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*Delivered via Gas Industry Co's website*

12 January 2015

Dear Ian

### **MPOC CHANGE REQUEST OCTOBER 2014\_CROSS-SUBMISSION**

Transpower New Zealand Limited, trading as emsTradepoint ("**emsTradepoint**") welcomes the opportunity to provide a cross-submission to the Gas Industry Company ("**GIC**") on the industry submissions received on the Maui Pipeline Operating Code Change Request dated 10 October 2014 (Market-based Balancing), ("**MBB CR**").

This cross-submission primarily addresses the matters highlighted by the GIC as being of particular interest, including;

- (a) the logic for the MBB CR cash-out mechanism being costless to industry;
- (b) the conditionality of the MBB CR on spot market linked cash-out prices; and
- (c) the effectiveness of the MBB CR arrangements in addressing over-pressure situations.

emsTradepoint has not attempted to address the cost of high-pressure situations as this is best left to those who operate production plant. We do, however, accept the logic put forward in producers' submissions.

### **1. THE MBB CR CASH-OUT MECHANISM IS COSTLESS**

In its initial submission dated 24 November 2014, emsTradepoint argued that the MBB CR cash-out mechanism must be considered neutral (or costless) to industry. This is because the net expenditure incurred by Maui Development Limited ("**MDL**") in executing cash-outs and taking balancing actions within each year will be rebated / supplemented via the transmission tariffs in the following year.

As follows, the total cost of the MBB CR cash-out mechanism to the industry will always be zero<sup>1</sup>. Using the simple income statement example from Figure 1, the \$55k net expenditure (profit) incurred by MDL from managing cash out and balancing transactions will be refunded via a reduction in tariff of the same amount in the next charging period. Conversely, any under-recovery would be supplemented via an increase in tariff.

**Figure 1: MDL Balancing Income Statement Example**

<b>Notes Revenue</b>		
	Negative Cash-Outs	GJ 100,000
1	Negative Cash-Outs	\$ 577,500.00
	Balancing Gas Sales (Put)	GJ 50,000
2	Balancing Gas Sales (Put)	\$ 275,000.00
	<b>A - Total Revenue</b>	<b>\$ 852,500.00</b>
<b>Expenditure</b>		
	Positive Cash-Outs	GJ 100,000
3	Positive Cash-Outs	\$ (\$522,500.00)
	Balancing Gas Purchases (Call)	GJ 50,000
2	Balancing Gas Purchases (Call)	\$ (\$275,000.00)
	<b>B - Total Revenue</b>	<b>\$ (\$797,500.00)</b>
	<b>C - Net Expenditure [A+B]</b>	<b>\$ 55,000.00</b>
4	<b>D - Tariff (Rebate) / subsidy [Cx-1]</b>	<b>\$ (\$55,000.00)</b>
	<b>Net cost to industry [C+D]</b>	<b>\$ 0.00</b>

**Notes**

- 1 Negative Cash-Outs are assumed to be priced at a baseline Cash-Out Sell P Price calculation. In this example, we have used \$5.78 (\$5.50 +5%).
- 2 Balancing gas sales and purchases are assumed to be priced at a baseline spot price. In this example we have used \$5.50.
- 3 Positive Cash-Outs are assumed to be priced at a baseline Cash-Out Buy P Price calculation. In this example, we have used \$5.23 (\$5.50 - 5%).
- 4 Tariff will be adjusted to rebate any positive net expenditure and recover any negative net expenditure.

The cash flow of individual Welded Points / Parties will, however, not necessarily be costless. This is a consequence of the decline in the cross-industry subsidy currently in place. The ‘NQ vs. AEOI’ ratio will determine individual profit and loss.

Under the MBB CR, any party that is ‘average’, i.e. - incurs the same percentage of total Accumulated Excess Operational Imbalance (“**AEOI**”) as its percentage of total Nominated Quantity (“**NQ**”), will be cost-neutral against the counterfactual. *Viz., that party’s individual profit and loss calculation will have the same outcome as the industry-wide calculation set out in Figure 1.*

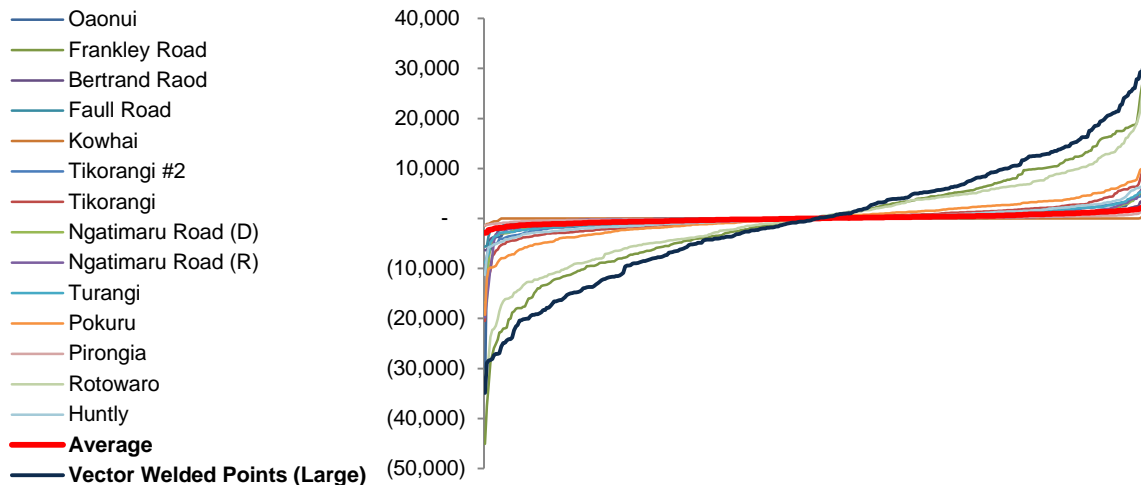
Parties that use *less* flexibility than the average (an NQ vs. AEIO ratio < 1:1) will see a net benefit against status quo (as they will be paying less flexibility subsidy), and any party that uses *more* flexibility than the average (an NQ vs. AEIO ratio > 1:1) will see a net cost against status quo.

<sup>1</sup> In real terms. The reality will see some small adjustments for nominal treatment.

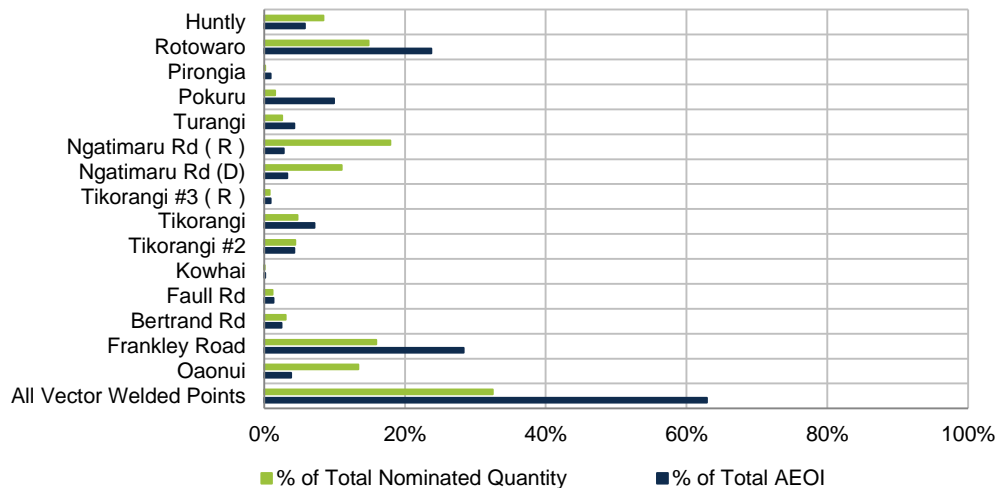
### Vector's and Shippers' balancing cost against counterfactual

Figures 2 and 3 below clearly illustrate why Shippers that nominate gas via Vector's Welded Points believe that they may bear additional cost under the MBB CR model. This is because Vector Welded Points are, by a considerable margin, the largest users of flexibility with a percentage of total NQ of 32.5%, but 62.9% of all AEOI<sup>2</sup>. That equates to an NQ:AEOI ratio of almost 1:2.

**Figure 2: Duration curve of Welded Points' Daily Operational Imbalance vs. average**



**Figure 3: Graph illustrating Welded Points' NQ vs. AEOI<sup>3</sup> percentage of totals**



Under the MBB CR, Shippers with an AEOI percentage greater than its NQ percentage will be required to bear the cost of the imbalance they cause. Under the counterfactual, however, these parties are able to evade these costs at the expense of parties with an AEOI percentage less than its NQ percentage.

<sup>2</sup> Both NQ and AEOI calculations are based on actual Financial Year 2014 data.

<sup>3</sup> Note, at 'direct connect' Welded Points, the Welded Party bears the cost / profit of cash-outs and the Shippers that nominate to/from each Welded Point incur tariff rebates / surpluses. At Vector's Welded Points, however, it is the Shipper that bears both cost / profit of cash-outs and tariff rebates / surpluses.

The scale of cost/benefit to individual parties cannot be calculated without knowing the volumes each Shipper nominates from/to individual Welded Points. This information is not publically available. An overview of likely costs/benefits can be calculated at the Welded Point level, however, and each individual party can calculate their own outcome.

These calculations are dependent on the following assumptions:

- **Running Operational Imbalance Limit (“ROIL”).** The MBB CR will see ROILs set at various levels during the ‘soft-landing’ period, and then reduced to 1,000 GJ/Welded Point.
- **Underlying spot market pricing.** Unless MDL utilises a balancing platform for ‘non-standard’ products (which is currently undeveloped and, when developed, unlikely to be used frequently), a ‘standard-product’ on a trading platform will set the underlying spot price used in the Cash-Out Buy/Sell Prices.
- **Price adjustment.** MDL may set a percentage adjustment that will increase the Cash-Out Sell Price and reduce the Cash-Out Buy Price. The allowable range for this percentage adjustment is 0-10%.
- **Behaviour improvement.** A percentage that represents the potential improvement in primary balancing due to price signal incentive, i.e. an assumed reduction in AEOI. This assumption is closely linked to the price adjustment assumption above. If you assume a high price adjustment, it follows that a larger behaviour improvement should also be assumed, and vice versa.

Vector’s calculation of balancing costs under the MBB CR indicated that Vector Shippers stood to incur \$5m<sup>4</sup>. emsTradepoint has since discussed the basis for this calculation with Vector and have the following comments:

- (a) Vector included ~\$1.5m of cost for the ‘Cash-Out Transmission Price’ in its calculation. Whilst this charge would be payable under the MBB CR, transmission is also payable on all NQ under the counterfactual. As such, this cost exists in both the counterfactual and MBB CR, and should be excluded. To claim it is an exclusive MBB CR cost would imply that tariff is not payable on all gas shipped and consumed at present, which is incorrect<sup>5</sup>.
- (b) Vector included ~\$541k of cost for the ‘Cash-Out Trading Fee Price’ in its calculation. In emsTradepoint’s view, this is incorrect as there will always be a cost associated with correcting imbalance; whether it is the direct cost of trading fees, or resources expended in negotiation or administration. As such, this component should also be excluded from the calculation.

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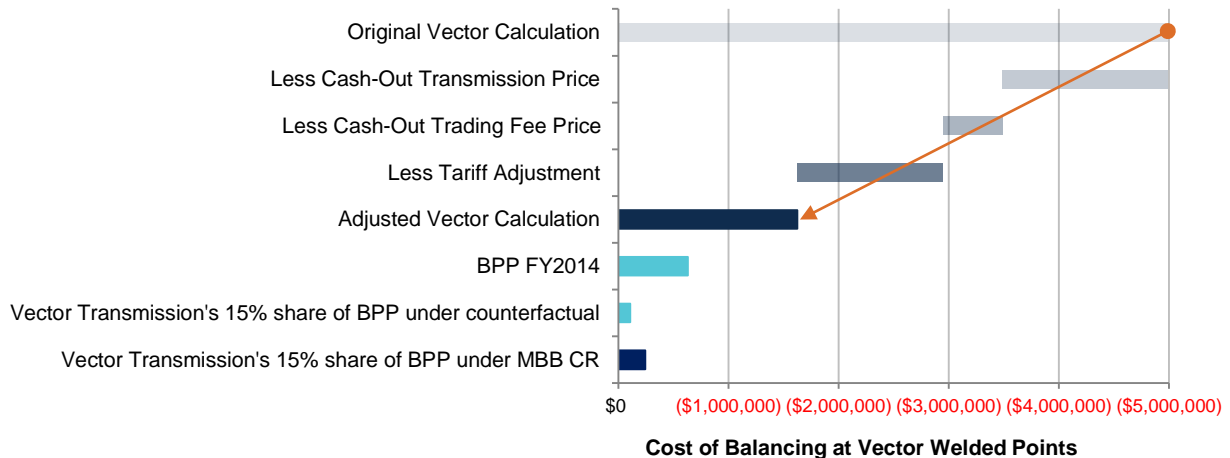
<sup>4</sup> Vector’s submission to the GIC, dated 24 November 2014, Page 9

<sup>5</sup> Note, under the counterfactual, tariff is not explicitly included in the Mismatch Price but taken into consideration within the methodology.

(c) Vector did not include the tariff rebate of ~\$1m<sup>6</sup> (assuming a 10% price adjustment). This counteracting benefit is a key component of the MBB CR cash-out methodology and must be included in the net calculation.

Using the same assumptions (approximately) as Vector, but excluding Cash-Out Transmission Price and Cash-Out Trading Price, and including the tariff rebate, emsTradepoint arrives at a cost of ~\$1.3m for all (large) Vector Welded Points:

**Figure 4: Adjusted Vector balancing cost calculation using Vector's 10% price adjustment assumption**



**Figure 5: Balancing cost results – Vector assumptions**

	DIRECT CASH-OUT COSTS			TARIFF ADJUSTMENT (following year)		Net Cash-Out Costs / Tariff Adjustment
	+ve AEOI	-ve AEOI	Cash-Out Value (Net)	% of Total SQ FY14	Tariff Adjustment	
<b>All</b>	<b>2,760,552</b>	<b>(2,761,406)</b>	<b>(\$3,041,379)</b>	<b>100%</b>	<b>\$3,041,379</b>	<b>-</b>
<b>All Vector Welded Points</b>	<b>2,075,812</b>	<b>(2,070,598)</b>	<b>(\$2,251,556)</b>	<b>32%</b>	<b>\$987,574</b>	<b>(\$1,263,982)</b>
Oaonui	86,376	(87,627)	(\$102,565)	13%	\$406,525	\$303,960
Frankley Road	992,616	(1,024,577)	(\$1,285,070)	16%	\$484,365	(\$800,704)
Bertrand Rd	35,165	(31,535)	(\$16,719)	3%	\$92,572	\$75,853
Faull Rd	8,097	(14,344)	(\$46,696)	1%	\$36,346	(\$10,350)
Kowhai	3,210	(2,565)	\$370	0%	\$282	\$653
Tikorangi #2	63,878	(65,088)	(\$77,581)	4%	\$134,685	\$57,104
Tikorangi	154,248	(156,567)	(\$183,678)	5%	\$143,814	(\$39,863)
Tikorangi #3 ( R )	19,690	(18,666)	(\$15,457)	1%	\$24,009	\$8,551
Ngatimaru Rd (D)	57,349	(60,030)	(\$79,295)	11%	\$334,790	\$255,495
Ngatimaru Rd ( R )	71,231	(69,920)	(\$70,415)	18%	\$545,419	\$475,004
Turangi	87,580	(83,939)	(\$74,299)	3%	\$77,068	\$2,769
Pokuru	271,392	(251,154)	(\$176,070)	2%	\$47,771	(\$128,299)
Pirongia	1,975	(3,659)	(\$12,358)	0%	\$4,573	(\$7,784)
Rotowaro	809,829	(791,209)	(\$778,059)	15%	\$450,865	(\$327,194)
Huntly	97,917	(100,528)	(\$123,489)	8%	\$256,230	\$132,741

**Figure 5 Assumptions:**

<b>Running Operational Imbalance Limit (“ROIL”):</b>	1,000 GJ
<b>Underlying spot market pricing:</b>	\$5.50/GJ <sup>7</sup>
<b>Price adjustment:</b>	10%
<b>Behaviour improvement:</b>	0%

<sup>6</sup> The sum of Frankley Road, Rotowaro, Pokuru and Pirongia Welded Point tariff rebates.

<sup>7</sup> emsTradepoint historic volume weighted average

Note, the actual cost to Shippers that nominate gas via Vector Welded Points will be less than the 'Net Cash-Out / Tariff Adjustment' calculation shown above, as they will also benefit from additional tariff adjustment whenever they nominate to/from a direct connect Welded Point (any Welded Point that is not a Vector Welded Point).

### ***Application of the 'price adjustment'***

Vector also put forward that *"the CBA should assess MBB prices on the assumption that the maximum of ten per cent will be the rate used"*<sup>8</sup>, when evaluating potential balancing costs of the MBB CR against the counterfactual.

emsTradepoint disagrees with this. Extremes should not form the basis of analysing likely CBA outcomes. The assessment must be made on equivalent assumptions between the counterfactual and the MBB CR.

For example, Mismatch Prices are set using a methodology unilaterally determined by MDL yet Vector has used its current Balancing and Peaking Pool ("**BPP**") charges as the counterfactual cost. If 10% is used as the MBB CR price adjustment assumption, then one would also have to assume the equivalent extreme scenario for the counterfactual. This could include MDL ceasing to use its compressor to support imbalance, and the resulting increase in balancing actions and spread of Mismatch Prices. Under this counterfactual scenario, BPP charges could increase tenfold.

emsTradepoint submits it is more appropriate to evaluate the counterfactual and MBB CR using the most likely assumptions. With regard to the price adjustment on cash-out prices, we submit that the most appropriate assumption for consideration is around 4%, as this may strike the necessary balance between incentive and behaviour improvement (see below).

### ***Price adjustment vs. behaviour improvement***

The price adjustment assumption is invariably linked to the behaviour improvement assumption. As the price adjustment increases, so too should the incentive to improve primary balancing and avoid cash-out.

An accurate forecast on the likely ratio between price adjustment and behaviour improvement is difficult to predict. emsTradepoint has suggested a set of scenarios that could apply to Vector Welded Points, as well as its own prediction:

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<sup>8</sup> Vector's submission to the GIC, dated 24 November 2014, Para 25, page 4

### Price Adjustment vs. Behaviour Improvement Scenarios

- Scenario 1 – 1% : 10%
- Scenario 2 – 1% : 7.5%
- Scenario 3 – 1% : 5%
  
- Scenario 4 – emsTradepoint Assumptions:

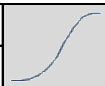
Price Adjustment	0%	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	
Reduction in AEOL	0%	3%	5%	10%	20%	35%	55%	75%	90%	95%	97%	

Figure 6: Percentage Adjustment vs. Behaviour Improvement vs. Balancing Costs (Vector Welded Points)

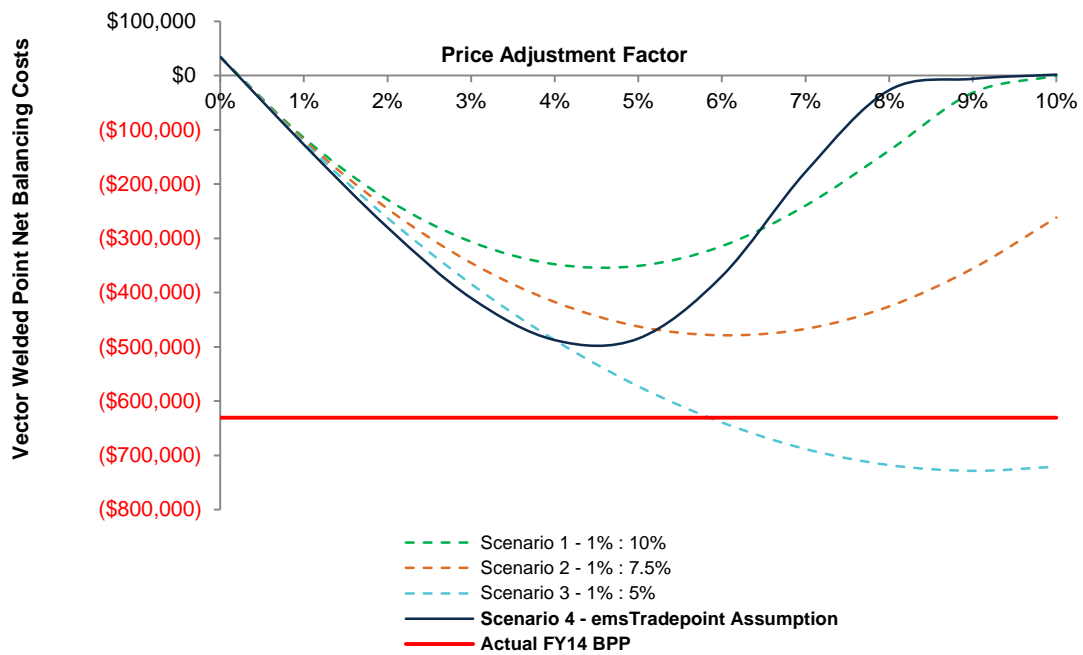


Figure 7: Balancing cost calculation using emsTradepoint's assumptions

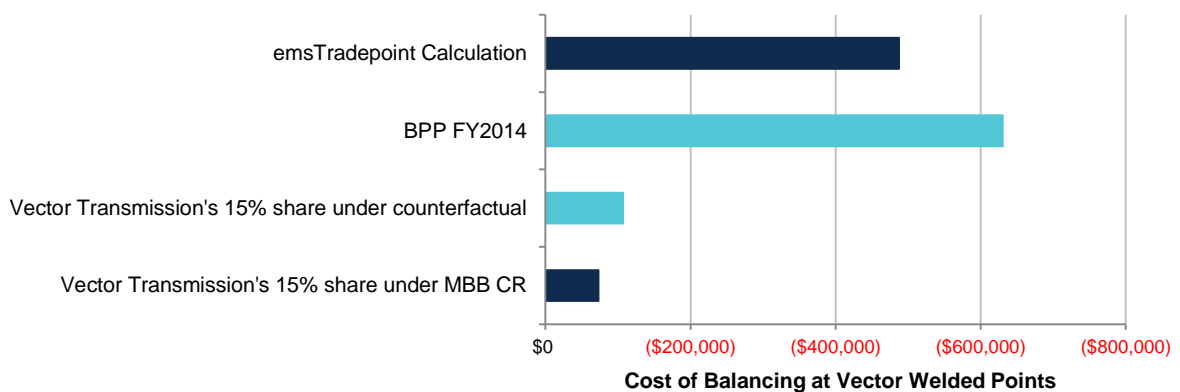


Figure 8: Balancing cost results – emsTradepoint assumptions

	DIRECT CASH-OUT COSTS			TARIFF ADJUSTMENT (following year)		Net Cash-Out Costs / Tariff Adjustment
	+ve AEOI	-ve AEOI	Cash-Out Value (Net)	% of Total SQ FY14	Tariff Adjustment	
<b>All</b>	<b>2,760,552</b>	<b>(2,761,406)</b>	<b>(\$1,219,371)</b>	<b>100%</b>	<b>\$1,219,371</b>	<b>-</b>
<b>All Vector Welded Points</b>	<b>2,075,812</b>	<b>(2,070,598)</b>	<b>(\$883,420)</b>	<b>32%</b>	<b>\$395,945</b>	<b>(\$487,474)</b>
Oaonui	86,376	(87,627)	(\$45,152)	13%	\$162,987	\$117,835
Frankley Road	992,616	(1,024,577)	(\$619,483)	16%	\$194,195	(\$425,288)
Bertrand Rd	35,165	(31,535)	\$5,290	3%	\$37,114	\$42,404
Faull Rd	8,097	(14,344)	(\$39,291)	1%	\$14,572	(\$24,719)
Kowhai	3,210	(2,565)	\$2,276	0%	\$113	\$2,389
Tikorangi #2	63,878	(65,088)	(\$35,027)	4%	\$53,999	\$18,971
Tikorangi	154,248	(156,567)	(\$81,122)	5%	\$57,659	(\$23,463)
Tikorangi #3 ( R )	19,690	(18,666)	(\$2,802)	1%	\$9,626	\$6,824
Ngatimaru Rd (D)	57,349	(60,030)	(\$40,565)	11%	\$134,226	\$93,661
Ngatimaru Rd ( R )	71,231	(69,920)	(\$23,842)	18%	\$218,673	\$194,832
Turangi	87,580	(83,939)	(\$17,706)	3%	\$30,899	\$13,193
Pokuru	271,392	(251,154)	(\$3,653)	2%	\$19,153	\$15,500
Pirongia	1,975	(3,659)	(\$10,499)	0%	\$1,834	(\$8,665)
Rotowaro	809,829	(791,209)	(\$249,786)	15%	\$180,764	(\$69,022)
Huntly	97,917	(100,528)	(\$58,011)	8%	\$102,730	\$44,719

Figure 8 Assumptions:

<b>Running Operational Imbalance Limit (“ROIL”):</b>	1,000 GJ
<b>Underlying spot market pricing:</b>	\$5.50/GJ
<b>Price adjustment:</b>	4%
<b>Behaviour improvement:</b>	20%

### A note on emsTradepoint’s analysis

Additional assumption scenarios are provided in appendix to this submission. emsTradepoint has also provided a balancing cost model to complement this submission, where parties are able to modify the assumptions and calculations, and view the results.

## 2. CONDITIONALITY OF THE MBB CR ON SPOT MARKET LINKED CASH-OUT PRICES

The GIC has asked for comment on the ‘significance of market prices’ in the context of; (a) MDL stating that the MBB CR will see prices linked to the spot market<sup>9</sup>; and (b) Vector submitting that such a pricing benefit is not a factor of the MBB CR, but rather arises out of MDL’s unwillingness to satisfy section 11.10 of the counterfactual<sup>10</sup>.

<sup>9</sup> The only operating spot market is emsTradepoint at time of writing.

<sup>10</sup> Section 11.10 of the current MPOC requires Mismatch Prices to be set by a liquid wholesale market, should one develop.



Rather than debate the two perspectives, emsTradepoint submits that this is an extraneous consideration. At this point in time, MDL is not setting Mismatch Prices using spot market derived prices. Further, as emsTradepoint understands it, no party has successfully disputed cash-out payments / charges on the grounds that the prices used are incorrect.

If Vector or any other party believes that the benefit attributed to aligning cash-out prices to the emsTradepoint spot market is not conditional on the MBB CR, it should lodge a dispute with MDL and settle the matter. Until then, however, the GIC must consider that conditionality exists and that the benefits of spot market prices (and the eradication of the costs arising from the large BGX spread) can only be attributed to the MBB CR.

### **3. THE EFFECTIVENESS OF THE MBB CR ARRANGEMENTS IN ADDRESSING OVER-PRESSURE SITUATIONS**

Some parties put forward in their submissions that the MBB CR will not be effective in addressing over-pressure situations.

emsTradepoint does not follow this logic. Currently, the cash-out mechanism allows parties to 'park' gas in the pipeline up to tolerance perpetually and for 48 hours after the delivery period (72 hours including the delivery period) above tolerance. Under the MBB CR, MDL will assume title to all parked gas above a (much reduced) tolerance every 24 hours and, as an RPO, be required to manage such title in a responsible manner.

emsTradepoint views the RPO standard as requiring MDL to divest of title at the time or, at least, on the day it assumes it. As such, over-pressure caused by positive imbalance would be managed far more effectively than under the counterfactual.

As an ancillary point, many parties argued in their submissions that they lacked sufficient data to balance their positions daily. Whilst emsTradepoint rejects this – non-Time of Use meters only make up ~8% of NQ – it is interesting that, when that purported 'unknown' imbalance is put into the hands of one party to manage (thereby turning many unknowns into one known), those same parties claim this will not reduce imbalance.

### **4. OTHER CROSS-SUBMISSION MATTERS**

#### ***Market liquidity as a barrier to the MBB CR***


Some parties have raised concerns over the emsTradepoint market's ability to meet the liquidity needs of the MBB CR.

With regard to market liquidity, it is important to understand that markets will be as liquid as they are required to be, provided there are no undue barriers to entry. In and of themselves, markets do not provide liquidity, but rather its participants do.

The vast majority of Welded Parties and Shippers are already emsTradepoint participants and there are no barriers to entry for those who are not. As such, we are more than confident that the emsTradepoint market will be sufficiently liquid to allow the MBB CR model to operate efficiently and allow participants to reasonably hedge their price and volume risks.

If you would like to discuss any of these matters further, please contact me on (04) 590 6843.

Yours sincerely

A handwritten signature in blue ink, appearing to read "James Whistler", with a stylized flourish at the end.

**James Whistler**  
emsTradepoint

# APPENDIX 1: BALANCING COSTS – 0% ADJUSTMENT FACTOR / 0% BEHAVIOUR IMPROVEMENT

### ASSUMPTIONS

Calculation		
Input		

		Notes
Tolerance (ROIL)	1,000	
Benchmark Spot Price	\$5.50	emsTradepoint hist. VWAP (08.12.14)
Price Adjustment	0%	0%-10%
Baseline Cash-Out Sell Price	\$5.50	Excl. Cash-Out Trading / Transmission Prices
Baseline Cash-Out Buy Price	\$5.50	
Cash-Out Trading Fee Price	\$0.10	Average of emsTradepoint fees
Tariff 1	0.0016850	As at 08.12.14
Tariff 2	0.0760580	As at 08.12.15

Include Cash-Out Transmission / Trading Price? (Y/N) N

emsTradepoint considers that these components should not be included as they exists within the counterfactual as well

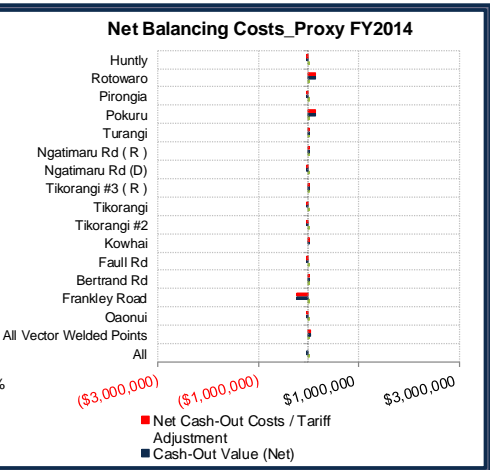
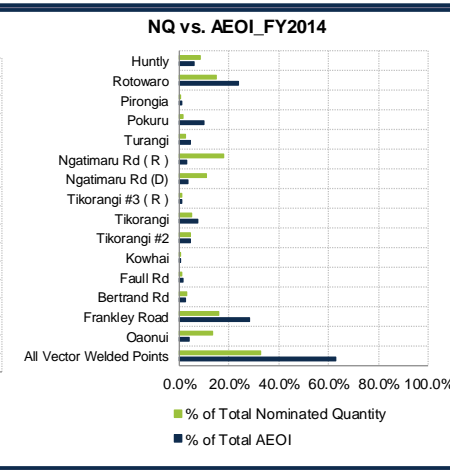
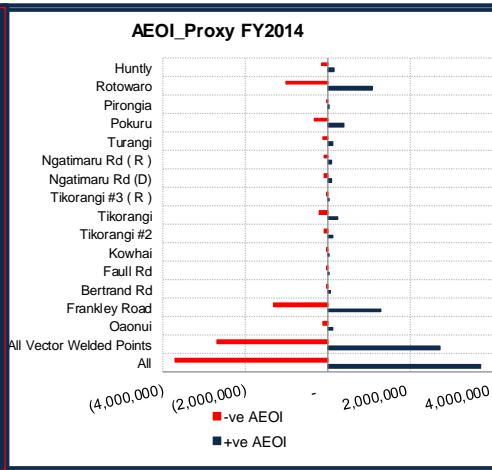
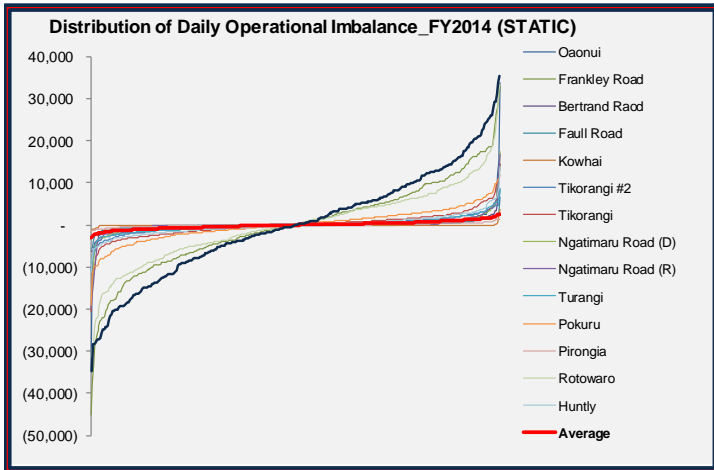
Behaviour Improvement 0% 0% = FY14 DOI, 100% = zero DOI

emsTradepoint

### RESULTS (FY14 as proxy)

-ve\$ = cost +ve\$ = benefit

	DIRECT CASH-OUT COSTS			TARIFF ADJUSTMENT (following year)		Net Cash-Out Costs / Tariff Adjustment
	+ve AEOI	-ve AEOI	Cash-Out Value (Net)	% of Total SQ FY14	Tariff Adjustment	
<b>All</b>	<b>3,692,598</b>	<b>(3,694,500)</b>	<b>(\$10,462)</b>	<b>100%</b>	<b>\$10,462</b>	<b>-</b>
<b>All Vector Welded Points</b>	<b>2,710,163</b>	<b>(2,704,494)</b>	<b>\$31,176</b>	<b>32%</b>	<b>\$3,397</b>	<b>\$34,573</b>
Oaonui	118,884	(120,197)	(\$7,220)	13%	\$1,398	(\$5,822)
Frankley Road	1,280,861	(1,321,409)	(\$222,987)	16%	\$1,666	(\$221,320)
Bertrand Rd	50,700	(46,985)	\$20,430	3%	\$318	\$20,749
Faull Rd	14,988	(21,857)	(\$37,774)	1%	\$125	(\$37,649)
Kowhai	4,262	(3,706)	\$3,058	0%	\$1	\$3,059
Tikorangi #2	99,364	(100,982)	(\$8,895)	4%	\$463	(\$8,432)
Tikorangi	218,471	(221,119)	(\$14,565)	5%	\$495	(\$14,070)
Tikorangi #3 ( R )	28,594	(27,063)	\$8,419	1%	\$83	\$8,502
Ngatimaru Rd (D)	80,686	(84,288)	(\$19,806)	11%	\$1,152	(\$18,655)
Ngatimaru Rd ( R )	95,779	(93,891)	\$10,384	18%	\$1,876	\$12,260
Turangi	125,018	(120,717)	\$23,655	3%	\$265	\$23,920
Pokuru	369,424	(344,377)	\$137,741	2%	\$164	\$137,905
Pirongia	3,893	(5,748)	(\$10,199)	0%	\$16	(\$10,183)
Rotowaro	1,055,986	(1,032,961)	\$126,621	15%	\$1,551	\$128,172
Hunty	145,688	(149,202)	(\$19,323)	8%	\$881	(\$18,442)



## APPENDIX 2: BALANCING COSTS – 2% ADJUSTMENT FACTOR / 10% BEHAVIOUR IMPROVEMENT

### ASSUMPTIONS

Calculation

Input

Notes

Tolerance (ROIL)	1,000	
Benchmark Spot Price	\$5.50	emsTradepoint hist. VWAP (08.12.14)
Price Adjustment	2%	0%-10%
Baseline Cash-Out Sell Price	\$5.61	Excl. Cash-Out Trading / Transmission Prices
Baseline Cash-Out Buy Price	\$5.39	
Cash-Out Trading Fee Price	\$0.10	Average of emsTradepoint fees
Tariff 1	0.0016850	As at 08.12.14
Tariff 2	0.0760580	As at 08.12.15

Include Cash-Out Transmission / Trading Price? (Y/N) N

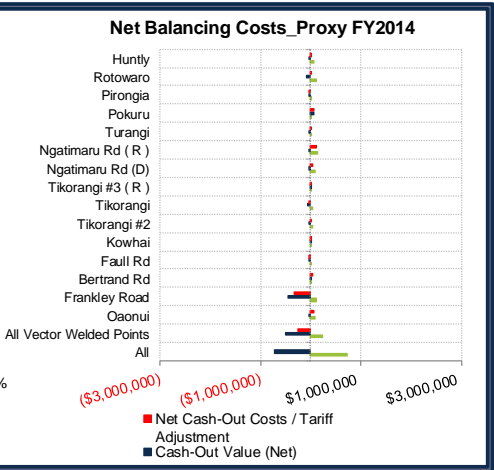
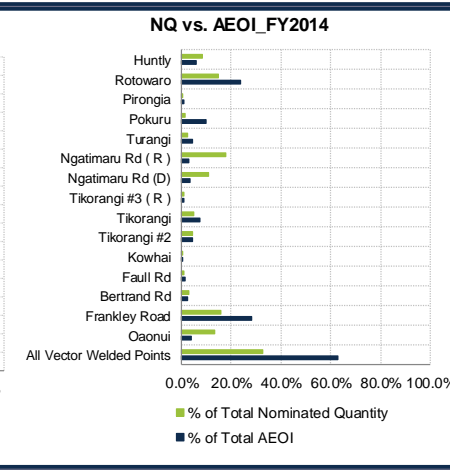
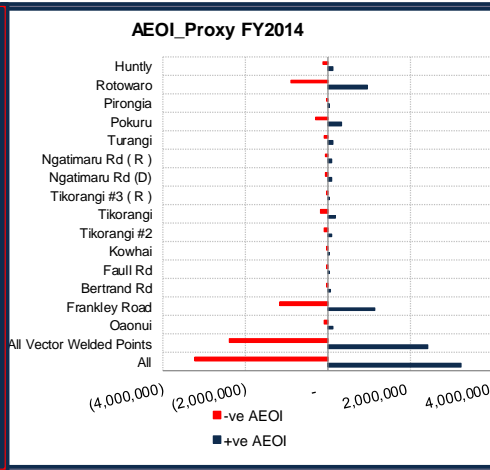
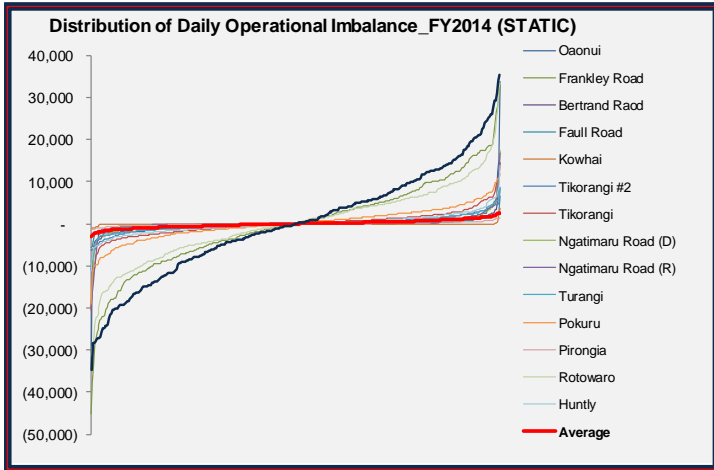
emsTradepoint considers that these components should not be included as they exist within the counterfactual as well

Behaviour Improvement 10% 0% = FY14 DOI, 100% = zero DOI

### RESULTS (FY14 as proxy)

-ve\$ = cost +ve\$ = benefit

	DIRECT CASH-OUT COSTS			TARIFF ADJUSTMENT (following year)		Net Cash-Out Costs / Tariff Adjustment
	+ve AEOI	-ve AEOI	Cash-Out Value (Net)	% of Total SQ FY14	Tariff Adjustment	
<b>All</b>	<b>3,223,332</b>	<b>(3,224,577)</b>	<b>(\$716,023)</b>	<b>100%</b>	<b>\$716,023</b>	<b>-</b>
<b>All Vector Welded Points</b>	<b>2,392,354</b>	<b>(2,386,752)</b>	<b>(\$494,825)</b>	<b>32%</b>	<b>\$232,502</b>	<b>(\$262,324)</b>
Oaonui	102,334	(103,616)	(\$29,700)	13%	\$95,707	\$66,007
Frankley Road	1,136,693	(1,172,787)	(\$452,498)	16%	\$114,033	(\$338,465)
Bertrand Rd	42,804	(39,161)	\$11,017	3%	\$21,794	\$32,811
Fauli Rd	11,324	(17,807)	(\$38,852)	1%	\$8,557	(\$30,295)
Kowhai	3,736	(3,135)	\$2,546	0%	\$67	\$2,613
Tikorangi #2	81,154	(82,642)	(\$26,194)	4%	\$31,709	\$5,515
Tikorangi	186,092	(188,576)	(\$54,867)	5%	\$33,858	(\$21,009)
Tikorangi #3 ( R )	24,135	(22,857)	\$1,859	1%	\$5,652	\$7,511
Ngatimaru Rd (D)	68,814	(71,956)	(\$32,758)	11%	\$78,819	\$46,060
Ngatimaru Rd ( R )	83,224	(81,625)	(\$9,335)	18%	\$128,406	\$119,071
Turangi	106,045	(102,074)	(\$1,051)	3%	\$18,144	\$17,093
Pokuru	320,065	(297,423)	\$56,602	2%	\$11,247	\$67,848
Pirongia	2,904	(4,673)	(\$10,563)	0%	\$1,077	(\$9,486)
Rotowaro	932,692	(911,869)	(\$88,367)	15%	\$106,146	\$17,779
Huntly	121,314	(124,377)	(\$43,863)	8%	\$60,323	\$16,460



### APPENDIX 3: BALANCING COSTS – 6% ADJUSTMENT FACTOR / 30% BEHAVIOUR IMPROVEMENT

#### ASSUMPTIONS

Calculation

Input

Notes

Tolerance (ROIL)	1,000	
Benchmark Spot Price	\$5.50	emsTradepoint hist. VWAP (08.12.14)
Price Adjustment	6%	0%-10%
Baseline Cash-Out Sell Price	\$5.83	Excl. Cash-Out Trading / Transmission Prices
Baseline Cash-Out Buy Price	\$5.17	
Cash-Out Trading Fee Price	\$0.10	Average of emsTradepoint fees
Tariff 1	0.0016850	As at 08.12.14
Tariff 2	0.0760580	As at 08.12.15

Include Cash-Out Transmission / Trading Price? (Y/N) N

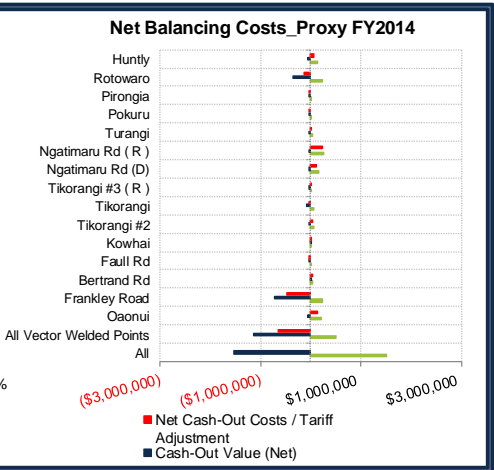
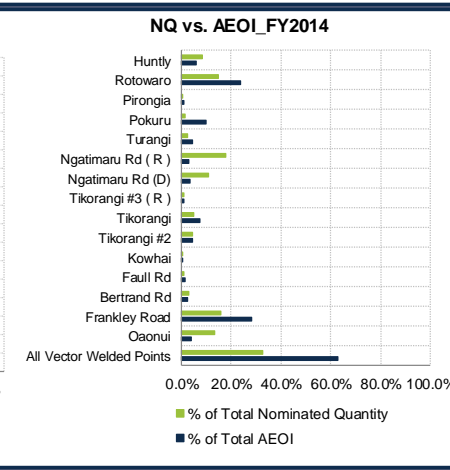
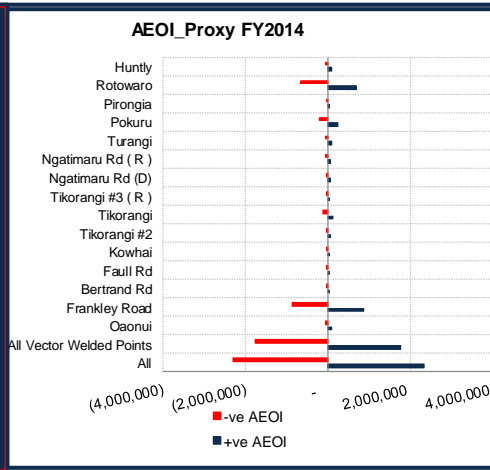
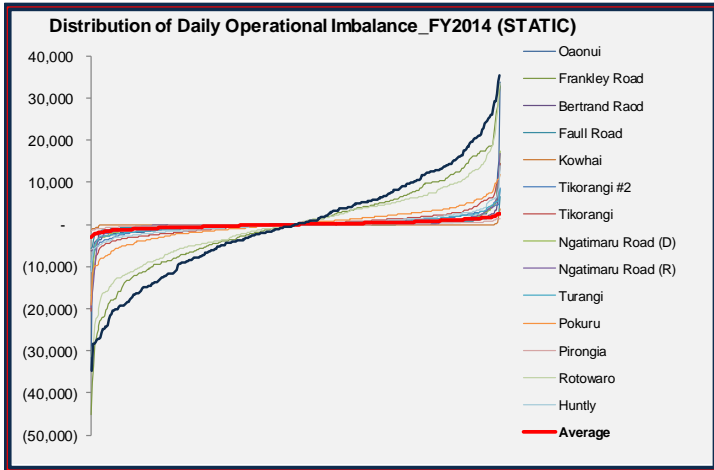
*emsTradepoint considers that these components should not be included as they exists within the counterfactual as well*

Behaviour Improvement 30% 0% = FY14 DOI, 100% = zero DOI

#### RESULTS (FY14 as proxy)

-ve\$ = cost +ve\$ = benefit

	DIRECT CASH-OUT COSTS			TARIFF ADJUSTMENT (following year)		Net Cash-Out Costs / Tariff Adjustment
	+ve AEOI	-ve AEOI	Cash-Out Value (Net)	% of Total SQ FY14	Tariff Adjustment	
<b>All</b>	<b>2,304,737</b>	<b>(2,305,276)</b>	<b>(\$1,524,069)</b>	<b>100%</b>	<b>\$1,524,069</b>	<b>-</b>
<b>All Vector Welded Points</b>	<b>1,760,565</b>	<b>(1,755,838)</b>	<b>(\$1,134,265)</b>	<b>32%</b>	<b>\$494,884</b>	<b>(\$639,381)</b>
Oaonui	70,934	(72,153)	(\$53,917)	13%	\$203,714	\$149,798
Frankley Road	849,041	(876,966)	(\$723,075)	16%	\$242,721	(\$480,354)
Bertrand Rd	27,817	(24,243)	\$2,477	3%	\$46,389	\$48,865
Faull Rd	5,439	(11,384)	(\$38,246)	1%	\$18,213	(\$20,033)
Kowhai	2,683	(1,994)	\$2,247	0%	\$142	\$2,388
Tikorangi #2	47,960	(48,895)	(\$37,097)	4%	\$67,492	\$30,395
Tikorangi	122,621	(124,775)	(\$93,475)	5%	\$72,067	(\$21,408)
Tikorangi #3 ( R )	15,656	(14,884)	(\$5,833)	1%	\$12,031	\$6,198
Ngatimaru Rd (D)	46,624	(48,845)	(\$43,715)	11%	\$167,767	\$124,052
Ngatimaru Rd ( R )	59,327	(58,305)	(\$33,194)	18%	\$273,316	\$240,121
Turangi	69,298	(65,987)	(\$26,430)	3%	\$38,620	\$12,190
Pokuru	223,038	(205,205)	(\$43,234)	2%	\$23,938	(\$19,295)
Pirongia	1,228	(2,827)	(\$10,127)	0%	\$2,292	(\$7,835)
Rotowaro	687,257	(670,840)	(\$357,829)	15%	\$225,933	(\$131,896)
Huntly	75,814	(77,974)	(\$62,620)	8%	\$128,400	\$65,780



## APPENDIX 4: BALANCING COSTS – 8% ADJUSTMENT FACTOR / 50% BEHAVIOUR IMPROVEMENT

### ASSUMPTIONS

Calculation	Input	Notes
Tolerance (ROIL)	1,000	
Benchmark Spot Price	\$5.50	emsTradeport hist. VWAP (08.12.14)
Price Adjustment	8%	0%-10%
Baseline Cash-Out Sell Price	\$5.94	Excl. Cash-Out Trading / Transmission Prices
Baseline Cash-Out Buy Price	\$5.06	
Cash-Out Trading Fee Price	\$0.10	Average of emsTradeport fees
Tariff 1	0.0016850	As at 08.12.14
Tariff 2	0.0760580	As at 08.12.15

Include Cash-Out Transmission / Trading Price? (Y/N)

*emsTradeport considers that these components should not be included as they exists within the counterfactual as well*

Behaviour Improvement  0% = FY14 DOI, 100% = zero DOI

### RESULTS (FY14 as proxy)

-ve\$ = cost +ve\$ = benefit

	DIRECT CASH-OUT COSTS			TARIFF ADJUSTMENT (following year)		Net Cash-Out Costs / Tariff Adjustment
	+ve AEOI	-ve AEOI	Cash-Out Value (Net)	% of Total SQ FY14	Tariff Adjustment	
<b>All</b>	<b>1,429,620</b>	<b>(1,427,567)</b>	<b>(\$1,245,710)</b>	<b>100%</b>	<b>\$1,245,710</b>	<b>-</b>
<b>All Vector Welded Points</b>	<b>1,139,024</b>	<b>(1,134,831)</b>	<b>(\$977,307)</b>	<b>32%</b>	<b>\$404,498</b>	<b>(\$572,809)</b>
Oaonui	42,436	(43,584)	(\$44,160)	13%	\$166,508	\$122,348
Frankley Road	564,983	(584,178)	(\$611,124)	16%	\$198,390	(\$412,734)
Bertrand Rd	15,236	(11,471)	\$8,955	3%	\$37,916	\$46,871
Faull Rd	1,817	(5,704)	(\$24,687)	1%	\$14,887	(\$9,800)
Kowhai	1,631	(853)	\$3,186	0%	\$116	\$3,301
Tikorangi #2	20,780	(21,161)	(\$20,551)	4%	\$55,165	\$34,614
Tikorangi	64,417	(66,241)	(\$67,514)	5%	\$58,905	(\$8,610)
Tikorangi #3 ( R )	8,353	(8,088)	(\$5,773)	1%	\$9,834	\$4,061
Ngatimaru Rd (D)	27,412	(28,713)	(\$31,845)	11%	\$137,126	\$105,280
Ngatimaru Rd ( R )	36,086	(35,642)	(\$29,114)	18%	\$223,397	\$194,283
Turangi	35,651	(33,244)	(\$17,074)	3%	\$31,566	\$14,492
Pokuru	130,606	(117,803)	(\$38,879)	2%	\$19,566	(\$19,312)
Pirongia	52	(1,479)	(\$8,523)	0%	\$1,873	(\$6,649)
Rotowaro	443,383	(431,371)	(\$318,781)	15%	\$184,668	(\$134,113)
Huntly	36,778	(38,035)	(\$39,825)	8%	\$104,949	\$65,123

