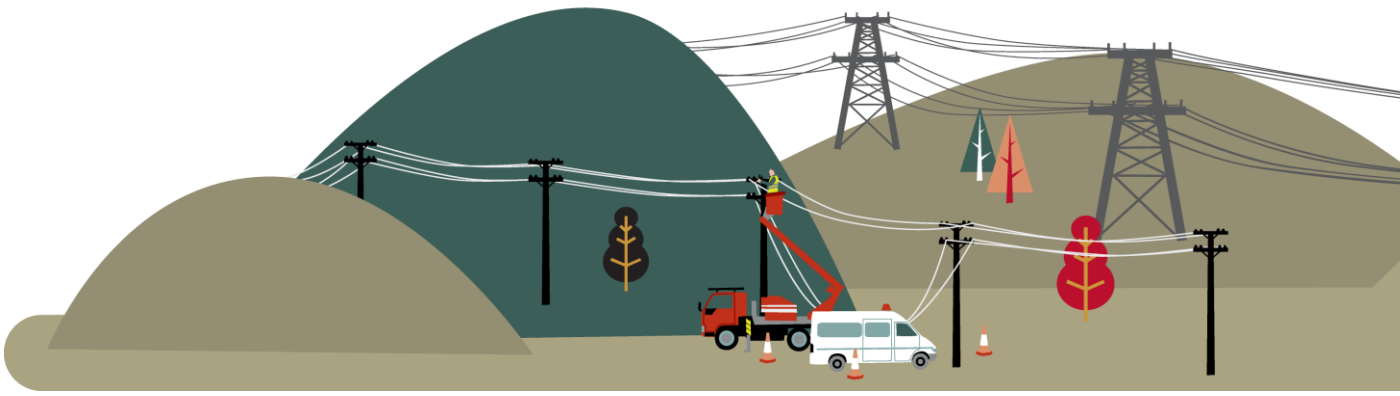
ISBN no. 978-1-869455-74-3
Project no. 14.16/15108

Public version

Draft decision on Transpower's Central Park Wilton B Line listed project

The Commission: S Begg
G Crombie
Dr S Gale
E Welson

Date of draft decision: 13 April 2017



Contents

[This page has been left blank intentionally]

Purpose of this paper

1. On 28 February 2017, Transpower New Zealand Limited (Transpower) submitted an application seeking approval for funding to reconductor the Central Park Wilton B line (application). [1,2]

2. This paper explains our draft decision to approve an additional $9.8m base capex allowance for this project.

3. We invite you to provide your views on our draft decision. Your views will help inform our final decision on this application. Table 1.3 below sets out the timeframes for submissions and cross submissions and our expected decision date. Details of how you can provide your views are outlined below in paragraphs 22 to 27.

Our draft decision

4. Transpower's cost estimate for the Central Park/Wilton B listed project is $11.3m. However, given uncertainties it considers it could cost up to $12.4m and have requested that we approve this amount. Transpower plans to complete this project by the summer of 2019.

5. Our draft decision is to increase the base capex allowance by $9.8m for Transpower for the disclosure years ending 2018 and 2019 as shown in Table 1.1 below.[3] We set out our reasons for approving this amount in this paper.

6. This draft decision will increase the base capex allowance for the regulatory period 1 April 2015 to March 2020 (RCP2) under the provisions for allowing additional funding for listed projects set out in the Transpower Individual Price Quality Path (IPP)[4] and the Transpower Capital Expenditure Input Methodology Determination (Capex IM).[5]

---

1 A summary of the proposed project is provided in Attachment A.

2 Transpower, "*Central Park – Wilton B reconductoring: Listed project application*", February 2017. Transpower's application and supporting documents are available on our website: http://www.comcom.govt.nz/regulated-industries/electricity/electricity-transmission/transpower-individual-price-quality-regulation/transpowers-price-quality-path-from-2015-to-2020/.

3 Under clause 1.1.5 of the Capex IM "disclosure year" means a 12 month period ending on 30 June.

4 Transpower Individual Price Quality Path determination 2015 [2014] NZCC 35, clause 12, Schedule I, available at http://www.comcom.govt.nz/regulated-industries/electricity/electricity-transmission/transpower-individual-price-quality-regulation/transpowers-price-quality-path-from-2015-to-2020/.

5 Transpower Capital Expenditure Input Methodology Determination [2012] NZCC 2, clause 3.2.4, available at http://www.comcom.govt.nz/regulated-industries/input-methodologies-2/transpower-input-methodologies/.

Table 1.1 | Draft decision on base capex allowance

Base capex allowances*	Years ending:	**30 June 2017**	**30 June 2018**	**30 June 2019**
Current RCP2 allowance		249.5	242.0	231.6
Additional allowance		-	1.0	8.8
Amended allowance		250.5	243.0	240.4

*$m in nominal prices

7. Table 1.1 shows forecast capex being commissioned in the 30 June 2018 disclosure year of $1 million, and forecast capex being commissioned in the 30 June 2019 disclosure year of $8.8 million. The implementation impacts of this draft decision are discussed below at paragraph 22.

The regulation that applies to Transpower

8. We regulate the services that Transpower supplies to consumers under Part 4 of the Commerce Act 1986 (Act).[6] We determined the price and quality requirements that apply to these services in the Transpower Individual Price Quality Path for RCP2.

9. When setting the IPP we approved amounts of base capex for all of the disclosure years of RCP2, but excluded certain 'listed projects' from the base capex allowance.

10. We included five transmission line reconductoring base capex projects as 'listed projects' in the IPP.[7] These projects were classified as listed projects because at the time of the RCP2 reset:

    10.1 their costs were expected to exceed $20 million;

    10.2 the projects involved asset replacement and/or asset refurbishment; and

    10.3 the commissioning dates were anticipated to be within the regulatory period but could not be forecast with specificity.[8]

11. The rules relating to listed projects are set out in the Capex IM. Under the Capex IM Transpower may seek approval for additional base capex for listed projects in RCP2.[9]

---

6 The service that Transpower provides is the transport of electricity through the transmission network also known as the national grid. The national grid connects large generators of electricity to large electricity consumers and electricity distribution businesses, who then connect to smaller electricity consumers.

7 These projects are listed in Schedule I of the IPP.

8 Capex IM, clause 2.2.3.

9 Capex IM, clause 3.2.4(1) and "Setting Transpower's individual price-quality path for 2015-2020 Final decision and reasons, 29 August 2014, par 2.21.

12. The Capex IM requires Transpower to seek approval for additional base capex for listed projects before the end of June 2018.[10]

13. When seeking approval Transpower must, among other things, outline its proposed investment, the justification for the investment, the options it has considered, and the costs and benefits of the investment options.[11]

14. We may then, at our discretion, approve an additional amount of base capex for the listed project over the remaining years of RCP2, following an evaluation in accordance with the relevant evaluation requirements in the Capex IM.[12]

15. When we listed this project at the RCP2 IPP reset, Transpower had estimated the project to cost $26m. We are satisfied that the project does not cease to be a listed project even though the revised cost estimate is now less than the $20m threshold for listed projects. Our reasons for this view are set out in paragraphs A8 to A10 below.

Our Evaluation framework

16. The Capex IM sets out the evaluation framework for assessing listed projects. This framework is outlined in Attachment B and requires us to focus on three key areas of assessment. We must:

    16.1 assess whether Transpower has met its consultation requirements;[13]

    16.2 evaluate the application using the criteria in clause 6.1.1 of the Capex IM applicable to a base capex project that qualifies as an identified programme under the Capex IM;[14] and

    16.3 apply the same CPI and FX values as used for the RCP2 proposal.[15]

17. We have analysed Transpower's proposal against this framework to reach our draft decision. Attachment C provides a summary of our analysis using this framework.

---

10 Capex IM, clause 3.2.4(1).

11 The information we require is set out in clause 3.2.4(2) and Schedule G of the Capex IM.

12 At least 22 months before the end of RCP2 – Capex IM, clause 3.2.4(4).

13 Capex IM, clause 3.2.4(4) (a).

14 Capex IM, clause 3.2.4(4)(b). These include, inter alia, whether Transpower has met the Input Methodology requirements, the extent what is proposed will promote the Part 4 purpose of the Act, and the relevant criteria in Schedule A of the Capex IM.

15 Capex IM, clause 3.2.4(5).

Summary of reasons for our decision

18. Transpower proposed an additional allowance of $12.4 million for the project, including investigation costs and overheads.[16] This amount estimated the costs of the project at the 90th percentile (P90) to allow for uncertainties.

19. In reaching our draft decision we have revised this amount to net-off the cost of the project already included in the base capex allowance set in 2014, adjusted the allowance for uncertainties (allowing costs at the 50th percentile (P50)), and revised inflation and financing costs. How we reached our draft allowance is summarised in Table 1.2 below.

Table 1.2 |Summary of determination of allowance

	Transpower est at P50 ($m)	Our draft view ($m)	Reason for change
Real costs	10.46	9.22	Our estimate excludes the RCP2 allowance for investigation costs ($0.55m) and overheads ($0.69m).
Inflation	0.46	0.36	Transpower assumes 2016 costs, but it is 2017 costs. Transpower uses a geometric mean on a quarterly basis. This results in an overestimation.
Financing costs	0.37	0.25	The difference is due to the changes in real costs
Nominal costs	11.29	9.83	The total difference of $ 1.5 million is the aggregate effect of these changes.

20. The reasons for the difference between our allowance and Transpower's application are:

    20.1 Transpower asked us to allow for P90 levels of cost.[17] We consider that P50 levels of costs are appropriate for base capex, which is consistent with our approach as part of the RCP2 IPP reset.

    20.2 The costs that Transpower incurred in 2016 and 2017 were already provided for in the RCP2 allowance for investigations.[18] We have removed $550,000 - the value of the actual investigations and studies - from the estimated costs of the Central Park Wilton B project.

---

16 We note that this project was estimated to cost $26m at the time that we set the IPP for RCP2.

17 P90 is the cost estimate where there is a 90% chance that the project cost will not exceed the estimate.

18 Commission "Setting Transpower's individual price-quality path for 2015-2020 – final decision and reasons", September 2014, par 5.164

20.3 Likewise, the costs associated with Transpower's overheads were also included in the RCP2 allowance and so we have removed a further $692,506 from the estimated costs of this project.

20.4 Finally we consider that Transpower overestimated inflation. We have adjusted CPI to correct for this, and discuss this further in C6 to C8.

21. In approving the additional allowance for this project, we are satisfied that:

21.1 Transpower has met the consultation obligations and taken these into account when developing options;

21.2 Transpower has met the Input Methodology requirements;

21.3 Refurbishing this line is consistent with the purpose of part 4 of the Act. Keeping the line in good condition will provide the quality of service consumers expect, and

21.4 Transpower considered a number of alternatives and selected the one with an appropriate balance between whole of life costs and expected service performance. The selected investment is also the option with the highest net electricity market benefits;[19] and

21.5 Our draft decision uses the same CPI and FX values as used for the RCP2 proposal.

We want your views

22. Before making our decision, we are required to consult with interested persons and consider their views on our draft decision.[20] We seek your views on:

22.1 our draft decision, in particular our evaluation of Transpower's application and the level of expenditure that we propose to approve; and

22.2 whether there is any further information that we should consider before making our decision.

23. We will take account of all submissions and cross submissions in reaching our decision.

---

19 Transpower "Central Park – Wilton B Reconductoring – Listed project application, Table 4-1, page 14.

20 Capex IM, clause 8.1.1(3).

24. Table 1.3 sets out the timeframes for you to provide your submissions, and when we expect to make a decision.

Table 1.3 | Dates for responses and process from here

Date	Event
4 May 2017	Submissions due on this paper
11 May 2017	Cross submissions due
June 2017	Expected decision

25. Submissions should be sent by email to regulation.branch@comcom.govt.nz , for the attention of Kade Sheely. Please title your submission '[your organisations name] submission on reconductoring the Central Park Wilton B line.'

26. We will publish all submissions on our website. Please provide your submissions in a form that readily enables us to do this, and allows us to copy and paste submissions for our analysis.

27. If your submission does not appear on our website, please contact us as soon as possible.

Attachment A: Overview of Central Park Wilton B project

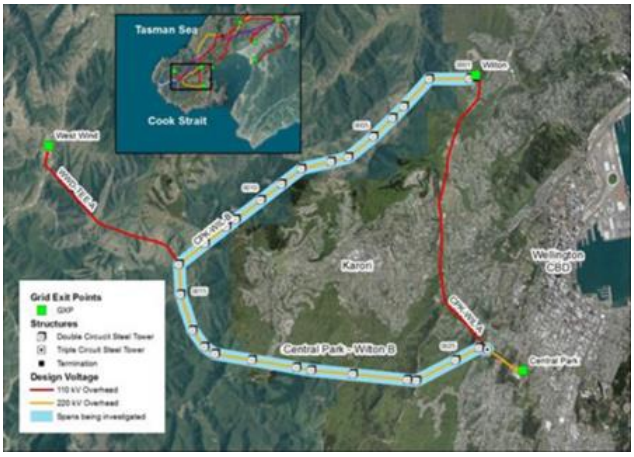
A1 The thick pale blue line in the figure shows the Central Park Wilton B line.

A2 The Central Park/Wilton B line is one of the two transmission lines supplying electricity to the Wellington CBD and the Southern suburbs via Wellington Electricity's distribution network. The line also connects Meridian's West Wind generation to the transmission grid.

A3 The line capacity is 235 MVA.

A4 The line is a 12.5 km 110 kV double circuit line and consists of 31 steel circuit towers. The line was commissioned in 1978.

A5 The scope of the project is to replace the conductors attached to 26 towers on this line which comprises 11.7 km of the line.



A6 Transpower has determined that the conductors on the first five towers out from Central Park have at least 10 years of remaining life so do not need to be replaced as part of this project.[21]

A7 Following detailed investigation and scoping, the estimated cost of this project has reduced from approximately $26m to $10m.

A8 We are satisfied that the project does not cease to be a listed project because the revised cost estimate is less than the $20m threshold for listed projects.

A9 The Capex IM requires listed projects to be identified before the IPP is set for a RCP.[22] The relevant projects are listed in the Schedule 1 of the IPP and the circumstances in which they cease to be a listed project are set out in cl 12.2 of the IPP. A project ceases to be a listed project when that project no longer meets the definition of a base capex project or programme during the RCP. The only practical circumstance where that is likely to arise is when the project or programme becomes a major capex project or the project need is deferred until after the current RCP.

A10 We therefore consider that Transpower can apply for additional funding for this project as we are satisfied it remains a listed project.

---

21 Transpower expect the savings from deferring the project are expected to significantly exceed the extra project establishment and management costs that will be incurred.

22 Clause 2.2.3.

Attachment B: Evaluation framework

B1 In this Attachment, we outline the framework for evaluating listed projects as set out in the Capex IM. The Capex IM has set out these criteria in a number of sections and in this Attachment we bring them together and show the interrelation between the various clauses.

B2 Under the evaluation requirements for a listed projects, set out in the Capex IM, we must:

B2.1 confirm that Transpower has met its consultation requirements;

B2.2 confirm that Transpower has applied the specified escalation and foreign exchange rates; and

B2.3 evaluate the application using the criteria in clause 6.1.1 applicable to a base capex project that qualifies as an identified programme under the Capex IM.[23]

Consultation requirements

B3 The Capex IM sets out consultation requirements for Transpower and the Commission. We are required to seek the views of interested parties on our draft decision.[24]

B4 Our evaluation included assessing that Transpower has met the consultation requirements set out in the Capex IM.

Consultation requirements for Transpower

B5 The Capex IM requires Transpower to consult with interested parties on listed projects. Consultation must be commensurate with the nature, complexity, impact and significance of the project. These rules are set out in clauses 3.2.1 and 8.1.2 of the Capex IM respectively.

> 3.2.1 Base capex projects or programmes with forecast cost of greater than $20 million
>
> In respect of a base capex project or base capex programme involving forecast capital expenditure of greater than $20 million Transpower must, prior to undertaking the project or programme, undertake-
>
> (a) a cost-benefit analysis consistent with determining expected net electricity market benefit; and
>
> (b) consultation with interested persons in accordance with clause 8.1.2.

[23] Capex IM, clause 3.2.4(4).

[24] Capex IM, clause 8.1.1(3).

8.1.2 Base capex projects or programmes forecast to cost more than $20 million

For the purpose of clause 3.2.1(b), consultation by Transpower with interested persons must be-

(a) of a scope commensurate with the proposed project's or programme's nature, complexity, impact and significance; and

(b) undertaken by Transpower acting in accordance with the policies and processes specified in its base capex proposal.

Specified escalation and foreign exchange rates

B6 The Capex IM specifies that to determine the base capex allowance, we will apply the same forecast CPI rate and forecast FX rates that were used to set the RCP2 base capex allowance.[25]

B7 When reviewing Transpower's application we confirmed that Transpower has used the forecast rates specified in the Capex IM.

The relevant criteria set out in clause 6.1.1

B8 Clause 3.2.4(4)(b) of the Capex IM requires that we assess a listed project proposal against the criteria in 6.1.1 that would apply if the application was part of the base capex proposal and the listed project was an identified programme. Clause 6.1.1(2) and (3) require that we consider:

B8.1 whether the proposal is consistent with the Capex IM and Transpower input methodology;

B8.2 the extent that the proposal will promote the purpose of part 4 of the Act;

B8.3 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;[26] and

B8.4 that we evaluate a **base capex proposal** in accordance with Schedule A.[27]

Evaluation against Schedule A

B9 Schedule A1 of the Capex IM sets out the requirements for general evaluation of base capex proposals while Schedule A2 sets out the requirements for evaluating identified programmes.

---

25 Capex IM, clause 3.2.4(5).

26 Capex IM, clause 6.1.1(2).

27 Capex IM, clause 6.1.1(3).

B10 We have focussed our evaluation of the proposal against the criteria in Schedule A2 rather than Schedule A1.

B11 Not all of the criteria in Schedule A1 are directly relevant to Transpower's proposal as Schedule A1 is designed to be used when considering a full base capex proposal – not an individual project. For example, Schedule A1(h) requires us to have regard to the overall deliverability of the base capex during the regulatory period. This is unlikely to be relevant to a specific project, except in circumstance where the project is sufficiently large to impact on the overall deliverability of the base capex package. Most of these criteria have also been thoroughly traversed as part of our reset process and they also overlap with the criteria in Schedule A2 in certain instances.

B12 The sub-clauses setting out the specific areas of evaluation in Schedule A2 are listed in paragraph C19 of this draft decision.

Attachment C: Summary of our evaluation

Purpose of this Attachment

C1 In this attachment we explain our evaluation of the application using the framework outlined in Attachment B.

Transpower has met the consultation requirements

C2 Transpower is required to consult with interested parties on listed projects, to the extent commensurate with the nature, complexity, impact and significance of the project.[28]

C3 In June 2015, Transpower consulted on its long list of options and invited interested parties to propose other options not in that list.[29]

C4 In December 2016, Transpower consulted a second time on its investment proposal. Meridian and Wellington Electricity (WE) submitted and both supported the proposal. WE also reiterated that Transpower should minimise the risk to Central Park security during construction and to engage with them when planning to mitigate the risks of interruptions.[30] Meridian submitted that Transpower should coordinate all maintenance work on the line during the reconductoring.[31]

C5 We are satisfied that Transpower has met its obligations to consult with interested parties through these two rounds of consultations.

Escalation and foreign exchange rates

C6 Transpower used the following cost escalators in this listed project application:

C6.1 changes in the general rate of inflation as measured by CPI; and

C6.2 changes in foreign exchange rates, such as USD to NZD for materials used in the current listed project.

C7 Under the Capex IM, we must apply the forecasts for escalation factors used to determine the RCP base capex allowance.[32] Therefore, in assessing the allowance for this project, we must use the forecast CPI and forecast FX determined when we set

---

28 Capex IM, clauses 3.2.1 and 8.1.2.

29 Transpower "Central Park-Wilton B Transmission Capacity investigation – long list consultation and non-transmission solution request for information (April 2015)". Web page address on 7 March 2017 https://www.transpower.co.nz/central-park-wilton-investigation-consultation#downloads.

30 Transpower "Attachment E Central Park-Wilton B Reconductoring – WE Submission", January 2017.

31 Transpower "Attachment F Central Park-Wilton B Reconductoring – Meridian Submission", January 2017.

32 Capex IM, clauses 3.2.4(4) and 3.2.4(5).

the IPP in 2014. We are also satisfied that Transpower has met this requirement.[33] The applicable forecast CPI and forecast FX rates are shown in Table C1 below:

Table C1 | CPI and FX used in the CPK WIL application

	1 July 2015 to 30 June 2016	1 July 2016 to 30 June 2017	1 July 2017 to 30 June 2018	1 July 2018 to 30 June 2019	1 July 2019 to 30 June 2020
CPI	1.80%	2.09%	2.06%	2.03%	2.00%
USD to NZD exchange rate	0.79	0.77	0.76	0.74	0.72

C8 We have, however, made an amendment to Transpower's CPI estimate. The reasons for this change are:

C8.1 Transpower assumed 2016 costs, but the costs provided are in 2017 terms; and

C8.2 Transpower determined CPI on a quarterly basis (using a geometric mean). This approach resulted in an slight overestimation of inflation. We have made an adjustment to estimate inflation on an annual basis as contemplated in the IMs.[34]

Results of evaluation against the criteria set out in clause 6.1.1

C9 In the following paragraphs, we provide a summary of our evaluation of the application against the criteria set out in clause 6.1.1 of the Capex IM. As mentioned in paragraph B8 above, these are:

C9.1 whether the proposal is consistent with the Capex IM and Transpower input methodology;

C9.2 the extent that the proposal will promote the purpose of part 4 of the Act;

C9.3 whether, the data, analysis, and assumptions underpinning what is proposed are fit for purpose; and

C9.4 an evaluation in accordance with Schedule A of the Capex IM, as if the listed project was part of a base capex proposal.

---

33 Transpower's application, Attachment G "CPK_WIL annual cost summary", see assumptions.

34 We would expect that by smoothing that annual rate on a quarterly basis would produce the same outcome. However, we found a small difference when we applied CPI on an annual basis. We will discuss this anomaly with Transpower following the publication of this draft decision.

The application is consistent with the Input Methodologies

C10 We are required to consider the consistency of the application with the relevant input methodologies in making our decision.[35] In analysing the application we have focused on assessing whether Transpower has provided the information specified in the Capex IM and the certification requirements.

C11 We are satisfied that the application is consistent with the relevant input methodologies. Transpower has met the information and certification requirements of the Capex IM.

C12 Transpower has provided a certified copy of the extract of the minutes of a meeting of the Board of Directors held on 23 February 2017 and the CEO's certification.[36]

The application promotes the purpose of part 4 of the Act

C13 We consider that Transpower's proposed investment is in the long term interest of consumers. Replacing conductors that are corroding will improve the condition of the line to the level suitable to provide the capacity and quality of service expected by the consumers serviced from this line.

C14 The counterfactual of not investing is likely to increase the number of conductor failures and affect security of supply. A prudent operator should improve the condition of these assets to mitigate these risks. Conductor failures would result in reduced quality of supply. Broken conductors could also pose a serious risk to public safety.

Data, analysis and assumptions in the application are fit for purpose

C15 We are satisfied that the data, analysis and assumptions provided by Transpower are fit for purpose. The main data relevant to our evaluation are:

C15.1 data on condition assessment that determines the need for this project;

C15.2 assumptions and data on demand forecast that supports Transpower's conclusion that the existing rating of this line is sufficient for the future; and

C15.3 analysis and data used for the investment test set out in the Capex IM.

---

35 Capex IM, clause 6.1.1(2)(a).

36 Transpower "Attachment H Chief Executive Certification listed project",

Evaluation criteria set out in Schedule A

C16 Base capex proposals are required to be evaluated in accordance with the evaluation criteria set out in Attachment A of the Capex IM.

C17 Attachment A contains two key sets of criteria for the purposes of the evaluating a base capex proposal:

C17.1 Schedule A1 sets out factors that the Commission will have regard to in evaluating a base capex proposal as part of a reset; and

C17.2 Schedule A2 sets out factors that the Commission must evaluate when reviewing identified programmes.

Schedule A1

C18 The factors in Schedule A1 of the Capex IM are primarily concerned with the evaluation of a full base capex proposal, as part of an IPP reset. We have had regard to these factors and do not consider that there are any new matters raised in this listed project proposal that necessitate further analysis than the analysis we undertook when we evaluated Transpower's base capex for RCP2 in 2014 (beyond what we have considered in our evaluation against the criteria in Schedule A2).

Schedule A2

C19 Schedule A2 sets out the criteria for evaluating an identified project and states that in evaluating a base capex proposal, the Commission will undertake a review of each identified programme and such a review may include evaluation of at least the criteria set out in A2(a)-(j). We set out a summary of our evaluation against each criterion below.

(a) Whether policies regarding the need for the project and its priority demonstrate a risk-based approach consistent with good asset management practice

C20 Transpower's policy on managing transmission line conductors is in the document FS03 that Transpower supplied to us as part of its RCP2 proposal.[37] This document sets out the policy on replacing ageing conductors. The relevant elements of the key policies on condition assessment of conductors and criteria for replacement are:

> Conductor condition is assessed based on a combination of loss of section and loss of tensile strength. AAAC conductors are deemed to have reached replacement criteria at 15% loss of strength or section loss and at 10% for copper. For aluminium conductor with steel reinforcing (ACSR) conductors, the replacement criteria is set at

[37] The document is FS03 "TL conductors and insulators – Fleet Strategy", 16 October 2013.

20% loss of tensile strength and 15% section loss. These values are generally in line with those used by other international utilities.[38]

C21 The conductors in the Central Park Wilton B line are ACSRs, so this criteria for replacing ACSRs applies. Transpower used two tests to assess whether the conductors needed replacement. These are the Cormon test and close aerial survey.

C22 In the Cormon test, a Cormon device is attached to the conductor. It then self-propels along the conductor measuring the thickness of the steel reinforcing every 5 to 10 mm of the conductor length. The results of the Cormon test are used to estimate the remaining thickness of coating on the steel core of the ACSR conductors. These thicknesses enable engineers to determine the tensile strength of the conductor.

C23 The results of the Cormon test carried out in 2013 show 80-100% galvanising loss on approximately 44% of the spans tested.[39] The result indicates that the aluminium conductors in these spans will start to corrode within the next few years.

C24 The close aerial survey uses a helicopter (Transpower is trialling drones as an alternative to helicopters) to undertake an aerial survey of transmission lines. This is the best method of identifying conductor bulges and markers.[40] Transpower undertook close aerial tests in 2011 and 2013. The results are in Table C2 below.

C25 The 2013 test results show an increased rate of conductor deterioration affirming that significant corrosion is starting.

C26 Transpower's policy of timing replacement to just before the conductor loses its tensile strength reflects a risk-based approach consistent with good electrical industry practice. We are satisfied that the risk based approach is applied satisfactorily. The risks that Transpower is managing are to provide a balance between replacing the conductor too soon to not letting the conductor deteriorate to the extent that it can break and drop onto the ground.

Table C2 |Results of close aerial survey

Year of test	Number of conductor bulges	Number of markers
2011	2	0
2013	20	110

38 Transpower, "FS03 TL conductors and insulators – Fleet Strategy", 16 October 2013, page 23.

39 Transpower 'CPK-WIL B Reconductor Attachment A – Condition Assessment; page 10.

40 A marker is an area of conductor that shows signs of decolourisation and is an indicator of imminent conductor bulging.

(b) Whether other relevant policies and planning standards were applied appropriately

C27 We are satisfied that Transpower applied the other relevant polices and planning standards appropriately.

C28 Policies on transmission line towers and transmission line foundations are two other policies applicable to this project. In assessing the scope of this project, Transpower engaged AECOM, a consultant, to scope the project in line with all policies on transmission lines. The study concluded that four towers require minor strengthening[41] and that the existing tower foundations do not require any strengthening.[42]

C29 The study also shows that parts of the tower structures are rusting. Transpower intends to fix these under its routine maintenance programme before reconductoring. [43]

C30 Other relevant policies or standards require considering Electro-magnetic field (EMF), noise, radio frequency interference levels and earth potential rise (EPR). AECOM studied these and concluded that EMF, noise, radio frequency interference levels for the reconductored line would be within the national and Wellington City Council limits.

C31 AECOM identified potential issues with EPR and has identified mitigation measures for these to be implemented during construction.[44]

C32 The planning standard relevant to this project is that the capacity of the line should cater for expected growth in demand. Failure to do this may result in a solution that may not meet the future service requirements of this line.

C33 The demand forecast used by Transpower, shown in Figure C1 below, confirms that the capacity of the line is sufficient to meet expected demand to beyond 2040. This confirms that the proposal to maintain the existing capacity is appropriate compared to the alternatives of upgrading or downgrading its capacity.

---

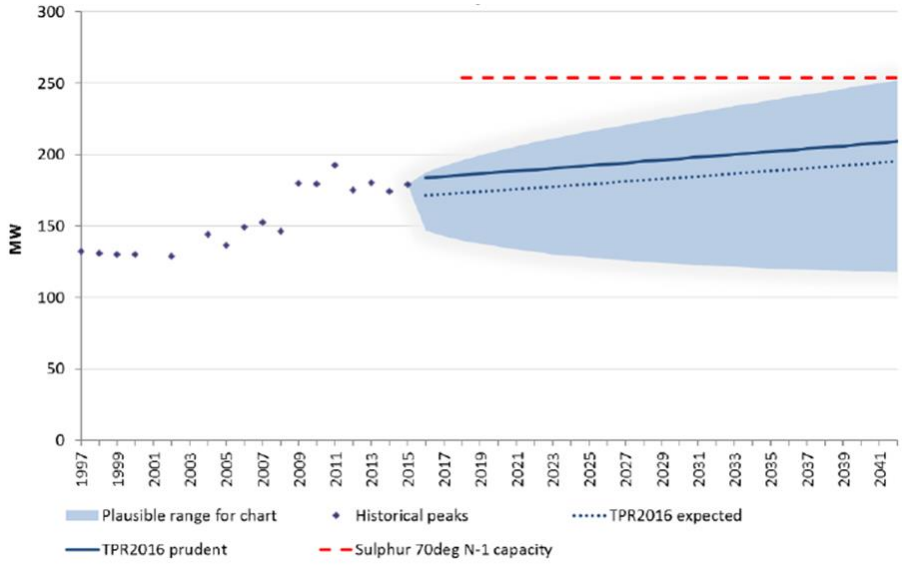
41 AECOM, "CPK-WIL B Reconductoring Design Investigation and Constructability Report" 23 February 2017, page 10.

42 AECOM "CPK-WIL B Reconductoring Design Investigation and Constructability Report" 23 February 2017, page 11.

43 AECOM "CPK-WIL B Reconductoring Design Investigation and Constructability Report" 23 February 2017, pages i and ii.

44 AECOM "CPK-WIL B Reconductoring Design Investigation and Constructability Report" 23 February 2017, page 11-18.

Figure C1 | Central Park – Wilton B winter peak demand forecasts



C34 We are satisfied that the assumptions for the peak demand forecast are reasonable. The forecast confirms that Transpower does not need to increase the capacity of the line to cater for future growth in peak demand. The forecast also confirms that there is an on-going need for this line.

C35 Demand forecasts are difficult in the present environment because new technologies and consumer behaviour have the potential to decrease future peak demand.

C36 Significant generation in the vicinity of the line may also require an increase in capacity. While no generation is planned or forecast in the Electricity Demand and Generation Scenarios (EDGS), additional generation could be installed within the lifetime of the new conductors. Feasible generation includes uprating the existing windfarm or even interspersing solar farms within the existing windfarm infrastructure. We do not consider that these scenarios need to be allowed for now because the section of the line from the generation site to Wilton can be upgraded at a later date if required.

(c) Transpower's processes to determine the project's reasonableness and cost effectiveness including the use of cost benefit studies

C37 When determining a projects reasonableness and cost-effectiveness, we expect Transpower's processes to ensure that projects are delivering the right solution, at the right time, and at the right cost.

C38 In paragraphs C41 to C47 we have discussed Transpower's approach to considering alternatives and that this process involved consultation with the wider industry. We consider that the process has helped ensure that the right solution is being delivered.

C39 Transpower used site specific data on the extent and the rate of deterioration of conductors to determine the timing for this project, as discussed in paragraphs C20 to C26 above. We are satisfied this process determines that the replacement is scheduled at the right time.

C40 Transpower used a consultant to scope the project and estimate its costs, as discussed in more detail in the section titled "The capital costing methodology and formulation and the quantum of contingencies" below. The consultant identified the scope and provided a cost in conjunction with one of Transpower's contractors. This process generally results in a reasonable estimate of costs. In requesting its proposed allowance, Transpower has included a greater amount of contingencies more suited to major capex projects than a listed project. We have accordingly reduced the allowance for contingencies for this project.

(d) Transpower's internal processes for challenging a need for an identified programme and the possible alternative solutions

C41 Given that the driver for this identified programme is deteriorating conductors, we do not consider that the need for the project needs to be thoroughly challenged. As discussed in paragraphs C20 to C26 the need for the project has been signalled since 2011. We therefore did not consider it necessary to review Transpower's internal process for challenging the project.

C42 We have reviewed the alternative solutions that Transpower considered and are satisfied that Transpower has chosen a solution that appropriately balances cost and performance of the conductors.

C43 In its long list consultation, Transpower proposed non-transmission solutions and a number of transmission options.[45] Given the driver for this project, non-transmission solutions are not appropriate and were discarded at an early stage.

C44 Transpower refined the long list of options into the following short listed options for further studies and development:

C44.1 piecemeal replacement of deteriorated sections of lines;

C44.2 replace with conductor type ACSR Chukar @75^{o}C;

C44.3 replace with conductor type ACSR Zebra @90^{o}C; and

C44.4 replace with conductor type AAAC Sulphur @70^{o}C.

C45 Chukar, Zebra and Sulphur are types of conductors used for overhead power lines. The names reflect their manufacturer's specifications and material. The temperature

[45] Transpower "Central Park-Wilton B Transmission Capacity Investigation", April 2015. pages 8-9.

represents the maximum design temperature at which the conductors can be operated.

C46 Transpower evaluated the above options and selected the investment option of reconductoring with Sulphur conductors based on cost-benefit analysis.

C47 We also support this decision because the AAAC (All Aluminium Alloy conductors) conductors have better technical performance over ACSR (Aluminium conductor steel reinforced) conductors. The AAAC conductors are designed to get better strength-to-weight ratio, offer improved electrical properties, better sag-tension characteristics and are more corrosion resistance than ACSR conductors.

(e) How grid outputs, key drivers, assumptions, and cost modelling were used to determine forecast capital expenditure

C48 Transpower engaged a consultant AECOM to prepare the scope and forecast capital expenditure (cost estimate) for this project. AECOM prepared the cost estimate in conjunction with Transpower's contractor Broadspectrum and the estimate includes all elements of cost required to complete the reconductoring.

C49 The main assumptions used for costing include:

C49.1 18 days of downtime due to weather;

C49.2 reconstruction of a shared driveway near T26;

C49.3 access upgrades at other sites;[46]

C49.4 stringing will be completed in 2 runs per circuit;

C49.5 existing conductor will be pulled out using a wire rope which will then be used to pull in the new conductor (this method reduces risks but requires more time);

C49.6 the large number of mid-span joints may slow down the stringing process; and

C49.7 ADSS (fibre optic cable) will be installed in two sections, increasing the complexity of the installation.[47]

C50 The above assumptions are included in the cost estimate.

---

46 AECOM "CPK-WIL B Reconductoring Design Investigation and Constructability Report" 23 February 2017, page ii.

47 AECOM "CPK-WIL B Reconductoring Design Investigation and Constructability Report" 23 February 2017, page 21.

(f) The capital costing methodology and formulation and the quantum of contingencies

C51 Transpower used a consultant to investigate the project, prepare a scope of works to replace the conductors and insulators and refurbish the towers and fittings, and prepare an estimate of costs. The consultant worked with Broadspectrum - one of Transpower's contractors – to scope the works and prepare the estimate of costs. The estimated cost takes into account all areas of identified works and reflects the cost of potential challenges during installation.

C52 It also takes into account the cost of work that cannot be accurately scoped now but can arise during construction. These costs include downtime due to weather, access and property management, additional site security and treatment of the existing and new conductors. The quantum of contingencies is $1.29 million. Transpower has included another $160,000 as additional contingency. The total P50 contingency allowance is 21%. We are satisfied that this amount is reasonable.

(g) The effect of the forecast capital expenditure on other cost categories, including the relationship with operating expenditure

C53 The capital expenditure is not likely to affect other cost categories or opex in RCP2. Apart from the site investigations and Transpower overheads, other costs related to this project are not included in the base capex or opex allowances for RCP2.

C54 All costs incurred for this project will be capitalised as per Transpower's practice.

C55 After the transmission line is refurbished and reconductored, maintenance capex and opex for this line should reduce and this should be reflected in the RCP3 proposal.

(h) Links with other projects or programmes, whether proposed or in progress

C56 This project does not link with any other project in RCP2.

(i) Mechanisms for controlling actual capital expenditure with respect to the proposed base capex allowances and ensuring performance of proposed grid output targets

C57 The three grid output measures that could be affected by this project are the number of unplanned interruptions, average duration of interruptions and duration of P90 unplanned interruptions.

C58 Transpower plans to do this work without an interruption to supply.[48] But unplanned interruptions can occur because of the nature of the work. Transpower's execution plan includes installing temporary arrangements to minimise the risk of interruptions to supply and therefore any impact on grid output targets.

---

48 Through the use of bypass structures.

C59 While installing temporary structures incur additional costs, we are satisfied that Transpower's plan adequately meets the requirements of WE and Meridian, as mentioned in paragraph C4 above.

(j) The efficiency of the proposed approach to procurement of associated goods and services

C60 These matters were considered as part of the assessment of the RCP2 proposal and recommendations for any improvement are made at that stage. We are comfortable with the efficiency of these approaches for this project.