

Feedback on CPP processes

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Key points

The Commerce Commission requirements for cost benefit analysis of major electricity network investment are not consistent across Transpower and EDB. The Commerce Commission has correctly pointed out that recent decisions about the input methodology processes did not specify the use of cost benefit analysis (CBA) for the assessment of customised price path (CPP) proposals. However:

- CBA is used to assess major capital project proposals
- submissions on the Powerco CPP by TDB and Pat Duignan have argued strongly that CBA methods are key component of the 'prudent expenditure' test that the Commission applies to CPP proposals
- some stakeholders have indicated a strong desire to test the costs and benefits of major investment proposals.

Building on the Commerce Commission's willingness to consider the use of cost benefit analysis as a tool to inform assessment of customised price paths it would be useful to agree some principles for the expected scope, approach and duration of cost benefit analysis. We suggest the analysis should include consumer willingness to pay for change in quality of service (planned and unplanned), be compared to a genuine counterfactual (or at least the DPP and explicitly consider) the projected state of the network at the end of the CPP. The benefits of improved health and safety and improved capacity to accept new connections should be quantified and compared to other quantified costs and benefits if the applicant or the Commission regard them as a material element of the rationale for approving the CPP proposal.

A standard approach to calculating the price changes for consumers should be implemented but it should be based on the EDB's pricing methodology and 'cost to serve consumer' models. The price change should be reported for major price plans. This approach would allow consumers to link the change in charges proposed under the CPP to their current charges and would avoid creating an artificial comparator.

Links between prices and quality of service are a key component of the choice offered to consumers in a CPP. We agree that asset criticality would improve the quantification of this trade-off but there are also opportunities to make better use of existing asset health and failure data that is available to and used by the relevant EDB now. There is no need to postpone a more rigorous CBA based assessment of price quality trade-offs based on better use of existing asset health indicators until a better measure of asset reliability (criticality) is available.

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1. Use of cost benefit analysis

1.1. Current practice

Submissions by some stakeholders on the Powerco customised price path (CPP) included a strong advocacy by some stakeholders for the use of cost benefit analysis (CBA) as a tool to assess the extent to which the proposed spending was meeting the test that the proposed expenditure was in the long-term benefit of consumers. The main argument for a cost benefit analysis is that it allows a more transparent and objective comparison of the timing and allocation of the gains with the costs of the proposed CPP. A secondary argument for CBA is that it helps to identify costs and benefits that can be quantified and separate them from those that cannot. If a proposal must be justified on unquantified benefit it at least gives a sense of how important those benefits would need to be to current and future consumers to offset the quantified net cost.

Recent events have demonstrated that CBA methods can be applied to CPP proposals and the problems of applying CBA to long-lived electricity assets can be addressed:

- Wellington Electricity Limited provide a CBA in support of its application for accelerating the improvement of the earthquake resilience of its network
- Transpower showed cost benefit analyses for major capital projects (including a test of options) as part of the 'investment test'
- the Commerce Commission states that while cost benefit analysis is not required as part of its evaluation under Part 4 it recognises that¹:

cost-benefit analysis is a useful tool to inform judgement and there is merit in exploring its role in the customised price-quality path process going forward, in particular as effective asset criticality² frameworks are established.

1.2. Next steps - improving CBA quality

Given the combination of a strong demand from key stakeholders to apply CBA methods to CPP applications, precedent for the use of CBA in Transpower major capital projects and the Commission's recognition of its usefulness as a tool to inform judgement, one of the next steps in the consideration of application of CBA is to agree a set of principles for the design of CBA methods for analysis of CPP proposals.

This assessment of the next steps is based on the contents of the Commission's open letter. The letter suggests the Commission is more open to using CBA to inform 'judgement' than its final decision on the Powerco CPP which implies that:

¹ See: 'Open letter: Requesting feedback on recent customised price-quality path processes', 'Table B: Use of cost-benefit analysis' page 5.

² We comment on asset criticality in more detail section 4. For the purpose of this section we argue that asset criticality is helpful to, but not necessary for, the application of CBA to the assessment of CPP proposals. In making its decision on the Powerco CPP to approve 96 percent of the proposed spend and increase the service quality standard the Commerce Commission arguably applied its own assessment of asset criticality

- CBA should not be used in the framework for CPP assessments until the input methodologies are reviewed (to allow consultation with potential CPP applicants)³
- a robust CBA of a CPP is dependent on an effective asset management framework that can measure the health and criticality of assets.

Putting to one side the Commissions comments on the timing of when CBA could be used as a tool for assessment of CPP proposals, a starting point for the discussion of the design of the CBA method is the resolution of the Commission's concerns⁴ with NZIER 'high-level quantitative analysis'⁵.

1.2.1. Commission concerns

The NZIER analysis illustrated that electricity distribution business (EDB) information disclosures and CPP proposals contain enough information to compare key costs and benefits and indicate what the value of other benefits would need to be for the CPP to have a net benefit to consumers. However, the NZIER analysis was limited by the level of detail provided in the Powerco CPP with respect to both the:

- expectation of what would happen in the absence of the CPP - the counterfactuals were either the default price path (DPP) or a 'do nothing' scenario for asset health
- lack of quantification of benefits of the CPP aside from the difference in reliability standards

The Commission's material concerns with the NZIER analysis could be addressed by requesting CPP proposals to:

- clearly define a complete counterfactual that can be compared to the CPP.
 - Several of the Commissions concerns with the NZIER analysis were based on the argument that the DPP forecasts provided by Powerco were not an accurate forecast of what would happen in the absence of the CPP (despite Powerco's comment to the contrary at least for asset health)
 - Powerco did not provide a counterfactual for asset health indicators but compared the asset health indicators under the CPP to a do-nothing scenario which was clearly untenable and described by Powerco as:

*This isn't presented as a counterfactual (which would be the DPP) but rather as a useful illustration to understand the full potential health degradation over the forecast period. As we will always ensure our assets are safe and provide reasonable service 'do nothing is not a viable option.'*⁶

³ 'Powerco's customised price-quality path, Final decision, 28 March 2018', Commerce Commission, paragraph 131, page43

⁴ 'Powerco's customised price-quality path, Final decision, 28 March 2018', Commerce Commission, paragraphs 133 to 137 page 43 to page 46 for Commissions' final assessment and paragraphs

⁵ The initial version of the NZIER high-level analysis can be found in 'Powerco CPP application Advice to MEUG for Commerce Commission submission', pages 1 to 4, available at <http://www.comcom.govt.nz/dmsdocument/15772> with a response to the Commission's draft decision comments in Powerco CPP draft decision, Advice to MEUG for Commerce Commission submission' pages 10 to 11 available at <http://www.comcom.govt.nz/dmsdocument/16022>

⁶ See 'Powerco CPP Main Application, Box 11.1 Asset Health Indices (AHI), p82

- include quantitative data on benefits cited as key drivers of the CPP. In particular ‘safety’ was quoted numerous times by Powerco in its CPP proposal – often alongside reliability or quality of service. The change in safety risk was not quantified while the change in quality of service was quantified as it was forecast for both the DPP and CPP.

A suggested approach to resolving the concerns is listed in the following table.

Table 1 CBA method design

Response to Commission concerns with NZIER analysis

Commission concern	Comment	Suggested approach
Health and safety benefits	The risk of accident and injury from network failure and the quality of service are both driven by the asset health and the probability of asset failure although the consequence of the events will differ for accidents and outages. The Powerco CPP and the verifiers report both discussed the correlation between asset failure and outages but did not compare the numbers of safety incidents with asset failure.	Require CPP applications to quantify estimated reduction in health and safety risk as part of the proposal if it is cited as a material benefit
Growth in connections and demand	Capacity to accommodate growth in new connections or increased demand from existing connections is a benefit only to the extent that additional demand is met at a lower cost under the CPP than the counterfactual adjusted for the probability that demand increases above the capacity in the counterfactual.	Require CPP proposals to include an estimate of the probability that the additional capacity for growth will be required during the forecast period
Improved operational efficiency	Improvements in operational efficiencies should be reflected in the difference between the counterfactual and the CPP operational expenditure path	Require CPP proposals to include a rationale for and quantitative estimate of efficiency gains if these are cited as material.
Long-lived assets	Defining an endpoint for the modelling of long lived assets is difficult. The uncertainty about long term forecasts and low present value of long term benefits needs to be balanced against the need to fully represent the benefits from investing in lumpy capacity that may not be ‘fully’ utilised until after it is commissioned. An issue with the Powerco CPP proposal was that the asset health indicators of several classes of assets did not seem to improve materially over the CPP period. This raised questions about what level of investment would be required in the network at the end of the CPP period.	For Transpower CBA the issue of modelling period seems to be resolved by selecting a relatively long fixed period. The issue could also be addressed by considering the projected change in asset health over the CPP period and assessing whether the asset health implies asset expenditure after the CPP that is like the counterfactual or the CPP level of investment. This would inform a judgement of whether the CPP price increase is a one-off, a new plateau, or the beginning of a steepening climb.

Source: NZIER

2. Long term price impact

The Commission's discussion on long term pricing impacts is focused on the fully reflecting the price change after the CPP period that will occur once all the assets approved for the CPP are commissioned. I agree with the Commission's contention that CPP applicants should consult with customers on long-term prices.

However, the Commission's contention raises a broader question of what CPP applicants should be asked to indicate about the state of their networks after the assets approved under the CPP are commissioned. This would give consumers a sense of the likelihood that either the CPP is a one-off or another round of investment and price increases materially above DPP levels will be required.

The Powerco CPP proposal illustrates the potential uncertainty around this issue as it forecast:

- quality of service measures that remained more or less flat after the CPP (unplanned SAIDI for 2024 to 2027) or deteriorated slightly but remained below 2018 levels (unplanned SAIFI for 2024 to 2027)
- forecast proportions of assets requiring replacement within three years (H1 and H2) in 2027 that were higher than the proportion for 2016 for 8 out of 17 asset classes and less than 1 percentage point lower than 2016 levels for a further three asset classes⁷.

In the absence of information on either the cost of replacing assets in each class or the contribution of replacing those assets to improving network safety and reliability it is difficult for consumers to form a view on the outlook for network charges beyond the CPP. The objective of providing this information is to help consumers balance their expectations of willingness to pay for service quality with what an effective and efficient supplier would offer.

⁷ Powerco CPP draft decision, Advice to MEUG for Commerce Commission submission' pages 14 to 18 available at <http://www.comcom.govt.nz/dmsdocument/16022>

3. Calculating price changes

3.1. Recent practice

The Commerce Commission has proposed calculating the impact of price changes following a CPP with reference to a standard household consumer as defined by the MBIE electricity survey. Calculation of price changes requires two steps: estimation of the revenue change related to the CPP and allocation of the revenue change among users.

3.2. Estimation of revenue

To provide a clear indication of the expected increase in costs to consumers the estimated change in price should be based on the estimated maximum allowable revenue after all additional assets considered under the CPP are commissioned.

3.3. Standard consumer – not helpful

The concept of the standard consumer is not particularly helpful in measuring the impact of the increase in charges on consumers as most EDB have:

- some residential consumers on a low fixed charge tariff and the rest on a tariff with a higher fixed charge and lower daily tariff. These groups have different energy usage patterns and exposure to price changes
- different proportions of commercial and industrial consumers with different levels of usage of the network services relative to residential consumers

3.4. Use EDB pricing methodology

All the EDB are required to report on the methodology they use to set line charges annually⁸. The methodology⁹ includes models to allocate the costs of various classes of high and low voltage network assets and operating costs to consumers with pricing plans based on the size and type of connection to the EDB network. The pricing methodologies often use combinations of contribution to coincident peak demand on the network as well as any time maximum demand to allocate network costs but the approach differs across EDB as well as the number of price plans and the rules for allocating consumers to a particular price plan. The methodologies seem to be quite stable over time.

⁸ See section 2.4 Pricing and related information of the Electricity Distribution Information Disclosure Determination 2012 (consolidated April 2018) URL <http://www.comcom.govt.nz/dmsdocument/16193> at <http://www.comcom.govt.nz/regulated-industries/electricity/information-disclosure-requirements-for-distributors/current-electricity-information-disclosure-requirements/>

⁹ For examples of the allocation approach see 'Powerco ELECTRICITY PRICING METHODOLOGY 2018' page 31 to 33 for the Eastern Region and page 38 to 41 for the Western Region available at <https://www.powerco.co.nz/media/1927/powerco-electricity-pricing-methodology-2018.pdf>

Rather than attempt to express price changes resulting from a CPP as a simple average for a hypothetical residential consumer we suggest that as part of the CPP proposal the applicant should run its current pricing methodology over the regulated asset base and operating expenditure levels expected under the CPP and report the expected price change for each consumer price plan. This would clearly signal to consumers how their cost of electricity is likely to be affected by the CPP.

4. Linking price and quality

4.1. Current practice

The current measures of service quality, fault duration (SAIDI) and fault frequency (SAIFI) are averages over both time and consumer groups. This ‘averaging’ makes it difficult to tell which consumer groups are affected by a measured improvement in service quality and the size of that improvement. The current service quality disclosures do not provide information on the undelivered load (time of day for outages and types of consumer affected are not reported), whether the effects of outages are spread across many consumers or concentrated with a few.

Although disclosures include detailed information on asset age and health it is difficult to link this information to either quality of service or the reasons for outages and therefore assess how efficiently a CPP may deliver its service quality objectives. The Powerco CPP indicated that the linkages between asset health, asset failure and reliability of service are variable and provided limited information on the relationships.

While we support the Commission looking more closely at how asset health and criticality measures can be improved we also suggest that this should be accompanied by a:

- more granular review of how consumers value service quality
- review of how the existing asset health and failure data held by EDB can be used to form a better picture of the links between asset health, asset failure, safety risk and reliability of service
- clear definition of the information gap between current asset health indicators and the measures required for what the Commission considers to be a robust CBA (based on the standard applied to Transpower) which the asset criticality index is expected to ‘close’
- parallel development of improved measures of the asset drivers of safety and quality of service with the resolution of the issues impeding the application of CBA to inform judgements outlined in section 1.2 of this note.

4.2. Acknowledging consumer preferences

The current incentives for delivery of quality of service:

- treat a percentage reduction in frequency in the same way as the percentage reduction in duration of outage
- value improvements in service quality for planned outages at half of the improvement in in service quality for unplanned outages.

These approaches seem to be based on past practice rather than an attempt to reflect the willingness of different consumers to pay to avoid unplanned or planned outages and the importance of other factors such as reliability of EDB information about the timing of planned outages and once an outage has occurred how long it will be until electricity supply is restored.

The Commission’s decision on the Powerco CPP included trade-offs between reliability and Powerco expenditure that were not explicitly compared to either the approved expenditure or consumer willingness to pay for improved reliability. The Commission decided to increase the quality of service that would be provided by Powerco by reducing the average duration of outages and average frequency of outages as shown in the following table.

Table 2 Change in service quality

Change in average outage duration (SAIDI) and average outage frequency SAIFI

Year	Average outage duration (SAIDI)			Average outage frequency SAIFI		
	CPP proposal	Commission	Change	CPP proposal	Commission	Change
2019	170.91	169.59	-0.77%	2.257	2.116	-6.24%
2020	166.54	166.06	-0.29%	2.226	2.094	-5.95%
2021	163.05	162.59	-0.28%	2.214	2.073	-6.38%
2022	161.95	159.20	-1.70%	2.217	2.052	-7.43%
2023	160.02	155.88	-2.58%	2.202	2.031	-7.75%

Source: NZIER

The changes in quality of service targets set by the Commission imply that the CPP investments are expected to be much more effective in reducing the frequency of outages than the duration of outages. It was not clear from the willingness to pay research by PwC that consumers were willing to pay more for a reduction in the frequency of outages than for a reduction in the duration.

4.3. Asset health – make data more useful

The Powerco CPP provided detailed information on asset health indicators for multiple asset types but its usability for CBA could be materially improved by:

- describing a counterfactual for asset health based on the default price path (or the counterfactual specified for the CPP) rather than a ‘do-nothing’ comparator
- reporting the asset health indicators, current and projected failure rates and planned investment in groups of assets that match the asset groups in EDB information disclosures on asset age and asset management plans to simplify the process of identifying the cost of improving asset health
- providing a concordance that maps the detailed asset health categories to the higher-level asset categories used in the pricing methodology to provide a clearer picture of how proposed investment in assets is allocated among consumer groups.

Answering these questions would provide an opportunity to improve stakeholder understanding of the relationship between EDB asset management plans and the potential impact of those decisions on service quality and safety. The key limitations

of this approach are likely to be that it is based on historical correlations and tends to consider safety and reliability on an asset by asset or 'weakest link in the network' basis. However, it is worthwhile for the Commission to assess EDB capacity to answer these questions as a test of the readiness and a stepping-stone toward the development of asset criticality measures.

4.4. Asset criticality

The discussion paper on asset criticality¹⁰ published by the Commerce Commission illustrates how data on asset health and asset failure rates can be used to model 'probalistic SAIDI' and 'probalistic customer expected unserved energy cost' as well as the sensitivity of the model to variations in the key modelling assumptions.

This approach would dramatically improve the robustness and transparency of CBA assessment of CPP proposals as it allows consideration of both the contribution of asset investment to improved safety and reliability as well explicitly considering the value to the consumer of improved reliability and safety. However, the asset criticality measures and the application of CBA methods should occur in parallel as:

- key elements of both measurement approaches are available to stakeholders and the measures do not need to be 'perfected' before they can provide valuable insights into which investment decisions contribute the most to the long-term benefit of consumers
- questions raised by CBA about proposed CPP investments are likely to help focus attention on material issues that need to be addressed by asset criticality analysis and vice versa.

¹⁰ 'Asset criticality modelling in electricity distribution networks', Simon Todd and Paul Mitchel, presented at EEA Conference & Exhibition 2018, 20 – 22 June 2018 and available at www.comcom.govt.nz/dmsdocument/16404