

Profitability of Electricity Distributors Following First Adjustments to Revenue Limits

Summary and analysis

Date: 8 June 2016

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Executive summary

Purpose of executive summary

- X1 In November 2012, we announced the first adjustments to the revenue limits that apply to 16 electricity distributors. Here we outline the main impacts on profitability. Further information can be found inside.

Stakeholder interest in profitability of electricity distributors

- X2 Under s 53B of the Commerce Act 1986, we are required to publish summary and analysis of the information disclosed by distributors. The purpose of summary and analysis is to promote greater understanding about the performance of distributors, their relative performance, and changes in their performance over time.
- X3 The specific focus of this report is on profitability, and people are interested in profitability for different reasons. For some, it is because each distributor faces little or no competition. As a consequence, consumer confidence is quite dependent on the extent to which excessive profits are limited.
- X4 Other observers, including ourselves, have wider interests in profitability. A commonly cited concern is that investment may be deterred if the limits on revenue are set too low. Profits must therefore be sufficient to support continued investment in the network.

Profitability of distributors reflected performance

- X5 In this report, we show that the profitability of distributors has reflected their performance. In competitive markets, profitability is not guaranteed. Similarly, each distributor's return has depended on the extent to which costs were controlled. Changes in demand played a role too.
- X6 More specifically, the profitability of each distributor comprised:¹
- X6.1 a performance-related 'real' return (through cash flows); plus
 - X6.2 compensation for actual inflation (through asset revaluations).
- X7 And as well as finding that excessive profits were limited, we have also found that distributors invested more than before. However, we have stopped short of assessing whether the increased levels of expenditure reflect better asset management.

¹ The analysis and discussion in this paper relies on a number of simplifications designed to capture the key points not all of the details. As an example, the revenue limit is updated each year for changes in the Consumer Price Index, so strictly speaking the 'real' component of returns will also reflect compensation for actual inflation. This effect is separately identified later in the paper. However, while we have tried to be as comprehensive as possible, there are other effects that we have not modelled in this paper.

Majority of distributors within one percentage point of expected return

X8 Figure X2 shows that, for the majority of distributors, real returns were within one percentage point above or below expectations (a range of 6.34% to 8.22% of returns around a target on average of 7.34%).² A further six distributors fell short of expectations by more than one percentage point.³

**Figure X1: Internal rate of return (nominal)
1 April 2012 to 31 March 2015**

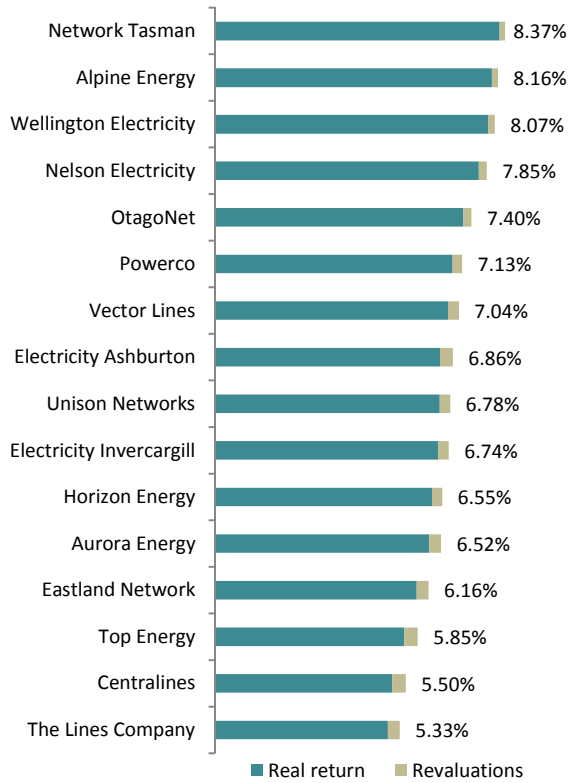
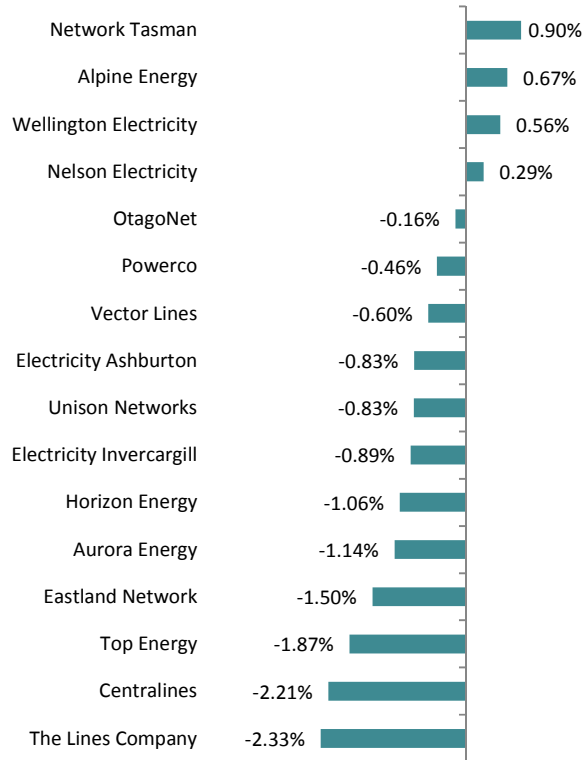


Figure X2: Variance from expected real return (percentage points)



X9 Our analysis has focussed on profitability over a three-year period. This time period reflects the date from which the adjustment to revenue limits was first intended to take effect (1 April 2012), until the end of the period that the revenue limits applied (31 March 2015).

² Our adjustments to the revenue limits were based on a nominal estimate of the ‘vanilla’ cost of capital, and inflation expectations at the same time were equivalent to around 1.43% of returns per annum. As a result, the implied real return for the industry was around 7.34%. In addition, the nominal estimate of the cost of capital was selected from the 75th percentile of the estimated range (0.72 percentage points above the midpoint). We subsequently decided to amend input methodologies so a 67th percentile estimate will be applied in future.

³ In Chapter 6, we also report on the returns achieved by Orion New Zealand, and other distributors that are not subject to limits on revenue. These distributors have, however, been excluded from our detailed analysis because they were not subject to our 2012 decision to adjust revenue limits. Consequently, forecasts were not developed that could be compared to actual outcomes.

X10 The results indicate that excessive profits were limited by our adjustments to the revenue limits. For example, had the revenue limits been left unadjusted, Vector Lines would have recovered around \$110m more profits than would have been justified. The impacts on returns are shown in Figure X3.⁴

Figure X3: Impact of adjustments to revenue (\$m)

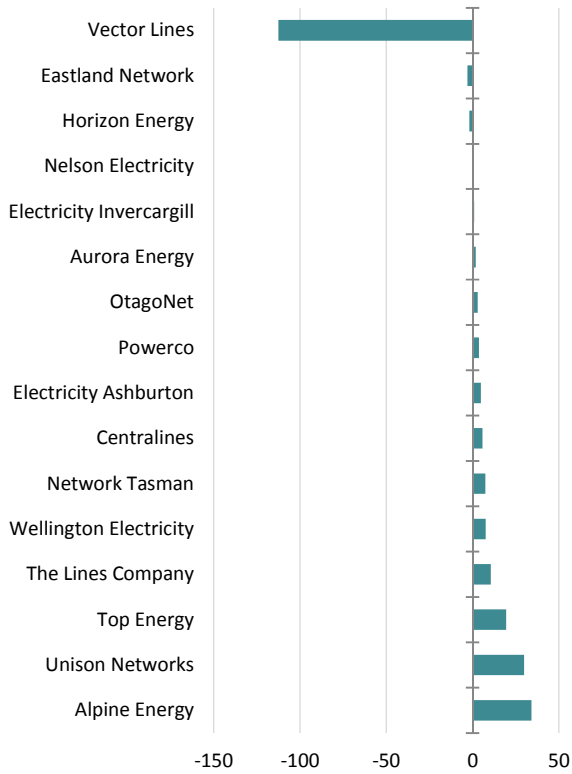
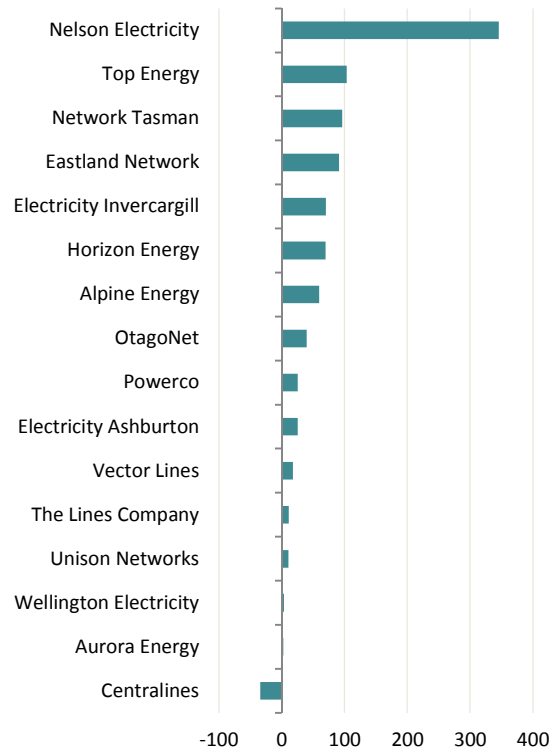


Figure X4: Change in average capital expenditure relative to historic average (%)



X11 Figure X4 shows that investment increased relative to historic levels, which indicates that the adjustments were consistent with distributors having continued incentives to invest. The increases in capital expenditure were equivalent to around \$97m of additional investment over the three years (2015 prices).

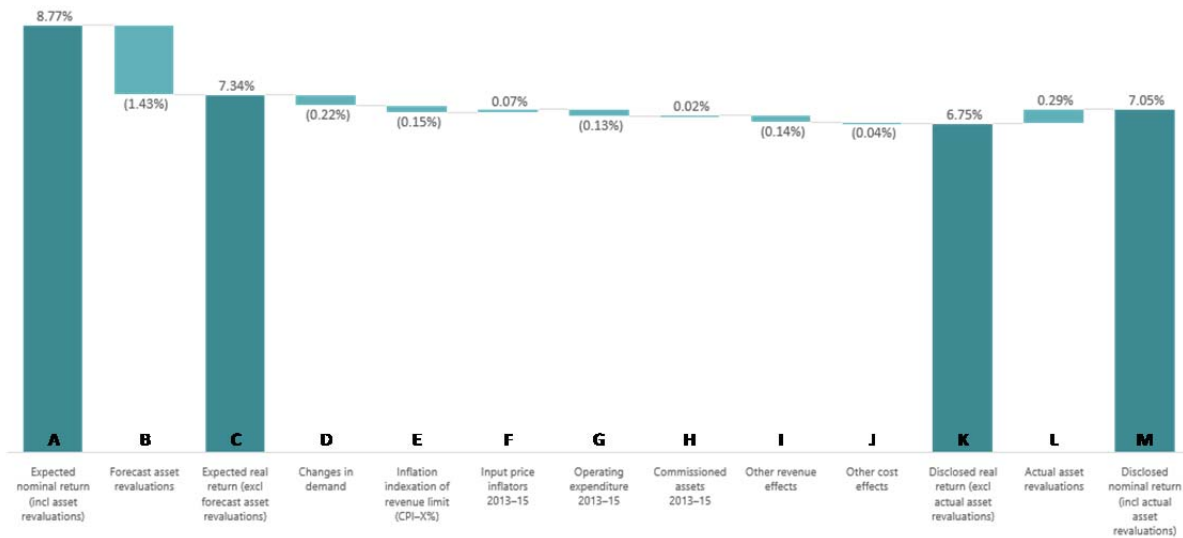
X12 Trends therefore suggest that distributors had incentives to invest but, based on this information alone, we are unable to reach conclusions about the quality of asset management practices. Nor is it clear whether such spending reflects prudently incurred costs.

⁴ All relevant distributors reported themselves as being compliant with the adjusted revenue limits.

Breakdown of variance between actual and expected returns

X13 To demonstrate the link between profitability and performance, we have broken down the variance between actual and expected returns. Starting from the expected nominal return of 8.77%, the waterfall chart in Figure X5 shows the steps that led to the returns observed in practice. Each step shows the impact of variances from the forecasts we relied on in November 2012.

**Figure X5: Breakdown of variance between actual and expected return for 16 distributors
1 April 2012 to 31 March 2015**



X14 Figure X5 shows that the main reason for variance in returns was the difference between actual and forecast inflation. In particular, our forecast of inflation (around 1.43% per annum) was higher than the compensation for inflation that was required and received through asset revaluations in practice (around 0.29% per annum).⁵

X15 Figure X5 also shows that the forecasting approaches we relied on in November 2012 generally performed well, on average. Aggregate operating expenditure was higher than forecast, but caused a reduction in returns of only 0.13 percentage points.⁶ Similarly, the aggregate value of assets commissioned was higher than forecast, but caused only +0.02 percentage points of variance in returns.

⁵ By indexing asset values to inflation, we therefore ensured the real return achieved in practice remained consistent with the real return embedded in the cost of capital. In the absence of this adjustment mechanism, the real return earned by distributors would be subject to significant inflation risk in both directions.

⁶ Owing to the way we forecast operating expenditure in November 2012, the impact of operating expenditure shown in Figure X5 includes the impact of gains or losses on disposal.

- X16 The impact of each factor was, however, different for each distributor. Most notably, where one percentage point is equivalent to around 14% of the target real return:
- X16.1 differences between forecast and actual operating expenditure explained between –1.72 and +0.67 percentage points of the variance in returns for individual distributors; and
 - X16.2 differences between forecast and actual changes in demand explained between –0.96 and +1.41 percentage points of the variance in returns for individual distributors.
- X17 For certain distributors, ‘other revenue effects’ explained a relatively significant amount of the variance. For example, avoided cost of transmission payments boosted returns by up to 0.75 percentage points. Pricing beneath the revenue limit suppressed returns by a maximum of 1.74 percentage points.
- X18 Similarly, a relatively significant amount of the variance for certain distributors was explained by ‘other cost effects’. For example, differences from the forecast level of net additions to the asset base prior to 1 April 2012 caused up to 2.20 percentage points of variance in returns. And in some cases discretionary discounts and consumer rebates boosted returns by up to 2.01 percentage points (by reducing tax payable).
- X19 Chapter 3 and Attachment A provide further information about the different sources of variance, as well as quantifying the materiality of the effects for individual distributors. We trust that this information will help you develop a greater understanding of the performance of individual distributors.

Next steps

- X20 Most immediately, our findings may be relevant to our first full review of input methodologies under s 52Y of the Commerce Act. For example, the extent to which distributors are exposed to volume risk is relevant to our decision on the form of control.
- X21 Our draft decisions on the input methodologies review are due on 16 June 2016.

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1. Introduction

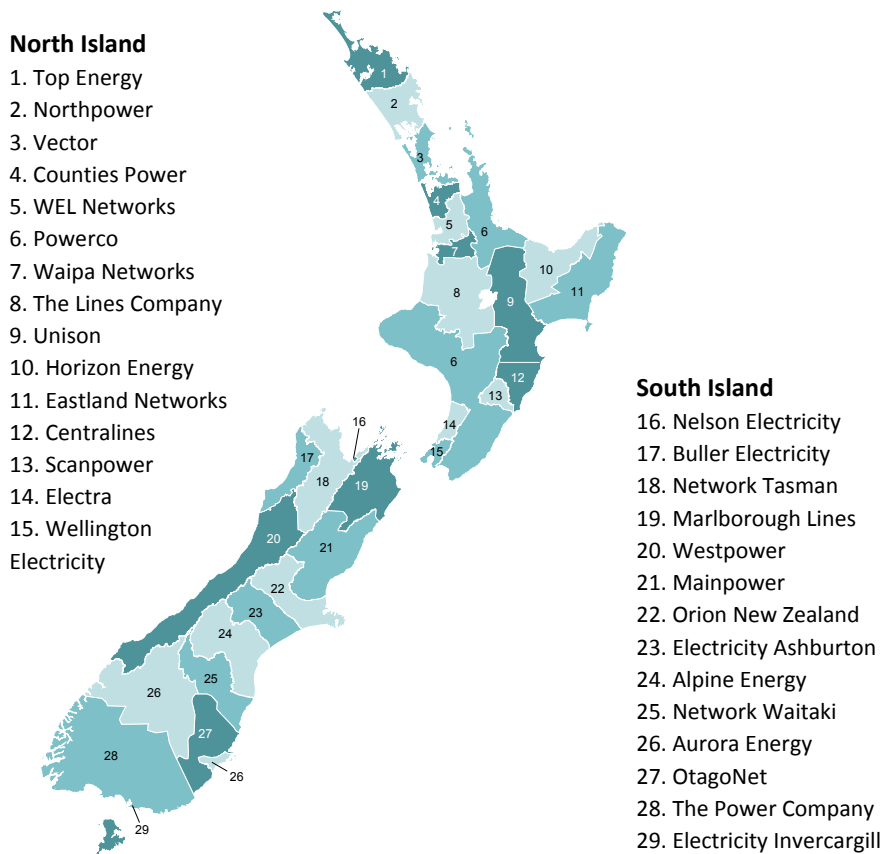
Purpose of report

1. This report is intended to improve stakeholder understanding about the impact that the first periodic adjustment to revenue limits had on the profitability of 16 electricity distributors. We also provide information about the changes in network reliability, and draw comparisons with other distributors.

Information disclosure regulation—our role under summary and analysis

2. As the economic regulator of 29 electricity distributors in New Zealand, we require public disclosure of a range of information about performance. This information includes asset management plans, pricing methodologies, and financial and network data. The location of each distributor is shown in Figure 1.

Figure 1: Location of 29 electricity distributors



3. The aim of information disclosure regulation is to allow people to assess whether the purpose of Part 4 of the Commerce Act 1986 (the Act) is being met. In broad terms, the 'Part 4 Purpose' is to promote the long-term benefit of consumers, by promoting outcomes consistent with those produced in competitive markets.⁷

⁷ The relevant outcomes are set out in (a)-(d) of the Part 4 Purpose. Refer: s 52A(1) of the Act.

Improving stakeholder understanding through summary and analysis

4. Under s 53B of the Act, we are required to publish summary and analysis of the information disclosed by distributors. The purpose of summary and analysis is to promote greater understanding about the performance of distributors, their relative performance, and changes in their performance over time.
5. To help improve stakeholder understanding, every year we consolidate the quantitative information and publish the centralised database on our website. We often receive positive feedback about these databases, including from the distributors themselves.
6. However, these databases are only one way in which we can help improve stakeholder understanding about performance. Other types of summary and analysis reports can provide additional insights into one or more of the six areas of performance that attract stakeholder interest.

Figure 2: Areas of stakeholder interest in performance



7. In the past we have frequently focussed our attention on investment—to understand whether distributors are investing in the right assets, at the right time, alongside the right operational solutions. This is because the asset management decisions that distributors make today can affect risks to network reliability for years to come.

8. Most recently, in 2013, our focus on investment continued with a summary and analysis report that:⁸
 - 8.1 highlighted wide variation in the expenditure plans disclosed by electricity distributors; and
 - 8.2 considered how the variation in the expenditure plans might be explained in the context of underlying drivers.
9. We welcomed stakeholder engagement on this topic and expect to revisit this work in future.

Focus for this report is on profitability

10. In this report we have chosen to focus on profitability, but we define profits differently to most. Instead of looking to standard accounting definitions, we specify regulatory rules for how costs are defined. This means we are able to keep a closer eye on the profitability of the regulated services over time, even if the distributor is part of a wider parent company.
11. Amongst other things, we hope this work will go some way towards answering questions that are frequently asked of us about the profitability of distributors. Our primary interest lies in understanding the extent to which profitability is comparable to competitive markets, in which:
 - 11.1 excessive profits are limited; and
 - 11.2 appropriate investment incentives are in place.
12. While we are also interested in the pricing structures used to recover revenue, it is the Electricity Authority that has primary responsibility for overseeing the practices of distributors in this area. As a consequence, we have focussed on the revenue recovered from prices overall, and the resulting level of profitability, rather than on individual pricing structures.

⁸ Commerce Commission “Initial observations on forecasts disclosed by 29 electricity distributors in March 2013” (29 November 2013).

More specifically: the profitability of distributors that are subject to revenue limits

13. Although we will be reporting on the profitability of all distributors, our analysis centres on the distributors that are subject to limits on revenue.⁹ In part, this is because 'exempt' distributors have ownership arrangements in which profits are returned directly to almost all consumers (in the form of rebates). Stakeholder interest in profitability is therefore different for exempt distributors.
14. Our decision to reserve our more detailed analysis for the distributors subject to revenue limits also has practical roots. Our approach to setting revenue limits involved creating a forecasting model and we have used this model as the basis for our more detailed analysis.

Variations in profitability expected—not a guaranteed rate of return

15. Our expectation is that profitability will vary under the revenue limits because distributors are not guaranteed to earn any particular rate of return. Rather, returns depend on the interplay, over a fixed duration, between the revenue limits that we determine, and the costs and demand experienced by each distributor.
16. The advantage of setting revenue limits for a fixed duration (known as the 'regulatory period') is that it preserves, and potentially improves, the financial incentive that each distributor has to improve its efficiency. This is because distributors are rewarded with higher profits if they can control their expenditure.
17. Minimum standards for service quality are important too, because they mitigate the risk that distributors will cut their costs by compromising quality. Distributors will therefore be more likely to provide services at a quality that reflects consumer demands.

⁹ As explained in Chapter 3, the limits on revenue are specified in the form of a weighted average price cap, which means that distributors are able to earn higher revenues through increased volumes.

Understanding and improving the effectiveness of regulation

18. Amongst other things, by promoting greater understanding of the performance of electricity distributors, we expect that summary and analysis will help us understand and improve the effectiveness of regulation. The evidence base that we develop may prove useful to a number of our workstreams.
19. For example, we are currently midway through a review of the up-front rules, requirements and processes of regulation, which are collectively referred to as 'input methodologies'. This is the first full review of input methodologies since they were originally determined in December 2010.¹⁰
20. We will also have other opportunities to refine aspects of our regulatory settings that are outside the scope of the input methodologies review. In particular, we can make further improvements at the next reset of the revenue limits for electricity distributors, or in our next suite of amendments to the disclosure requirements.
21. However, the current revenue limits, which expire on 31 March 2020, have already been set and cannot be changed. The only provisions for reconsidering these revenue limits relate to specific circumstances such as natural disasters or legislative changes.

Our first comparison of supplier profitability based on original forecasts

22. The analysis presented in this report is the first time that we have undertaken detailed profitability analysis of suppliers after a regulatory period. We welcome feedback on our approach. We are particularly interested in feedback on our calculation of internal rates of return and the comparisons to the expected return.
23. Feedback can be provided to us by email using the email address regulation.branch@comcom.govt.nz, or during our process to review input methodologies. This is not a formal submission process so there is no specific deadline for feedback.

¹⁰ We are required to review each input methodology under s 52Y of the Commerce Act.

Data generally relied on 'as disclosed' by distributors

24. In this report, we have generally relied on data 'as disclosed' by distributors. We have adopted this approach because we recognise that the onus is on distributors to be sufficiently confident in their data before it is publicly disclosed. We also take comfort from the fact that the information is subject to independent audit requirements.
25. Nevertheless, some errors were still obvious in the information that had been publicly disclosed, eg, the closing value in one year being different to the opening value the following year. Where these issues were identified, we have corrected these data points, in discussion with distributors.
26. However, without duplicating the efforts of distributors in ensuring their data is robust, we recognise there is a risk of further errors being identified after this report has been published. We therefore invite distributors to contact us if they identify an error, and would like to request an opportunity to submit corrected data.
27. We note that the data disclosed by distributors is consistent with the rules and requirements that we have set. Any changes to these in the future may result in changes to our view of the distributors' returns. Some potential changes would be more material than others. For example, the rules for considering regulated party transactions will be considered in the future, and could be more material than other potential changes.

Material published alongside this report

28. We have published a range of supporting material for this report on our website, including:
 - 28.1 the data that we have used for our analysis;
 - 28.2 the calculations and modelling used for our analysis; and
 - 28.3 detailed analysis and findings for individual distributors.
29. In particular, we have reproduced charts that are equivalent to Figure 3, Figure A1, and Figure A2 for each individual distributor that was subject to the 2012 adjustments to revenue limits.

2. First adjustment to revenue limits

Purpose of chapter

30. This chapter summarises the key features of our decision to adjust the revenue limits for the first time in November 2012, which provides the context for our analysis of:
- 30.1 profitability over the period 1 April 2012 to 31 March 2015; and
 - 30.2 quality of service over the period 1 April 2010 to 31 March 2015.
31. This chapter also explains why we have not analysed Orion New Zealand alongside the other distributors that are subject to revenue limits.

First regulatory period under new Part 4—and a number of other regulatory ‘firsts’

32. The regulatory period 1 April 2010 to 31 March 2015 was the first under the new Part 4 of the Commerce Act, and as such it is perhaps unsurprising that the time period contained a number of other regulatory ‘firsts’. For the first time we:
- 32.1 adjusted revenue limits based on projected profitability; and
 - 32.2 applied input methodologies to price setting.
33. Importantly, it was also the first regulatory period for a new type of regulation known as ‘default/customised price-quality regulation’. Under this type of regulation, we set a default price-quality path for each distributor, but individual distributors could seek a customised price-quality path instead.
34. The common feature between each type of ‘price-quality path’ is that they specify limits on revenue, and minimum quality standards. However, as explained in Box 1, the two paths do differ in terms of how, and when, they are set. The ‘customised’ path is a more tailored alternative to the initial ‘default’ set for each distributor.

Box 1: Purpose of default/customised price-quality regulation¹¹

The purpose of default/customised price-quality regulation is to provide a relatively low cost way of setting price-quality paths for electricity distributors, while allowing the opportunity for individual distributors to have alternative price-quality paths that better meet their particular circumstances.

¹¹ Refer: s 53K of the Act.

35. When we first set default price-quality paths in November 2009, we recognised that the revenue limits could be adjusted midway through the regulatory period, after input methodologies had been determined for the first time. In particular, adjustments could be made if materially different pricing outcomes were implied by input methodologies.¹²
36. For that reason, in November 2009, we set the default price-quality path for the first regulatory period by simply rolling over the revenue limits that were already in place. Quality standards reflected historic levels of performance. These default price-quality paths applied to all 17 distributors that were subject to price-quality regulation.
37. Then, in November 2012, we applied input methodologies to adjust the revenue limits to better reflect the expected costs of each distributor. Input methodologies affected our assessment of key cost components, such as the industry-wide cost of capital, and were applied alongside other assumptions (such as demand growth).
38. Taking our direction from the purpose of default/customised price-quality regulation, the other assumptions we relied on were developed in a relatively low cost way. More costly approaches could be used to set a customised path, such as those associated with audit, verification, and approval processes.
39. Consequently, in assessing profitability in November 2012, a variety of low cost techniques were used. Forecasts of demand and expenditure were developed through a combination of reliance on the supplier's own forecasts, independent forecasts, and simplifying assumptions.
40. Based on our low cost approaches, adjustments in both directions appeared appropriate. For some distributors, reductions in the revenue limit were necessary to limit excessive profits. For others, increases would preserve incentives to invest. Consumers would benefit from different outcomes depending on the market.
41. Notably, because the revenue limits had not been adjusted since 2003, some of the required increases were so significant that we had to smooth the increases over multiple years to minimise price shocks to consumers. This is because, prior to the adjustments, prices reflected information that was many years out of date.

¹² Refer: s 54K(3) of the Act. This was a transitional provision that only applied to the first regulatory period.

Mid-period reset focussed on profitability over a three-year period

42. The analysis in this paper reflects the fact that the November 2012 reset occurred midway through the regulatory period, and the focus of that reset was on returns over a three-year period (1 April 2012 to 31 March 2015).¹³ We have therefore focussed on the level of profitability achieved during this period as it reflects the date from which input methodologies were first intended to be reflected in pricing.
43. The aim of applying input methodologies over this period was to provide an opportunity to earn an appropriate return in real terms, ie, after inflation.¹⁴ Focussing on real returns is common in overseas jurisdictions, as recognised by Australasian expert Jeff Balchin (on behalf of Powerco Limited):¹⁵

the desirability of ... protecting investors in long-lived regulated assets from inflation risk dates back to the 1970s, where the unexpectedly high rate of inflation in that decade and beyond had a substantial adverse effect on the values of regulated businesses in the US, as well as encouraging frequent applications for tariff resets. By the time that modern price cap regulation emerged in the UK in the 1980s, inflation indexation of prices and underlying asset values became a standard part of the regulatory regime.

For investors in regulated assets to be protected from inflation, regulated prices must be determined such that the same real return (that is, the return above what is necessary to compensate for the decline in the purchasing power of money) would be delivered, all else constant, irrespective of the measured rate of inflation. This means that if inflation is higher than forecast, then the nominal return (that is, the return that includes compensation for the decline in the purchasing power of money) must also be correspondingly higher. I also observe that the proposition that investors care about real rather than nominal returns is a standard proposition in economics – it merely means that investors are sufficiently astute to see through the influence of inflation on “headline” returns and assess the acceptability of returns in terms of real purchasing power.

¹³ Although the changes to the revenue limits only came into effect on 1 April 2013, we applied claw back to compensate distributors for the under or over recovery of revenue that occurred in the previous year. This approach ensured that we achieved broadly similar outcomes for suppliers and consumers, in net present value terms, as if the adjustment to revenue limits had been implemented in full on the date that was originally envisaged (1 April 2012). For further reasoning, refer: Commerce Commission “Resetting the 2010-15 Default Price-Quality Paths for 16 Electricity Distributors” (30 November 2012)

¹⁴ This aim is discussed further in the ‘RAB Indexation and Inflation Risk’ chapter of Dr Martin Lally, “Review of further WACC issues” (22 May 2016).

¹⁵ PwC (for Powerco) “Draft Input Methodology for Default Price-Quality Paths – Inflation Issues” (6 July 2012).

44. The importance of considering returns in real terms can be seen by looking at changes over time in our nominal estimate of the cost of capital. For example:¹⁶
- 44.1 our estimate of the required nominal return from 1 April 2010 until 31 March 2015 was 8.77%, when forecast inflation implied a real return of 7.34% over the period; and
 - 44.2 our estimate of the required nominal return from 1 April 2012 until 31 March 2015 was 7.14%, when forecast inflation implied a real return of 6.32% over the period.
45. For this reason, when adjusting the revenue limits, the forecast of inflation that we relied on was the most recently available when the applicable nominal estimate of the cost of capital was determined. We noted that “such an approach ensures that the implied real return during the regulatory period is consistent with the inflation expectations that are embedded in our estimate of the cost of capital”.¹⁷

...while quality standards remaining unchanged for the full five years...

46. As noted previously, although the revenue limits were adjusted midway through the period, the quality standards remained unchanged. This is because the revenue limits were adjusted to ensure input methodologies were reflected in pricing. However, service quality is not one of the matters covered by input methodologies.
47. For this reason, the analysis of service quality that appears in this paper is based on performance over the full five years of the regulatory period. The analysis of quality of service therefore includes an additional two years of data than the analysis of profitability.

...and Orion New Zealand were excluded following the Canterbury earthquakes

48. In light of the circumstances surrounding the Canterbury earthquakes, we excluded Orion New Zealand from the scope of our November 2012 decision to minimise consultation obligations on the business. We therefore did not develop forecasts in the same way for Orion New Zealand as for other distributors.

¹⁶ All figures in this section correspond to the 75th percentile estimate of the ‘vanilla’ cost of capital. Given the uncertainty of estimating the cost of capital, this uplift was intended to help mitigate the potential asymmetric consequences on investment of estimation error. One of the practical effects of the uplift was to provide compensation for catastrophic risk. We have since revised down the percentile that we will rely on in future, from the 75th percentile to the 67th percentile.

¹⁷ Commerce Commission “Resetting the 2010-15 Default Price-Quality Paths for 16 electricity Distributors” (30 November 2012); paragraph 4.19.

49. We recognised at the time that Orion New Zealand would apply for a customised price-quality path to better reflect its particular circumstances. Amongst other things, the alternative price-quality path that we set allowed Orion New Zealand to recover increased expenditure associated with the network rebuild.¹⁸
50. For that reason, we have excluded Orion New Zealand from the more detailed profitability analysis contained in this paper. However, we do expect to report in more detail on the profitability of Orion New Zealand at a date closer to the end of the customised price-quality path.

¹⁸ More information on Orion’s customised price-quality path is provided in: Commerce Commission “Setting the customised price-quality path for Orion New Zealand Limited” (29 November 2013).

3. Performance relative to expectations

Purpose of chapter

51. This chapter relies on our November 2012 forecasts to assess the main sources of variance between actual and expected profitability for the period 1 April 2012 and 31 March 2015.

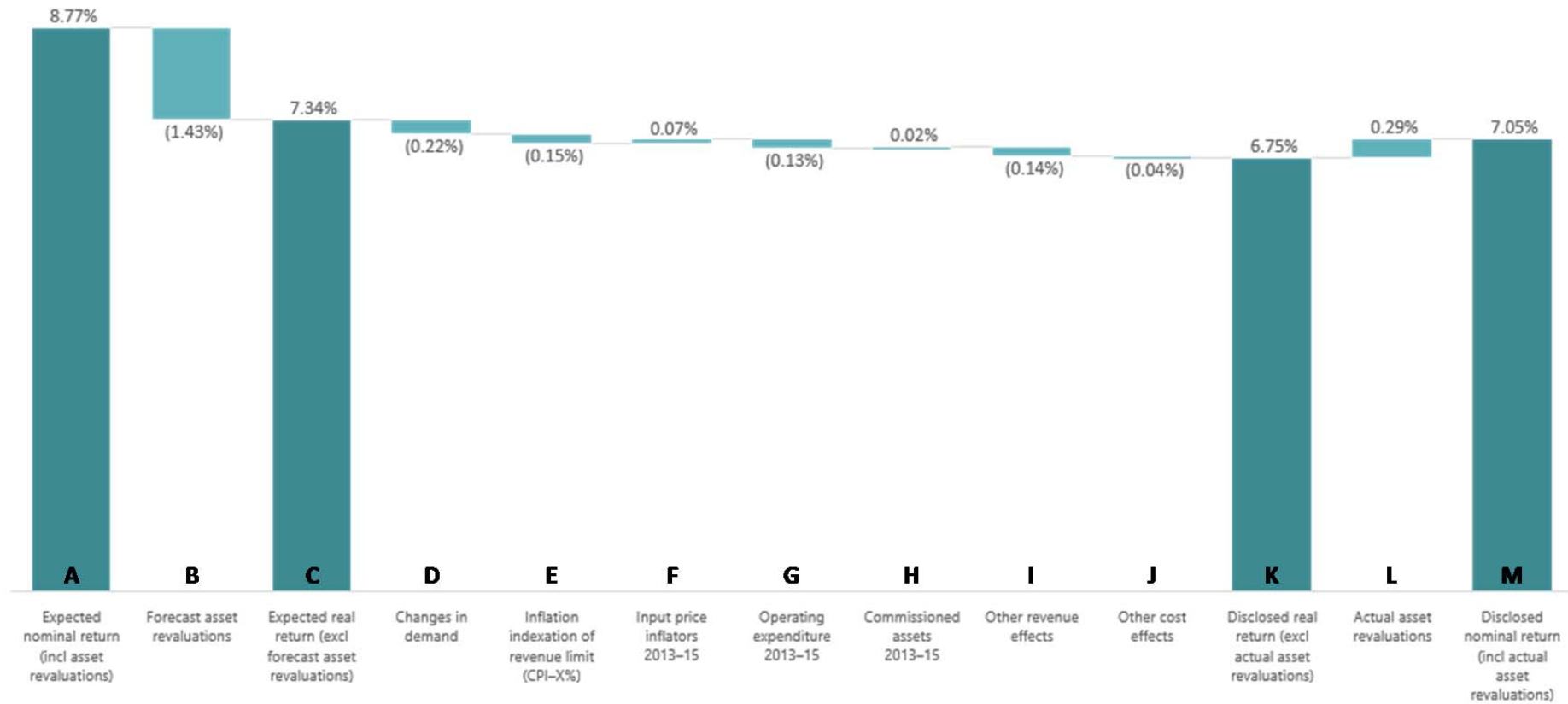
Breakdown of variance between actual and expected profitability

52. To demonstrate the link between profitability and performance, we have broken down the sources of variance between actual and expected profitability. The waterfall chart in Figure 3 shows the impact on returns of each difference between actual outcomes varying from the assumptions we relied on in November 2012.
53. The starting point for the waterfall chart is the return we expected each distributor to earn in nominal terms, based on a nominal estimate of the weighted average cost of capital (WACC), and the end point is the return that was achieved by all distributors in aggregate.¹⁹ Because it shows the effect at the industry level, Figure 3 is heavily influenced by larger distributors, such as Vector Lines, and Powerco Limited.
54. In between the start and the end point of the waterfall is a sequence of steps, with each step showing the impact on returns of a difference between our assumption and the actual outcome. For example, there is a step that shows the impact on returns of actual operating expenditure being different from forecast.
55. The first and last steps in the waterfall are different from the steps in between, because they both relate to the portion of returns that is attributable to inflation indexation of asset values.²⁰ By contrast, the intervening steps relate to the 'real returns' that arise as a result of net revenue recovered during the three-year period.

¹⁹ As noted in Chapter 2, the expected return reflected the 75th percentile estimate of the industry wide cost of capital. The use of this percentile represented an uplift of 0.72 percentage points relative to the midpoint.

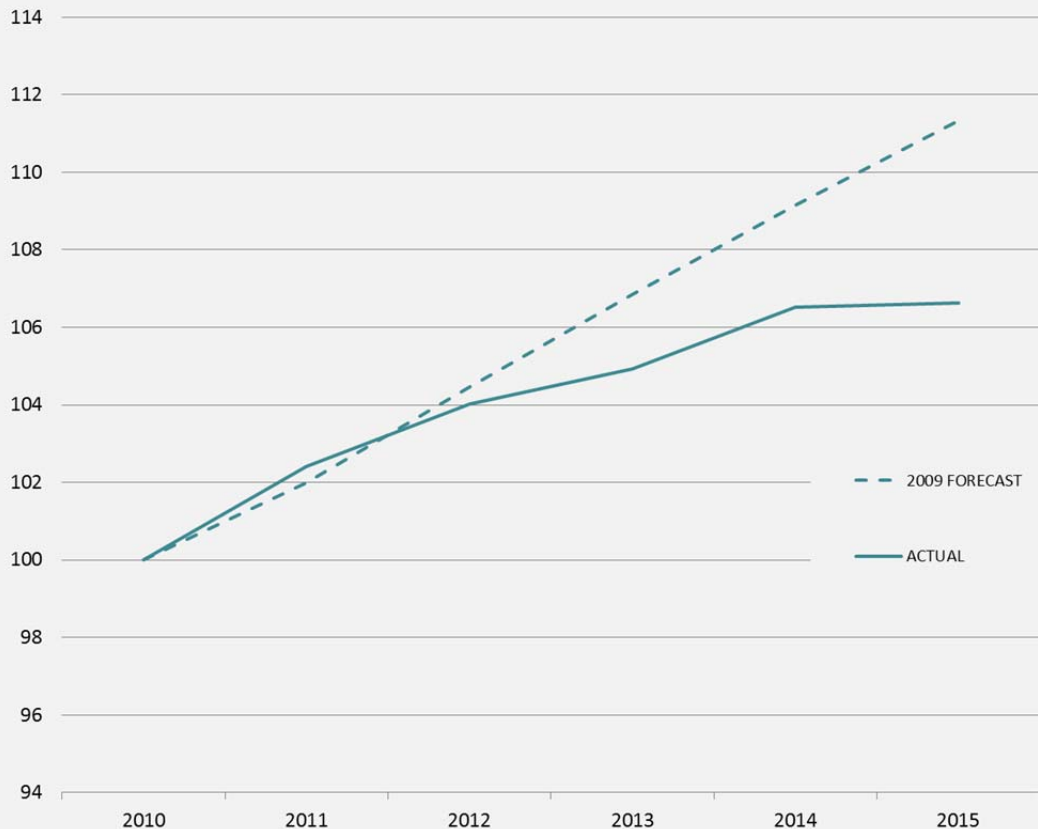
²⁰ Revaluations increase supplier returns by increasing the return *on* and *of* capital that is expected in future and vice versa.

Figure 3: Industry variance from pricing assumptions for period 1 April 2013 to 31 March 2015



Box 2: Difference between forecast and actual revaluations

The large difference between forecast and actual returns in nominal terms is largely explained by the difference between forecast and actual inflation. As shown below, actual inflation was around one percentage point lower on average over a five-year period than forecast inflation.



The forecast we relied on was based on an approach that was developed through consultation, and which in our view was free of deliberate bias in either direction. Consistent with input methodologies:

- forecast data was sourced from the Monetary Policy Statement from 10 September 2009, and applied from the March 2010 quarter to the March 2012 quarter; and
- for years not covered by the Monetary Policy Statement, our forecast converged towards 2%—the target rate of inflation for the Reserve Bank of New Zealand.

Distributors report revaluations in information disclosure based on actual inflation by applying the Statistics New Zealand quarterly inflation index known as SE9A.

'Nominal return' reflected performance-related real return and compensation for inflation

56. Figure 3 also shows that the nominal return for the industry reflected the real return of 6.75% plus compensation for actual inflation in the form of asset revaluations.²¹ Inflation indexation of asset values added around 0.29% to industry returns.²²
57. Although inflation was lower than forecast, the practical effect of indexing asset values to actual inflation was to ensure that the real return was consistent with the real return embedded in the cost of capital. In the absence of this adjustment mechanism, the real return earned by distributors would be subject to inflation risk in both directions.
58. A benefit of applying inflation indexation to asset values is therefore that real returns are more stable over time, which in our view is more conducive to a regulatory environment that supports long-term network investment. However, we are open to receiving views on whether we should change this approach as part of our review of input methodologies.

'Real return' for industry of 6.75% below target real return of 7.34%

59. By comparing Steps C and K in Figure 3, both of which exclude the effects of asset revaluations on returns, we can see that the actual real return for the industry of 6.75% was below the target real return of 7.34%.²³ The returns for individual distributors are shown in Chapter 4.
60. Figure 3 indicates that at the industry level our models for forecasting expenditure and revenue growth performed reasonably well. Although some factors affected individual distributors more than others, there were no sources of variance for the industry as a whole that were equivalent to more than 0.3 percentage points of returns.

²¹ For presentational purposes we have defined the real return as being equal to the nominal return less the impact of asset revaluations. In practice, the relationship between the real return and the nominal return is more complicated. For example, the relationship between the real return, inflation, and the nominal return is multiplicative rather than additive.

²² The definition of inflation that we apply when revaluing regulated assets excludes the impact of changes in Goods and Services Tax (GST). This is because individuals and entities that are GST registered (such as electricity distributors) face the same price for goods and services before and after the tax change.

²³ The actual real return for the industry was, however, above the real return implied by the midpoint estimate of the cost of capital of around 6.62%, ie, 7.34% less the uplift of 0.72 percentage points from the midpoint of the estimated range.

Impact of changes in demand

61. Step D in Figure 3 shows the variance in returns caused by differences between the actual and expected impact of changes in demand. It is the impact on revenue growth that would have occurred as a result of changes in demand even if average prices remained unchanged (which we have referred to in the past as ‘constant price revenue growth’).
62. This variance arises because the limit on revenue is specified in the form of a ‘price cap’, which means that distributors are exposed to revenue risk with respect to changes in demand.²⁴ Specifically, an increase in quantities boosts revenue, and a fall in quantities reduces revenue.
63. Distributors differ in terms of the quantities upon which their prices are based. The majority of distributors recover revenue through a combination of fixed charges for connections, and variable charges for throughput. Other distributors recover revenue through capacity based charges.
64. The pricing approach applied by a distributor will affect the extent to which revenues are exposed to demand risk. For example, Wellington Electricity recently changed to have a greater proportion of fixed charges, which means changes in throughput have less of an impact than with a larger proportion of variable charges. However, Wellington Electricity remains exposed to variations in the number of connections.
65. Figure 5 shows that the variation in returns attributable to changes in demand relative to forecast were –1.0 to +1.4 percentage points. The net effect for the industry as a whole was –0.22 percentage points, but only five distributors saw an increase in returns relative to our expectations.
66. These impacts reflect differences between our forecast of the impact of changes in billed quantities, and the actual impact of changes in billed quantities. As shown in Figure 4, the largest difference was 5.5 percentage points of revenue growth per year for Alpine Energy following a period of sustained increases in industrial demand.
67. The relative ranking of a distributor in terms of variation in the growth rate for demand (Figure 4) does not always map across to the same relative ranking in terms of variation in returns (Figure 5). This is because the growth rate is calculated as an average over three years, but in practice differences in the earlier years will have a greater impact on returns than differences in later years.²⁵

²⁴ As part of the review of input methodologies, we are required to consider whether a price cap remains the most appropriate form of control for electricity distributors.

²⁵ In the case of Unison, Centralines, and Network Tasman, the profile of growth explains why average demand growth above forecast resulted in a negative impact on returns.

Figure 4: Difference between forecast and actual revenue growth due to changes in billed quantities (percentage points)

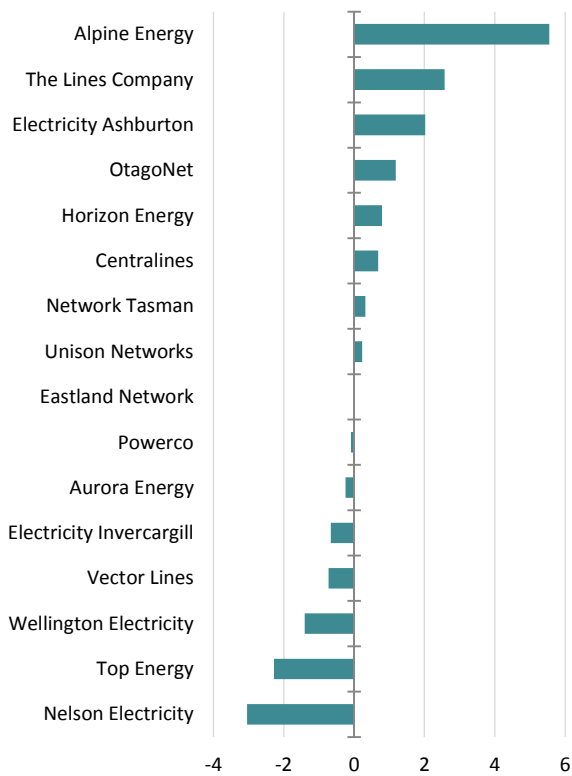
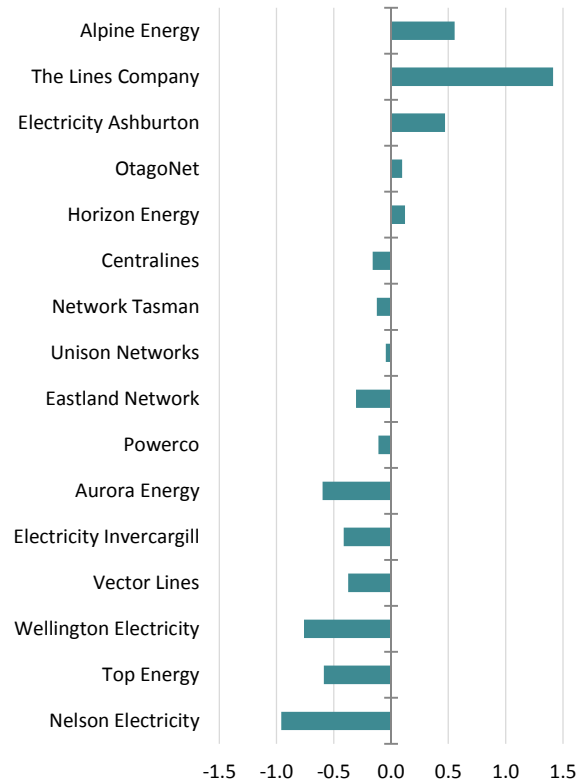


Figure 5: Impact on returns of difference between forecast and actual revenue growth (percentage points)



68. The formula we used to forecast the impact of changes in demand on revenue was based on separate modelling of two user groups—residential users, and industrial and commercial users. For example, to forecast the change in the revenue collected through fixed charges from residential users, we forecast changes in the number of households as a proxy for the number of fixed charges from residential users.
69. In Attachment A, we decompose the impacts shown in Figure 5 at an industry level according to the variances that arose as a result of our assumption about changes in demand before the reset revenue limits came into effect on 1 April 2013, and those that arose as a result of our assumption about changes in demand after the reset occurred.

Inflation indexation of revenue limit (CPI-X%) and input price inflators

70. Indexation of the revenue limit to inflation is intended to ensure that revenues are updated annually during the period in a way that mimics economy wide pressures on profitability, in light of changes in input prices. In our view, therefore, the variance for inflation indexation of the revenue limit should be considered alongside the variance for the input price inflators used to predict expenditure.
71. As can be seen in Table 1, inflation indexation of the revenue limit was 0.9 percentage points lower than forecast, and input price inflation over this period was also lower than forecast. These two effects will therefore have partially offset one another.

Table 1: Differences between forecast and actual inflation 2013-15

Price index	Forecast annual average (%)	Actual annual average (%)	Difference (percentage points)
Consumer Price Index	1.93	1.03	-0.90
Capital Good Price Index	1.62	1.61	-0.01
Labour Cost Index	1.90	1.73	-0.18
Producer Price Index	2.82	0.33	-2.49

Source: CPI forecast data from the Reserve Bank as at September 2012; other forecast data from NZIER as at June 2012; actual data from StatsNZ as at May 2016

72. The net impact on profitability of these two effects—ie, the revenue inflator less the cost inflator—was around -0.08 percentage points at the industry level. This difference implies that distributors would have had to make modest improvements in productivity to make up the shortfall.

Capital and operating expenditure after 1 April 2013 in constant prices

73. After accounting for changes in input prices, the variances relating to capital and operating expenditure appear relatively small at the industry level, but the variation is quite pronounced for individual distributors.²⁶ The breakdown for each distributor is shown in Figure 6 to Figure 9.
74. We developed the forecasts for capital and operating expenditure in different ways. Before applying uplifts for expected input price inflation:
- 74.1 the forecast of capital expenditure was based on the distributor's own forecast of spending on the network, plus an amount that reflected the historic level of non-network expenditure; whereas
- 74.2 the forecast of operating expenditure was developed by projecting forward expenditure in 2010 based on certain known and predictable factors, such as the length of the network and changes in productivity.
75. The largest increases in capital expenditure relative to the distributor's own forecast were for comparatively small distributors. This is because large, one-off capital projects have a proportionally larger effect on the expenditure of small distributors. In some cases, the difference is due to a difference in the timing of the investment rather than whether or not the investment is made. For example, Nelson Electricity's recent delayed replacement of its only zone substation (the Haven Road substation) had a very large impact on its overall expenditure.²⁷
76. The net impact on the returns for the industry as a result of differences between actual and expected capital expenditure was +0.02 percentage points, and the impacts on individual distributors were quite evenly split. Seven distributors had higher than expected returns, while returns were lower for nine distributors.
77. In addition, the impact of capital expenditure being different from forecast is less than it is for operating expenditure. This is because suppliers are able to earn a return *on* and *of* the depreciated value of capital expenditure remaining at the end of the period. By contrast, increased operating expenditure is not offset by a higher closing asset value.

²⁶ We refer to capital expenditure in this section but in practice it is the value of commissioned assets.

²⁷ This capital expenditure had originally been forecast for the two years preceding 1 April 2012. Consequently, our forecast of the opening RAB value for Nelson Electricity on 1 April 2012 was higher than it was in practice. The analysis in Attachment A shows that Nelson Electricity benefitted more from the overestimation of the opening RAB value for 1 April 2012 than the loss suffered as a result of increased capital expenditure after 1 April 2012.

Figure 6: Difference between forecast and actual commissioned assets (%)

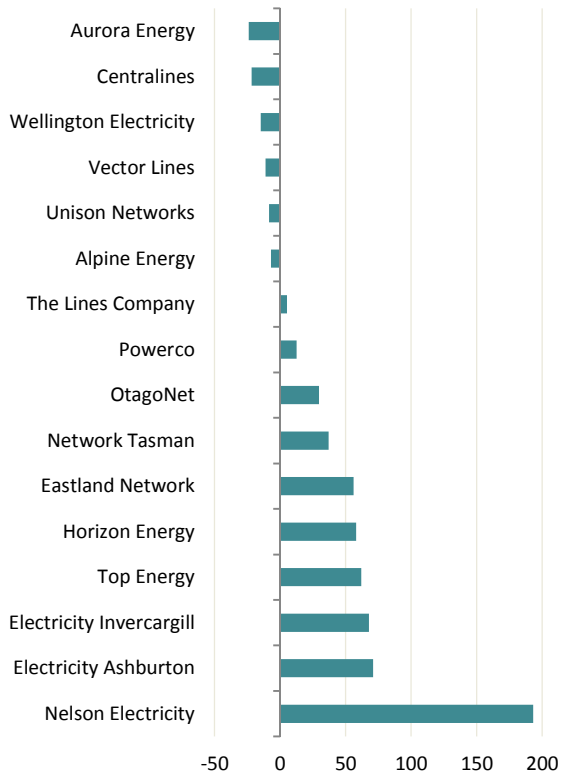


Figure 7: Impact of commissioned assets on returns (percentage points)

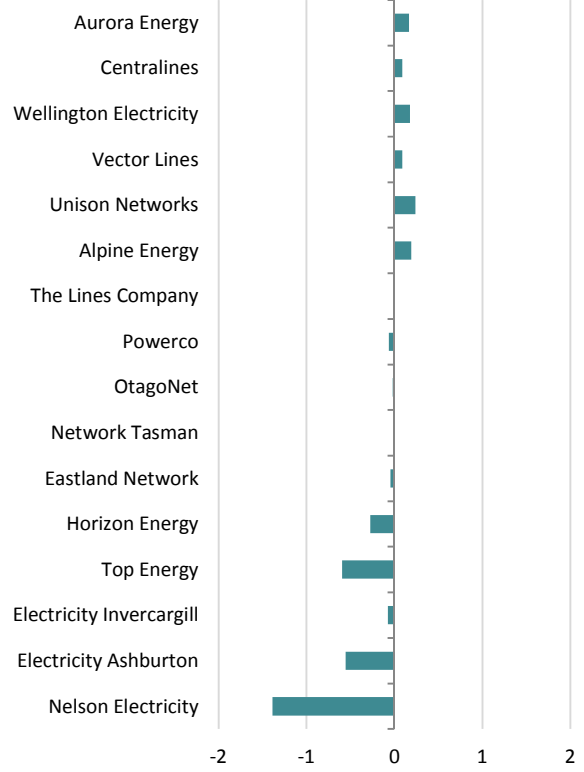


Figure 8: Difference between forecast and actual operating expenditure (%)

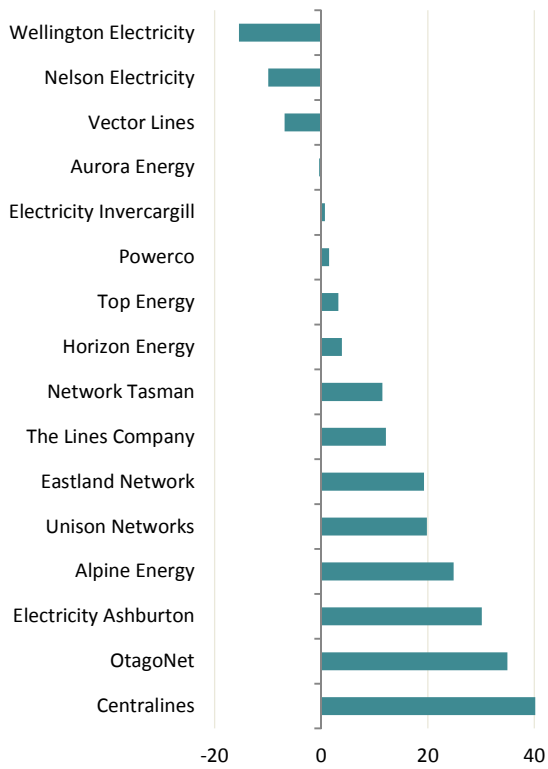
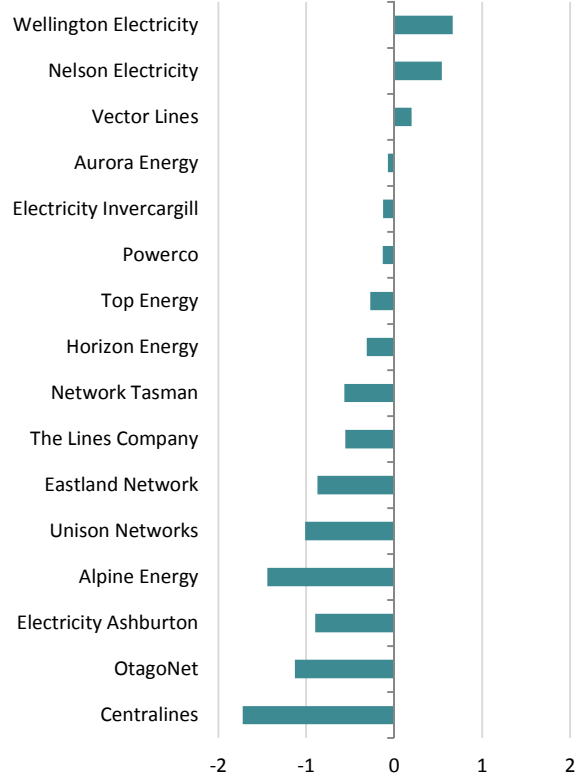
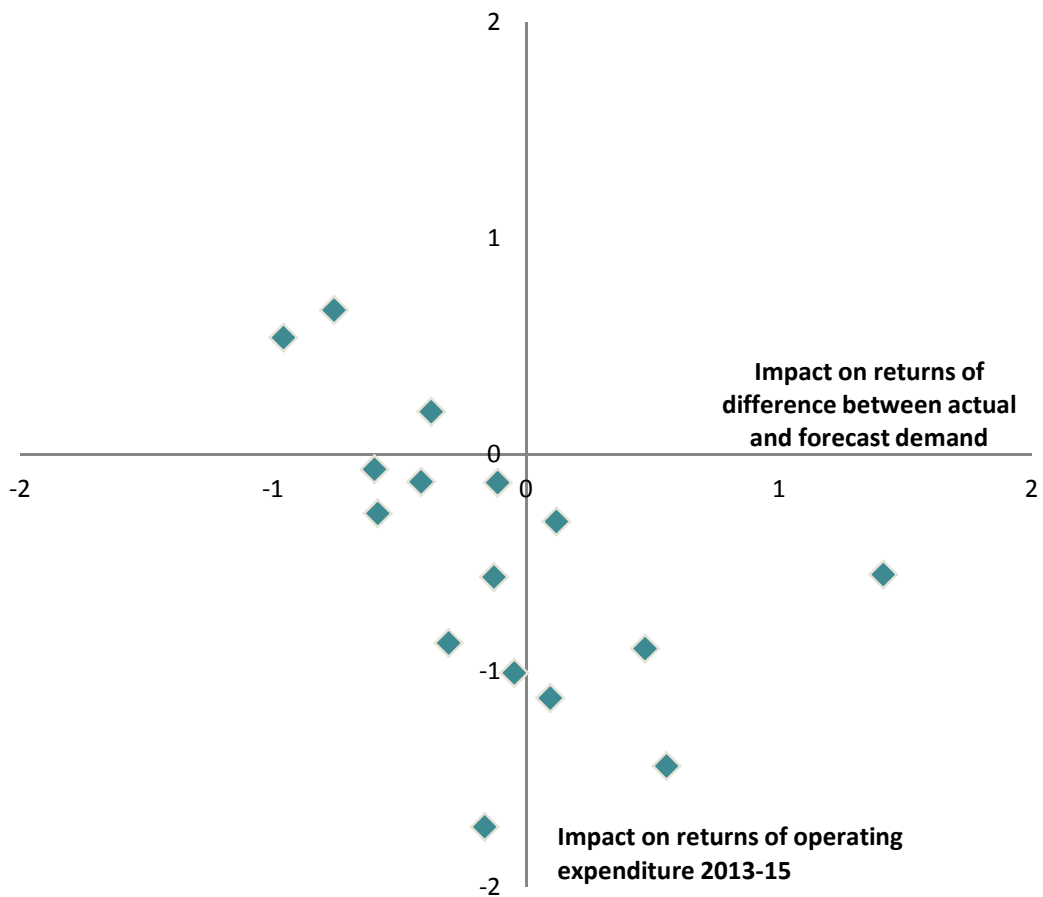


Figure 9: Impact of operating expenditure on returns (percentage points)



78. The net effect on returns of the differences between actual and expected operating expenditure at the industry level was -0.13 percentage points.²⁸ The majority of distributors spent more operating expenditure than was forecast, while only four spent less.
79. We have also looked at whether the variances in operating expenditure could have been associated with, and offset by, the impact of changes in demand. Figure 10 shows that, for some of the distributors, the impact of the variance in demand was offset, at least in part, by the impact of the variance in operating expenditure. However, the offsetting effect does not occur for all distributors.

Figure 10: Comparison of variances caused by operating expenditure versus the impact of demand growth on revenue (percentage points)



²⁸ Owing to the way we forecast operating expenditure in November 2012, the impact of operating expenditure shown in Figure 8 and Figure 9 includes the impact of gains or losses on disposal.

80. What Figure 10 does not tell us, however, is whether the variance in operating expenditure was:
 - 80.1 caused by the same demand effect that resulted in a change in revenue, eg, increased connections would be associated with higher operating costs as well as higher fixed charges; or
 - 80.2 a decision by the distributor to reduce operating expenditure in order to maintain returns in response to lower than forecast demand.
81. In future, we may consider in more detail the extent to which changes in operating expenditure can be explained by drivers such as weather patterns or changes in demand. Amongst other things, analysis of this nature may help stakeholders understand whether expenditure is efficient.
82. At this stage, however, we are cautious about reaching conclusions about the efficiency of expenditure based on the information available. For example, additional expenditure may be required to maintain a level of quality that is sufficiently valued by consumers, in response to events occurring during the period.

Other revenue effects

83. Attachment A provides a breakdown of the –0.14 percentage points of variance in returns that is attributable to ‘other revenue effects’. These include:
- 83.1 impacts that broadly offset one another (such as the impact of the delay to the reset, and the impact of associated claw-back amounts); and
 - 83.2 impacts that do not offset one another, such as pricing beneath the revenue limit and differences between actual and forecast other regulatory income.
84. At the aggregate level the most material of the second group was pricing beneath the limit, which resulted in returns being 0.14 percentage points lower than expected. Variance in other factors was relatively limited at the aggregate level. In particular:
- 84.1 other regulatory income (excluding gains and losses on disposals), accounted for +0.01 percentage points of variance in returns; and
 - 84.2 avoided cost of transmission payments accounted for +0.03 percentage points of variance in returns.
85. However, individual distributors are affected more than others. For example, the maximum variance in returns was caused by differences from forecast:
- 85.1 avoided costs of transmission payments (+0.75 percentage points); and
 - 85.2 pricing beneath the revenue limit (–1.74 percentage points).
86. Attachment A provides further information about ‘other revenue effects’.

Other cost effects

87. Attachment A also breaks down the –0.04 percentage points of variance in returns that is attributable to ‘other cost effects’. Notably, although the aggregate impact was quite small, ‘other cost effects’ explained a significant amount of the variance between actual and expected returns for some distributors.
88. For example, the maximum variance in returns was caused by differences from forecast:
- 88.1 capital expenditure prior to 1 April 2012 (+2.20 percentage points); and
 - 88.2 discretionary discounts and consumer rebates (2.01 percentage points).
89. Attachment A provides further information on ‘other cost effects’.

4. Profitability of individual distributors

Purpose of chapter

90. This chapter is intended to promote greater understanding about the impact the adjustments to revenue limits had on the profitability of individual distributors for the period 1 April 2012 to 31 March 2015.

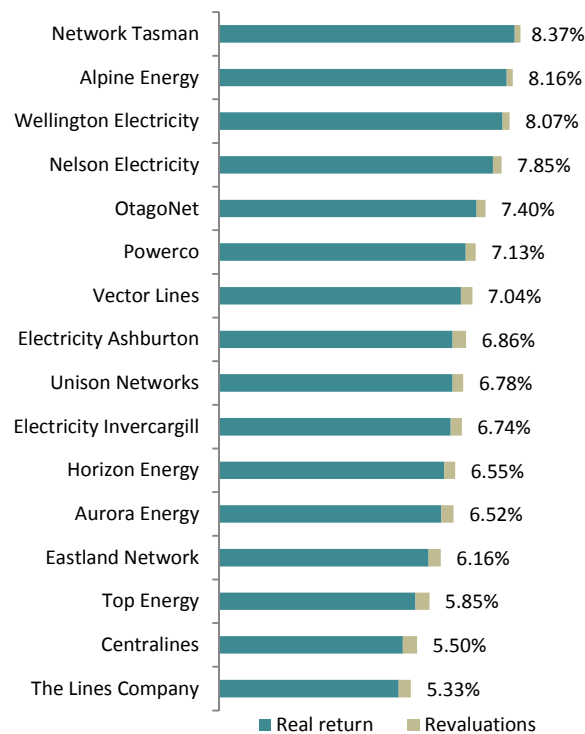
Variation in profitability across industry

91. In this chapter, we:
- 91.1 break down the profitability of individual distributors into the real return and the compensation for actual inflation; and
 - 91.2 explain how excessive profits were limited by the adjustments to revenue limits, and investment incentives improved.
92. We end the chapter by considering whether the evidence provides any indication about whether returns have been sufficient to incentivise investment.

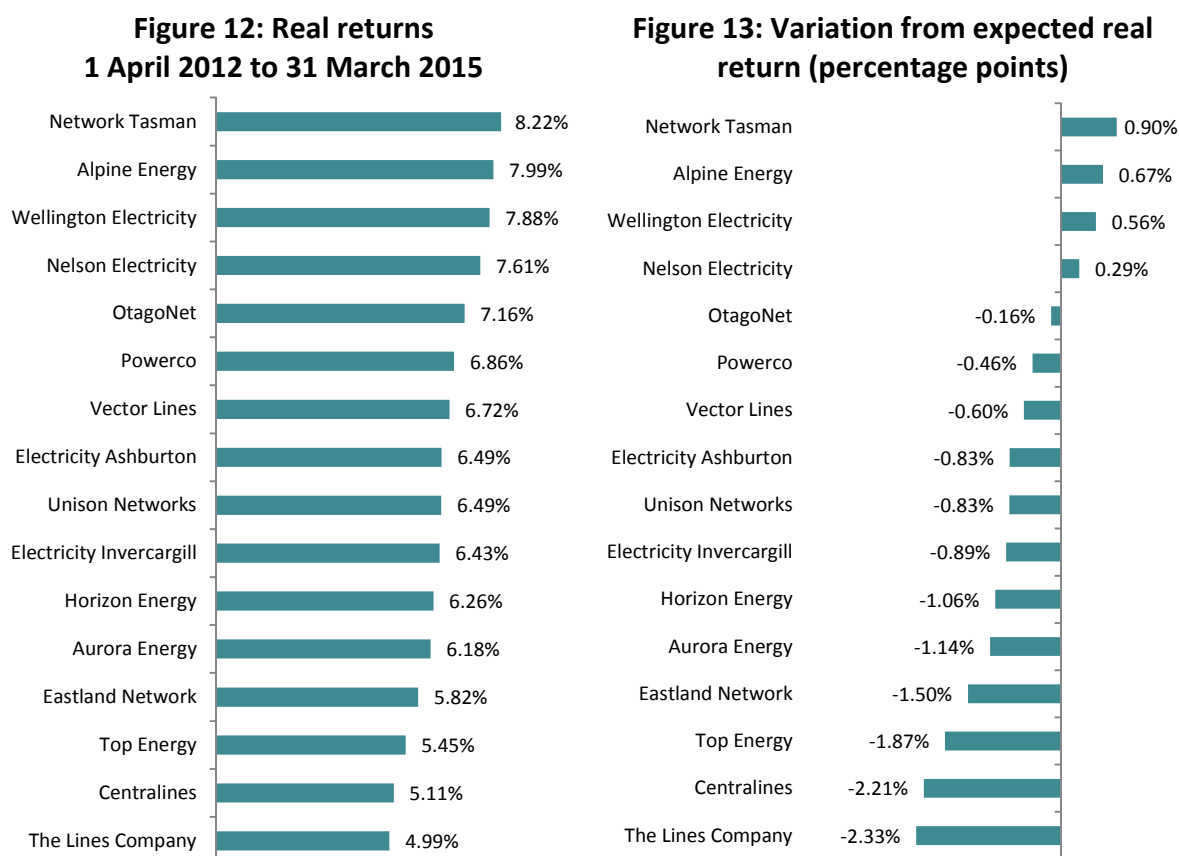
Profitability reflected real return plus compensation for actual inflation

93. As explained in Chapter 3, the nominal return for each distributor reflects the real return plus compensation for actual inflation in the form of asset revaluations. Figure 11 shows that the range in nominal returns was 5.33% for The Lines Company to 8.37% for Network Tasman.

**Figure 11: Internal Rate of Return
1 April 2012 to 31 March 2015**



94. Figure 11 also shows that the impact of inflation indexation of asset values on returns varied slightly across each distributor. In particular, the size of the effect of asset revaluations ranged from 0.16 percentage points to 0.40 percentage points. This variation is primarily due to the size and timing of each distributor's capital expenditure relative to its asset value.²⁹
95. Figure 12 separates out the real return component and Figure 13 compares the real return to that embedded in our nominal estimate of the cost of capital, ie, after deducting the impact of the forecast of asset revaluations.



96. Figure 13 shows that, for the majority of distributors, real returns were within one percentage point above or below our expectations when the revenue limits were adjusted.³⁰ A further six distributors fell short of expectations by more than one percentage point.

²⁹ The size and timing of capital expenditure affects the level of revaluations occurring during the period. Because the real return is the residual between the nominal return and asset revaluations, some degree of variation in real returns across distributors is inevitable.

³⁰ Our adjustments to the revenue limits were based on a nominal estimate of the cost of capital, and inflation expectations at the same time were equivalent to around 1.43% of returns per annum, so the real return for the industry was expected to be around 7.34%. In addition, the nominal estimate of the cost of capital was selected from the 75th percentile of the estimated range, and was 0.72 percentage points above the midpoint. Therefore, the real return implied by the midpoint was 6.62%.

97. Of the six distributors with profitability significantly below expectations, the variances were primarily explained as follows:
- 97.1 The Lines Company—pricing beneath the limit and operating expenditure (–1.74 and –0.55 percentage points respectively);
 - 97.2 Centralines—higher than forecast operating expenditure (–1.72 percentage points);
 - 97.3 Top Energy—pricing beneath the limit and capital expenditure (–1.13 and –0.59 percentage points respectively);
 - 97.4 Eastland—higher than forecast operating expenditure and lower than forecast billed quantities (–0.87 and –0.41 percentage points respectively);
 - 97.5 Aurora Energy—lower than forecast billed quantities and other cost effects (–0.81 and –0.83 percentage points respectively); and
 - 97.6 Horizon Energy—higher than forecast operating expenditure, capital expenditure, and other cost effects (–0.31, –0.27, and –0.86 respectively).

Excessive profits limited by reset and investment incentives improved

98. As shown in Figure 15, had the revenue limits not been reset, Vector Lines would have recovered around \$110m more in profits than would have been justified. Indeed, the delay to the reset resulted in Vector Lines maintaining prices above costs for an additional one year out of three. However, when resetting the revenue limits in the second of the three years, claw-back was applied to neutralise the impact of the delay.
99. At the other end of the profitability distribution were a number of distributors that were forecast to recover insufficient revenue. As explained in Chapter 2, this is because the original revenue limits were a number of years out of date. Increases in the revenue limits were therefore appropriate to preserve incentives to invest.

Figure 14: Impact of adjustments to revenue (\$m)³¹

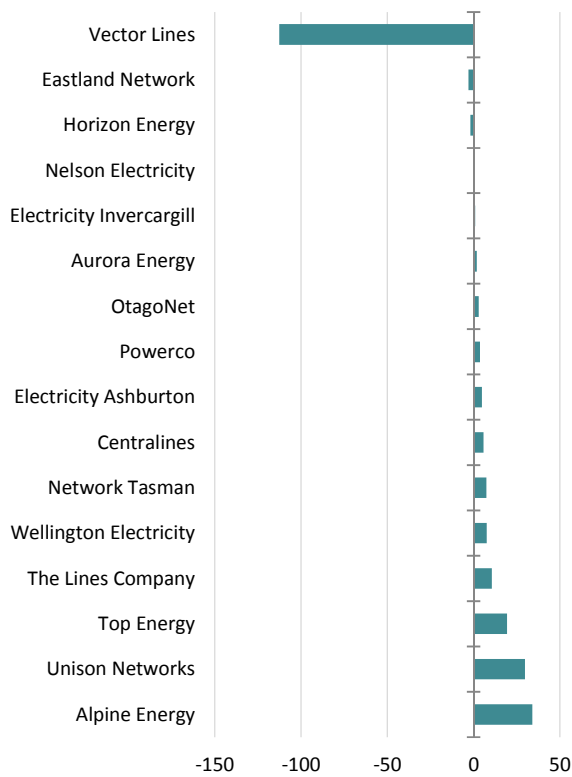
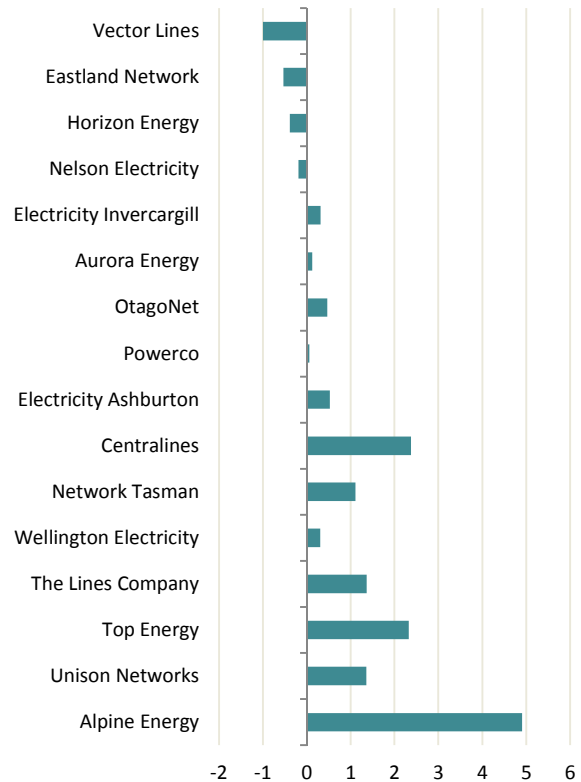


Figure 15: Impact of adjustments to revenue limits on returns (percentage points)

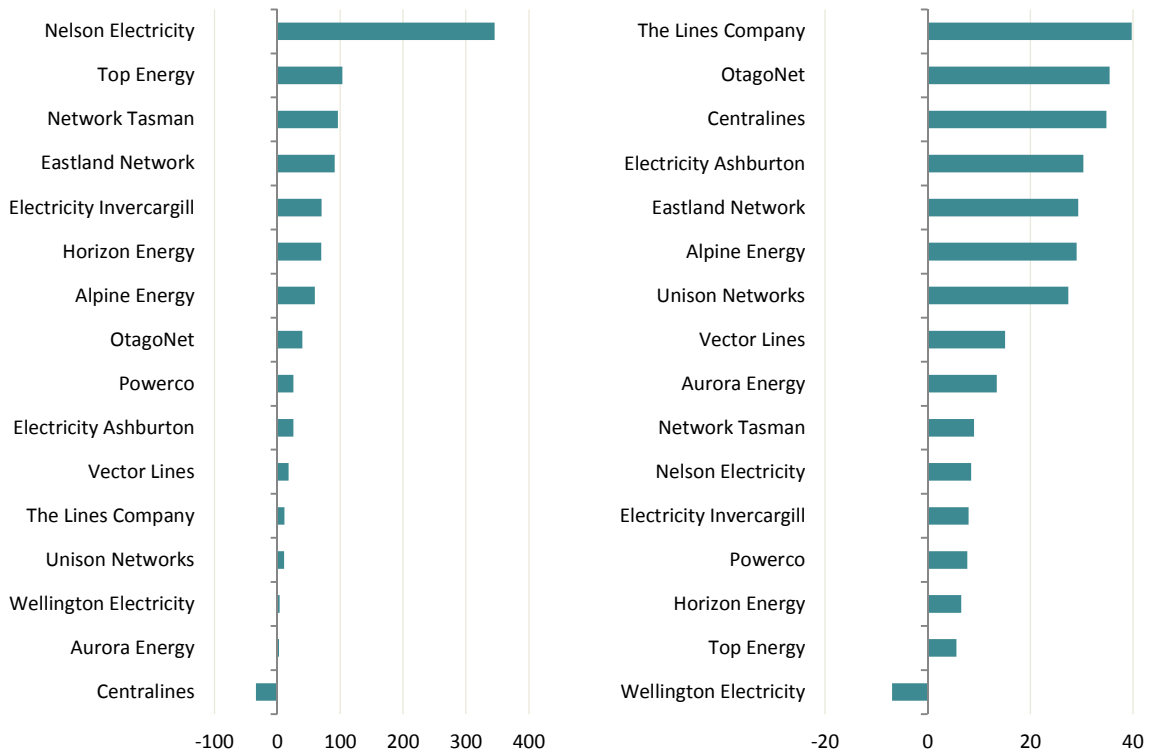


Returns appear sufficient to incentivise investment

100. One indicator that returns were sufficient to incentivise investment is the general increase in expenditure that has been observed recently relative to historic levels. These trends therefore suggest that distributors had sufficient incentives to invest more than historic levels.
101. However, based on this information alone, we are unable to reach conclusions about the quality of asset management practices. Nor is it clear whether such spending reflects prudently incurred costs, although distributors did have incentives to keep costs under control. This is because any increases in expenditure would have resulted in returns lower than they would have been otherwise.

³¹ All relevant distributors reported themselves as being compliant with the adjusted revenue limits.

Change in average expenditure relative to historic average (2015 prices)
Figure 16: Capital expenditure (%) **Figure 17: Operating expenditure (%)³²**



102. Figure 16 and Figure 17 indicate that the annual average level of capital and operating expenditure was higher than historic levels for the period 1 April 2012 to 31 March 2015. For five out of 16 distributors, investment was between 0% and 20% higher than historic averages, and for eight distributors, investment increased by significantly more than 20%.

³² Includes pass through costs and recoverable costs.

5. Changes in network reliability

Purpose of chapter

103. Although our primary focus in this report is profitability, this chapter analyses the changes in network reliability that occurred during the first regulatory period to provide a more rounded picture of performance.

Network reliability is the main measure of quality of service

104. At present, the average number and duration of interruptions experienced by consumers is the main way we measure quality of service. A recent working group of the Electricity Networks Association (ENA) summarised customer surveys, undertaken by distributors, and found the frequency and duration of power cuts to be the most important aspect of quality for consumers.
105. However, as noted in Box 3, changes in network reliability do not necessarily reflect changes in the risk of future asset failure. We must therefore be cautious about reaching conclusions about the current level of service being provided to consumers based purely on the level of reliability currently being experienced on the network.
106. In practice, the impact of poor asset management practices on network reliability may only be evident in the event of a significant and sudden asset failure, or through a steady deterioration in reliability over a number of years. For this reason, we have started to require that distributors disclose additional information about the impact of investments on the network (such as the health and condition of assets).
107. Despite the limitations, we think that information about reliability provides additional context for understanding the profitability of distributors. We have, however, deliberately stopped short of drawing direct comparisons between distributor profitability and changes in reliability. Rather the information is provided to help identify where further investigation to improve understanding may be required.
108. Variation in the average level of reliability experienced by consumers, and a comparison with historic performance, is shown in Figure 18 to Figure 21. In the sections that follow, we:
- 108.1 identify and explain the reasons for wide variation between distributors in the average number and duration of interruptions; and
 - 108.2 examine in more detail the changes in reliability over time, relative to natural levels of variability.
109. We then provide additional information about the most significant deteriorations in reliability that occurred between 1 April 2010 and 31 March 2015.

Box 3: Measures of reliability

Two internationally recognised measures of reliability shown in Figure 18 to Figure 21 are:

- System Average Interruption Duration Index (SAIDI); and
- System Average Interruption Frequency Index (SAIFI).

The benefit of relying on these measures is that they measure reliability in aggregate across all consumers for each distributor. Therefore, the measures provide a simple, cost-effective, and transparent method of understanding changes in performance over time.

These measures do, however, have obvious limitations. For example:

- the level of reliability experienced by individuals, groups, or classes of consumers may be very different from average reliability;
- the extent to which consumers are notified in advance will affect the costs imposed by an interruption;
- the reliability of the low voltage parts of the networks (ie, less than 3.3 kV) are not taken into account; and
- the average level of network reliability may not accurately reflect the risks associated with past and present asset management practices.

In addition, other factors—such as communication during a power outage—will also affect the overall quality of service experienced by consumers. Consequently, we recognise that this area of performance would merit further analysis in its own right, potentially alongside or in support of industry-led initiatives.

Figure 18: Average duration of interruptions per connection per year (average SAIDI minutes, 2011-15)

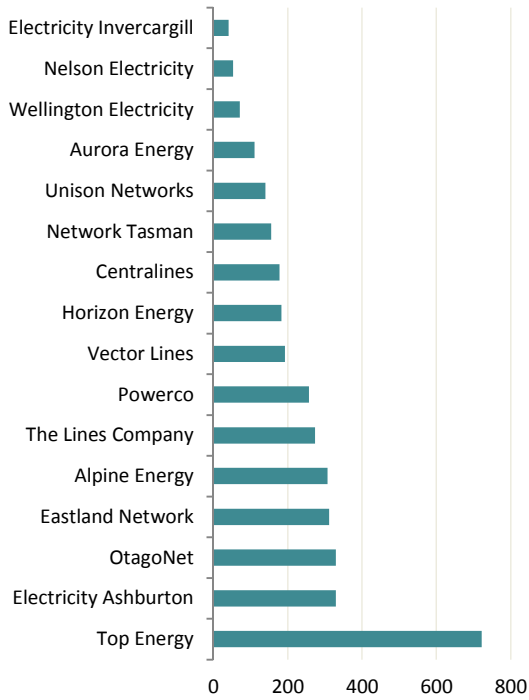


Figure 19: Change in average duration of interruptions per connection per year (% change 2003-10 to 2011-15)

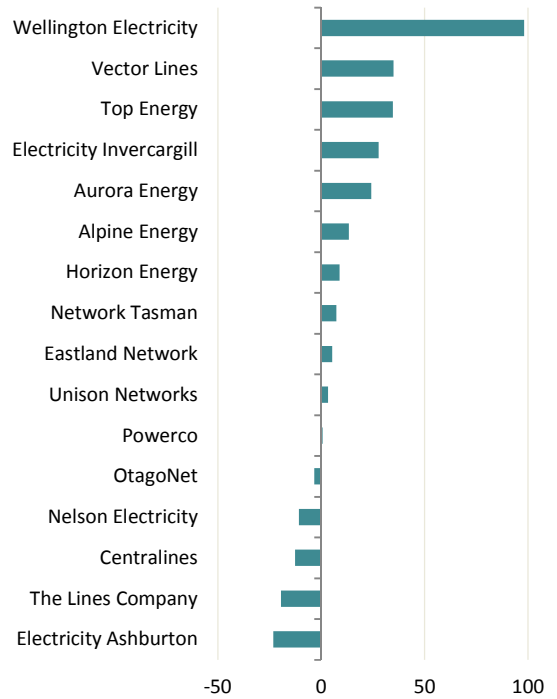


Figure 20: Average number of interruptions per connection per year (average annual SAIFI, 2011-15)

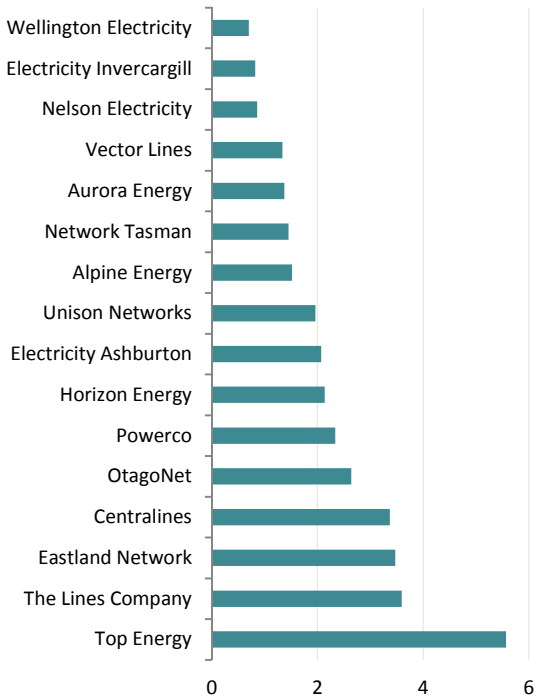
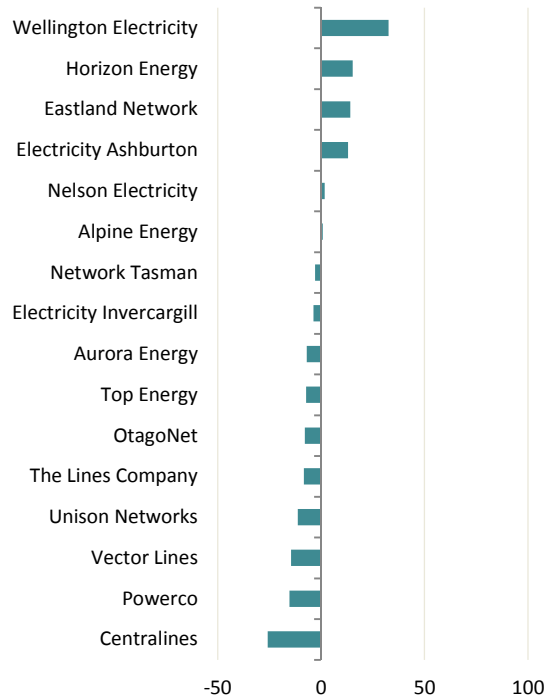


Figure 21: Change in average number of interruptions per connection per year (% change 2003-10 to 2011-15)



Variation in average duration and frequency of interruptions

111. Figure 18 and Figure 20 show that between 1 April 2010 and 31 March 2015:
- 111.1 the average duration of interruptions varied between 41 and 722 minutes per connection per year; and
 - 111.2 the average number of interruptions varied between 0.7 and 5.6 interruptions per connection per year.
112. This variation is likely to be explained, at least in part, by differences in the characteristics of each network. Commonly cited characteristics include the following:
- 112.1 Network design or topology—the type and configuration of asset used to supply consumers is impacted by historic design decisions, eg, voltage levels and extent of undergrounding of the network;
 - 112.2 Network topography—the terrain of the network can affect the cost of accessing assets; and
 - 112.3 Composition of consumer connections—different types of consumers have different needs, which may affect the cost of serving these consumers.
113. In addition, the existing reliability of each network may reflect regional differences in consumer preferences, given the link between the cost and quality of a service. For example, industrial and commercial centres may place greater emphasis on reliability, whereas affordability may be more important in other areas.

Reliability of price-quality regulated distributors generally similar to past

114. Figure 19 and Figure 21 show that, with the exception of Wellington Electricity:
- 114.1 the average duration of interruptions varied between 35% above and 23% below historic levels; and
 - 114.2 the average number of interruptions varied between 15% above and 26% below historic levels.
115. These changes over time will to some extent reflect natural variability due to changes in environmental factors. This is because the information in Figure 18 to Figure 21 has not been adjusted for events such as storms. Rather, the figures are intended to reflect the actual level of reliability experienced by consumers.

Changes in average reliability generally consistent with natural variability

116. By assessing reliability relative to the reliability limits we have set for the default price-quality path, we can show that the changes in average reliability were generally consistent with natural variability. Natural variability might arise, for example, due to prolonged periods of bad weather, and for this reason:

116.1 the reliability limits were set at one standard deviation above the historic average to take into account natural variability in reliability; and

116.2 the impact of individual large events, such as storms, are normalised down on days that major events occurred.

117. Figure 22 and Figure 23 show that the majority of distributors remained within the reliability limits, on average, across the five years of the regulatory period. The most notable exceptions were Alpine Energy and Wellington Electricity.

Figure 22: Average duration of interruptions per year (2011-15) relative to SAIDI limit (%)

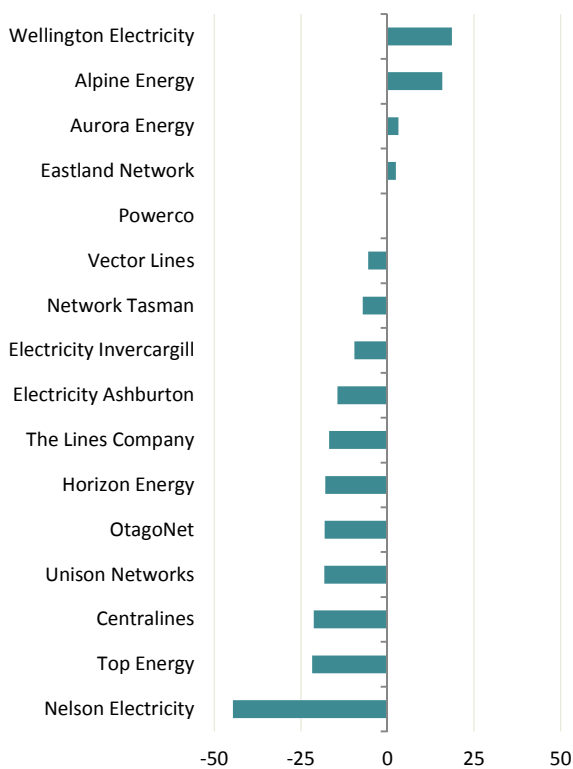
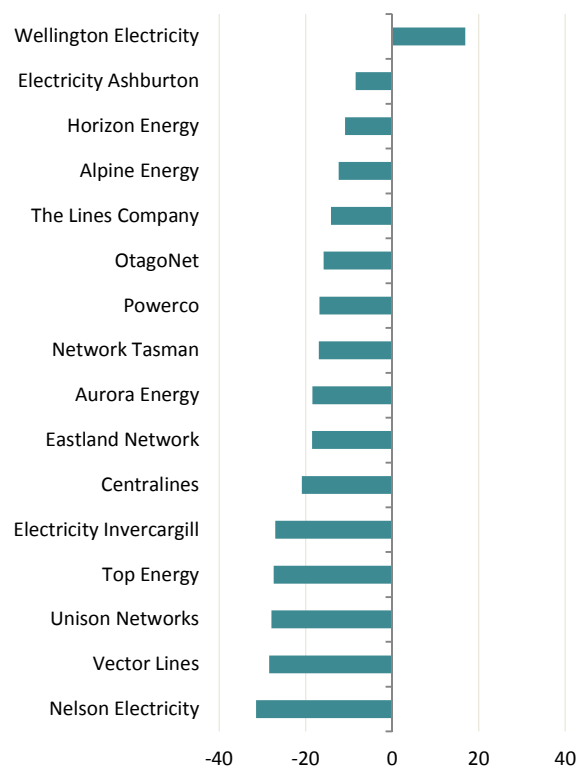


Figure 23: Average frequency of interruptions per year (2011-15) relative to SAIFI limit (%)



Five distributors identified with material deterioration in reliability

118. Looking at performance in individual years, the reliability limits identified five distributors as having a material deterioration in network reliability between 1 April 2010 and 31 March 2015. These five distributors were therefore found to be non-compliant with our quality standards and are shown in Box 4.
119. Each of the five distributors were identified as having a material deterioration because they exceeded the reliability limit for SAIDI and/or SAIFI in two out of three consecutive years. The ‘two out of three years’ rule separated out distributors that performed poorly in an individual year from repeated poor performers.³³
120. The crosses in Box 4 show the instances of non-compliance with the quality standard between 1 April 2010 and 31 March 2015. Also shown, with dots, are the other instances that the distributors exceeded a reliability limit during the first regulatory period.

Box 4: Non-compliance with quality standard³⁴

	2011	2012	2013	2014	2015
Aurora Energy	●	✘			●
Eastland Network	●	✘			
Electricity Invercargill	●	✘			
Wellington Electricity		●	✘	✘	
Vector Lines				●	✘

³³ All 16 distributors exceeded the reliability limit at least once during the regulatory period, except for Horizon Energy.

³⁴ We have not included Orion New Zealand in this table. Orion New Zealand was non-compliant with its quality standard in 2012, 2013, and 2014 as a result of the Canterbury earthquakes and as such we issued a ‘no further action’ letter.

121. Box 4 reflects compliance with the quality standards as opposed to average performance over the regulatory period, which was shown in Figure 22 and Figure 23. For example, Alpine Energy had a 5 year average annual SAIDI above the annual limit because the limit was exceeded by a material amount in 2011 and 2014. However, the two years between 2011 and 2014 were below the limit. Therefore, Alpine Energy did not break the ‘two out of three year’ rule.
122. Likewise a distributor could be found to be non-compliant with the quality standard owing to performance in two out of three years, even if performance over the 5 year period was within the limit. This is because the limit is intended to allow for a degree of natural variation. The quality standard identifies businesses where performance falls outside the range of natural variability in two out of three years.

Responses to non-compliance

123. Our options for enforcement responses to non-compliance with the quality standard range from issuing a ‘no further action’ letter through to seeking a penalty in Court. We select the appropriate response by assessing our enforcement criteria: extent of detriment; seriousness of conduct; and public interest.
124. We have already issued warning letters to Aurora, Eastland, and Electricity Invercargill in response to those instances of non-compliance.³⁵ Our engineering advisors raised concerns about Eastland and Aurora’s asset management (but not Electricity Invercargill’s). Further breaches of quality standards by Eastland or Aurora may therefore lead to stronger enforcement responses in the future.
125. For the remaining two instances of non-compliance:
- 125.1 we are soon to complete our review of the causes and conduct associated with the two instances of non-compliance by Wellington Electricity; and
- 125.2 we are currently considering the findings of the Electricity Authority’s investigation into the 2014 Penrose substation fire, which contributed to the non-compliance reported by Vector Lines in 2015.
126. The asset management practices employed by these two distributors have added significance given that together they serve around 34% of electricity consumers in New Zealand.

³⁵ Further information on our enforcement responses—including the warning letters and investigation reports from our engineering advisors—is available on our website.

6. Comparison with other distributors

Purpose of chapter

127. This chapter provides a comparison of profitability, investment, and quality between distributors affected by the November 2012 decision and other distributors in the sector.

Comparison with other distributors provides useful context

128. A comparison with other distributors is useful for understanding the performance of the distributors affected by our November 2012 decision in the context of the wider sector. The other distributors include those that are only subject to information disclosure regulation, and Orion New Zealand which is currently subject to a customised price-quality path.

129. As explained in the Introduction, there is less concern about profitability of distributors that are only subject to information disclosure regulation, because additional profits flow back to consumers in their role as owners. Customers can also vote for the members of the Board of the Trusts which own and direct the distributors.

Profitability of distributors affected by November 2012 decision was similar to others

130. Figure 24 shows that, with only a few exceptions, the profitability of distributors affected by our November 2012 decision was broadly similar to other distributors from 1 April 2012 to 31 March 2015. The distributors affected by our November 2012 decision are shown as blue bars, Orion New Zealand is shown as the orange bar, and other distributors are shown as green bars.³⁶

³⁶ As noted in Chapter 2, Orion New Zealand were not subject to the revenue limit adjustments in 2012 and instead applied for a customised price-quality path, which came into effect from 1 April 2014.

Figure 24: Nominal internal rate of return 2013-15 (%)

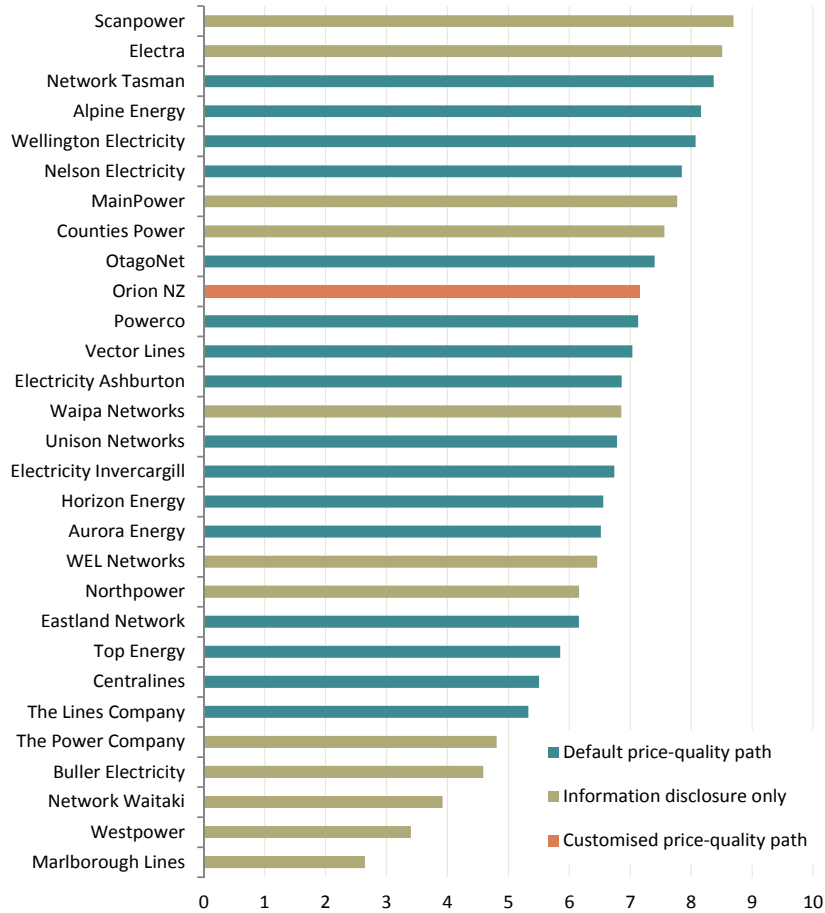
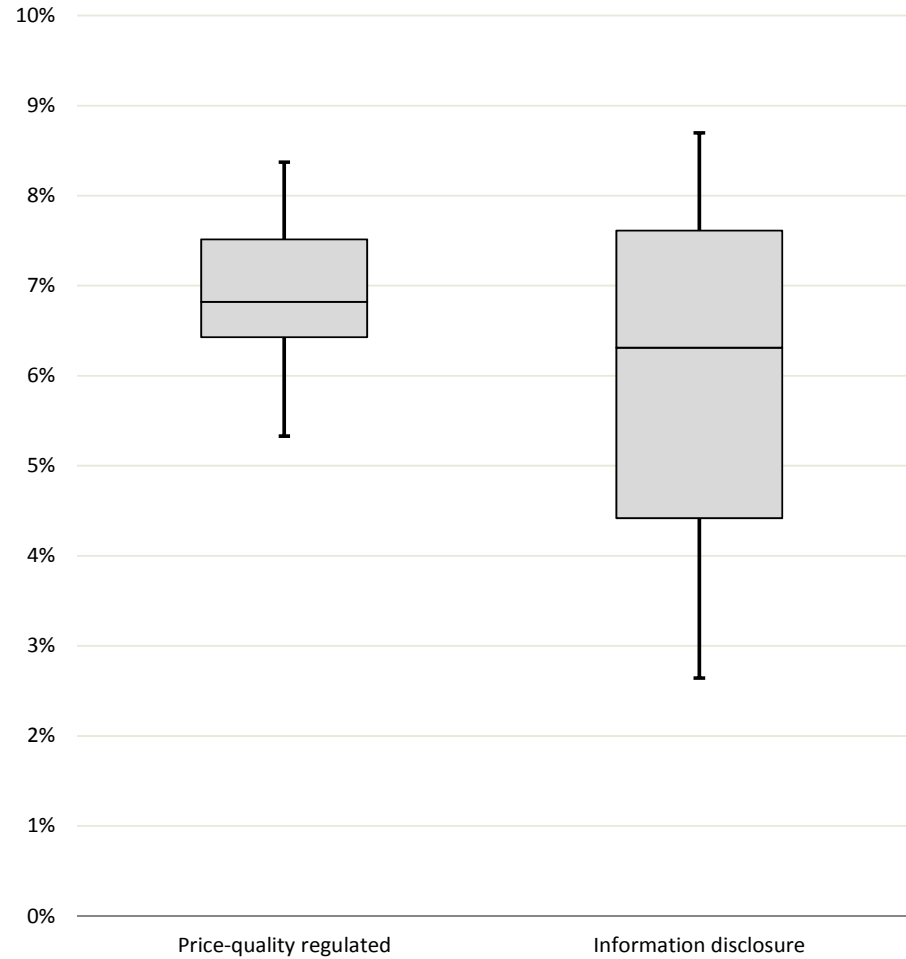
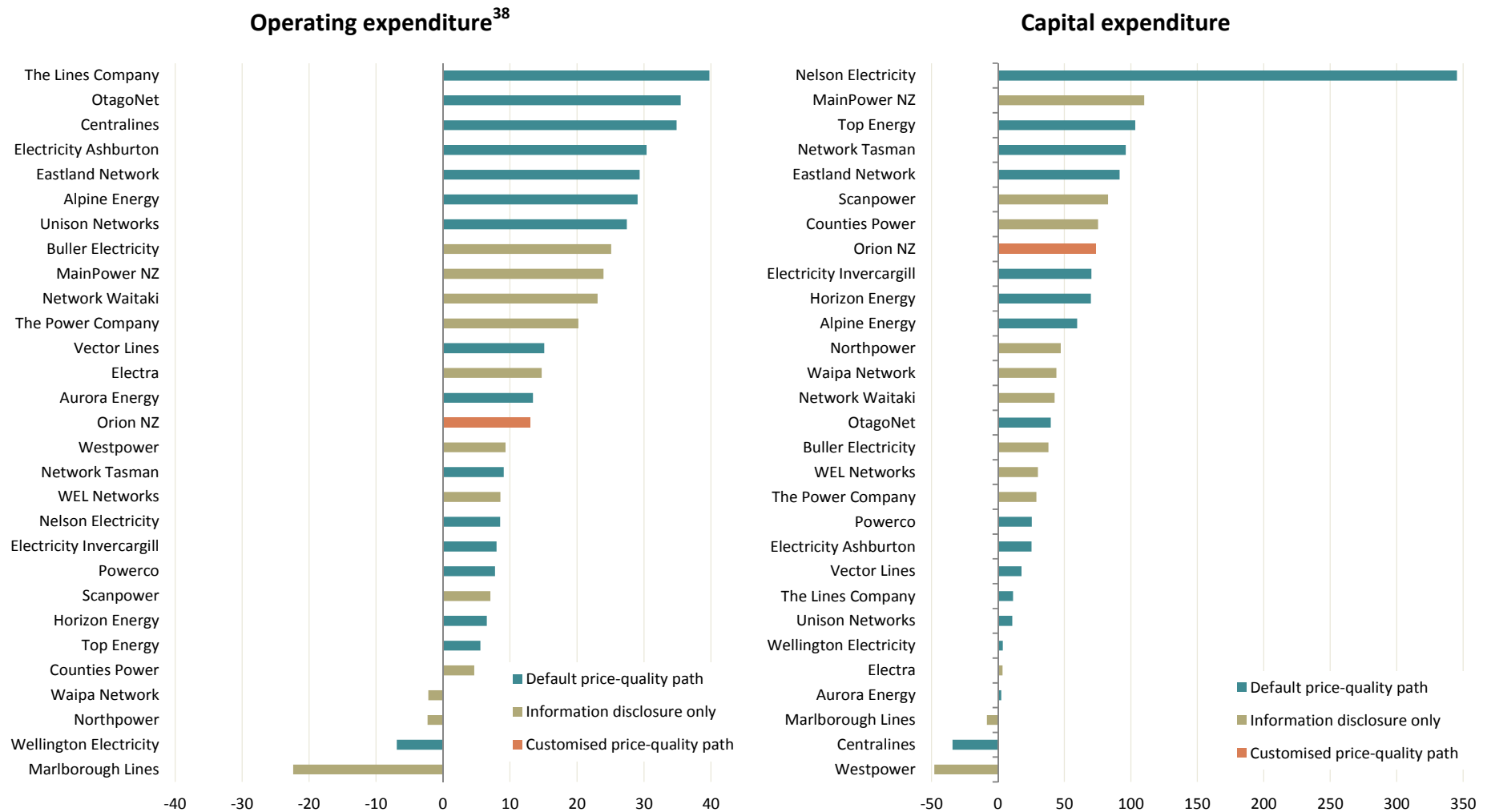


Figure 25: Nominal returns of distributors affected by November 2012 decision compared to other distributors³⁷



³⁷ The boxes show the range of the middle two quartiles (divided by the median) and the vertical lines show the range of the top and bottom quartiles.

Figure 26: Percentage change in average annual expenditure between 2008-2012 and 2013-15



³⁸ Operating expenditure includes pass through and recoverable costs.

Reliability was also similar to other distributors

131. This section presents the reliability of all distributors and the change in reliability from previous levels. The measures of reliability, SAIDI and SAIFI, represent the duration and frequency of interruptions respectively (as described in Chapter 5).³⁹
132. Figure 27 and Figure 28 show that reliability levels are generally similar between the two main groupings of distributors. However, there are large differences at the individual distributor level. The potential causes of these differences are described in Chapter 5.

³⁹ The SAIDI and SAIFI measures have not been normalised for this chapter.

Figure 27: Average duration of interruptions per connection per year (average SAIDI minutes, 2011-15)

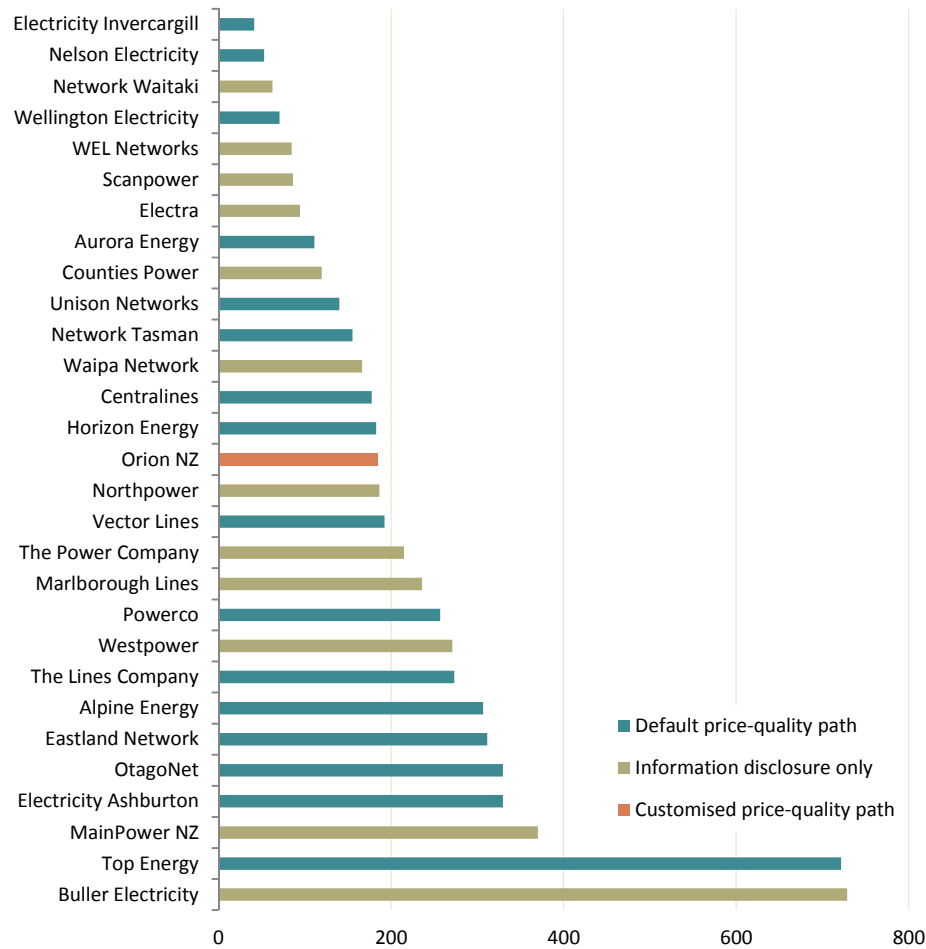


Figure 28: Change in average duration of interruptions per connection per year (% change 2003-10 to 2011-15)

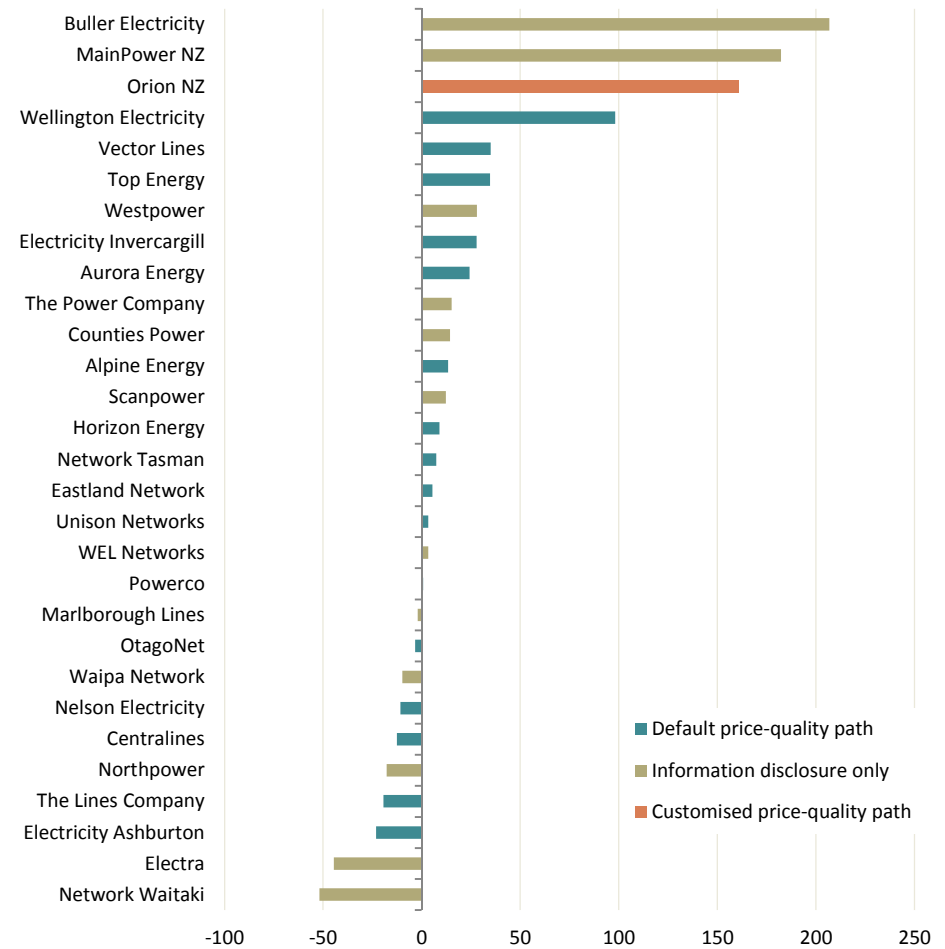


Figure 29: Average number of interruptions per connection per year (average annual SAIFI, 2011-15)

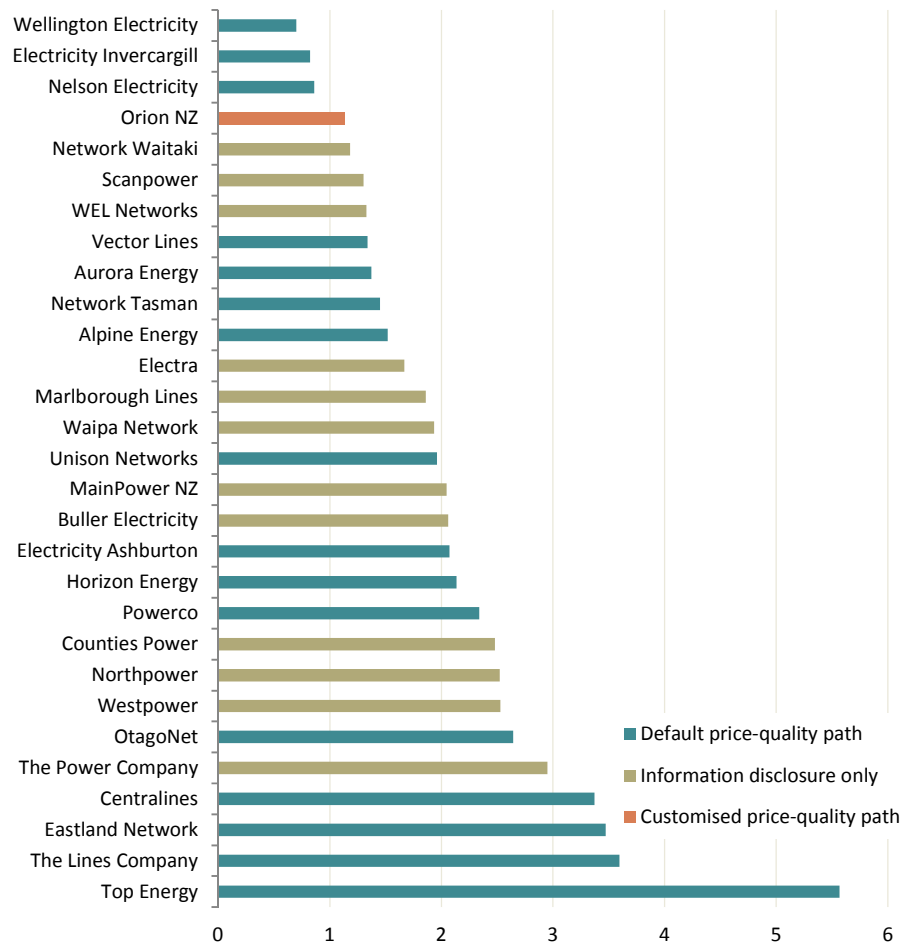
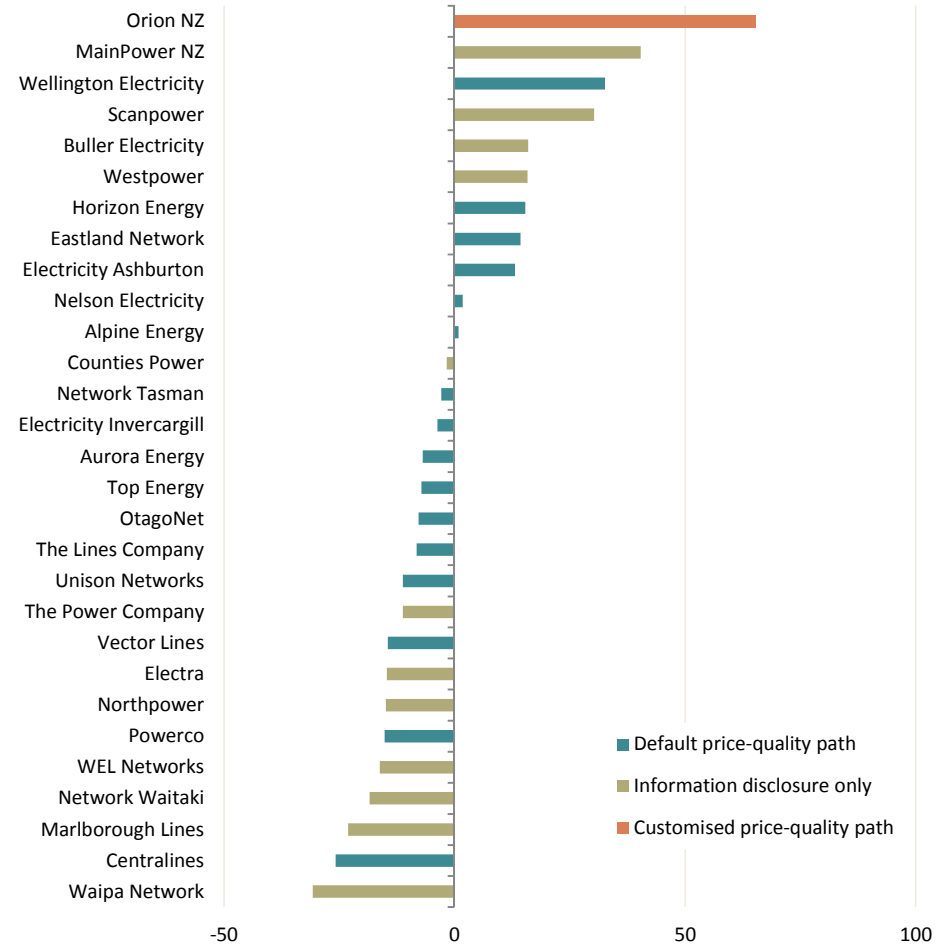


Figure 30: Change in average number of interruptions per connection per year (% change 2003-10 to 2011-15)



7. Conclusions and next steps

Purpose of chapter

133. This chapter explains the conclusions we have reached based on the findings presented in this paper, and outlines what we expect to do next.

Key findings from this report

134. The key findings from our analysis of the profitability of electricity distributors are:
- 134.1 the adjustments we announced in November 2012 were effective at limiting excessive profits and supporting investment incentives;
 - 134.2 the return that distributors earned is comprised of a performance-related real return plus compensation for actual inflation; and
 - 134.3 the profitability of individual distributors varied under the revenue limits, but on average the forecasts we relied on in November 2012 performed well.
135. In addition, we have not found any evidence to suggest that the revenue limits created barriers to investment in the network. However, we have stopped short of assessing whether the increased expenditure was efficient.

Reflections on the variances

136. Although the forecasting approaches appear to have performed well, we consider that the analysis raises some questions for us to address in future. These questions relate to the variances for:
- 136.1 capital expenditure, which showed the biggest individual variation between the forecast and actual outcome for a relatively small distributor; and
 - 136.2 billed quantities, which had a material impact on the returns earned by certain distributors, without necessarily reflecting any changes in performance, or better outcomes for consumers.
137. Reliably forecasting capital expenditure is difficult, especially when a small number of projects can lead to large changes in spending. Therefore, for small distributors specifically, we could:
- 137.1 consider the confidence we can have in distributor forecasts for future resets;
 - 137.2 consider the exposure of profits to changes in capital expenditure under the Incremental Rolling Incentive Scheme; and
 - 137.3 consider whether and how customised price-quality paths could be made to be a more viable option.

138. Forecasting the impact of changes in quantities billed has its own challenges, and these are likely to grow towards future resets. For example:
- 138.1 the five-year forecast developed in 2012 relied on actual information for certain factors (such as Gross Domestic Product), whereas in future the five-year forecast will rely exclusively on forecast data; and
 - 138.2 the emergence of new technologies may make the impacts on revenue more difficult to predict given that past relationships between revenue and the factors that drive demand may no longer hold.
139. These difficulties are not insurmountable, but will need to be factored into our future work.

Review of input methodologies provides opportunity to better promote Part 4

140. Most immediately, the analysis contained in this report may help inform our work on the review of input methodologies. Amongst other things, this work includes consideration of:
- 140.1 requirements for customised price-quality path proposals;
 - 140.2 form of control; and
 - 140.3 inflation indexation of asset values.
141. We will also be reviewing all other matters covered by input methodologies, which may have implications for future assessments of profitability, eg, the review of the parameters for estimating cost of capital which is used to set and assess returns.

Incremental improvements introduced in November 2014

142. The review of input methodologies follows a number of incremental improvements introduced before default price-quality paths were reset in November 2014. These incremental improvements included the introduction of:
- 142.1 the Incremental Rolling Incentive Scheme which will change the impact on returns of differences between forecast and actual expenditure;
 - 142.2 a new mechanism to better treat pass-through and recoverable costs, to eliminate the risk that may have resulted in some distributors pricing beneath the limit to avoid inadvertent breaches; and
 - 142.3 a new mechanism to 'wash up' for the difference between forecast and actual capital expenditure prior to the start of the regulatory period.

143. We also made changes to our approaches for forecasting expenditure and revenue growth, and selected the cost of capital from the 67th percentile of the estimated WACC range rather than the 75th.

Attachment A: Further detail on sources of variance

Purpose of attachment

A1 This attachment provides further detail on the causes of the profitability variances. In particular, we expand on the 'other cost effects' and 'other revenue effects' covered in the main body of the report, and provide further detail about the variances caused by differences between forecast and actual demand.

Description of 'other cost effects' and 'other revenue effects'

A2 Table A1 provides a description of the different cost impacts that we have modelled.

Table A1: Description of cost impacts

Net additions to the asset base prior to April 2012	Impact of differences between forecast and actual opening value of the regulatory asset base (RAB) on 1 April 2012, arising as a result of: <ul style="list-style-type: none"> • Adjustments to the 2010 opening RAB value • Commissioned assets prior to 1 April 2012 • Disposed assets prior to 1 April 2012
Cost inflators	Impact due to change in expected operating and capital expenditure as a result of cost inflator assumptions.
Operating expenditure	Difference between projected and actual operating expenditure in constant prices.
Assets commissioned	Difference between projected and actual assets commissioned in constant prices.
Asset disposals	Difference between projected and actual assets disposals.
Discretionary discounts and rebates	Impact of discretionary discounts and customer rebates which reduce tax payable.
Other cost effects	Further cost and other effects not included above, eg, impact of average asset lifetime assumption for depreciation.

A3 Table A2 provides a description of the different revenue impacts that we have modelled.

Table A2: Description of revenue impacts

Changes in demand (Delta D and CPRG)	Impact of difference between forecast and actual consequences of changes in demand, which affects the internal rate of return through demand changes prior to the period (Delta D) and during the period (Constant Price Revenue Growth or 'CPRG')
Inflation indexation (CPI-X%) of revenue limit	Impact of inflation indexation of the revenue limits being different to forecast
Pricing beneath limit	Impact of setting prices beneath the level consistent with recovering the maximum amount of revenue allowed under the limit
Avoided Cost of Transmission Payments	Impact of payments received by distributors for avoided cost of transmission
Other regulatory income	Impact of difference between forecast and actual 'other regulatory income' (excluding gains or losses on disposal)
10% cap	Impact on four distributors of limiting the maximum increases in average prices to CPI+10%
NPV adjustment for 10% cap	Impact on four distributors of including a net present value (NPV) adjustment to allow for the deferred recovery of revenue following the introduction of a CPI+10% cap on the maximum increases in average prices
Delay to reset	Under- or over-recovery of revenue arising in 2012/13 as a result of the delay to the reset of the revenue limits under s 54K(3)
Claw-back	Impact of applying claw-back to compensate for the under- or over-recovery of revenue that occurred as a result of the delay to the reset
Other revenue effects	Impact of other revenue effects that have not been separately identified

Materiality of detailed cost and revenue impacts at aggregate level

A4 Figure A1 and Figure A2 show the materiality of the different sources of variance for distributors in aggregate. The remainder of this attachment provides further detail on the cost and revenue impacts shown in Figure A1 and Figure A2.

Figure A1: Waterfall of cost-based variances for price-regulated distributors combined

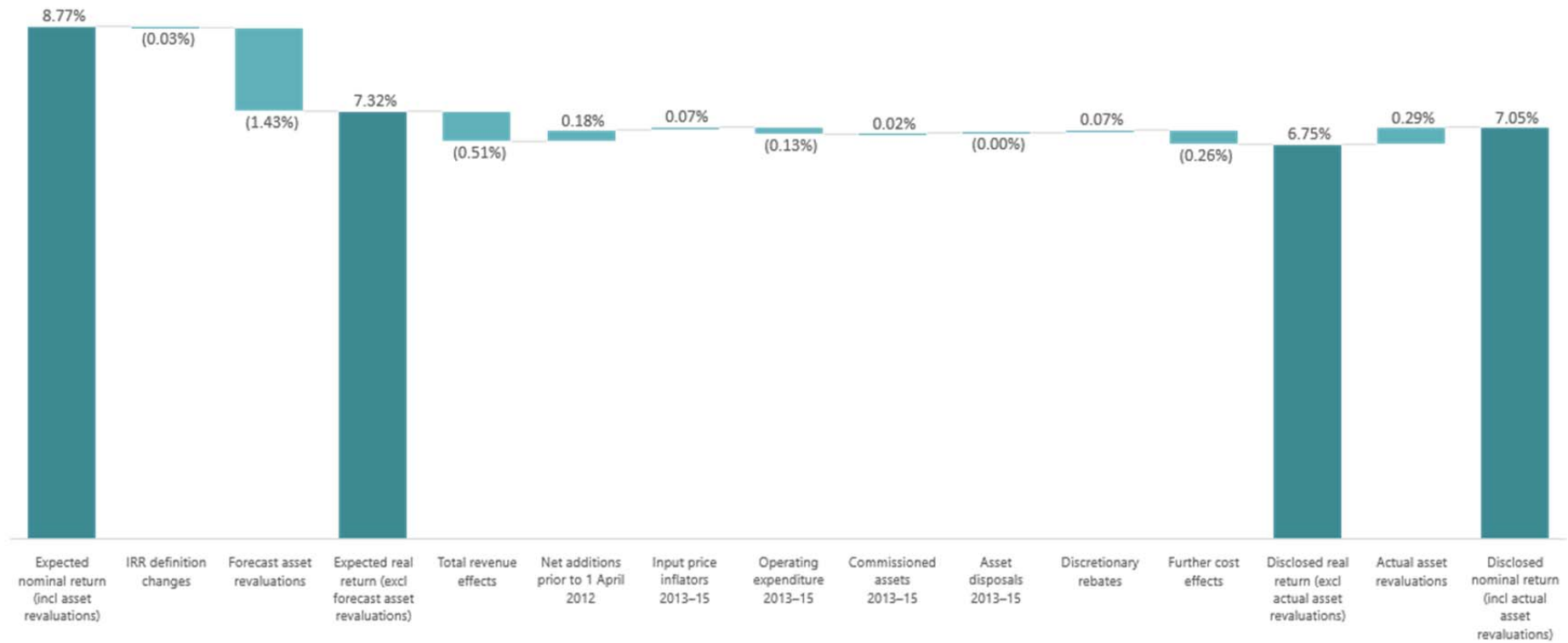
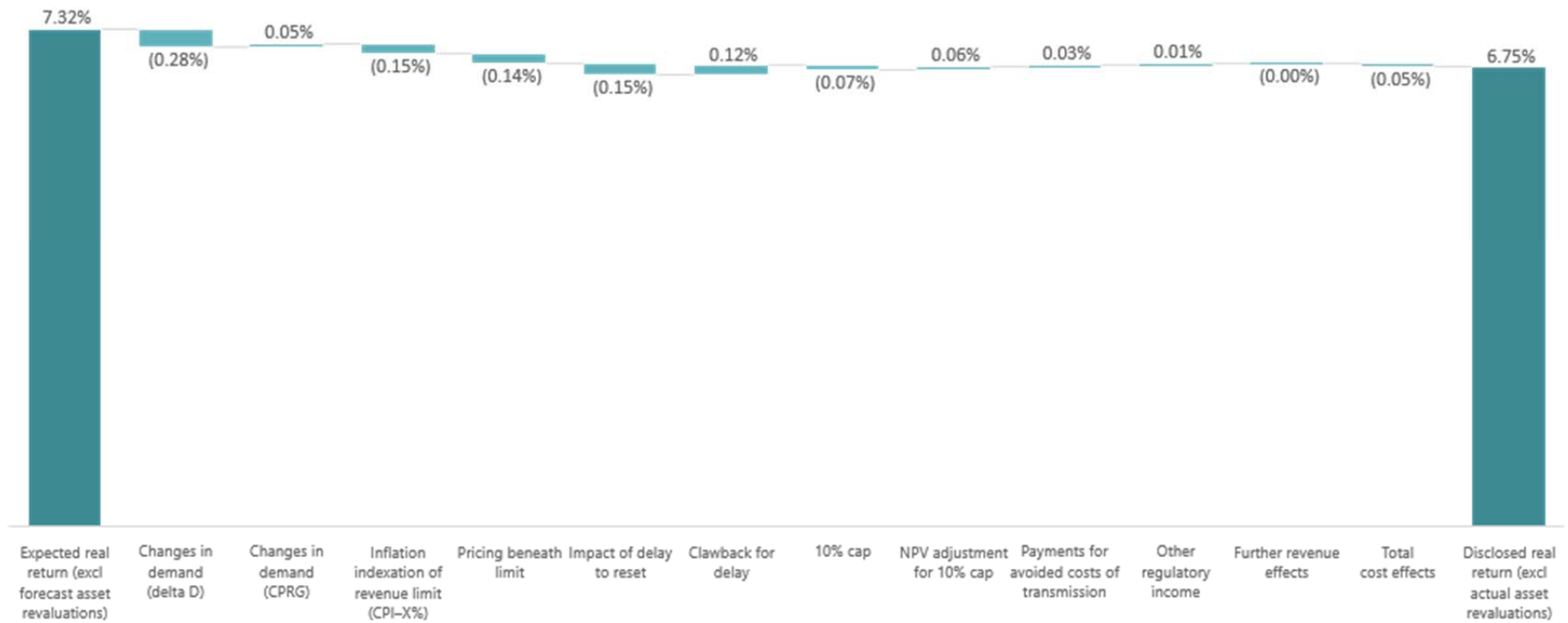


Figure A2: Waterfall for revenue-based variances for price-regulated distributors combined



Pricing beneath limit

- A5 To varying degrees, all distributors set average prices that were below the maximum allowed under the revenue limit. When we adjusted the revenue limits, however, we assumed that distributors would set average prices as high as possible in order to maximise revenue and profitability.
- A6 Figure A3 shows that the differences in some cases were large, with three distributors setting average prices that were more than 10% below the maximum.⁴⁰ For most distributors, the differences were quite small, between 0% and 2%.
- A7 Importantly, Figure A3 and Figure A4 reflect the impact of pricing beneath the limit in only the last two of the three years examined in this report. This is because of the way we specified the approach to claw-back, which allowed distributors to recover any shortfall arising in the first of the three years.⁴¹
- A8 For the three distributors most affected—Network Tasman, Centralines, and The Lines Company—the difference was equivalent to more than one percentage point of returns. In the case of Network Tasman, returns would therefore have been as high as 9.38% if prices had been set consistent with the revenue limit.

⁴⁰ For the purposes of this report, we have calculated ‘pricing below the limit’ as the percentage difference between actual notional revenue and allowable notional revenue. Our calculation of the amount that the distributors have priced below the limit is therefore based on their self-reported compliance position.

⁴¹ Notably, Wellington Electricity set prices 2.0% lower due to an error in the calculation of the inflation indexation of the revenue limit. Our clawback decision allowed Wellington Electricity to increase prices in later years to recover this shortfall.

Figure A3: Difference between allowed and actual revenue (%)

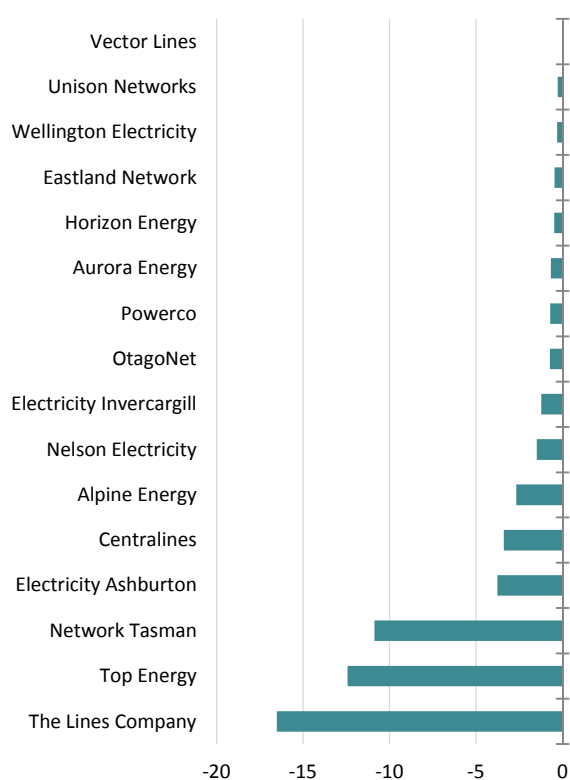
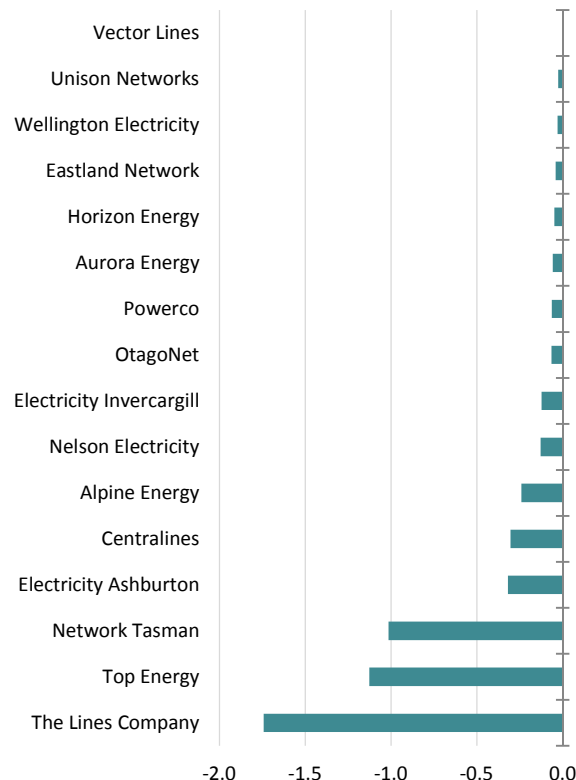


Figure A4: Impact on returns of pricing below limit (percentage points)



- A9 The reasons for pricing significantly beneath the limit may be explained, at least in part, by the ownership arrangements in place for the three distributors. All three distributors appear to have set prices with the impacts on consumers in mind. This suggests that consumer-ownership may have played a role.
- A10 In addition, these distributors and others may have set prices beneath the limit to provide a buffer against the risk of non-compliance with the revenue limits. For example, the buffer may reflect issues associated with the way pass-through and recoverable costs were recovered during the last regulatory period.⁴²
- A11 The issues associated with pass-through and recoverable costs were that:
- A11.1 distributors were required to forecast pass-through and recoverable costs, which they have found difficult in practice; and
 - A11.2 the recovery of the amounts required to cover pass-through and recoverable costs were associated with some degree of volume risk.
- A12 Notably, despite these issues, a number of distributors were still able to price quite close to the limit, eg, Vector Lines and Unison Networks.

⁴² These issues have been addressed in the way the revenue limits are specified for the 2015-20 regulatory period.

Discretionary discounts and consumer rebates

A13 Three distributors made discretionary discounts and customer rebates, which were not forecast when adjusting the revenue limits. Consequently, tax payable was lower than expected, and returns were higher. Table A3 shows the distributors affected.

Table A3: Impact of discretionary discounts and customer rebates

	Discretionary discounts and customer rebates (\$m)	Impact on returns (percentage points)
Network Tasman	30	2.01
Electricity Ashburton	13	0.63
Centralines	3	0.52

Other regulatory income excluding gains and losses on disposal

A14 'Other regulatory income' is income from the provision of regulated services that were recovered in a different manner from line charges, but—to ensure consistency with our approach to operating expenditure—we have excluded any gains or losses on disposal of assets. Further examples of other regulated income are lease or rental income from regulated assets.

A15 We estimated each distributor's other regulatory income by using an average of their actual figures from 2007/08 to 2010/11, excluding:

A15.1 gains or losses on disposal, which were included implicitly within our forecast of operating expenditure instead; and

A15.2 a small number of line items that we thought were particularly large and unlikely to reoccur during the period.

A16 Forecasting other regulated income was particularly difficult because the time series of other regulatory income was very volatile. Also, our information disclosure requirements did not require distributors to disclose a forecast of other regulatory income.

A17 Figure A2 showed that the variance in returns for all distributors in aggregate was 0.01 percentage points due to differences between forecast and actual other regulatory income. For individual distributors:

A17.1 Figure A5 shows the difference between forecast and actual other regulatory income; and

A17.2 Figure A6 shows the impact of those differences on returns.

A18 A few of the distributors (such as Aurora Energy) received particularly higher than expected other regulatory income, which increased their profitability.

Figure A5: Difference between forecast and actual other regulatory income (\$m)

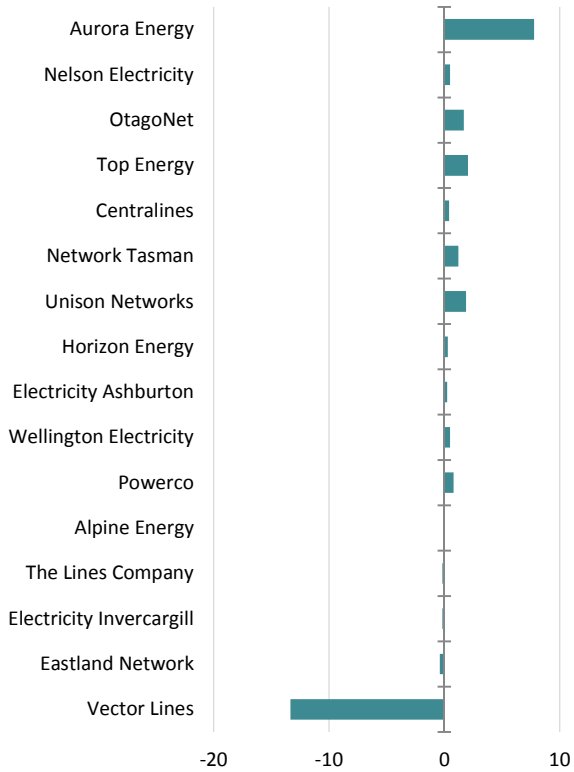
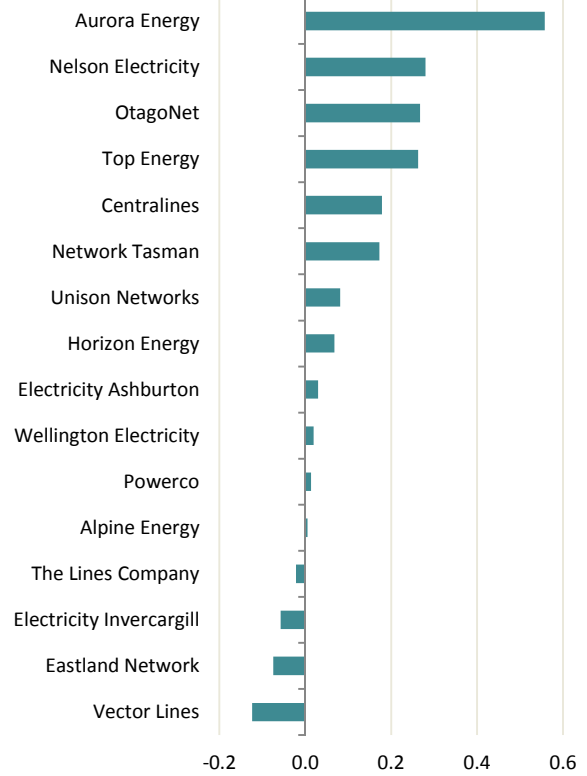


Figure A6: Impact on returns of other regulatory income (percentage points)



Payments for avoided cost of transmission

- A19 The input methodologies contain an incentive mechanism that applies to purchases of Transpower assets. In particular, distributors are allowed to recover, for a period of five years, the value of any transmission charges that are avoided by purchasing an asset from Transpower.^{43,44} The ability to recover avoided transmission charges for five years after the transfer applies irrespective of the date of the transfer.

Table A4: Impact of financial incentives on returns

Distributor	NPV of financial incentives, 2013-15 (\$m)	Impact on returns of financial incentives (percentage points)
Top Energy	5.8	0.75
OtagoNet	1.3	0.22
Unison Networks	0.7	0.03
Powerco	1.0	0.02

Net additions to the asset base prior to April 2012

- A20 Differences between the forecast and actual opening value of the regulatory asset base (RAB) on 1 April 2012 could arise as a result of:
- A20.1 adjustments to the 2010 opening RAB value;
 - A20.2 commissioned assets prior to 1 April 2012; and
 - A20.3 disposed assets prior to 1 April 2012.
- A21 The most material of these impacts was the impact of commissioned assets being different to forecast prior to 1 April 2012. Figure A7 and Figure A8 provide further information on individual distributors.

⁴³ *Electricity Distribution Services Input Methodologies Determination 2012* [2012] NZCC 26, clauses 3.1.3(1)(b) and 3.1.3(1)(e).

⁴⁴ This was the only financial incentive that applied during the 2012/13 to 2014/15 period.

Figure A7: Difference between forecast and actual capex prior to 1 April 2012 (%)

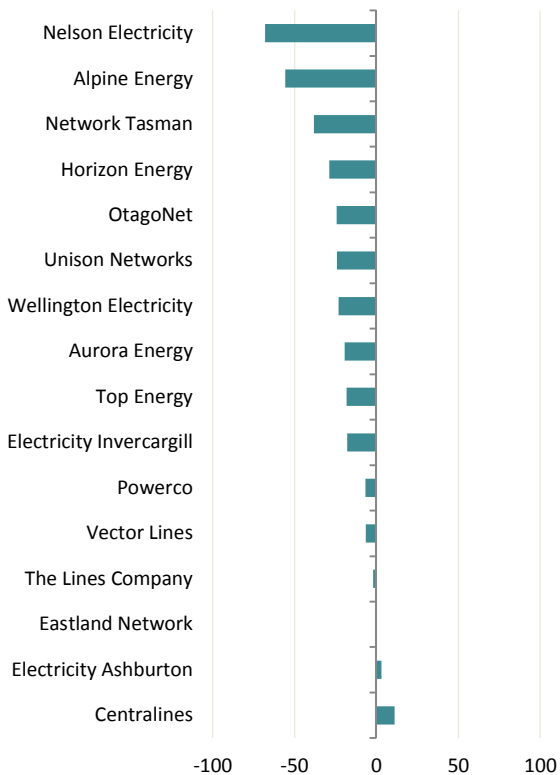
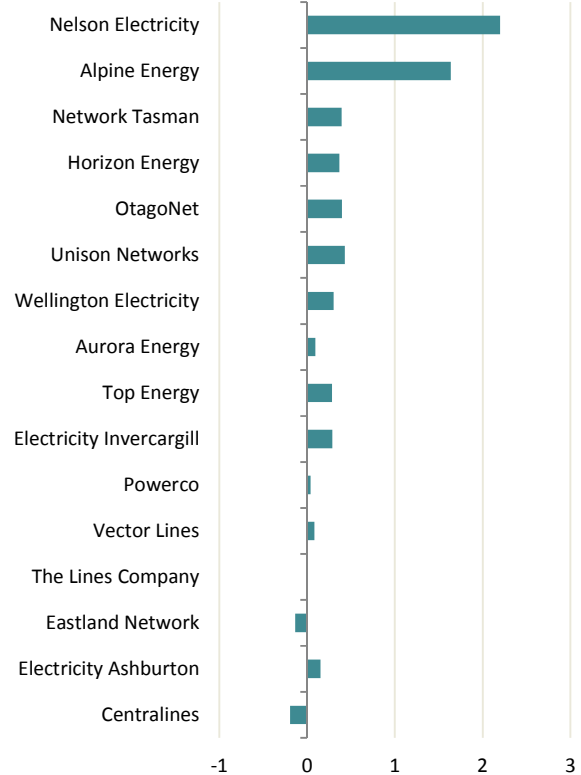


Figure A8: Impact on returns of difference between forecast and actual capex prior to 1 April 2012 (percentage points)



Delay to reset and claw-back for delay

A22 The impact of the delay to the reset was largely offset by claw-back for the delay (when assessed using the cost of debt as the interest rate). The reason for a slight difference at the aggregate level is that claw-back was not provided for The Lines Company in the next regulatory period. This is because The Lines Company provided incorrect information in response to the information gathering request we issued ahead of the November 2012 reset.⁴⁵

CPI+10% cap and net present value adjustment for ten percent cap

A23 Alongside our decision to apply a CPI+10% cap to the maximum increases in average prices, which affected four distributors, we also committed to allowing additional recovery of revenue in the next regulatory period. This had the effect of spreading the most significant price increases over a longer time period. The two effects offset each other in NPV terms (when assessed using the cost of debt as the interest rate).

⁴⁵ For further information, refer: Chapter 5 of Commerce Commission “Default price-quality paths for electricity distributors from 1 April 2015 to 31 March 2020: Main policy paper”, 28 November 2014.

Attachment B: Calculations

Purpose of attachment

- B1 This attachment explains how we calculated the profitability of each supplier, and variances from our assumptions, using internal rate of return analysis.

Internal rate of return calculations

- B2 In this section we explain:
- B2.1 the internal rate of return formula that we used;
 - B2.2 the inputs that we used;
 - B2.3 simplifications and assumptions that we made; and
 - B2.4 differences to the internal rate of return formula in information disclosure.
- B3 The other section of this attachment explains how we calculated the profitability variances (presented in Chapters 3 and 4).

Internal rate of return formula

- B4 Our analysis relied on the standard formula for calculating an internal rate of return (IRR) over a particular period—in our case 1 April 2012 to 31 March 2015—based on three components:
- B4.1 opening asset value;
 - B4.2 cash flows during the period; and
 - B4.3 closing asset value.
- B5 The IRR is the discount rate that would make the net present value of the three components equal to zero.

Opening asset value

B6 We considered the opening asset value to be the opening regulated asset base plus the value of deferred tax. Both of these terms are defined in the electricity distribution services input methodology (regulated asset base is abbreviated as RAB in the input methodology).⁴⁶

Cash flows during the period

B7 We considered several categories of incoming and outgoing cash flows (ie, revenues and costs) for calculation of the IRR.

B8 The incoming cash flows—the total regulatory income less pass-through costs and recoverable costs—that we considered were categorised as:

B8.1 revenue recovered under the price limit;

B8.2 other regulator income (excluding gains and losses on disposals); and

B8.3 revenue adjustments made during the period for claw-back.

B9 The outgoing cash flows that we considered were categorised as:

B9.1 operating expenditure;⁴⁷

B9.2 capital expenditure; and

B9.3 tax payable.

Closing asset value

B10 We calculated the closing asset value as the sum of:

B10.1 the regulated asset base;

B10.2 deferred tax;

B10.3 outstanding claw-back amounts; and

B10.4 any net present value adjustment required in the next regulatory period.⁴⁸

⁴⁶ Commerce Commission “Electricity Distribution Services Input Methodologies Determination 2012; consolidating all amendments as of 15 December 2015” (3 February 2016).

⁴⁷ Owing to the way operating expenditure was forecast in November 2012, we included gains and losses on disposal when modelling the impact of differences in operating expenditure.

⁴⁸ To give deferred clawbacks a neutral impact in real terms we add an adjustment by applying the debt rate to the clawback.

General approach for calculating variances

- B11 To assess the impact of any differences—such as actual and forecast operating expenditure—we used the financial model to calculate the profitability for each of the two scenarios. The difference between the two resulting internal rates of return is what we considered to be the impact of the variance.
- B12 For some of the variances we had to run scenarios as if we had perfect foresight for some inputs in the financial model. This required recalculation of the regulated asset base roll forward. The opening and closing regulated asset base values were also affected by the depreciation and revaluation effects.

An exception—how we calculated the impact of actual asset revaluations

- B13 To calculate the impact of actual asset revaluations, instead of applying actual inflation in the financial model for the revaluation of the regulated asset base, we applied forecast inflation to the regulated asset base value disclosed and rolled forward under information disclosure.
- B14 The regulated asset base value disclosed by distributors reflects actual capital expenditure, disposals, and depreciation rates. Consequently, our approach to calculating the effect of actual asset revaluations produces a better estimate than comparing two scenarios of the financial model with actual and forecast inflation.

Relationship with profitability indicator under information disclosure regulation

- B15 For the analysis presented in this paper we have calculated profitability in largely the same way as the improved profitability indicator disclosed by distributors since the March 2015 amendments to the information disclosure requirements. Specifically, this is the return on investment indicator with mid-year cashflow timing reflecting all revenue earned. This means that it is not equivalent to the profitability indicator disclosed during 2012/13 to 2014/15.
- B16 The main improvement in the profitability indicator is that it now includes revenue from financial incentives and wash-ups like the avoided transmission recoverable cost. The other improvements were changes to the timing assumptions, such as when line charge revenue was assumed to be received. Some of these other improvements explain why we have calculated the nominal target return to be 8.73% to 8.77% (depending on the distributor) rather than the 8.77% that was originally used for setting the default price-quality path.