

## **Amending the major capex project outputs for the Bunnythorpe-Haywards Lines A and B Upgrade project**

### **Decision and reasons paper**

Date: 18 December 2019

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## Executive Summary

- X1 Transpower New Zealand Limited (Transpower) has applied to the Commerce Commission (the Commission) to amend a major capex project output for the Bunnythorpe-Haywards lines A and B upgrade project (Project). The Project relates to the reconductor and upgrade of the capacity of transmission lines A and B between Transpower's Bunnythorpe substation and its Haywards substation. The Commission approved the Project on 9 May 2014. Transpower expects to commission the Project in summer 2019/2020.
- X2 Transpower has applied to amend the major capex project output relating to the Zebra aluminium conductor steel-reinforced cable (ACSR). Transpower proposes using a trapezoidal Curlew ACSR conductor instead on selected segments of the Waikanae and Horowhenua sections of the Bunnythorpe-Haywards A and B lines. Transpower states that the proposed amendment will improve noise performance and will deliver similar or superior electricity market benefits.
- X3 We have decided to amend the major capex project output of the Project as requested by Transpower in its application. Amending the relevant output does not affect the Project's maximum approved allowance. The amendment means that the Commission will not apply a major capex output adjustment to this Project when it is completed.
- X4 We are satisfied that Transpower's application meets:
- X4.1 the requirements for amending major capex project outputs as set out in the Transpower Capital Expenditure Input Methodology Determination (Capex IM)<sup>1</sup>; and
  - X4.2 the evaluation criteria set out in the Capex IM.
- X5 We are comfortable that Transpower's proposed amendment provides a better performance solution than that specified when we approved the Project.
- X6 This paper sets out our decision and the reasons for our decision.

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<sup>1</sup> *Transpower Capital Expenditure Input Methodology Determination [2012] NZCC 2, as amended.*

## The application and our decision

### Purpose of this paper

- 1.1 On 30 August 2019, Transpower applied to us to amend one of the major capex project outputs (outputs) of the Bunnythorpe-Haywards lines A and B upgrade project (Project).<sup>2,3</sup>
- 1.2 This paper sets out our decision on Transpower's application and explains the reasons for our decision.

### Structure of this paper

- 1.3 This paper sets out:
  - 1.3.1 the key points in Transpower's application;
  - 1.3.2 a summary of the regulation that applies to Transpower;
  - 1.3.3 our analysis of the output that Transpower seeks to amend; and
  - 1.3.4 our decision.
- 1.4 Attachment A summarises the regulatory framework that applies to this application.
- 1.5 Attachment B details our evaluation of the application.

### Materials released alongside this paper

- 1.6 We have published on our website the following documents along with this paper:
  - 1.6.1 Transpower's application; and
  - 1.6.2 Transpower's response to our question of 23 September 2019 and subsequent request for clarification on 2 October 2019.

### Why Transpower needs our approval to amend the output

- 1.7 We require Transpower to deliver major capex projects according to approved outputs.<sup>4</sup> The outputs set out the assets Transpower is required to deliver and the level of performance expected from those assets.

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<sup>2</sup> Transpower New Zealand Limited, "Application for Amendment of Outputs for the approved Bunnythorpe Haywards A and B lines major capex project", 30 August 2019. In this paper, we refer to this document as Transpower's application.

<sup>3</sup> Information on the Bunnythorpe Haywards A and B lines major capex project is available at <https://comcom.govt.nz/regulated-industries/electricity-lines/electricity-transmission/transpower-capital-investment-proposals/transpower-major-capital-proposal>.

<sup>4</sup> Clause 3.3.5 of the Capex IM.

- 1.8 If there is a need to change an approved output, Transpower must seek our approval to amend the output in order to recover the full cost of its investment.
- 1.9 In this instance, Transpower seeks to amend the output of the Project relating to the type of conductor Transpower is required to use. Transpower seeks our approval to use an alternative conductor in segments of the lines within the section between Waikanae and Horowhenua.

### **The regulation that currently applies to Transpower**

- 1.10 The price and quality of the service that Transpower supplies to consumers is regulated under Part 4 of the Commerce Act 1986 (Act). This service is the delivery of electricity through the national grid. The national grid connects generators of electricity to large electricity consumers and to electricity distribution businesses, who then connect to smaller electricity consumers.
- 1.11 The Commission is responsible for regulating Transpower under the Act.
- 1.12 The rules relating to Transpower's major capital investments are set out in the Capex IM.
- 1.13 The Capex IM requires Transpower to seek approval for major capital projects for the national grid,<sup>5</sup> and to deliver these projects according to a set of approved components, including outputs, in order to recover the full cost of major capital investments from consumers.<sup>6</sup> The actual cost of the approved major capex is included in Transpower's regulatory asset base after the relevant project is commissioned.<sup>7</sup> Transpower is then able to recover its investment under Transpower's individual price-quality path determination.
- 1.14 If Transpower does not deliver one or more of the approved outputs, Transpower must seek our approval to amend the relevant output under the Capex IM. If we decide not to approve the requested amendment, or if Transpower does not apply for the amendment, then we make a retrospective adjustment to compensate for the value of the output that was not delivered.<sup>8</sup> This adjustment effectively reduces the value of the investment Transpower is able to recover.
- 1.15 The regulatory framework that applies to output amendments is set out in Attachment A.

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<sup>5</sup> Clause 3.3.2(1) of the Capex IM.

<sup>6</sup> These components are set out in clause 3.3.5(6) of the Capex IM.

<sup>7</sup> Clause 2.2.3(2)(f) of the Commerce Commission *Transpower Input Methodologies Determination 2010*, as amended.

<sup>8</sup> Clause 3.3.9 of the Capex IM.

### The output Transpower seeks to amend

- 1.16 To mitigate potentially increased noise levels, Transpower has applied to amend one of the outputs of the Project relating to the type of conductor it will install. In a selected section of the lines, Transpower proposes to install a Curlew conductor instead of the Zebra conductor stated in the outputs. The proposed scope of work is:
- 1.16.1 procuring, installing and commissioning Curlew conductor on selected segments of the Waikanae and Horowhenua sections of the Bunnythorpe-Haywards lines A and B remaining to be reconducted as at August 2019, and decommissioning the existing conductor;<sup>9</sup> and
  - 1.16.2 works on the foundations and towers for the spans on which Transpower proposes to install the Curlew conductor.
- 1.17 Transpower has stated that the main reason for the amendment is because after installing the Zebra conductor, Transpower received a complaint that the conductor produces noticeably higher levels of audible tonal noise in wet conditions.<sup>10</sup> The noise level is highest when the wire is shiny, and it reduces as the surface of the wire ages. Transpower's tests show that the level of audible noise reduces over time as the conductor ages.
- 1.18 Following this complaint, Transpower investigated mitigation options. Transpower's investigation found that a different type of conductor (Curlew) provides better noise attenuation than the Zebra conductor.<sup>11</sup> Transpower noted that tests showed that the audible noise level halved within 150 days.
- 1.19 Transpower advises that it proposes to install the Curlew conductor as a responsible operator under the Resource Management Act 1991 (RMA). Section 16 of the RMA does not set a noise limit for Transpower but does require Transpower to adopt the best practicable option to ensure its noise emissions do not exceed a reasonable level.<sup>12</sup>
- 1.20 Transpower did not foresee the issue of the high tonal noise because a combination of factors influences the noise level a conductor produces. Specifically:

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<sup>9</sup> Zebra, Curlew and Goat are names of conductors (wires) for power lines. Among other characteristics, the names represent the material used for conveying electricity and the mechanical strength and size of the conductor.

<sup>10</sup> Transpower application, p. 5.

<sup>11</sup> Transpower application, p. 6.

<sup>12</sup> Response to Commerce Commission questions of 23 September 2019 and subsequent request for clarification on 2 October 2019.

- 1.20.1 the age and shininess of the conductor. New, shiny conductors tend to produce higher noise levels;
  - 1.20.2 the size of the conductor. Larger conductors produce a lower noise level;
  - 1.20.3 the configuration of the line. A single circuit line with one conductor per phase produces a higher noise level; and
  - 1.20.4 weather conditions. Audible tonal noise occurs in wet conditions.
- 1.21 Transpower states that when developing the Project, Transpower concluded that Zebra would have lower noise levels than Goat, because Zebra is a larger conductor.<sup>13</sup> The conclusion was based on noise modelling during the investigation phase. Transpower advised that it follows international best practice methods for noise modelling which assesses the noise produced by moderately aged conductors. The noise level produced by new conductors is higher than that produced by aged ones.

**Our decision is to amend the output**

- 1.22 We are satisfied that Transpower's reasons for amending the Project output, and its application, meet the evaluation criteria for approving an amendment to an output of a major capital project.<sup>14</sup> We consider that Transpower has found an efficient solution that will provide a performance better than that expected from the originally approved output for the Project.
- 1.23 Transpower advised that amending the output will increase the cost of the Project by \$800,000. However, the Project's Forecast End Cost (FEC) of \$83.5 million (including the additional \$800,000) would still be considerably less than the approved major capex allowance of \$161 million.<sup>15</sup> According to Transpower, this lower FEC is due to scope reduction through design, delivery efficiencies due to design efforts, productivity efficiencies, and lower financing costs.
- 1.24 There is no need to amend any other components of the Project.
- 1.25 More details on our evaluation are set out in Attachment B to this paper.

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<sup>13</sup> Transpower application, pp. 4-5.

<sup>14</sup> These evaluation criteria are set out in clause 6.1.1 of the Capex IM.

<sup>15</sup> Transpower application, p. 4. Forecast end cost means the forecast cost of the project when it is completed.



## Attachment A: Regulatory framework

A1 This Attachment sets out the legal framework against which we evaluated Transpower's application to amend the relevant output of the Project.

### Components that can be amended and application timeframes

A2 The Capex IM recognises that major capex projects are planned well in advance and circumstances around a project may change over time. The approval of a project may need to be updated as better information becomes available. This may include more appropriate solutions, changes to technology, or circumstances that are not within Transpower's control. When the uncertainties, changes in circumstances, or changes in the environment affect a project, it may be appropriate to amend components of the project's approval.

A3 Transpower can apply for amendments to the following components of an approved major capex project:<sup>16</sup>

A3.1 maximum recoverable costs for non-transmission solutions;

A3.2 recovery scheme for non-transmission solutions;

A3.3 major capex outputs; and

A3.4 major capex project approval expiry date.

A4 Transpower is limited in when it can apply for amendments. The application date for output amendments is the date on which Transpower provides its annual compliance statement to the Commission for the disclosure year in which the commissioning date or completion date of the project occurs.<sup>17</sup>

### How we evaluate an application to amend a major capex project output

A5 We cannot decide to approve or reject an amendment to an output until we have evaluated the application for the amendment, and any further information we request from Transpower, in accordance with Part 6 of the Capex IM.<sup>18</sup>

A6 The evaluation of an amendment to a major capex project consists of:

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<sup>16</sup> Clause 3.3.6(1)(a) to (d) of the Capex IM. The Application is under clause 3.3.6(1)(c).

<sup>17</sup> Clause 7.4.2(1) to (2) of the Capex IM.

<sup>18</sup> Clause 3.3.6(5) of the Capex IM.

- A6.1 an evaluation of the application in accordance with the general criteria;<sup>19</sup> and
- A6.2 an evaluation of matters specific to the application, in accordance with the specific evaluation criteria.<sup>20</sup>

### **General criteria for evaluation**

- A7 The general criteria for evaluation are:
  - A7.1 whether what is proposed is consistent with the Capex IM and, where relevant, the Transpower Input Methodologies Determination 2010 as amended (Transpower IM determination);
  - A7.2 the extent to which what is proposed will promote the purpose of Part 4 of the Act; and
  - A7.3 whether, the data, analysis, and assumptions underpinning what is proposed are fit for the purpose of the Commission exercising its powers under Part 4 of the Act, including consideration as to the accuracy and reliability of data and the reasonableness of assumptions and other matters of judgement.
- A8 When assessing whether a proposal is consistent with the input methodologies, we assess compliance with the application timeframes,<sup>21</sup> the information requirements,<sup>22</sup> and certification requirements.<sup>23</sup>

### *The extent to which the proposal promotes the purpose of Part 4 is the overarching test*

- A9 As part of the general criteria the Commission must consider “the extent to which what is proposed will promote the purpose of Part 4 of the Act”.<sup>24</sup> The Capex IM was enacted under the umbrella of requirements set by Part 4 of the Act, and as such is in accordance with Part 4. The provisions of the Capex IM must ultimately be construed and applied in a way that promotes the purpose of Part 4. Clause 6.1.1(2)(b) is a restatement of this overriding test.
- A10 The purpose of Part 4 of the Act is to promote the long-term benefit of consumers in markets where there is little or no competition and little or no likelihood of a

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<sup>19</sup> Clause 6.1.1(2)(a) to (c) of the Capex IM.

<sup>20</sup> Clause 6.1.1(5)(a) to (d) of the Capex IM.

<sup>21</sup> Clause 7.4.2 of the Capex IM.

<sup>22</sup> Schedule H7 to H12 of the Capex IM.

<sup>23</sup> Clause 9.3.1 of the Capex IM.

<sup>24</sup> Clause 6.1.1(2)(b) of the Capex IM.

substantial increase in competition.<sup>25</sup> ‘Competition’ means ‘workable or effective competition’.<sup>26</sup>

A11 To promote workable or effective competition that is in the long-term interests of consumers, we must promote outcomes in regulated markets that are consistent with outcomes in competitive markets.

A12 The four limbs of the purpose of Part 4 set out specific outcomes that we should promote, so that regulated suppliers, including Transpower:

A12.1 have incentives to innovate and invest;<sup>27</sup>

A12.2 have incentives to improve efficiency and provide services at a quality that reflects consumer demands;<sup>28</sup>

A12.3 share the benefits of efficiency gains with consumers, including through lower prices;<sup>29</sup> and

A12.4 are limited in their ability to extract excessive profits.<sup>30</sup>

### **Specific criteria for evaluation**

A13 The specific criteria for evaluation are:

A13.1 the extent to which each key factor relevant to the proposed amendment-

A13.1.1 was reasonably foreseeable by Transpower before the major capex project was approved by Commission; and

A13.1.2 was or is within Transpower’s control;

A13.2 in relation to each key factor outside Transpower’s control-

A13.2.1 the reasonableness of any applicable mitigation strategy devised by Transpower; and

A13.2.2 the reasonableness and extent of mitigation actions taken by Transpower;

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<sup>25</sup> Section 52A(1) of the Act.

<sup>26</sup> Section 3(1) of the Act.

<sup>27</sup> Section 52A(1)(a) of the Act.

<sup>28</sup> Section 52A(1)(b) of the Act.

<sup>29</sup> Section 52A(1)(c) of the Act.

<sup>30</sup> Section 52A(1)(d) of the Act.

A13.3 the extent to which the major capex project's 'expected net electricity market benefit' would be materially lower as a result of the amendment than when it was approved;<sup>31</sup> and

A13.4 in respect of a major capex project that has already commenced, the extent to which Transpower has incurred capital expenditure by the date of the application.<sup>32</sup>

A14 We can consider in our evaluation any additional information that we consider relevant.<sup>33</sup>

### **The Commission's discretion when making decisions on project output amendments**

A15 The Commission's discretion when making decisions on project output amendments is limited under clause 3.3.6(7)(a) of the Capex IM.

A16 Upon carrying out our evaluation of Transpower's application, we can decide to either:

A16.1 approve the amendment as proposed by Transpower in its application; or

A16.2 reject the amendment as proposed by Transpower in its application.

A17 Where the proposed change in outputs impacts on the relevant project timeframes, we may also decide to adjust the:

A17.1 commissioning date assumption; and

A17.2 completion date assumption.<sup>34</sup>

### **What the Capex IM does not allow us to do**

A18 The Capex IM sets the framework for our treatment of Transpower's capital expenditure and limits our discretion on Transpower's application to either approving or rejecting the proposed amendment to the outputs.

A19 The Capex IM gives us no scope to reopen the original approval of a major capex project.

A20 The Capex IM also does not allow us to make a decision that goes against the purpose of Part 4 of the Act or is inconsistent with the other relevant input methodologies.

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<sup>31</sup> Clause D2 of the Capex IM.

<sup>32</sup> Clause 6.1.1(5)(a) to (d) of the Capex IM.

<sup>33</sup> Clause 6.1.1(1)(a)(ii) of the Capex IM.

<sup>34</sup> Clause 3.3.6(9) of the Capex IM.

## Attachment B: Summary of our evaluation

B1 In this Attachment, we present a summary of our evaluation of Transpower's application against the general and specific criteria and process requirements set out in Attachment A.

### General criteria

B2 The three general evaluation criteria are:

- B2.1 whether the proposal is consistent with the input methodologies that apply to Transpower;
- B2.2 the extent to which the proposed amendment promotes the purpose of Part 4 of the Act; and
- B2.3 whether the data, analysis and assumptions underpinning the application are fit for purpose.<sup>35</sup>

### Whether the proposal is consistent with the input methodologies that apply

B3 We are satisfied that the proposed amendment is consistent with the Capex IM and meets the necessary process requirements.

B4 The three process requirements set out in the Capex IM are the date by which Transpower needs to apply, the information that needs to be included in the application, and the certification requirements.<sup>36</sup>

B4.1 Transpower met the requirements for application dates. Transpower submitted this application on 30 August 2019. Under the Capex IM Transpower is required to apply for any amendment to the output with its annual compliance statement for 2020, since the Project is scheduled to be completed by the end of summer 2019/2020.<sup>37</sup>

B4.2 Transpower complied with the information requirements of the Capex IM.<sup>38</sup> Transpower provided all the information set out in Division 2 of Schedule H of the Capex IM. Specifically, Transpower provided:

B4.2.1 Project identification and specifications;

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<sup>35</sup> Clause 6.1.1(2) of the Capex IM.

<sup>36</sup> Clauses 7.4.2(1), 7.4.2(3) and 7.4.2(4) respectively of the Capex IM.

<sup>37</sup> Clauses 7.4.2(1) of the Capex IM.

<sup>38</sup> Clause 7.4.2(3)(b) of the Capex IM and Division 2 of Schedule H of the Capex IM.

- B4.2.2 Amendment sought;
- B4.2.3 Progress of project;
- B4.2.4 Current and forecast expenditure; and
- B4.2.5 Reasons for making the application.<sup>39</sup>

B4.3 Transpower also satisfied the certification requirements of the Capex IM that requires Chief Executive Officer certification.<sup>40</sup> Transpower's application included a certificate signed by the (Acting) Chief Executive Officer of Transpower.<sup>41</sup>

B5 The Transpower IM determination does not set out any requirements that apply to the application.

#### **The extent that the proposed amendment promotes the purpose of Part 4 of the Act**

- B6 We are satisfied that the proposed output amendment promotes limbs (b) and (c) of the purpose of Part 4 of the Act.<sup>42</sup>
- B7 In seeking the amendment to the relevant output, Transpower demonstrates that it is providing services at a quality that reflects consumer demands. Quality includes the noise level emitted from a conductor and the visual impact of a conductor.
- B8 Transpower also selected a cost-efficient solution, consistent with "sharing the benefits of efficiency gains with consumers, including through lower prices" under the Part 4 purpose. Other options that Transpower considered included using two conductors instead of one, and undergrounding sections of the line. Both these options are more expensive than the solution Transpower selected.
- B9 We are satisfied that the proposed solution of using Curlew conductors would deliver electrical, mechanical and environmental performance better than that expected from the originally approved output of using Zebra conductors.

#### **Whether the data, analysis and assumptions underpinning the application are fit for purpose**

B10 Transpower's application included the information specified in the Capex IM.

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<sup>39</sup> Transpower application, pp. 9-14.

<sup>40</sup> Clauses 7.4.2(4) and 9.2.1 of the Capex IM.

<sup>41</sup> Transpower application, Attachment.

<sup>42</sup> The purpose of Part 4 of the Act is set out in Attachment A.

- B11 When assessing the application, we asked Transpower for additional information on its investigations which Transpower provided.<sup>43</sup> We also had a technical meeting with Transpower on 24 September 2019 to discuss some of the more complex issues.
- B12 We are satisfied that the information provided by Transpower enables us to assess the application and make a decision on whether to approve it under the Capex IM.<sup>44</sup>

### **Specific criteria for evaluation**

- B13 The specific criteria for evaluation are:
- B13.1 the extent to which each key factor relevant to the proposed amendment:
    - B13.1.1 was reasonably foreseeable by Transpower before the major capex project was approved by Commission; and
    - B13.1.2 was or is within Transpower's control;
  - B13.2 in relation to each key factor outside Transpower's control:
    - B13.2.1 the reasonableness of any applicable mitigation strategy devised by Transpower; and
    - B13.2.2 the reasonableness and extent of mitigation actions taken by Transpower;
  - B13.3 the extent to which the major capex project's 'expected net electricity market benefit' would be materially lower as a result of the amendment than when it was approved; and
  - B13.4 in respect of a major capex project that has already commenced, the extent to which Transpower has incurred capital expenditure by the date of the application.<sup>45</sup>
- B14 In the following paragraphs we present the results of our evaluation against the above specific criteria.

### **The key factor relevant to the proposed amendment**

- B15 We consider that the key factor behind the proposed amendment is the higher than expected audible noise level from the existing conductor. In its application,

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<sup>43</sup> Transpower "Application for amendment of outputs for the approved Bunnythorpe - Haywards A and B lines major capex project. Response to Commerce Commission questions of 23 September 2019 and subsequent request for clarification on 2 October 2019". (BPE-HAY amendment response to questions).

<sup>44</sup> Clause 3.3.6(1) of the Capex IM.

<sup>45</sup> Clause 6.1.1(5) of the Capex IM.

Transpower describes the key factor as a 'desire to mitigate conductor noise on the Waikanae and Horowhenua sections of the BPE-HAY A and B lines'.<sup>46</sup>

*The key factor was not reasonably foreseeable*

B16 We are satisfied that the key factor was not reasonably foreseeable at the time Transpower selected these conductors. Transpower states that the noise issue was not foreseen before the major capex project was approved by the Commission for the following reasons:

B16.1 Modelling showed that the Zebra conductor's noise levels would be lower. Transpower undertakes noise modelling during the investigation phase of a project. For transmission lines, Transpower follows international best practice methods which assess the noise produced by moderately aged conductors. For the Project, Transpower's assessment indicated that the proposed Zebra conductor would have lower noise levels than the existing Goat conductor.

B16.2 The higher noise level is also, in part, due to the configuration of the Bunnythorpe-Haywards lines A and B. The lines have only one conductor per phase (simplex conductor) in a single circuit configuration. Transpower states that most reconductoring undertaken by Transpower in recent years has not had noise issues because it has either not involved simplex conductor in a single circuit configuration in urban areas, or it has involved voltages lower than 220kV.<sup>47</sup>

*The extent that the key factor was within Transpower's control*

B17 We consider that the key factor was not fully within Transpower's control. The remedial action is in Transpower's control and is the reason for this application.

*The reasonableness of the mitigation strategy*

B18 We consider that Transpower's mitigation strategy is reasonable and appropriate. Transpower's mitigation strategy is to reduce the level of noise produced by the lines and to comply with the requirements of the RMA.<sup>48</sup>

B19 Transpower has advised that it must comply with section 16 of the RMA, which requires Transpower to adopt the best practicable option to ensure its noise emissions do not exceed a reasonable level. Transpower states:

Transpower is not required to meet the noise limit in the Kapiti Coast District Plan (District Plan). This is because the District Plan does not apply to reconductoring of transmission lines that were operating at 14 January 2010 (as the BPE-HAY A & B lines were). Transpower's project is authorised under the Resource Management (National Environmental Standards

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<sup>46</sup> Transpower application, p. 12.

<sup>47</sup> Transpower "BPE-HAY amendment response to questions"; p. 1.

<sup>48</sup> Transpower application, p. 5.



for Electricity Transmission Activities) Regulations 2009 (NESETA). The NESETA does not contain a noise limit that has to be met. However, Transpower has to comply with the general requirements of the Resource Management Act 1991 (contained in section 16). Section 16 also does not contain a noise limit that must be met but contains a duty to avoid unreasonable noise by implementing the best practicable option. Transpower considers that using Curlew ACSR conductor in place of Zebra in residential areas is best option, as Curlew mitigates the identified noise issue with Zebra (in wet conditions).<sup>49</sup>

*The reasonableness and extent of mitigation actions*

- B20 Transpower's mitigation action involved looking at various options that included using two conductors per phase, undergrounding, and identifying alternative conductors.
- B21 Transpower assessed the Curlew conductor as an effective technical and economic option. Based on the information provided by Transpower to us, we concur with Transpower's findings. In assessing the mitigation strategy, we considered the impact of the higher noise level, the performance of the Curlew in the environment it will be installed, and the comparable visual impact and electrical characteristics of Curlew conductors.
- B22 We are satisfied with Transpower's assessment that installing the Curlew conductor would be a reasonable mitigation. In particular, the Curlew conductor:
- B22.1 produces a slightly higher level of tonal noise when new, but the Curlew conductor's noise level reduces faster over time than that of the Zebra conductor. Transpower's tests show that the Curlew conductor's level of audible noise halves within 150 days;
  - B22.2 has a similar or better expected corrosion performance than the Zebra conductor;
  - B22.3 has a better visual impact. The Curlew conductor is the same physical size as the Zebra conductor but is surface-treated and so is less shiny;<sup>50</sup> and
  - B22.4 has better electrical characteristics than the Zebra conductor.

**The effect of the amendment on the expected net electricity market benefit**

- B23 The expected incremental cost of using the Curlew conductor is \$800,000.<sup>51</sup> Since the FEC of the Project of \$83.5 million is considerably less than the estimated (P50)

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<sup>49</sup> Transpower "BPE-HAY amendment response to questions"; p. 3.

<sup>50</sup> Transpower "BPE-HAY amendment response to questions"; p. 3.

<sup>51</sup> The cost of the Zebra conductor that Curlew replaces will not be included in the cost of the project.

cost of \$151 million in 2020 prices, the output amendment will not have a material impact on the expected net electricity market benefit.<sup>52</sup>

**The extent that Transpower has incurred capital expenditure by the date of application**

B24 Transpower's application notes that it has spent \$73 million on the Project to date.<sup>53</sup> Transpower states that 97% of the Project is complete, and it expects to complete the reconductoring in 2019.<sup>54</sup>

**Conclusion**

B25 We are satisfied that the proposed amendment to the Project's outputs meets the requirements of the Capex IM and will deliver the beneficial outcomes that Transpower specifies in its application.

B26 We approve the proposed amendment to the Project's outputs.

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<sup>52</sup> Transpower application, p. 10.

<sup>53</sup> Transpower application, p. 11.

<sup>54</sup> Transpower application, p. 11.