
Submission to the Electricity Authority

on

Transmission Pricing
Methodology: CBA

Made on behalf of 22 Electricity Distribution Businesses

*PwC Submission on
behalf of 22 EDBs*

15 October 2013



Table of contents

| | |
|---|---|
| Glossary | i |
| Submission on Transmission Pricing Methodology: Cost Benefit Analysis | 1 |
| The problem definition | 2 |
| Focus on final prices | 3 |
| Identifying the impacts | 4 |
| Quantifying and valuing the impacts | 5 |
| Adjust for differences in timing of impacts | 6 |
| Decision criteria | 7 |
| Sensitivity analysis | 7 |
| Next Steps | 8 |

Glossary

| | |
|--------|---|
| ACOT | Avoided Cost of Transmission, being payments to DG by distributors in recognition of avoided transmission costs |
| CBA | Cost Benefit Analysis |
| DPP | EDB Default Price-Quality Path under Part 4 of the Commerce Act 1986 |
| DG | Distributed Generation |
| EA | Electricity Authority |
| EDB | Electricity Distribution Business |
| Grid | Transpower's national transmission grid |
| GXP | Grid Exit Point |
| HVDC | High Voltage Direct Current circuit linking the North and South Island |
| MBIE | Ministry of Business Innovation and Employment |
| Part 4 | Regulation under Part 4 of the Commerce Act 1986 |
| PV | Photovoltaic |
| RCPD | Regional Coincident Peak Demand, basis for charging for interconnection under the current TPM |
| TPM | Transmission Pricing Methodology |

Submission on Transmission Pricing Methodology: Cost Benefit Analysis

1. This paper forms our submission on the Electricity Authority's (EA) working paper, "Transmission Pricing Methodology: CBA" released on 3 September 2013 (the Working Paper). This submission has been prepared by PricewaterhouseCoopers (PwC) on behalf of the following 22 Electricity Distribution Businesses (EDBs or distributors):
 - Alpine Energy Limited
 - Aurora Energy Limited
 - Buller Electricity Limited
 - Counties Power Limited
 - Eastland Network Limited
 - Electra Limited
 - EA Networks Limited
 - Electricity Invercargill Limited
 - Horizon Energy Distribution Limited
 - MainPower New Zealand Limited
 - Marlborough Lines Limited
 - Nelson Electricity Limited
 - Network Tasman Limited
 - Network Waitaki Limited
 - Northpower Limited
 - OtagoNet Joint Venture
 - Scanpower Limited
 - The Lines Company Limited
 - The Power Company Limited
 - Top Energy Limited
 - Waipa Networks Limited
 - Westpower Limited.
2. These businesses together supply 36% of electricity consumers, maintain 48% of total distribution network length and service 74% of the total network supply area in New Zealand. They include both consumer owned and non consumer owned businesses, and urban and rural networks located in both the North and South Islands. In the year to March 2012 these distributors paid over \$150m in transmission charges, over 20 per cent of Transpower's 2012 transmission revenue.
3. In October 2012 the EA consulted on a proposal for a new Transmission Pricing Methodology (TPM), set out in its consultation paper, "Transmission Pricing Methodology: issues and proposal" (the October Issues Paper). This proposal was supported by cost benefit analysis (CBA).
4. In response to feedback received on the proposal and CBA, the EA decided to develop a second Issues Paper that may modify the original TPM proposal. As an initial step in this revised work steam, the EA wish to strengthen and clarify the CBA framework used to analyse and support any TPM reform options. This is in direct response to feedback received. The Working Paper sets out the EA's revised

CBA approach and seeks feedback to test whether it captures the key concerns and suggestions made in regards to the October Issues Paper.

5. The key features of the revised CBA approach are presented as a 10-step analysis process, as follows:
Step:
 - 1) define the problem
 - 2) select the options for assessment
 - 3) specify the baseline scenario
 - 4) indentify the impacts of the options – negative (cost) and positive (benefits)
 - 5) where possible, quantify the impacts
 - 6) where possible, value the impacts
 - 7) adjust for differences in the timing of impacts (ie calculate the present value of future benefits and costs)
 - 8) calculate decision criteria
 - 9) analyse the sensitivity of the results
 - 10) document the CBA.
6. Step 2 (selection of options) is not discussed in the Working Paper as this will be addressed in the revised TPM proposal. Step 10 (documentation) is also not discussed.
7. The distributors represented by this submission are supportive of the EA’s efforts to strengthen and clarify the CBA underpinning any analysis of TPM options. The Working Paper usefully provides greater understanding of the EA’s current thinking as to how it proposes to develop a revised CBA. However, the Working Paper does not go into specifics and, accordingly, there remains some uncertainty in a number of areas. This is understandable given models have yet to be developed or information collected and analysed. We also acknowledge that the EA is still refining it’s thinking on this topic and at this stage is only seeking feedback on the wider framework. Nevertheless, we look forward to further dialogue and detail regarding the features of the CBA as this work stream progresses, particularly with regards to the design of the model.
8. We set out below our primary submission comments on the Working Paper. Our comments are structured in line with the key CBA steps identified above.

The problem definition

9. Section 6 of the Working Paper provides further explanation as to why the EA believes the current TPM is inefficient. This discussion broadly explains at a high level how transmission pricing can impact on economic efficiency and how changes to the TPM can improve economic efficiency.
10. This section is useful for explaining the economic rationale and objectives for efficient transmission pricing and hypothetical TPM reforms that might improve efficiency. However, we are concerned that a clear problem statement in relation to the current TPM still remains elusive¹.
11. From our reading of this discussion, it appears that the EA is primarily concerned by the locational price signals (or lack thereof) under the current TPM and the affect this might have on investment decisions regarding substitutes for transmission plus remote grid-based generation. For instance, various transmission substitutes which might be affected by inefficient transmission pricing are mentioned, namely:

¹ In paragraph 9 of our submission on the October Issues Paper we submitted that a clear problem statement needs to be defined to guide decision making.

-
- Waikato generation does not require the HVDC link to serve Auckland customers and similarly Otago generation does not require the HVDC link to serve Christchurch.
 - Distributed generation and storage
 - Combined heat and power
 - Energy efficiency
 - Demand management and response.
12. The Working Paper suggests that investment decisions for transmission substitutes are being distorted because transmission prices may be too high or low relative to a TPM that has regard to the location of transmission substitutes.

“A move toward more efficient transmission pricing creates incentives both to:

- *Reduce transmission usage where there are more efficient (lower cost) substitutes.*
- *Increase transmission usage where there are less efficient (higher cost) substitutes.”²*

13. If the EA believe that the current TPM does not appropriately signal efficient investments in transmission and transmission substitutes then we submit this should be explicitly stated in a short problem statement (or series of problem statements) which will act as a guide for developing alternatives to the TPM. The efficacy of the various TPM options in resolving each problem statement can then be tested with the CBA measuring the extent of benefit under each.

14. As an example, a problem statement in the form set out below would be useful:

“Interconnection charges are biased towards remote grid based generation leading to inefficient investments in transmission substitutes“ (Example statement only)

15. Such a problem statement would also go some way to fulfilling clause 12.86 of the Code which provides that the EA may review the TPM when there has been a material change in circumstances. We therefore recommend that the EA clearly define problem statements that provides context to the development of alternative TPM options and the development of the CBA.

Focus on final prices

16. The Working Paper discusses methods and approaches to estimating reform benefits. It is proposed that differences in final consumer prices will be compared over a defined projection period between the factual (current TPM) and each counter-factual (alternative TPM) scenario. The objective of this step is to develop a present value estimate of the differences in prices over time.
17. In order to better understand the causal impacts of a change in the TPM, it is suggested the various components of final prices may need to be estimated. While these components are not explicitly listed, we assume this will comprise the modelling of prices for key parts of the value chain:
- Wholesale generation
 - Transmission
 - Distribution
 - Metering
 - Retail.

² Working Paper, Paragraph 6.8

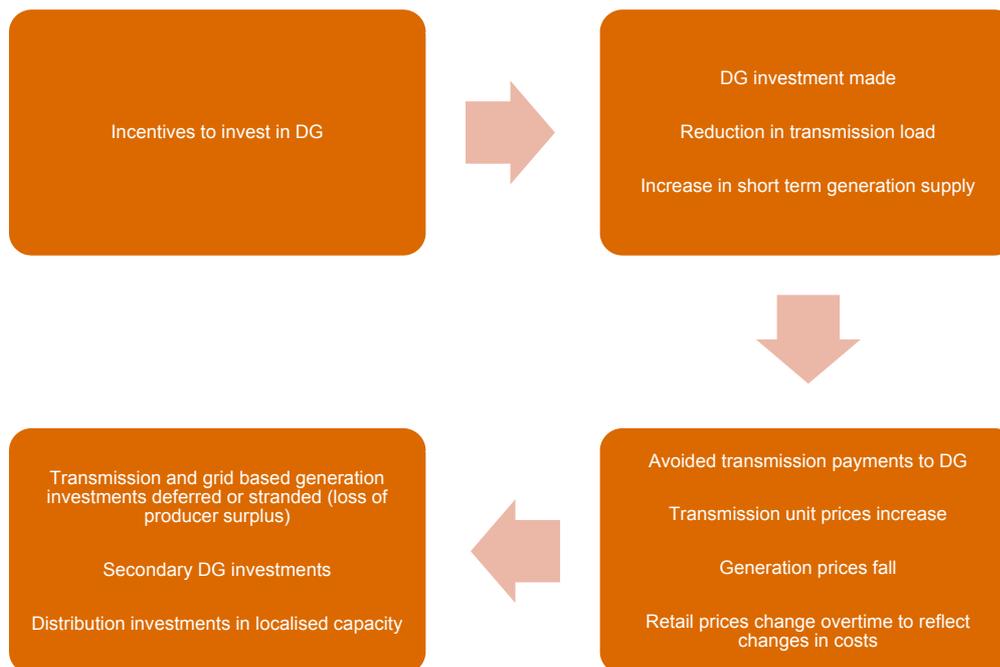
-
18. Final consumer prices for electricity are likely to be useful in analysing potential costs and savings arising from TPM reform. However, using prices to understand changes in net reform benefits is only likely to be appropriate in a competitive market where there is pressure on prices to reflect underlying costs. Alternatively, for those parts of the sector that do not face competition, cost based regulation would need to be in place to ensure prices reflect underlying costs over time.
 19. Nevertheless, even where these conditions exist, costs and efficiency savings arising from TPM reform will take some time to filter down to consumers. For regulated utilities such as Transpower and EDBs, any costs or savings arising from the TPM should be passed through transparently given these companies broadly rely on a cost based approach to setting prices. For those parts of the sector exposed to competition (e.g. generators and retailers), costs and benefits will be passed through to the extent the competitive markets allows. In either case the EA needs to understand the drivers and timing for how costs and prices are passed through to consumers.
 20. It is less clear from the Working Paper how the EA plans to model the upstream and downstream components of final consumer charges (e.g. distribution charges). We welcome further discussion on this as the CBA methodology progresses. This topic is discussed further in later sections.
 21. It is also unclear whether final consumer prices would include social externalities and benefits, or be based on observed market prices. For instance, a change in the TPM may influence the use of low carbon generation (ie use of PV) or promote generation that is less harmful to natural habitats. This would reduce social externality costs, all else being equal. However, the reduction in these externalities may not be fully priced into observed market prices so the full social cost of change may not be captured in the CBA. Similarly, TPM reform may promote use of alternative fuels, such as natural gas, solar water heating, or LPG, which will not be recognised in final consumer prices for electricity. We therefore recommend further consideration as to exactly what is included in final consumer prices and whether adjustments need to be made for wider economic impacts.
 22. We also believe it is necessary to monitor the impact of reform on consumption and load (ie quantities). As we understand the problem, the EA is seeking to reduce inefficiencies arising from the application of the current TPM. Inefficiencies from an economic perspective, at least allocative inefficiencies, are measured by dead weight loss. This represents the loss in economic welfare that neither consumers nor producers capture, which is lost to society. However, dead weight loss is measured by the interaction of both price and quantity. Changes in quantities, as well as prices, arising from variations to the TPM are therefore very important to understanding changes in allocative efficiency.

Identifying the impacts

23. Under this step, individual benefit and cost categories will be identified and linked to each reform option in order to determine its impact. Costs will be split into two categories; initial transition costs and on-going steady state costs. More detailed cost sub-categories will fall under these categories. More detailed modelling will also consider the key tasks and activities relevant to each party affected by the TPM reform.
24. The key risk arising from this approach, in our view, is that certain costs and benefits for individual parties will be missed. To minimise this risk, we suggest that there needs to be thorough understanding of the flow on effects stemming from each reform impact. Secondary and potentially tertiary loop effects also need to be well understood. This requires a thorough understanding and analysis of the key business drivers for each affected party and any secondary impacts on other parties³. As an example, if investment in distributed generation (DG) is promoted by TPM reform then this is likely to impact various parties over time. The following simplistic diagram illustrates the potential flow on effects that would need to be considered for each cost or benefit impact.

³ Similar to that set out in the positive and negative feedback loops discussed in Figure 7 of the Working Paper

Figure 1: Flow on impacts resulting from incentive to invest in DG



25. The timing and impact on final consumer prices of each step will need to be assessed. Secondary flow effects will also need to be assessed. This analysis should ideally be undertaken for each reform impact that is identified in order to fully understand each impact.
26. As a secondary concern, it appears that transitional costs are assumed to stop during the start year of the TPM. Following this, steady state operating costs apply. In our view, there will be ongoing transitional costs that need to be factored in throughout the projection period. For instance, resolution of errors and market issues arising out of TPM reform are likely to be a feature for some time to come. We therefore suggest that transitional costs are not limited to the initial development period but are considered across the projection period.

Quantifying and valuing the impacts

27. In quantifying and valuing the benefits, the EA is proposing to use two complementary modelling approaches:
 - a 'top down' approach, which calculates likely outcomes resulting from TPM reform based on benchmark data from similar types of reform in overseas jurisdictions
 - a 'bottom up' approach that involves calculating likely reform outcomes based on causal relationships between input variables and likely efficiency gains.
28. Similarly, costs will be estimated by drawing on a combination of extrapolations from estimated reform costs for comparable reforms and estimates of possible implementation costs.
29. Final consumer prices will be calculated from estimates of revenue developed based on data sourced from the Ministry of Business Innovation and Employment (MBIE) energy data file and projected forward based on consideration of historical volume and productivity trends. Counterfactual prices will be affected, relative to base prices, by the impact of the various features of TPM reform, including the possibility of adverse consequences.
30. We support the use of a top down and bottom up model to calculate reform benefits. However, it is less clear how costs will be estimated. The various supporting information and analysis that is cited is likely to be useful. This information includes feedback provided in previous submissions, empirical evidence, case studies, and analysis of previous reform.

31. The approach to calculating revenue and prices appears quite simplistic, as it does not appear to be based on a buildup of costs but rather a forward extrapolation of historical prices using various assumptions. To improve the robustness of these projections, we recommend a cost build up approach is employed where estimates of future costs can be readily and reliably sourced. We recognise that a cost based approach would be difficult to apply to some parts of the sector, given the availability and uncertainty over information. However, we note that a significant amount of information is disclosed by EDBs annually under information disclosure regulation under Part 4 of the Commerce Act 1986 (Part 4). This information includes forecasts of operating and capital expenditure going out ten years as well as demand and consumption growth forecasts. This information could be used to improve forecasts of prices for the distribution component of the sector and could also assist in forming a view on other components (ie DG and transmission).
32. In forecasting prices for distributors, the EA also needs to have regard to a number of other considerations specific to distributors:
 - The new regulatory input methodologies applying to non-exempt EDBs under Part 4 price regulation are likely to be complex to model but are important to consider in order to accurately forecast distribution prices. Exempt EDBs are not subject to price regulation, but their returns are monitored under information disclosures which may provide insight into how prices are set.
 - It is unclear how EDB regulation under Part 4 will change over time. Changes to the TPM may also influence EDB regulation (eg changes to interconnection and ACOT charges)
 - Distributors may have excess capacity in their networks or may have committed to certain investments and contractual arrangements which are difficult to adjust. It may therefore take some time for TPM reform to have an effect on distribution prices.

Adjust for differences in timing of impacts

33. Benefits and costs valued under the previous step will be assigned over a 20 year projection period. A 10 and 30 year projection period will also be investigated as a sensitivity.
34. The use of a 20 year projection period with 10 and 30 year sensitivities does not seem unreasonable. While it is desirable to align the projection period with the life of investments made in response to TPM reform, these investments are likely to be long lived (eg generation and transmission assets) and it will become increasingly more difficult to accurately project net benefits as the projection period increases. The EA may wish to consider the use of a terminal value at the end of the projection period in recognition of the present value of ongoing net benefits associated with long lived assets.
35. The present value of net benefits projected over the appraisal period will be calculated based on a discount rate. In the October Issues Paper, Transpower's 2013 regulatory WACC was used to discount net benefits. Under the revised CBA, the EA has decided to adopt Treasury's discount rate of 8% with a sensitivity of +/-2%.
36. The selection of a discount rate is typically a contentious input to CBA and economic analysis, given the sensitivity of final outputs to this input. However, the use of Transpower's regulatory WACC is unlikely to be appropriate, not least because it is based on a notional 5-year bond so is unlikely to be useful as a long-term discount rate. The adoption of Treasury's discount rate may be better in this regard, however, we note there is some debate over using this discount rate for CBA. In recognition of this, we support the use of a +/- 2% sensitivity to ensure that options are not accepted or rejected solely on the discount rate specification.
37. We also note that Treasury's discount rate is a real discount rate meaning forecast prices would need to be expressed in real terms. However, the Working Paper suggests that nominal unit prices will be

estimated. The Treasury discount rate will therefore need to be converted to a nominal discount rate by adding inflation⁴.

Decision criteria

38. Under this step the various TPM options are ranked by their ability to “maximise social and economic welfare consistent with promoting competition in, reliable supply by, and the efficient operation of, the electricity industry for the long term benefit of consumers”⁵. We interpret this to mean that the preferred option will be that which:

- has the highest risk-adjusted net benefit
- best meets the EA’s statutory objectives.

39. The adoption of a set of decision criteria taking into account the quantitative risk adjusted results of the CBA and the EA’s statutory objectives is an appropriate basis upon which to make a decision. Nevertheless, the decision making process is likely to be more robust and transparent where:

- an approach is developed for adjusting CBA net benefit results for variance and sensitivities such that they can be meaningfully ranked or compared. For example, probability weights could be attached to the likely scenarios and sensitivities to derive a single expected net benefit result for each counter-factual option. While the adoption of probability weights could be contentious, they will at least be more transparent and open to scrutiny than a qualitative assessment of risk. This approach will also provide a single expected net benefit result for each counter-factual which can be used, alongside other analysis results, to compare each option.
- a clear set of decision criteria should also be developed early in the process in relation to the EA’s statutory objectives (preferably prior to any CBA analysis being undertaken). This should set out the criteria for ranking or scoring each TPM option by its ability to meet each objectives (ie promote competition, reliable supply, and efficient operations).

Sensitivity analysis

40. This step includes undertaking sensitivity analysis of alternative assumptions and estimates of costs and benefits. The primary objective is to test the robustness of any finding, and to test whether that even under a pessimistic case, benefits would nevertheless exceed costs. A more empirically robust approach to setting the pessimistic approach is proposed than under the previous CBA. This will be based on the range of efficiency estimates developed in the course of the benefits quantification.

41. We support the use of sensitivity analysis to better understand the impact of the key risks and variables. We also support a more robust approach to developing scenarios. However, as discussed above, we also recommend attaching probability weights or distributions to each of the key variables and sensitivities in order to derive an expected return. This will show regard not only to the magnitude of a sensitivity but to its probability of occurring.

42. In terms of process, we consider that sensitivity analysis should be considered as part of the ranking of various options under the decision making criteria (eg as an expected net benefit estimate). Accordingly, we propose that sensitivity analysis needs to be conducted prior to the application of any decision making criteria.

⁴ i.e based on the Fisher Equation

⁵ Working Paper - Paragraph 12.2

Next Steps

43. We trust this submission provides useful input for the EA in reviewing the TPM. We would be happy to answer any questions you may have regarding this paper.
44. The primary contacts for this submission are:

Lynne Taylor
Director
PricewaterhouseCoopers
lynne.taylor@nz.pwc.com
(09) 355 8573

Aaron Webb
Associate Director
PricewaterhouseCoopers
aaron.m.webb@nz.pwc.com
(09) 355 8285