Comments on Submissions on Revised Draft Reset of Electricity Distribution Prices

12 October 2012

1 Introduction and Summary

We have reviewed the submissions made on the revised draft decision of the Commerce Commission (the Commission) to reset the default price-quality path (DPP) for electricity distribution businesses (EDBs) (the Revised Draft Reset). This note responds to two specific issues raised in submissions:

- The need to "reality check" the econometric models used by the Commission—particularly for projecting operating expenditure (opex), and
- The merits of using a sector-specific index for inflating cost components for EDBs.

We also briefly comment on broader themes in the submissions that the Commission's sole focus on supplier profitability neglects, other important areas of supplier performance (i.e. what are suppliers actually delivering to customers), and that incentives should be a core component of the regulatory regime, but are currently absent.

2 Ability of Econometric Models to Project Opex

Several parties raised concerns about the ability of the Commission's econometric models to predict future opex needs. We believe that these concerns are valid: the Revised Draft Reset is the first time that the Commission has proposed to use econometric approaches to forecast opex, and the Commission does not provide any comparison of how the approaches perform relative to other forecasting techniques.

In our report on the Revised Draft Reset we proposed two alternative econometric models to forecast opex. We proposed these models because we believe that they would perform better at forecasting future opex needs, particularly for urban networks such as Vector (our client). Using information disclosure data, we find that both of the models that we recommend using provide better predictions of the total controllable opex incurred by suppliers over the period from 2005 to 2007 (using 2004 as a base year for forecasting).

Concerns raised about the predictive power of the Commission's opex econometric models

Several parties raised concerns about the Commission's use of econometrics. Unison argues that the econometric model does a poor job of explaining changes over time in opex (as opposed to explaining variations in opex levels between EDBs) (see paragraph 43(a) of the Unison submission). Horizon Energy contends that using total circuit length to predict future opex is inappropriate for its network (see pages 13-15 of the Horizon submission).

We believe that these are valid concerns. Following good regulatory practice, the Commission is obliged to show that any new forecasting approaches that are proposed provide valid and reliable results.

A methodology for comparing the predictive power of econometric models

The Commission undertakes a cursory analysis of the predictive power of its opex econometric models in Stata by generating graphs showing how its opex predictions compare with actual opex outturns. This analysis appears to be completed for 2009/10 and 2010/11), and the Commission does not seem to draw any conclusions from this analysis.

In fact, it would be dangerous to use the Commission's analysis to evaluate the predictive power of the econometric models. The graphs generated in Stata compare actual opex outturns in years that are used in the sample for deriving the econometric relationships between opex and scale variables. As a result, the models should predict opex in 2009/10 and 2010/11 better than for out-of-sample years, such as the remaining years of the regulatory period. A more orthodox and valid approach for analysing the predictive power of econometric models is to exclude the final year of data from the sample, and to compare the model's predictions with the actual results from that year. However, because the Commission's model only uses two years of data (2009/10 and 2010/11), excluding the final year would not leave sufficient data to derive a robust relationship.

Another analytical challenge when assessing the predictive power of the Commission's opex models is that annual operating expenditures vary considerably from year to year. We pointed out this feature of opex in our report to Vector, and concluded that the Commission should consider a longer timeframe for setting the base year. Other submitters (such as Unison) also note the volatile nature of annual supplier opex. In our view, this volatility means that the Commission should not try to maximise the ability of its models to predict opex in any single year, because that year might be atypical. Rather, the Commission needs to be assured that its models provide reasonable and unbiased opex predictions over a longer time period (in this case, the remaining three years of the regulatory period).

To consider how well the different forecasting approaches perform over a three year period, we have analysed the predictions made by four different forecasting approaches against actual opex from 2005 to 2007 (using 2004 as a base year). The benefit of using this time period is that the total controllable opex variable in the information disclosure dataset appears relatively consistent for most suppliers (as noted in our report, there appears to be a break in this series from 2008). The four approaches that we compare are:

- **Revised Draft Reset.** Uses the total opex that would have been allowed by the Commission by summing up the components for network and non-network opex, given the actual scale characteristics for each supplier from 2005 to 2007
- **Including Density Effects.** Uses the total opex that would have been allowed under the Revised Draft Reset if a density variable is included in forecasts of both network and non-network opex
- **Total Opex Model.** Uses the total opex that would have been allowed under the Revised Draft Reset if the dependent variable was changed to "total controllable opex", and network length and customer density were used as explanatory variables, and

- **Time Series.** Uses total opex predicted by applying a simple annual average growth rate for each supplier's opex from 2004-2011.

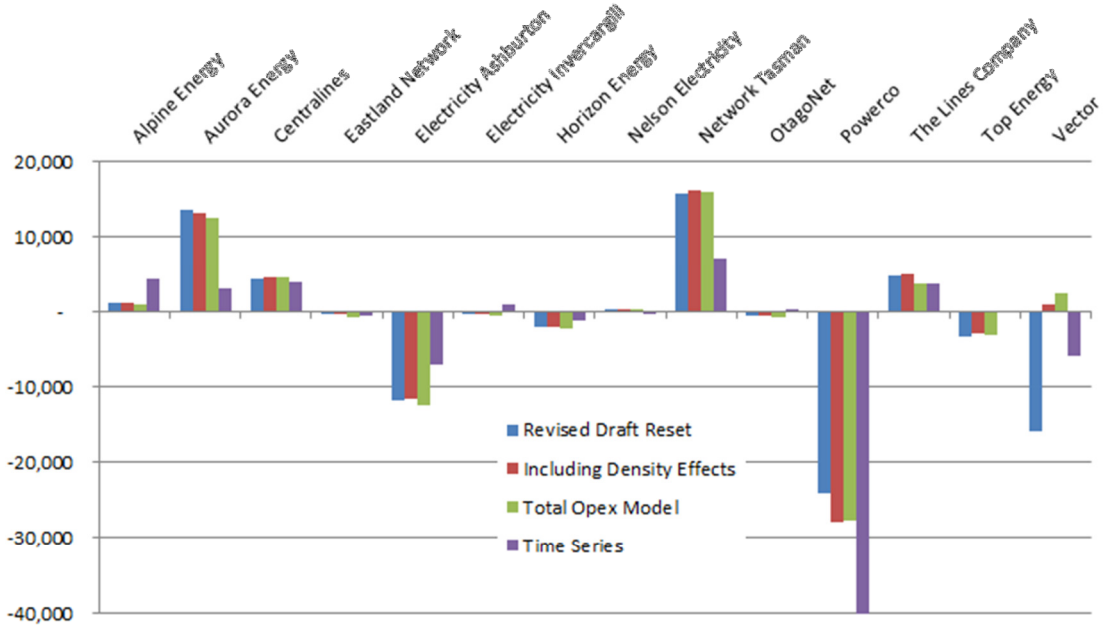
Comparing the predictive power of different models

The results of our analysis are shown in Figure 2.1. For most suppliers, the econometric models make similar predictions to a time series approach, and therefore have similar errors. For example, all econometric models predict opex for Centralines and The Lines Company that is higher than the actual opex incurred, and a time series analysis also produces this result. The econometric models also provide broadly consistent results for Electricity Ashburton and Top Energy, although the models predict lower opex than was actually reported.

A time series approach does considerably better at predicting the opex spent by Aurora Energy and Network Tasman. These suppliers would be provided with an additional $10 million in opex allowance under all three econometric models that was not actually spent, nor was it predicted by applying a simple time series approach. However, the opex forecasts for Powerco (while still understated) are more accurately predicted by the econometric models than by a time series approach.

An econometric approach that incorporates density variables provides the best prediction of Vector's opex from 2005 to 2007 (including Wellington Electricity). Excluding density variables understates the actual opex spent by Vector by around $15 million over the three years analysed. This finding is consistent with the submission made by Vector that density is an important variable for predicting the opex needs of urban EDBs.

Figure 2.1: Difference between Actual and Predicted Opex (2005-2007)



Note: Vector also includes Wellington Electricity (which was owned by Vector during the period of this analysis). Unison has been excluded from this analysis due to unusually high opex in 2005/06 (three times greater than the previous year or the following year)

Different forecasting approaches will inevitably favour particular suppliers *ex post*. The Commission needs a way to project reasonable opex requirements *ex ante*. The most relevant indicators from this analysis for evaluating the accuracy of sector-wide forecasts are the sum of the residuals and the total industry-wide error term. The sum of the

residuals ignores the direction of any errors, providing an overall sense of the accuracy of different forecasting approaches over the time period considered. The total industry-wide error term does not ignore the sign of the error term, and therefore nets-off under- and over-estimation of opex.

These statistics for each forecasting approach are presented in Table 2.1. The time series approach performs best in terms of minimising the sum of the residuals. Our suggested improvements to the Commission's econometrics (to incorporate a density variable or to use the total controllable opex series) both provide better predictions of actual opex from 2005 to 2007 in terms of minimising the sum of residuals. When we consider the net effects of the forecasts, all approaches forecast less opex than actually spent (due to the low forecasts of opex for Powerco compared with actual expenditure). However, the econometric models proposed in our report have a lower industry-wide error term than the Commission's models or the time series approach.

Table 2.1: Comparison of Residuals from Different Opex Prediction Models

	Revised Draft Reset	Including Density Effects	Total Opex Model	Time Series
Sum of residuals	98,154	86,719	87,318	79,603
Total industry-wide error	-17,297	-3,720	-6,486	-31,791

This analysis suggests that the Commission could improve the accuracy of its opex forecasts by modifying its econometric models, or by adopting a time series approach.

3 Use of Price Indices in the Draft Reset

The Commission uses price indices to forecast changes in operating and capital expenditure input prices over the regulatory period. The purpose of using these indices is to ensure that the prices charged by suppliers reflect the real costs of delivering services, adjusted for inflation. The Commission proposes to use the following indices to achieve this outcome:

- **A weighted average of the Labour Cost Index (LCI) and the Producer Price Index (PPI)** to forecast changes in opex input prices over the remaining three years of the regulatory period, and
- **The Capital Goods Price Index (CGPI)** to forecast changes in capex input prices. These forecast price changes are applied to the total annual network and non-network capital expenditure. The Commission has used actual changes in the CGPI for 2009/10 and 2010/11, and NZIER's latest forecasts for the remaining three years of the regulatory period.

Several parties' submissions (and our report on the Revised Draft Reset) recommend that the Commission constructs sector-specific price indices. In our view, the benefits of having tailored sector-specific indices to forecast changes in opex and capex input prices would outweigh the minor costs of putting together the required indices.

Suppliers generally support customised price indices

Submissions on the Revised Draft Reset support using more specific price indices to forecast real operating and capital expenditures to better reflect the cost changes facing EDBs. Suppliers were clear that the all-industries indices do not provide a good proxy for the electricity sector.

PWC (on behalf of the Electricity Networks Association (ENA)) support the development of industry specific input price indices for regulatory and planning purposes to be used as substitutes for the all industry indices currently used by the Commission (see paragraphs 49-52 of the Revised Draft Reset). Unison identified that the Commission's opex growth forecasts of around 3 percent per year underestimate growth across the sector, which was closer to 6 percent per year from 2008-2011.[1] These differences include an element of cost inflation differences. Powerco highlights that the LCI and PPI currently used by the Commission do not account for price shocks experienced in the electricity sector, and that if the Commission retains the use of these indices then shocks should be taken into account (presumably by adjusting the index).

We agree that there would be benefits from developing customised price indices that better reflect the cost inflation facing EDBs.[2] This would improve confidence in the fact that the Commission's forecasts fully compensate suppliers for the real costs of delivering services in future years. We also support the view that more specific indices will have additional uses for analysing information disclosures and for preparing Asset Management Plans.[3] Overall, we believe that a customised index is appropriate given the significant value of the assets regulated by the Commission and the small cost involved in constructing a customised index.

Sector-specific indices are widely-used in other industries to reflect actual costs

Sector-specific or customised price indices are used in a variety of other jurisdictions to improve forecasting accuracy. We mentioned in our submission,[4] that Local Government New Zealand uses customised price indices to forecast future costs.[5] These indices have enabled more accurate budgeting by local government authorities, which generally face higher price increases than reflected in national inflation indices.

Customised price indices are also used by regulators in the Australian electricity sector. The Australian Energy Regulator (AER) acknowledged in its final determination for Victorian electricity distribution companies that:

---

1 Unison, *Submission on Revised Draft Reset of the 2010-2015 Default Price-Quality Paths,* Public Version, 1 October 2012

2 Electricity Networks Association, *Submission on Revised Draft Reset of the 2010-2015 Default Price-Quality Paths,* 1 October 2012, PWC, *Submission to the Commerce Commission on Revised Draft Reset of the 2010-15 Default Price-Quality Paths*, Made on behalf of 20 electricity distribution businesses, 1 October 2012; Castalia, *Review of Revised Draft Reset of the 2010-2015 Default Price-Quality Paths*, Report to Vector Limited, September 2012; PWC, *Letter to Powerco on the Revised Draft Default Price-Quality Paths – Inflation and Depreciation Issues*, 28 September 2012; Unison, *Submission on Revised Draft Reset of the 2010-2015 Default Price-Quality Paths,* Public Version, 1 October 2012

3 Electricity Networks Association, *Submission on Revised Draft Reset of the 2010-2015 Default Price-Quality Paths,* 1 October 2012

4 Castalia, *Review of Revised Draft Reset of the 2010-2015 Default Price-Quality Paths*, Report to Vector Limited, September 2012

5 BERL, *A Local Government Cost Index for New Zealand,* May 2010

> *"over the regulatory control period, the costs incurred for labour and materials inputs may increase (or decrease) by an amount that is beyond the Consumer Price Index (CPI) …Therefore, the AER provides compensation for these real increases (or decreases) through input cost escalation. For operating expenditure, this escalation is primarily for labour costs."*[6]

The AER deals with changes in the costs of materials inputs predominantly through capex forecasts. The AER has also used customised price indices to forecast inflation that affects the opex of Powerlink, the transmission service provider in Queensland. In years not covered by the union collective agreement, the AER forecasts labour costs using the Deloitte Access Economics' Labour Price Index (LPI), which is specific to utility businesses.[7]

Customised price indices are straightforward to construct

To illustrate the difference between an all-industries price index and changes in costs faced by suppliers within a sector, we have constructed a customised Electricity Distribution Price Index. This has been a straightforward exercise, and draws upon publicly available data from Statistics New Zealand. Clearly, an additional set of assumptions are needed to forecast changes in price levels for a specific sector.[8]

Using information disclosure data from 2008 to 2011 we analysed the operating and capital expenditure specific to suppliers to create weightings for each cost category. For each of these categories, we matched components from the following price indices published by Statistics New Zealand:

- Labour Cost Index (LCI)
- Capital Goods Price Index (CGPI), and
- Producer Price Index (PPI) – input index.

All indices were re-based to March 2007 to allow direct comparisons, and a customised EDB price index was created by weighting the relevant components of the price indices to the suppliers' expenditure weights.

Materials and labour costs have increased at different rates in recent years

In the following charts, we compare the values generated under our customised EDB price index for suppliers' opex and capital expenditure to the indices resulting from the Commission's approach.[9]

The customised EDB price index for opex places greater weight on labour costs than the Commission's weighted average approach. We note that the AER places a similar emphasis on labour costs, and compensates suppliers for increases in materials costs

---

[6] Australian Energy Regulator, *Victorian Distribution Determination - Final Decision,* October 2010

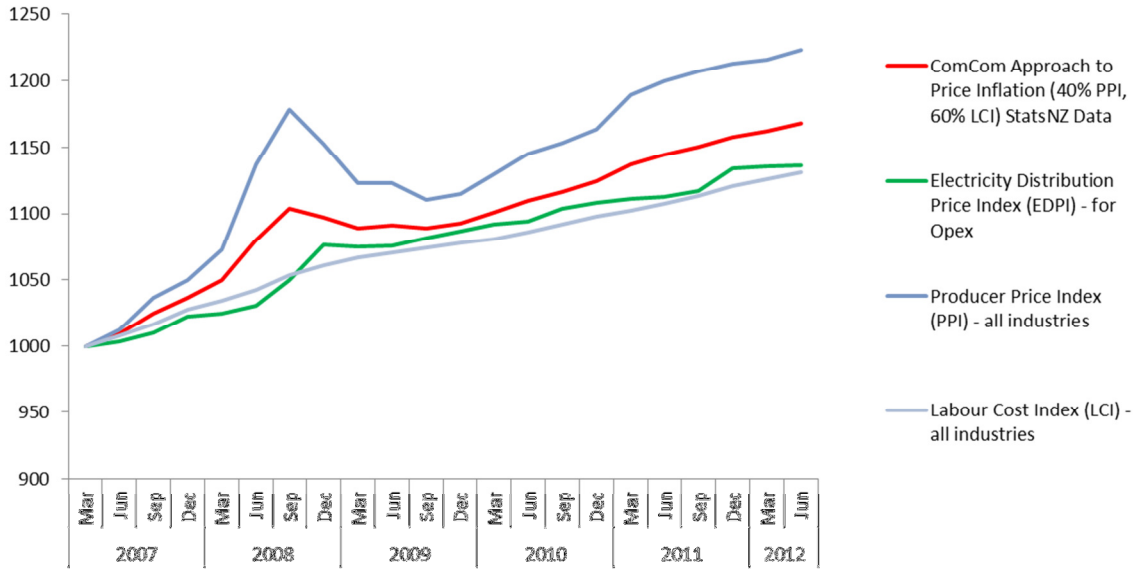
[7] Australian Energy Regulator, "*Powerlink Transmission determination 2012-13 to 2016-17: Final Decision*" April 2012. See Access Economics, Forecast growth in labour costs: update of March 2010 report, Report for the Australian Energy Regulator, 20 September 2010, http://www.aer.gov.au/sites/default/files/Access%20Economics%20-%20cost%20escalators%20report%20%2820%20September%202010%29.pdf

[8] We have not developed these additional assumptions because we would be unable to compare our resulting forecasts with the forecasts used by the Commission due to the commercial terms between the Commission and NZIER.

[9] 40 percent weighting on the all-industries producer price index and 60 percent weighting on the labour cost index. Commerce Commission, *Revised Draft Reset of the 2010-15 Default Price-Quality paths*, 21 August 2012, Section C23

through capital expenditure forecasts. As a result, the customised EDB price index shows a lower rate of inflation than the Commission's approach, as illustrated in Figure 3.1.

Figure 3.1: Weighted Average Price Index v Customised EDB Price Index for Opex



Source: Statistics New Zealand Data, Castalia Analysis

The Commission stated in Footnote 122 of the Revised Draft Reset that they estimate

> *"a correlation of over 97% with the Electricity, Gas, Water and Waste Services LCI. The all-industries PPI has a correlation of 71% with the Electricity, Gas and Water PPI and a correlation of 64% with the Electricity and Gas Supply PPI."*

We agree with the ENA submission that the relevance of these calculations is unclear.[10] The high correlation between the all-industries PPI and the Electricity, Gas and Water PPI simply means that utility charges have moved in line with other inflationary pressures in New Zealand. This does not mean that an all-industries approach explains the main cost changes facing EDBs. The all-industries approach is strongly driven by the costs of the larger production industries in New Zealand, (for example, the raw milk prices for agricultural production), which are not relevant costs to EDBs.

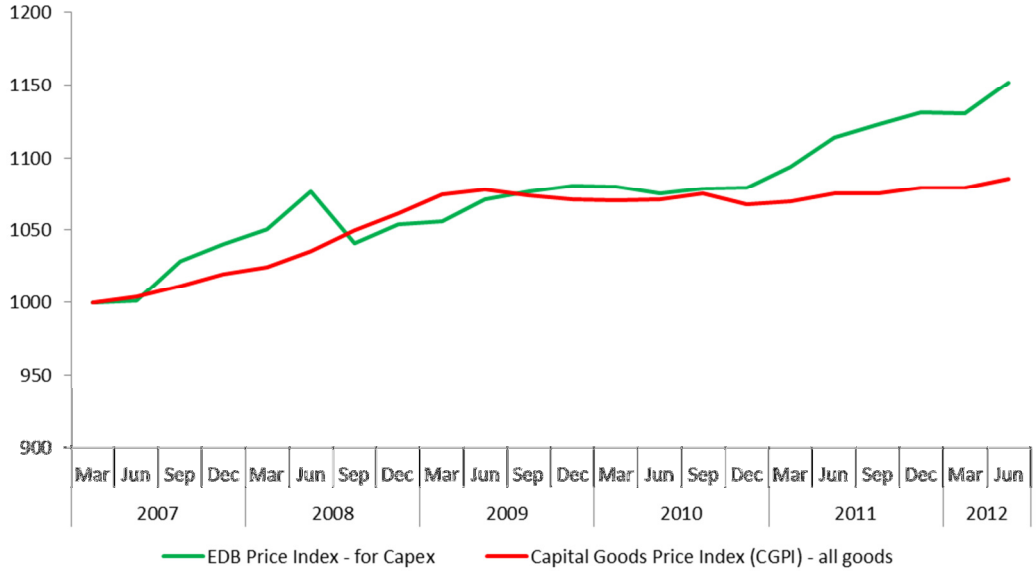
Prices of capital projects in the electricity sector are volatile, and high

By comparing the price indices reflecting input price changes for capital expenditure, we find that the customised price index does show a higher level of volatility than the all-industries capital goods price index used by the Commission. The volatility inherent in the prices of components of suppliers' capital expenditure is consistent with the expectations of NZIER, which considers that in the short term, sector specific indices are typically more volatile than all-industries indices.[11]

[10] Electricity Networks Association, *Submission on Revised Draft Reset of the 2010-2015 Default Price-Quality Paths,* 1 October 2012, paragraph 65

[11] NZIER, *Forecast of PPI and LCI, and Uncertainty of Forecast,* Report to Powerco, 18 August 2011

Figure 3.2: Capital Goods Price Index v Customised EDB Price Index for Capex



Source: Statistics New Zealand Data, Castalia Analysis

Figure 3.2 also shows that the customised EDB price index had growth of 15 percent from 2007 to 2012, which is considerably higher than the 8.6 percent growth in the all-industries CGPI.

The results above suggest that from 2007 to 2012 EDBs have faced a lower level of price inflation for opex than would be predicted by the Commission's approach, and a higher level of price inflation for capital projects. The net effect of using a sector-specific index on cost forecasts is uncertain, and will depend on the relative scarcity of inputs to the services delivered by EDBs (such as labour and materials). What is clear, is that customised price indices would more accurately reflect changes in future input costs.

Customised price indices fit with the low cost approach to regulation

The ability for sector-specific indices to improve the accuracy of the Commission's forecasts needs to be weighed against the costs of constructing customised indices. In addition, the Commission is required to take a low-cost approach to regulation under the DPP. While we agree with the Commission that supplier-specific forecasts of cost inflation are not appropriate for a DPP,[12] this does not exclude the Commission from adopting sector-specific forecasts.

As we have shown above, creating a customised price index for EDBs is a relatively straightforward process. The Commission would need to refine the weightings applied to different cost drivers to ensure that the indices are appropriately tailored, and should seek industry input to ensure that the indices better reflect actual cost inflation compared with an all-industries approach. The Commission would also need to generate assumptions for deriving forecasts of the sector-specific indices, and could commission an external forecasting body (such as NZIER) to assist with this exercise. We encourage the Commission to make the assumptions behind its forecasts transparent, which would help to build greater confidence in the results.

[12] Commerce Commission, *Revised Draft Reset of the 2010-15 Default Price-Quality paths*, 21 August 2012, Section C5.1

4 Broader Submission Themes

From our review of the submissions made by other parties on the Revised Draft Reset, we have identified two clear themes that support the findings in our April 2012 report on the impacts of regulatory incentives:[13]

- The Commission's focus on supplier profitability neglects other important areas of supplier performance, such as the services that suppliers are delivering to customers (see Contact Energy submission, page 1). Good supplier performance should be rewarded with a realistic prospect of earning higher rates of return, and poor performance should result in lower rates of return, on average. In our view, the Revised Draft Reset continues to unnecessarily focus on driving supplier returns to the Commission's WACC estimate—for example, through the Commission's refusal to provide additional allowances under the DPP.
- Incentives that should be a core component of the regulatory regime are absent from the Revised Draft Reset. This view is widely held by suppliers and shared by parties such as Contact Energy (see Contact Energy submission, page 2). Rolling incentives could be incorporated into the DPP relatively easily, and completed with a staggered approach to price adjustments. Failing to incorporate any similar measures puts the DPP out of step with regulatory practices overseas, which explicitly encourage suppliers to improve efficiency, invest, and innovate through opportunities to increase their returns.

We believe that the time constraints for making a final reset decision do not prevent the Commission from addressing the weaknesses identified in the Revised Draft Reset. While the Commission would need to complete further work to understand the full impacts of an allowance and explicit incentives, these measures would effectively be added on to the model for resetting prices that has already been developed.

[13] http://www.comcom.govt.nz/assets/Electricity/Input-Methodologies/Vector-Submission-on-Revised-Draft-DPP-Reset-Castalia-Evidence-on-Impacts-1-October-2012.pdf