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**SUBMISSION ON THE TRANSMISSION PRICING REVIEW: 2019 ISSUES PAPER**

Rio Tinto welcomes the opportunity to provide a cross-submission to the Electricity Authority (Authority) on responses to its consultation paper entitled, "2019 issues paper, Transmission pricing review" dated 23 July 2019. This submission is made by Rio Tinto on behalf of Pacific Aluminium (New Zealand) Limited and New Zealand Aluminium Smelters Limited (NZAS). Nothing in this submission is confidential.

Should you have any enquiries, please do not hesitate to contact Lesley Silverwood at [lesley.silverwood@riotinto.com](mailto:lesley.silverwood@riotinto.com).

Yours sincerely

A handwritten signature in blue ink, appearing to read "J. Nolan".

Jennifer Nolan  
**Director External Relations**

A cross-submission from  
Rio Tinto  
to the Electricity Authority on the

**Submissions to the 2019 issues paper**  
**Transmission pricing review: consultation paper**

Due: 31 October 2019

## Contents

Introduction .....	3
Clear consensus that existing method is flawed.....	4
Credibility will be established only by following the analysis.....	4
Authority's interpretation of relevant literature not challenged .....	4
Conceptual approach to the CBA is logical and follows from the analysis .....	5
CBA approach models the Authority's proposal.....	5
Additional costs of generation not excluded from the Authority's CBA .....	7
Authority distinguishes between transfers and efficiency gains .....	8
CBA helps illustrate the urgency of implementation.....	8
Poor modelling does not imply a flawed concept .....	9
Allocation of residual to generators .....	9

## Introduction

1. Rio Tinto welcomes the opportunity to make a cross-submission on the submissions received by the Electricity Authority (Authority) on its 2019 issues paper, Transmission pricing review: consultation paper, 23 July 2019 (2019 Issues Paper). Having reviewed the submissions, Rio Tinto reiterates the points we made in our own submission on the 2019 Issues Paper; all those points remain valid and important.
2. Our approach in this cross-submission is to focus on material or argument raised by submitters that was not addressed in our submission. Where a submission from another party simply asserted a position different from the conclusions reached in our primary submission we do not, in the interests of brevity, point out that difference. We continue to rely on our primary submission.
3. On our reading of the submissions, seven points of significance emerge which are additional or supplemental to those we raise in our primary submission:
  - There is now a clear consensus that the Authority has identified flaws in the existing transmission pricing methodology (TPM) and that those flaws are leading to inefficient investment and consumption outcomes.
  - Submitters opposed to a benefit-based charge fail to identify any material flaws in the conceptual underpinnings of the Authority's approach nor do they engage in, or challenge, the Authority's interpretation of the economics literature cited in the 2019 Issues Paper; rather they would have preferred that the analysis arrived at a different conclusion and encourage the Authority to diverge from its analysis.
  - The claims—relied upon by Transpower and Trustpower in particular—that the CBA contains obvious and very serious mistakes originates in the errors and misunderstanding of their consultants, not the Authority's CBA; the Authority's approach to its cost benefit analysis is sound and the results plausible.
  - If, as we submitted it should, the Authority recognised that the long-term benefit of consumers is central to the Authority's purpose statement, it would have arrived at a much larger estimate of the net benefit to consumers.
  - We agree with Meridian, that implementing the TPM even one year earlier would increase the net benefits materially (NERA calculated the increase at \$163 million); these estimates underpin Rio Tinto's submission that the Authority progress its TPM review with the utmost urgency.
  - Work done by the Electric Power Optimization Centre (EPOC) reinforces Rio Tinto's analysis that the modelling undertaken by the Authority to support the charges specified in Schedule 1 of the draft Guidelines was not fit for purpose. However, EPOC's work should also provide confidence that benefits can be assessed objectively—the problem is poor modelling by the Authority not a flawed concept.
  - The application of a fixed transmission charge, the residual charge, to existing generators would largely be capitalised into asset values of existing generation assets, not wholesale prices.

## Clear consensus that existing method is flawed

4. On our reading of the submissions, there is now a clear consensus that the Authority has identified flaws in the existing TPM and that those flaws are leading to inefficient investment and consumption outcomes. Almost all submitters recognise that the distortions from inefficient transmission pricing are likely to increase as the electricity sector evolves with technological change and the transition to a lower carbon emitting economy. The case for reform is both obvious and urgent.

## Credibility will be established only by following the analysis

5. Submissions on the 2019 Issues Paper closed a few days prior to the Minister of Energy releasing her decisions on the Electricity Price Review recommendations. Several submitters encouraged the Authority to defer making decisions on the TPM.
6. The Government has decided that it will wait for the Authority's current process to run its course. In announcing this decision, the Minister emphasised that the Government retains the option of preparing a GPS if it considers it should provide the Authority with guidance (under section 17 of the Electricity Industry Act 2010).
7. The Authority will be acutely aware that in tackling the difficult issue of transmission pricing (an issue which is objectively important and urgent), it will come under scrutiny, including becoming a focus of political attention. In an industry in which participants routinely make decisions to commit capital over long periods of time, measured in decades, the Authority has rightly identified the importance of the durability of its decisions to amend the Code. Durability does not mean static, but it does mean the Code evolves consistent with the best analysis available to the Authority at the time it makes its decisions.

## Authority's interpretation of relevant literature not challenged

8. The Authority correctly summarised in its 2019 Issues Paper that economically efficient price signals depend both on efficient marginal prices *and* the total price (the infra-marginal prices) paid by users for the services they receive. The Authority referenced the economic literature that supported this conclusion (see the literature cited by the Authority at footnote 322 of its 2019 Issues Paper). In previous papers (for example, its Second Issues Paper, 2016), the Authority provided examples of the problems that arise when charges for transmission services are divorced from the benefits and costs of the service.
9. No submitter has referred the Authority to literature that challenges the literature cited by the Authority and no submitter has suggested that the Authority incorrectly interprets the literature it cites.
10. There are of course submitters who would have preferred the Authority reached a different conclusion, or would have the Authority defer introducing a TPM that is centred on achieving the long-term benefit to consumers.

## Conceptual approach to the CBA is logical and follows from the analysis

11. Two submitters, Trustpower and Transpower, are especially critical of the Authority's cost benefit analysis. Each submitter attaches a consultant report criticising the CBA. HoustonKemp (consultant for Trustpower) says that the Authority's "errors are just as serious, and in some respects more acute, than the errors in the 2016 cost benefit analysis that caused the EA to delay the development of the TPM guidelines".<sup>1</sup> Axiom Economics (consultant for Transpower) says "The main piece of fresh analysis is a new cost-benefit analysis (CBA) to replace Oakley Greenwood's deficient modelling. Regrettably, the new CBA is just as flawed – if not more so – than its ignominious predecessor".<sup>2</sup> However, their criticism results from basic analytical errors by these consultants.
12. HoustonKemp claims that the Authority's modelling:<sup>3</sup>
  - overestimates the benefits by including transfers from producers to consumers, whereas it should only include the change in deadweight loss
  - underestimates the costs by excluding the impact of higher peak demand on generation costs.
13. Axiom Economics claims that the Authority's modelling:<sup>4</sup>
  - does not reflect the TPM proposal
  - does not include generator investment costs in its assessment.
  - implies that generators would continue to invest while not earning the long-run marginal cost of new investment.
  - counts wealth transfers from generators to consumers and efficiency gains
14. We comment briefly on these claims.

### CBA approach models the Authority's proposal

15. As noted above (paragraphs 8 to 10), the Authority has correctly concluded that transmission charges that reflect the costs of the services received by a user will lead to better resource allocation decisions over time. These resource allocation decisions are not limited to new transmission investment, which is why the economic efficiency arguments for applying a benefits-based charge to existing assets are just as strong as the arguments for applying the charge to new investments.

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<sup>1</sup> HoustonKemp, *Review of the cost benefit and options analysis of the EA's proposed TPM guidelines*, A report for Trustpower, 30 September 2019, page ii.

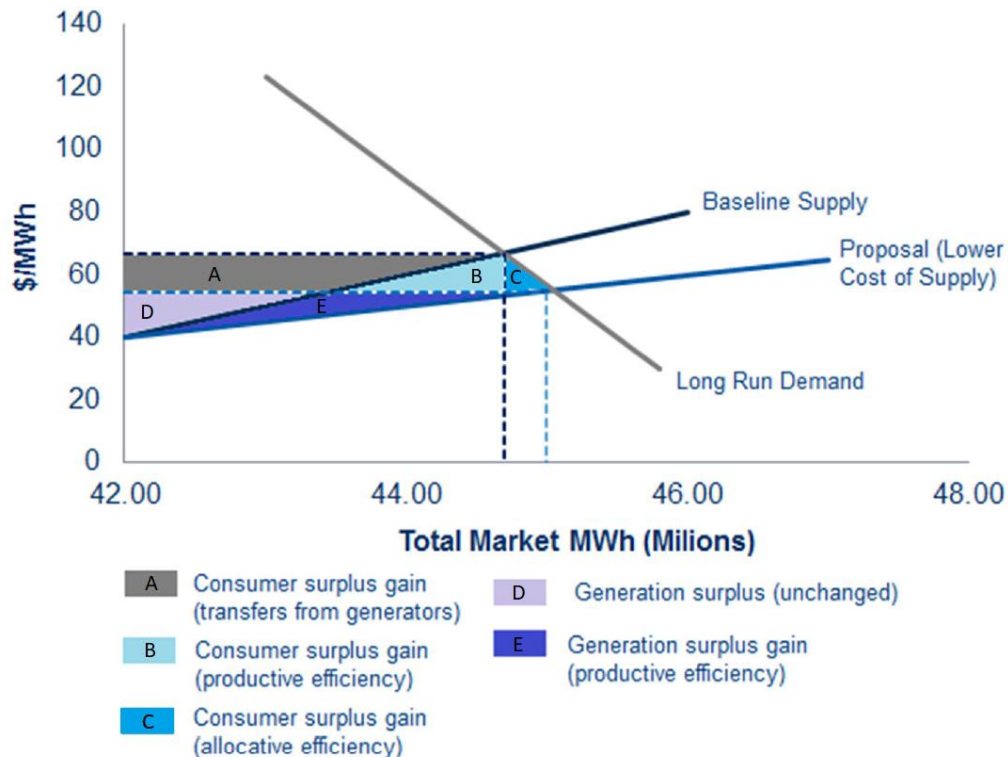
<sup>2</sup> Axiom Economics, *Economic review of transmission pricing review consultation paper, a report for Transpower*, September 2019, page iv.

<sup>3</sup> Op cit, page ii.

<sup>4</sup> Op cit, page

16. Better resource allocation decisions will mean consumer demand can be satisfied at lower economic cost in the long-run. During its 10 September 2019 Technical Workshop, the Authority presented an illustrative diagram of these economic effects.<sup>5</sup> NERA, in a report attached to the Meridian submission, added further helpful annotations to the Authority's diagram. We replicate the NERA diagram in Figure 1.

Figure 1 Long run energy price effect



17. As this diagram illustrates, the efficiency gains from better resource allocation over time comprise allocative efficiency gains (the dark blue triangle, labelled C) and productive efficiency gains (light blue and dark purple triangles, labelled B and E). HoustonKemp is wrong to claim that the efficiency gain is just the change in deadweight loss (the dark blue triangle, C).
18. Axiom is wrong to claim that the modelling does not represent the Authority's proposals. Axiom claim that the Authority's modelling "assumes that generators would invest without giving any thought to the potential consequences for future spot prices. Afflicted with this myopia, the generators in the model consequently invest billions of dollars in new plant – a large proportion of which would almost certainly not produce a reasonable economic return".<sup>6</sup>

<sup>5</sup> Right-hand panel diagram of slide 14.

<sup>6</sup> Axiom, op cit, page 86.

19. The claim by Axion is incorrect. The Authority has necessarily simplified the modelling of costs and benefits to achieve a tractable model to solve a complex problem. The Authority has taken the reasonable approach of using elasticity functions to discover new levels of demand following a reduction in peak transmission costs. This approach discovers the willingness to pay, or 'revealed preferences', as described in the CBA Technical Paper. The Authority then models generation competition to discover the marginal Long Run Marginal Cost (LRMC), or the willingness to sell. The difference between the increased willingness to buy, and the increased willingness to sell, is an increase in total economic welfare regardless of who is assumed to accrue the benefit of the economic surplus. This gain in economic welfare is illustrated in Figure 1 above.
20. NERA estimate that these efficiency gains represent just 1.6% per cent of the present value of the sum of Transpower's expected revenue and expected wholesale electricity market revenue over the next 30 Years.<sup>7</sup> Rio Tinto agrees with NERA's observation that efficiency gains of this magnitude seem quite plausible, and at the low end of the range of results produced from other studies into efficiency gains from better pricing.<sup>8</sup>
21. Better resource allocation would also result in additional long-term benefits to consumers (the grey shaded trapezoid, labelled A in figure 1). The Authority excludes these benefits from its evaluation because this element of the increase in consumer surplus would be a transfer from generators due to lower prices in the future relative to what would occur without TPM changes. This would be the correct approach if the Authority's objective was limited to economic efficiency. However, as the long-term benefit of consumers is central to the Authority's purpose statement, the Authority should give weight to long-term benefits to consumers where those benefits results from efficiency enhancing changes

### Additional costs of generation not excluded from the Authority's CBA

22. It is difficult to work out how Axiom came to the conclusion that the Authority's modelling did not include the cost of generation to meet the additional demand. In the Authority's modelling, generation is only assumed to invest once prices exceed their long-run marginal cost (LRMC); that is, the price at which the generation fully recovers its costs. As generation competition is limited to hold prices at a competitive, but investment adequate, level then the resulting generation revenue covers the full cost of generation.
23. HoustonKemp is also incorrect in arriving at their claim that the Authority should have interpreted its CBA as showing an economic efficiency loss of \$2,303 million.<sup>9</sup> HoustonKemp arrive at this figure by deducting the 'increase in generation costs' (-\$1,940 million) from the Authority's net benefit estimate. However, HoustonKemp double counts these costs. In the Authority's CBA, consumer surplus is calculated as the difference between the consumer value (or, consumer benefit) and the price paid by the consumer. The prices in the calculation already account for generation costs.

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<sup>7</sup> NERA, Review of Electricity Authority's transmission pricing review 2019 papers: Meridian Energy, 1 October 2019, paragraph 83.

<sup>8</sup> NERA, *ibid*, paragraphs 84 - 85.

<sup>9</sup> HoustonKemp, *op cit*, page iii).



24. Similarly, Axiom's claim that generators would not recover their long-run marginal costs and would not invest within the Authority's model is unfounded. The Authority's modelling recognises that a static model risks overinvesting in generation and "The model includes a parameter that limits the number of investments that can occur in any given year, to avoid large amounts of investments if prices rise to high levels." The Authority only allows up to two generation investments in any year. It also performed sensitivity analysis on the number of generation investments that would be allowed in a year, simulating only one investment and up to five investments. The Authority's CBA Technical Paper was deficient in not discussing the sensitivity results in terms of generator's revenue adequacy, but Axiom are wrong in saying that the Authority's modelling is designed to under compensate generation investment.

### Authority distinguishes between transfers and efficiency gains

25. Axiom claim that the consumer welfare benefits identified by the Authority in its grid use model are not economic benefits, but transfers of wealth. The Authority explicitly considers the potential for wealth transfer in its CBA Technical Paper "*... it is arguable that the energy price effects include some wealth transfers. That is, when wholesale prices reduce under our proposal, it could be argued that consumers gain at the expense of generators.*" However, the Authority correctly characterises these effects: "*We do not consider the effect to be predominantly a wealth transfer. Generators would not lose wealth, because in the model prices fall to their long-run average because generators have expanded voluntarily and efficiently in response to increased demand.*"
26. Nevertheless, the Authority takes a conservative approach to the benefits ascribed. It considers an approach where the benefits include both consumption effects and the reduced price effect. It also considers an approach where only the benefits of consumption are considered benefits. A deficiency in the Authority's CBA Technical Paper means it is not clear how they derive the value of the consumption effect only, but there is an assessment that does not account for the reduction in prices after generation investment.
27. The Authority takes a conservative view on the benefits that accrue from the price effect by averaging the two approaches: "*Given the extent of uncertainty about the size of energy price impacts, and to account for a remaining potential for this effect to include wealth transfers, we have adopted a simple average of the consumer welfare impacts with and without the price effects: that is, an average of the approaches noted at 2.34 (a) and (b) above. Model averaging is a common approach to deal with these types of uncertainties.*"<sup>10</sup>

### CBA helps illustrate the urgency of implementation

28. The CBA prepared by the Authority helps illustrate that allowing a further four years for Transpower to implement the TPM is far too long. NERA calculates that implementing the TPM even one year earlier would increase the net benefits materially (by \$163 million). This

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<sup>10</sup> This statement is correctly reflected in the Authority's calculation at cell F4, 'Summary table with ranges' tab, Summary costs and benefits.xlsx, [https://www.emi.ea.govt.nz/Wholesale/Datasets/\\_AdditionalInformation/SupportingInformationAndAnalysis/2019/20190723\\_TPM\\_2019\\_IssuesPaper/2019\\_Cost\\_Benefit\\_Analysis%20\(including%20additional%20files\)/Summary](https://www.emi.ea.govt.nz/Wholesale/Datasets/_AdditionalInformation/SupportingInformationAndAnalysis/2019/20190723_TPM_2019_IssuesPaper/2019_Cost_Benefit_Analysis%20(including%20additional%20files)/Summary)

estimate underpins Rio Tinto's submission that the Authority progress its TPM review with the utmost urgency, and that the Authority should set 1 April 2022 as the latest date for applying the new TPM prices.

## Poor modelling does not imply a flawed concept

29. In our primary submission, Rio Tinto identified serious flaws and inconsistencies in the Authority's modelling to specify charges under Schedule 1 of its proposed Guidelines.<sup>11</sup> The submission by the Electric Power Optimization Centre (EPOC) identifies similar flaws. EPOC operates as an independent research group based at the University of Auckland with a focus on wholesale electricity markets. EPOC supports the beneficiary pays approach in determining transmission charges but recognises that the current methodology used by the Authority can be improved.<sup>1213</sup>
30. In Section 3 of its report, EPOC notes that the methodology to compute benefits has several weaknesses.<sup>14</sup> Its primary critique of the Authority's methodology was the assumption that market participants behaved similarly with or without the asset.<sup>15</sup> EPOC correctly contends that this is an oversimplification of participant behaviour in the counterfactual situation. To demonstrate their point, EPOC produced their own model which they believe derives a better estimate of benefits than the one proposed by the Authority.
31. EPOC computes an alternative counterfactual model in the case of no HVDC line using vSPD and alters input assumptions such as risk aversion of market participants.<sup>16</sup> Their modelling found that benefits accruing to South Island generators were substantially underestimated using the assumptions in the Authority's vSPD modelling.<sup>17</sup> If these benefits had been considered in the Authority's modelling, we would expect a load consumer such as Rio Tinto to have a smaller percentage of benefits apportioned to them.
32. Alternative modelling by EPOC shows that the benefits charge, as proposed by the Authority, can be applied, including to historic assets. While EPOC's alternative analysis was only done for the HVDC the principles could be applied to any combination of lines providing the modelling problem is correctly formulated. As Rio Tinto submitted, the application of beneficiary charges requires a more robust and appropriate modelling of benefits than undertaken by the Authority.

## Allocation of residual to generators

33. Rio Tinto observed in its primary submission (as did other submitters, such as Vector) that the Authority has not responded nor engaged in the literature and logic presented in earlier

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<sup>11</sup> Rio Tinto, (2019), Transmission pricing review: consultation paper, page 7, para 3(d).

<sup>12</sup> Electric Power Optimization Centre, (2019), Consultation on Transmission Pricing Review, para 3.

<sup>13</sup> In para 3 EPOC describes their assessment of being on the cost-benefit analysis but the counterfactual model is the one used to determine beneficiary pays.

<sup>14</sup> Ibid, para 11.

<sup>15</sup> Ibid, para 12.

<sup>16</sup> Ibid, para 15.

<sup>17</sup> Ibid, para 19.

submissions supporting allocating the residual charges to generators as well as load customers. NERA, on behalf of Meridian, attempt to fill the gap by suggesting the theory of two sided markets supports the Authority's proposal to charge the residual only to load customers.<sup>18</sup>

34. We accept NERA's analysis that the design of the residual charge should consider the elasticity of the counterparties for the charge, though only after it has been allocated on the widest possible base for the reasons set out in our primary submission. We also accept that on a short-run basis, generator demand for transmission service is more elastic than load. However, applying short-run signals to the load side is also inefficient, and if it wasn't there would be little benefit in removing RCPD as proposed by the Authority. For this reason, the Authority is proposing a charge that is unavoidable in the short-run, i.e. fixed charges.
35. On the basis that the fixed charge is only avoidable by exiting the electricity market there is no reason to assess that generation is any more elastic than load. Both sets of parties face significant value loss from exiting. Providing that beneficiary charges are maximised, and the use of the residual charge is minimised, then the inefficient incentives to exit due to the residual fixed charge would also be minimised.
36. NERA also claims that generators will simply recover their transmission costs through the electricity market although NERA recognises that "The Authority also points out that if the residual charge was allocated to generation, it would be passed on to load via higher energy prices anyway ([B.224 IP])). Introductory textbook economics might suggest this is only correct to the extent that short-run marginal cost includes the residual charge.<sup>19</sup>" NERA then claims that "However, in a more dynamic sense, fixed costs have to be recovered through the wholesale market – investment in generation will only occur if investors expect to recover their fixed and variable costs, including any fixed transmission costs.<sup>20</sup>" While investors may expect to recover all costs in a competitive market, this is not guaranteed.
37. A highly competitive electricity market would clear on variable cost much of the time and generators at the margin would be unable to recover their fixed transmission charges. Generators with operating costs below the marginal price will recover fixed costs, including a return on asset (which in the case of hydro generation assets have been revalued upwards during the period the wholesale market has been in operation). If the electricity market were less competitive, generators would be able to recover their fixed transmission charges more of the time.
38. During periods of scarcity, or in risk weighted hedge contracts, generators will attempt to recover their fixed costs through higher peak prices or higher contract prices. However, prices may attract new investment into the market that would put downward pressure on prices and prevent the recovery of all fixed costs. If the generator's fixed transmission charges are mostly residual charges then high residual charges could lead to inefficient investment. The same effects occur in relation to demand, potentially leading to less

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<sup>18</sup> NERA, op cit, paragraphs 43 - 57

<sup>19</sup> NERA, op cit, paragraph 54.

<sup>20</sup> NERA, ibid.

efficient investment decisions for loads. The potential for the residual charge to give rise to economically inefficient decisions is why it is imperative to determine beneficiary charges to the greatest extent possible, and to allocate any residual charge over the widest base feasible, including existing generators.

39. NERA also suggests that applying costs to generators, which they may not be able to recover, would lead to reduced future investment by generators. The same logic applies to load customers, especially trade-exposed industries. The solution—as set out in Rio Tinto’s primary submission and above—is to minimise the residual charge by maximising the revenue recovered through the beneficiary charge, allocating the residual charge over the widest base feasible (generators and load) and insuring that the TPM reflects the Authority’s analysis. No party to the electricity market should expect that market inefficiencies would be left unaddressed by the regulator.