 5 below, it can be seen that with the exception of the last two years, performance during the current DPP regulatory period (RY11 onwards) has been good, with far less volatility than the reference period (RY05-RY09). Annual results have been variable but no sustained trend of declining reliability performance, viewed in terms of the normalised reliability results, is evident.

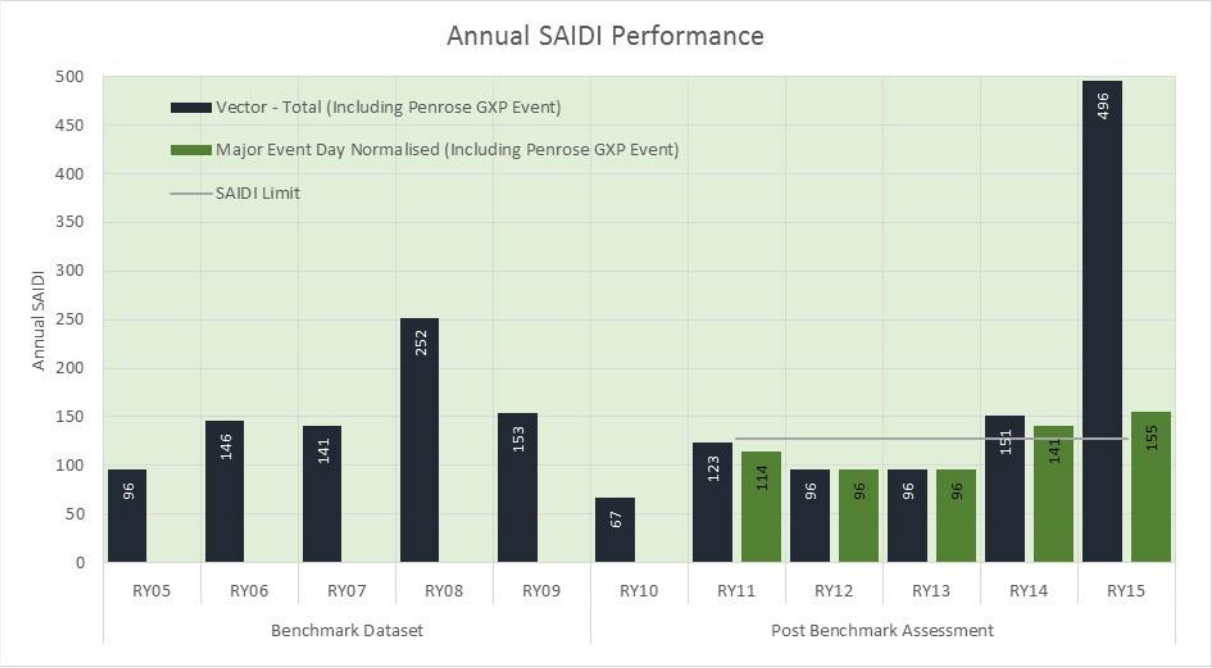



*Figure 5 – Historical SAIDI performance*

We therefore do not believe that this result reflects a general deterioration in network quality. This is also demonstrated in Table 5 below, in normalised terms.

| Date Range | Averaged SAIDI | | Averaged SAIFI | |
|---|---|---|---|---|
| | Normalised | Non-normalised | Normalised | Non-normalised |
| Benchmark Dataset (RY05-RY09) | 114 | 158 | 1.66 | 1.68 |
| Post Benchmark Assessment (RY10-RY15) | 111 | 171 | 1.27 | 1.29 |

*Table 5 – Comparison of reliability performance over two periods*

The overall circumstances giving rise to the quality regulation breach in RY15 are discussed below.

**Major Events Days**

There were four events that were classified as major event days over the RY15 assessment period, by exceeding the boundary value of 8.9 SAIDI minutes[8]. In context, during the benchmark period five years from RY05 to RY09 on a comparative basis Vector experienced six major event days (1.2 events per year), then during the post benchmark five year period from RY10 to RY14 experienced just two major event days (0.4 per year), one being in RY14.

The major event day threshold of 8.9 minutes is in itself a multiple of 28 times greater than the reference period's daily average; in context these events are exceptional. Refer to Appendix 13 for more details of the events themselves.

**High Wind Speed Network Performance**

In order to demonstrate the relationship between high wind speed events and system performance, Figure 7 below depicts daily fault counts and the SAIDI impact of events, experienced in relation to measured sustained daily peak wind speeds. Days which exceeded the Major Event Day (MED) SAIDI boundary value for the corresponding period are highlighted[9].

[8] The fourth event refers to the Penrose incident. Refer to Section 3.3 for more information.

[9] Although major event days resulting from high wind speed weather events are typically accompanied by both heavy rain and lightning, lightning events can certainly compound the amount of network damage experienced, however the damage and fault causality of the coincident heavy rains is relatively minor. Both are not significant compared to wind speed damage.

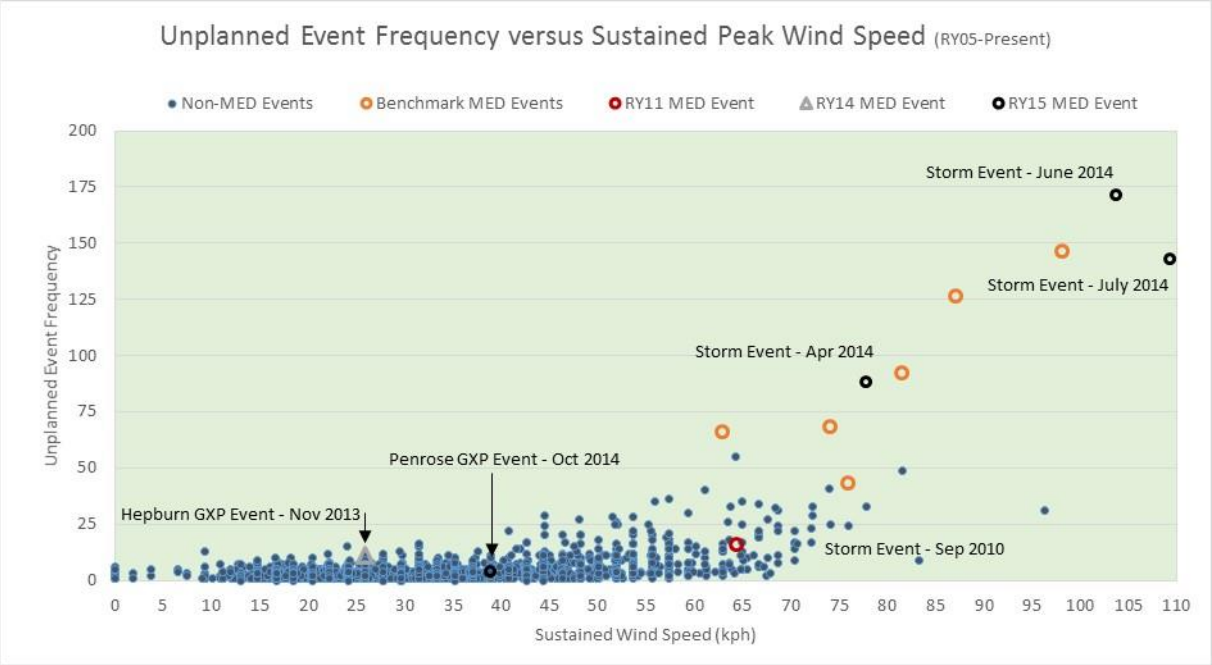
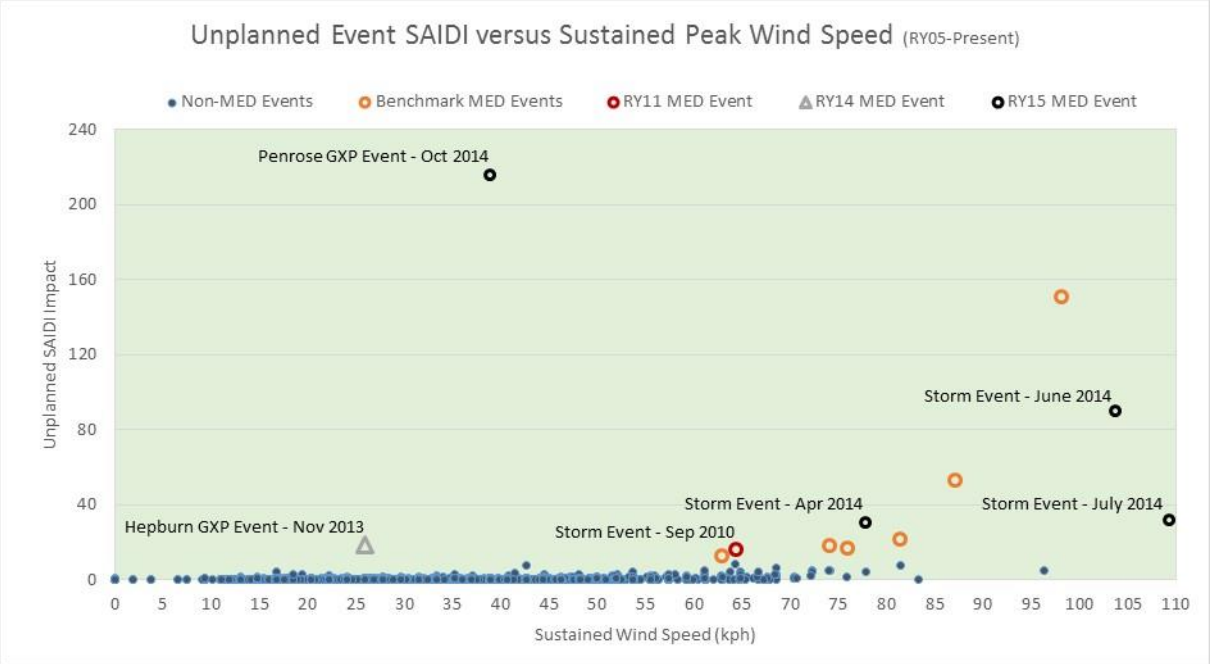



*Figure 6 - Daily fault count compared against the measured sustained daily peak wind speeds*[10]




[10] Data taken from 01/04/2005 to 31/03/2015 (RY06 to RY15). Daily peak wind speed data has been sourced from the Met Service's Whangaparoa monitoring station, located within a representative area of Vector's northern network. This part of the network has a much higher proportion of overhead lines, as well as rural lines than the southern (Auckland) part of the network and hence is more representative when considering the impact of adverse weather. Only one station was selected for the purpose of this indicative analysis - highly localised wind patterns may therefore not have been fully captured or represented. However, for this type of analysis, this is not considered to be significant to the overall high level trends.

*Figure 7 - Daily fault count and SAIDI compared against the measured sustained daily peak wind speeds*[11]

As can be seen from Figure 6, as the wind speed increases so does the volatility or deviation in the observed fault counts. There is relatively tight banding of fault counts in the block of wind speed from 0-45 kph, with this banding spreading slightly up to about 60 kph. Beyond 60 kph the band spreads significantly, with the correlation to major event days easy to observe. Extreme wind speeds tend to generate an 'avalanche' of network faults at the same time, as well as often making conditions unsafe in which to perform restoration tasks – both resulting in more extreme SAIDI results (see Figure 7).

To help further visually depict the relationship with wind speed and SAIDI, Figure 8 plots wind pressure[12] on days where wind was >60kph against SAIDI for the year. It can be seen that there is a strong relationship between high wind pressure and high SAIDI, with RY07 being the slight anomaly in this pattern over a 10 year period.

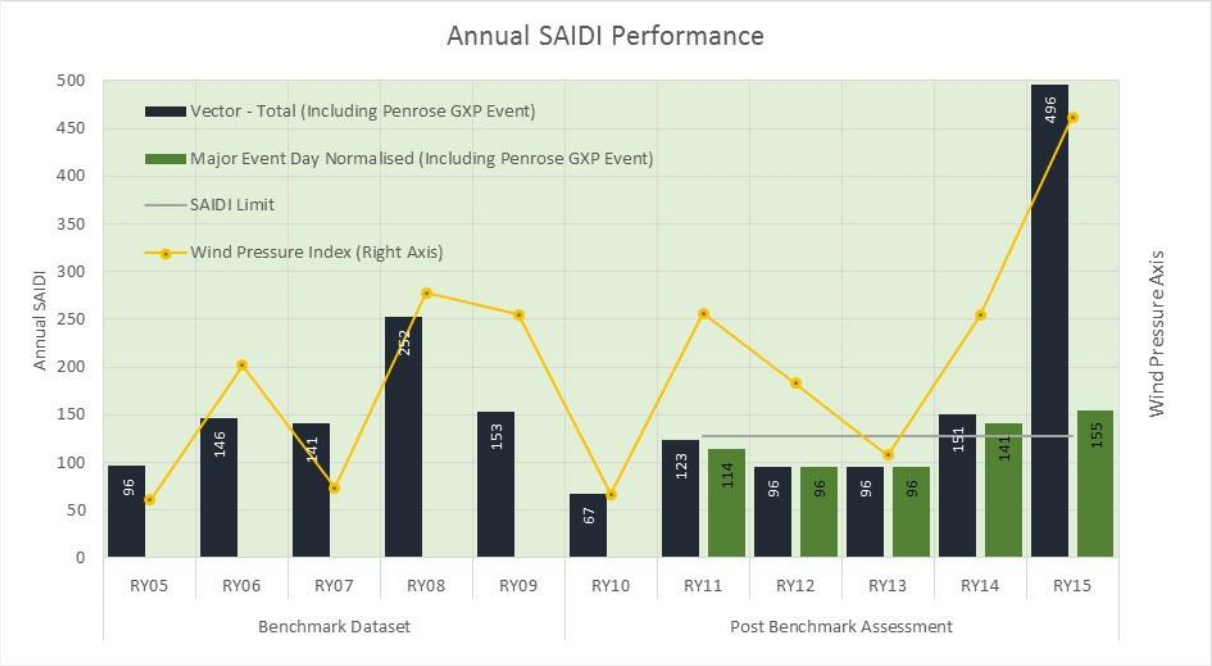



*Figure 8 – Relationship between wind pressure for wind speeds >60kph, and network SAIDI performance*

Vector's network is predicated on the ability to withstand 'normal' wind speed weather conditions. Very few structural failures have occurred during high winds, however overhead accessories have been observed to fail. The main cause of damage during high

[11] ibid footnote 10.

[12] Wind Pressure ∝ (Wind Speed)²

winds is related to falling vegetation and debris damage. A significant factor which adds to the variability in correlating network reliability with wind speed is 'out-of-zone' vegetation from airborne debris. 'Out-of-zone' vegetation is that not in the cut-zone of the overhead assets, and therefore not managed through Vector's vegetation management programme.

**Did the Network Experience More or Less High Wind Speed Days Compared to Previous Regulatory Years?**

In addition to Figure 8 above, the best way to demonstrate the comparatively high wind-speed days experienced by the network from year-to-year is to refer to the histogram shown in Figure 9 below. Figure 9 presents the percentage of days in which high wind speeds at or above 60 kph (potentially damaging, gale force levels) have been experienced, and compares RY15 and RY14, against the period RY05-RY13.

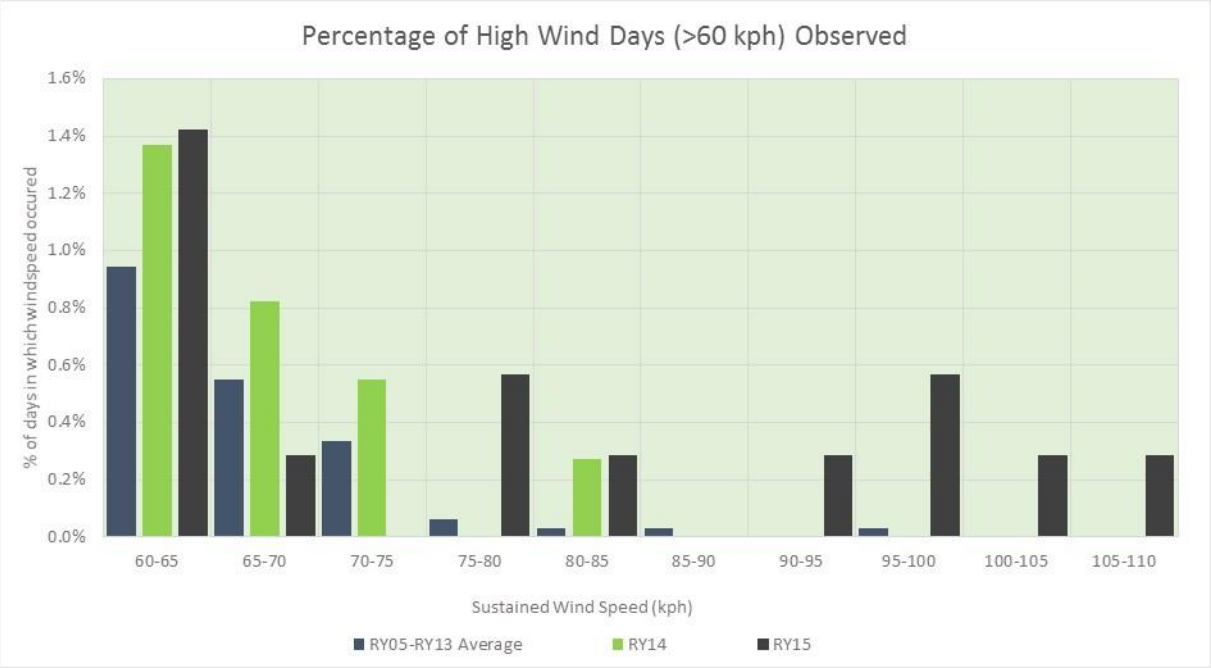



*Figure 9 - Percentage of days in which high wind speeds > 60 kph (potentially damaging levels) have been experienced*

As can be seen in Figure 9, significantly more high wind speed days were experienced in RY15 than average, when compared to the previous period of RY05-RY13. In particular, during RY15 Vector experienced a number of days with the highest sustained wind-speed ever recorded on its network. The storm-related major event days all occurred on days with exceptionally high sustained wind-speeds.

**Non-weather related incidents**

The fire at the Penrose GXP on 5 October 2014 is the subject of an inquiry by the Electricity Authority (EA). Vector is therefore not in a position to provide further analysis and discussion (this can be done once the inquiry is complete, if required). In the interim, we can confirm that we consider this a one-off, exceptional event that is in no way representative of a general network trend.

**Material Factors Impacting the Breach of RY15 SAIDI Reliability Limit**

It is acknowledged that network reliability is a combination of many factors. However, Vector believes that the high SAIDI values seen in RY15 (as well as in RY14) are primarily attributable to the combination of the series of major storm events discussed above.

Vector's network is designed to withstand typical wind speeds, however as illustrated above, a significant number of the outages associated with high wind speed are attributable to trees and vegetation debris hitting the lines. It is acknowledged that effective vegetation management around the overhead assets is key and is something that Vector has a programme to manage, pro-actively monitoring overhead assets for vegetation issues on an annual basis. However, in high-wind situations, the impact of 'out-of-zone' vegetation from airborne debris becomes more pronounced. 'Out-of-zone' vegetation is that not in the cut-zone of the overhead assets, and therefore not currently managed through Vector's vegetation management programme. Given the number of high wind events over the past two years relative to recent history, Vector has been reviewing and changing its practices for best administering its vegetation management programme for the future.

Although designing for a higher wind tolerance (and associated vegetation debris issues) is possible, for example through undergrounding initiatives or installation of insulated conductors, these would incur significant additional cost (and in the latter example potential HSE issues too). Vector will consider whether the recent high wind events of the past two years materially changes the costs and benefits of designing for a higher wind tolerance. Past customer engagement surveys have revealed that the majority of customers are satisfied with current network performance and are not prepared to pay more for improved reliability by designing the network to withstand 'abnormal' events.