

Amending Transpower's allowance and outputs for the North Island Grid Upgrade Project (NIGU Project)

[2015] NZCC 21

Final decision

Date of decision: 6 August 2015

The Commission: Dr M Berry

S Begg

P Duignan

Dr S Gale

Associated documents

| Publication date | Reference | Title |
|-------------------|--|--|
| 30 September 2013 | Transpower New Zealand application to the Commerce Commission | North Island Grid Upgrade Project: Application for increase of major capex allowance |
| 29 November 2013 | ISBN 978-1-869453-38-1 | Amending Transpower's allowance for the North Island Grid Upgrade Project proposed approach and issues |
| 30 June 2014 | Report from Calverton Business Consulting Group to the Commerce Commission | Evaluating Transpower's property and easement acquisition strategy and implementation for the NIGU project |
| 30 July 2014 | Report from Strata Energy Consulting Ltd to the Commerce Commission | Report on the Transpower New Zealand Ltd NIGUP Alliance Contract Arrangements |
| 23 April 2015 | ISSN 1178-2560 | Amending Transpower's allowance and outputs for the North Island Grid Upgrade Project Draft Decision |

Regulation Branch, Commerce Commission

Wellington, NEW ZEALAND

Contents

| | |
|---|------------|
| Executive Summary | 5 |
| 1. Introduction | 9 |
| 2. Framework and approach | 12 |
| 3. How we have determined an amended MCA..... | 22 |
| 4. How we have evaluated the output amendments | 32 |
| | |
| Attachment A : Summary of events | 35 |
| Attachment B : Summary of cost overruns | 44 |
| Attachment C : Project management and governance | 52 |
| Attachment D : Property..... | 66 |
| Attachment E : Alliance Contract | 74 |
| Attachment F : Construction costs | 81 |
| Attachment G : Need date | 96 |
| Attachment H : Outputs..... | 106 |
| Attachment I : Potential improvements | 115 |
| | |
| Glossary | 124 |

[Blank page]

Executive Summary

- X1 The Commerce Commission’s decision on Transpower’s application to amend the major capex allowance (MCA) for the North Island Grid Upgrade (NIGU) Project is to set an allowance of \$876.3 million. The allowance remains unchanged from our draft decision. This is an increase of \$52.3 million above the \$824 million originally approved, but is \$17.7 million less than the \$894 million Transpower applied for.
- X2 We are also amending the four major capex project outputs (outputs) for the NIGU Project that Transpower has applied to amend.
- X3 We have made our final decision after considering submissions and cross-submissions. We would like to thank parties for their input into our decision making process.

The North Island Grid Upgrade Project

- X4 The NIGU Project involved building a new 400 kV-capable transmission line from Whakamaru in the central North Island to Brownhill in South Auckland. The line covers a distance of 186 km.
- X5 The line was built to increase transmission capacity, and to improve the security of electricity supply to Auckland and Northland. The NIGU Project contained a number of associated substation, cable, and deferral projects, and was completed in October 2012.
- X6 The project was approved in July 2007 by the Electricity Commission with an MCA of \$824 million.¹ The approval for the project also included a list of improvements or additions to the grid which Transpower was to deliver, known as outputs.
- X7 Transpower spent \$894 million delivering the project, \$70 million more than the approved MCA of \$824 million, and some of the delivered outputs differed from those originally approved.²

¹ The term “major capex allowance” or “MCA” did not appear in the Electricity Governance Rules used by the Electricity Commission. However, we use this term to refer to the quantum of major capital expenditure previously approved by the Electricity Commission for the NIGU Project. See, Capex IM, cl 1.1.4(2)(a).

² We refer to this \$894 million amount as the ‘actual spend’. This is the amount Transpower has applied for, and the maximum amount it would be able to recover from consumers for the project under the Capex IM if it was approved. An additional \$51 million loss on the resale of properties cannot be capitalised under the Transpower IMs.

Transpower's major capex amendment application

- X8 Under the Transpower Capital Expenditure Input Methodology (the Capex IM), Transpower may apply to the Commission for an amendment to a major capex proposal after the proposal has been approved.
- X9 Transpower applied to the Commission to amend the MCA and certain outputs for the NIGU Project on 30 September 2013.
- X10 Without an amendment to the approved MCA, Transpower would not have been able to recover more than the approved amount of \$824 million.
- X11 Without an amendment to the outputs the amount Transpower could have recovered from consumers would have been reduced by the value of the undelivered outputs.³

Our approach to evaluating Transpower's application

- X12 Our power to amend a major capex proposal is limited to the scope of the matters covered in the amendment application. We cannot revisit the Electricity Commission's original approval of the project.
- X13 Our decision must promote the long-term benefit of consumers as described in section 52A of the Commerce Act (the Act) by preserving Transpower's incentives to make appropriate investments, and its incentives to deliver these investments efficiently.
- X14 The Capex IM sets out the criteria we must apply when evaluating Transpower's application.
- X15 Our approach identifies costs that were caused by key factors that were reasonably foreseeable, and that were either within Transpower's control, or that Transpower could and should otherwise have mitigated. We refer to these costs as 'avoidable costs'.
- X16 Transpower's actions to control or mitigate the key factors are assessed against the standard of care expected of a diligent and prudent operator in Transpower's position at the relevant times.

³ In this case this amount is approximately \$30 million.

- X17 To determine an appropriate MCA, we:
- X17.1 take the amount Transpower actually spent delivering the project;
 - X17.2 identify any avoidable costs within this amount; and
 - X17.3 ensure that the allocation of these avoidable costs between consumers and Transpower promotes the purpose of Part 4 of the Act.

Summary of our findings

- X18 Applying our approach, we have determined that \$17.7 million of the \$70 million of expenditure above the original approved MCA was avoidable. This amount was caused by out of sequence construction work. This out of sequence work was itself caused by out of sequence property access during construction.
- X19 Although Transpower included the \$17.7 million in its application to amend the MCA, it volunteered to not recover this amount from consumers.⁴ Transpower bearing all of these costs promotes the purpose of Part 4.
- X20 We did not find any additional avoidable costs directly attributable to the other key factors that we investigated. These key factors were:
- X20.1 Transpower’s approach to the acquisition of property rights;
 - X20.2 project management and governance;
 - X20.3 the Alliance Contract between Transpower and Balfour Beatty United Group; and
 - X20.4 the system need date for the project.
- X21 From our investigation of Transpower’s project management and governance, we have concluded that overoptimistic forecasting by Transpower of time, costs, and risks – both before the project was approved and during delivery – caused most of the expenditure above the approved MCA.
- X22 We have found that all of the proposed amended outputs are appropriate. These changes have reduced the overall cost of the NIGU Project, while delivering a similar level of service and performance to the originally approved outputs.

⁴ See page 5 of Transpower’s application for an increase of its major capex allowance, “North Island Grid Upgrade Project - Application for increase of major capex allowance” 30 September 2013.

How our decision promotes the purpose of Part 4

- X23 Our decision to exclude \$17.7 million in avoidable costs from the amended MCA ensures that consumers do not pay for these inefficient costs. Preventing Transpower from recovering these avoidable costs also promotes Transpower's incentives to improve efficiency when delivering capital works in the future.
- X24 Allowing Transpower to recover all the other costs of delivering the NIGU Project preserves Transpower's incentives to invest in assets in a way that promote the long-term benefit of consumers.

1. Introduction

- 1.1 On 30 September 2013, Transpower New Zealand Limited (Transpower) applied to the Commerce Commission (the Commission) to amend the major capex allowance (MCA) and certain major capex project outputs (outputs) for the North Island Grid Upgrade (NIGU) Project. The NIGU Project was approved by the Electricity Commission in July 2007.
- 1.2 Transpower sought to amend the original MCA of \$824 million to \$894 million, and to amend four outputs.

Why we have written this paper

- 1.3 The Commission must decide whether to approve any amendment to a major capex project before the amendment can take effect. The purpose of this paper is to communicate our decision.
- 1.4 Specifically, we have written this paper to:
 - 1.4.1 outline our decisions to increase the MCA to \$876.3 million and to amend four outputs; and
 - 1.4.2 explain how we arrived at those decisions.

Structure of this paper

- 1.5 In Chapter 2, we explain our approach to assessing Transpower's application. We discuss how we have applied the regulatory framework set out in Part 4 of the Commerce Act 1986 (the Act) and in the relevant provisions of the Transpower Capital Expenditure Input Methodology Determination (the Capex IM).
- 1.6 In Chapter 3, we explain how we have applied our approach when deciding to increase the MCA to \$876.3 million. In Chapter 4, we explain why we have decided to amend the outputs.
- 1.7 In Attachment A, we summarise Transpower's application, and outline the key events in the NIGU Project.
- 1.8 In Attachment B, we discuss the differences between the original MCA and the amount Transpower actually spent delivering the project.
- 1.9 In Attachments C to G, we present our detailed findings in relation to each key factor.
- 1.10 In Attachment H, we present our findings in relation to each output amendment.

- 1.11 In Attachment I, we suggest potential areas for improvement based on our observations. This attachment and the suggested improvements do not form part of our decision on the amended MCA or outputs. Our intent in raising these matters is to encourage behaviour in the future that promotes the purpose of Part 4.

The process we have followed

- 1.12 We received Transpower's amendment application (the application) on 30 September 2013.⁵ We published a paper setting out the process we intended to follow in assessing the application on 23 October 2013.⁶
- 1.13 On 29 November 2013, we published a paper setting out our proposed approach to assessing the application, and the areas of the NIGU Project we proposed to investigate (the Issues Paper).⁷ We received submissions in response to this paper in January 2014.
- 1.14 We engaged external consultants to review key aspects of the NIGU Project. Strata Energy Consulting (Strata) provided us with a report on the Alliance Contract arrangements.⁸ Calverton Business Consulting (Calverton) provided us with a report on Transpower's property acquisition strategy.⁹ These reports were published on 11 August 2014. We received submissions on these reports in September 2014.
- 1.15 On 23 April 2015, we published our draft decision on Transpower's application. We received submissions on our paper on 21 May 2015 and cross-submissions on 4 June 2015.¹⁰

Material referred to in this paper

- 1.16 To better inform our evaluation of Transpower's application we sought a large amount of additional information from Transpower. This information is referenced as "response to questions" in the footnotes.

⁵ Transpower "North Island Grid Upgrade Project - Application for increase of major capex allowance" 30 September 2013. In all other footnotes, this document will be referred to as "NIGUP amendment application."

⁶ Commerce Commission "Amending Transpower's allowance and outputs for the North Island Grid Upgrade Project: Process Paper" 23 October 2013.

⁷ Commerce Commission "Amending Transpower's allowance and outputs for the North Island Grid Upgrade Project: Issues Paper" 29 November 2013.

⁸ Strata "Alliance Contract report" (report to the Commerce Commission) July 2014

⁹ Calverton, "Property and easement acquisition report" (report to the Commerce Commission) June 2014

¹⁰ We received submissions on our draft decision from: Transpower, MEUG, Pacific Aluminium, and The Southland Chamber of Commerce. We received cross-submissions from: Transpower, MEUG and M. Melhuish. These submissions and cross-submissions can be found on our website.

- 1.17 We have not published Transpower's responses to our questions on our website, given the large size of many of the files. However, this information (except where it is confidential) remains available to interested parties upon request.
- 1.18 Please note that quotations from Transpower's application, submissions, responses to questions, or other sources are presented as-written. As such, they sometimes contain spelling or grammatical errors, or use terms inconsistent with the rest of this paper.

2. Framework and approach

Purpose of this chapter

- 2.1 The purpose of this chapter is to explain our approach to evaluating Transpower's application for an amended MCA and to amend certain outputs for the NIGU Project.
- 2.2 In this chapter we discuss:
 - 2.2.1 what we have considered when determining our approach to evaluating the application;
 - 2.2.1 the approach we used to determine the amended MCA;
 - 2.2.2 the approach we used to decide whether or not to approve the amendments to the output sought by Transpower; and
 - 2.2.3 how we will implement our decisions.

What we have considered when determining our approach

- 2.3 The regulatory framework set out in Part 4 of the Act and the relevant provisions of the Capex IM provide the legal requirements we must apply when evaluating the application. These considerations apply both to the application to amend the MCA and the outputs.
- 2.4 Our approach must:
 - 2.4.1 promote the purpose of Part 4; and
 - 2.4.2 follow all relevant input methodologies, and in particular the rules for evaluating amendment applications set out in the Capex IM.

How our approach can best promote the purpose of Part 4

- 2.5 The purpose of Part 4 provides the primary objectives and considerations that we must give weight to when exercising our judgment.

The purpose of Part 4

- 2.6 Section 52A(1) of the Act directs us to make decisions that promote the long-term benefit of consumers by promoting outcomes consistent with those in competitive markets.

- 2.8 The outcomes concerned are those listed in section 52A(1)(a) to (d), such that suppliers of regulated goods or services:
- 2.8.1 have incentives to innovate and to invest;
 - 2.8.2 have incentives to improve efficiency and provide services at a quality that reflect consumer demand;
 - 2.8.3 share any benefits of efficiency gains with consumers, including through lower prices; and
 - 2.8.4 are limited in their ability to extract excessive profits.
- 2.9 Our decision must strike a balance between promoting Transpower's incentives to invest, and promoting its incentives to deliver capex investments efficiently.
- 2.10 We seek to promote these outcomes, not to replicate mechanisms or commercial arrangements seen in workably competitive markets.¹¹ Part 4 envisages that in the case of regulated goods and services, the regulation of prices and quality will promote these outcomes.

The purpose of Part 4 and MCA amendments

- 2.11 Under the Capex IM, Transpower may only recover new major capex via its maximum allowable revenue if the project the capex relates to has been approved by the Commission (or previously by the Electricity Commission).
- 2.12 Therefore, the revenue Transpower can earn partly depends on the amount of major capex approved by the Commission (or previously by the Electricity Commission).
- 2.13 In the merits appeal judgment on the Commission's Input Methodologies, the High Court noted that prices in workably competitive markets tend to reflect normal rates of return, after covering the firm's efficient costs, and that such prices led towards the outcomes listed in section 52A(1)(a) to (d).¹²
- 2.14 Consistent with the approach of the High Court, as a general rule, any identifiable inefficient costs incurred above the approved MCA in delivering the NIGU Project should be excluded from the amended MCA.

¹¹ This can be contrasted with the views raised in submissions that appear to approach the original MCA as a contract price, where any overspend should be borne by the 'contractor' (Transpower) alone. Major Electricity Users' Group "Submission to the Commerce Commission on Issues Paper for amending the allowance and outputs for the NIGU Project" 17 January 2014, para 12; Pacific Aluminium "Submission to the Commerce Commission on Issues Paper for amending the allowance and outputs for the NIGU Project" 17 January 2014, para 2.

¹² *Wellington International Airport Ltd & Ors v Commerce Commission* [2013] NZHC 3289, 11 December 2013, para 18.

- 2.15 To achieve this, our approach identifies those costs that were caused by key factors which were reasonably foreseeable, and either within Transpower's control, or which Transpower could and should have mitigated.
- 2.16 Transpower's actions to control or mitigate key factors are assessed against the standard of a diligent and prudent operator in Transpower's position at the relevant times.
- 2.17 Costs are 'avoidable costs' if we are able to establish that a diligent and prudent operator in Transpower's position would not have incurred those costs in delivering the NIGU Project, by either controlling or mitigating the key factors. A more detailed explanation of avoidable costs is given below in paragraphs 2.44 to 2.52.
- 2.18 As avoidable costs are always inefficient costs, allowing Transpower to recover these costs would generally be inconsistent with the outcomes referred to in section 52A(1)(a) to (d), in that:
- 2.18.1 consumers should not be required to pay for inefficient costs;
 - 2.18.2 preventing Transpower from recovering the avoidable costs promotes incentives to improve efficiency when delivering capital works and discourages inefficient expenditure; and
 - 2.18.3 preventing Transpower from recovering costs which are avoidable would not disincentivise Transpower from investing appropriately.
- 2.19 Transpower should generally be allowed to recover costs in excess of its approved MCA where the costs are not avoidable, in that:
- 2.19.1 Transpower's future incentives to innovate and invest in the long-term interest of consumers are best preserved when costs which could not have been avoided by a diligent and prudent operator in Transpower's position are allowed to be recovered from consumers; and
 - 2.19.2 disallowing Transpower from recovering costs where we cannot establish that the costs could have been avoided by a diligent and prudent operator in Transpower's position may undermine its incentives to innovate and invest, contrary to the long-term interests of consumers.
- 2.20 There may be circumstances where we are able to establish that there were avoidable costs due to a particular key factor, but are unable to determine the quantum accurately. In those instances we would use our best estimate of the avoidable costs, taking into account the uncertainty around the estimate, and the impact that uncertainty might have on Transpower's future incentives to invest.

The purpose of Part 4 and output amendments

- 2.21 The availability of an output amendment enables us to make decisions that better promote the purpose of Part 4, by allowing Transpower the flexibility to propose outputs that better reflect the actual circumstances of a project.
- 2.22 Our decision to approve or reject proposed outputs will consider how the service that consumers receive and the costs that they pay are affected. It will also take into account how Transpower is incentivised to invest efficiently. For example, where a proposed output would maintain the same level of service but for a lower cost, it promotes the purpose of Part 4 to allow the amendment.
- 2.23 The ability to amend the MCA to account for any change in the cost of the output means the benefits of lower costs can be shared with consumers.

We have considered how to apply the rules set out in the Capex IM

- 2.24 Our avoidable cost approach is also consistent with the rules set out in the Capex IM.¹³ The requirements in the Capex IM provide the basis for making our decisions on Transpower's application. The specific considerations in the Capex IM which we must take into account, along with how we have considered each of them are set out in Table 2.1.¹⁴
- 2.25 While these criteria give us some discretion in how we apply our judgment, there are limits to what the Capex IM allows us to do when evaluating an amendment proposal.
- 2.26 Specifically, we cannot reconsider the Electricity Commission's original decision to approve the NIGU Project, change the way we value Transpower's regulatory asset base, or decline Transpower's application because we doubt the cost efficiency of the project as a whole.¹⁵

¹³ The Capex IM applies to the NIGU Project even though the project was originally approved by the Electricity Commission. Under clause 1.1.4 of the Capex IM, major capex projects approved by the Electricity Commission under the Electricity Governance Rules (EGRs) are to be treated as having been approved by the Commission under the Capex IM.

¹⁴ Commerce Commission "Transpower Capital Expenditure Input Methodology Determination" 31 January 2012, clause 6.1.1.

¹⁵ We note the submission from M. Melhuish that, in her view, "today's regulatory systems, for both networks and generation/retail, are no longer fit for purpose". While reasoned views on the wider regulatory framework and how it can potentially be improved are encouraged, this is not a factor that we can take into account when making this decision. M. Melhuish "Submission: NIGU Capex allowance", 4 June 2015, page 1.

We also note submissions from the Southland Chamber of Commerce and Pacific Aluminium which submit that consumers in the South Island must pay for an asset that they do not benefit from. However, this is also not a matter relevant to our decision. Cost recovery from specific consumers is an outcome of the Transmission Pricing Methodology, which is currently under review by the Electricity Authority.

Table 2.1 Considerations for amendment applications set out in the Capex IM

| Clause | What we must consider | Our consideration |
|-----------------|---|---|
| 6.1.1(2)(a) | Whether what is proposed in the application is consistent with the Capex IM and Transpower's other input methodologies. | The application is materially consistent with the Capex IM and Transpower's other input methodologies. |
| 6.1.1(2)(b) | The extent to which what is proposed will promote the purpose of Part 4. | Discussed in paragraphs 2.5 to 2.23 above. |
| 6.1.1(2)(c) | Whether the information underpinning the proposal is fit for our purposes. | The information underpinning Transpower's application, when taken together with the additional information Transpower has provided in response to our questions, is fit for our purposes. |
| 6.1.1(5)(a)(i) | The extent to which the key factors relevant to the proposed amendment were reasonably foreseeable by Transpower. | How we have applied these three criteria to the MCA decision is discussed in paragraphs 2.44 to 2.52. |
| 6.1.1(5)(a)(ii) | The extent to which the key factors relevant to the proposed amendment were within Transpower's control. | How we have applied them to the outputs decision is discussed in paragraphs 2.53 to 2.55. |
| 6.1.1(5)(b) | The extent to which Transpower mitigated key factors outside their control. | |
| 6.1.1(5)(c) | The extent to which the project's expected net electricity market benefit would be materially lower as a result of the amendment than when it was approved. | These criteria are of limited application to amendments to major capex projects that have been completed. The project has been completed, and all the expenditure has already been incurred. |
| 6.1.1(5)(d) | The expenditure that Transpower has already incurred on the project at the date of the application. | Our decision cannot change either the costs or the benefits of the project. It can only change how they are allocated. |

How we have determined an appropriate amended MCA

- 2.27 To determine the amended MCA we have taken the actual expenditure of \$894 million that Transpower incurred in delivering the NIGU Project, identified the avoidable costs, and excluded them from the amended MCA.
- 2.28 This section sets out the steps of our evaluation, and reflects feedback we have received in submissions on the approach we outlined in the Issues Paper and in our draft decision.

2.30 Specifically we have:

- 2.30.1 taken Transpower's proposed MCA as our starting point;
- 2.30.2 identified the key factors that may have led to the actual cost of the project exceeding the originally approved MCA;
- 2.30.3 focused our investigation on the areas of the project most likely to contain avoidable costs; and
- 2.30.4 assessed the extent to which costs were avoidable.

Our starting point is Transpower's actual expenditure

- 2.31 The amended MCA Transpower proposed is the starting point for our evaluation. We then identified any costs within this amount that were avoidable.¹⁶
- 2.32 An alternative approach was starting with the original MCA. The original MCA was a forward-looking estimated cost of delivering the project.¹⁷ Disparity between the MCA and the actual spend could be caused as much by forecast error as by avoidable costs. Accordingly, expenditure above the approved MCA may still be efficient costs, and the original MCA cannot be viewed as the efficient cost of delivering the project.
- 2.33 We, therefore, disagree with the suggestion implicit in some submissions on our draft decision that allowing Transpower to recover any expenditure above the approved MCA is necessarily inconsistent with the outcomes produced by workably competitive markets.¹⁸
- 2.34 In submissions on the Issues Paper, the Major Electricity Users Group (MEUG) stated:

The Commission must apply appropriate resources to ensure any approved cost overrun can be clearly identified as being efficient.¹⁹

¹⁶ We refer to this \$894 million amount as the 'actual spend'. This is the amount Transpower has applied for, and the maximum amount it would be able to recover from consumers for the project under the Capex IM if it was approved. An additional \$51 million loss on the resale of properties cannot be capitalised under the Transpower IMs.

¹⁷ In the case of the NIGU Project, the MCA was set at a P90 estimate of the likely cost of the project. Conceptually this means that before the project started, if it was planned, scoped, and delivered cost efficiently there was a 10% probability that the actual costs of the project would exceed the allowance.

¹⁸ Pacific Aluminium "Submission on amending Transpower's allowance and outputs for the North Island Grid (NIGU Project)" 17 January 2014, paragraph 2, page 1; "Submission on the draft decision on amending Transpower's allowance and outputs for the North Island Grid Upgrade Project (NIGU Project)" 21 May 2015, page 1; MEUG "Cross-submission on NIGU draft decision, 23 April 2015, paragraph 6(a), page 2.

¹⁹ Major Electricity Users' Group "Submission to the Commerce Commission on Issues Paper for amending the allowance and outputs for the NIGU Project" 17 January 2014, para 5.

- 2.35 In the absence of evidence to the contrary, expenditure above the original MCA should not be treated as inefficient. It is better to assess Transpower's application with reference to the amount it actually spent delivering the NIGU Project, rather than with reference to the original MCA.
- 2.36 Starting with the original MCA would require Transpower to justify all spending on the project, and for the Commission to assess these justifications. This would be a much more resource intensive process, and would likely result in a similar outcome. The appropriate time for assessing a major capex project as a whole is prior to approval.²⁰

We have identified the key factors which may have led to expenditure above the originally approved MCA

- 2.37 We have identified the key factors which may have led to the actual amount spent exceeding the MCA, and consequently to Transpower's application for an amended MCA.²¹
- 2.38 The Capex IM directs us to consider the key factors that led to Transpower's proposed amendment.²² Key factor is not a defined term in the Capex IM, but in the case of the NIGU Project, the relevant key factors are the drivers which led to expenditure above the originally approved MCA.
- 2.39 There are interrelationships between some of these key factors. We have therefore considered the combined effect of the key factors, and not just each factor in isolation. Additionally, within each category examined there may be additional contributing factors.
- 2.40 We discuss each of the factors we have analysed briefly in Chapter 3, and in greater detail in Attachments C to G.

We have prioritised our areas of investigation

- 2.41 As indicated in our Issues Paper we have focused our attention on the key factors in the NIGU Project that have the highest risk of leading to avoidable costs, rather than attempting to analyse all available information.²³

²⁰ Additionally, such an investigation would be complicated by the fact that the cost categories for the original MCA and those used in the project are different, and Transpower not necessarily being able to provide components of MCA by the cost categories.

²¹ For simplicity, we refer to the difference between the approved MCA and the actual spend as an 'overspend'. This usage is distinct from the 'overspend adjustment' provided for in the Capex IM.

²² Capex IM, cl 6.1.1(5)

²³ Commerce Commission "Amending Transpower's allowance and outputs for the North Island Grid Upgrade Project: Issues Paper" 29 November 2013, para 4.7 to 4.10.

- 2.42 Our list of priority areas was informed by aspects of the project:
- 2.42.1 that have incurred significantly higher costs than forecast;
 - 2.42.2 that are more prone than others to incurring avoidable costs in projects of this size;
 - 2.42.3 Transpower identified as leading to increased spending; and
 - 2.42.4 where there is a realistic prospect of reaching a robust conclusion on whether Transpower incurred avoidable costs.
- 2.43 We excluded some areas from our investigation where we would be unlikely to identify any avoidable costs. For example, examining the terms of a commercially negotiated contract that was subject to a competitive tendering process. In such circumstances it is appropriate to rely on the processes in place, and the resulting competitive tension to minimise any inefficient costs.

We have assessed the extent to which costs were avoidable

- 2.44 Identifying avoidable costs forms the core of our approach to determining the amended MCA.
- 2.45 We have used the criteria set out in clause 6.1.1 of the Capex IM, and applied the standard of a diligent and prudent operator to determine the extent to which the key factors that led to expenditure above the originally approved MCA could have been avoided.
- 2.46 We do not apply hindsight when evaluating Transpower's conduct. As such, 'avoidable' must be understood in the terms of the criteria in the Capex IM, and not in terms of what might have been avoidable with perfect foresight.

We have applied the Capex IM criteria to assess the extent to which costs were avoidable

- 2.47 We find avoidable costs by assessing the project's delivery against the specific criteria in the Capex IM:
- 2.47.1 the extent to which key factors that caused the expenditure above the originally approved MCA were reasonably foreseeable by Transpower when the project was approved;
 - 2.47.2 the extent to which Transpower could be reasonably expected to control these factors; and
 - 2.47.3 for uncontrollable factors, the reasonableness of any mitigation strategy devised and implemented by Transpower to mitigate the effects of these factors.

- 2.48 We have considered the materiality of any costs when looking for avoidable costs. This is in line with our decision to focus on those areas that have the highest risk of containing avoidable costs, and ensures that we focus on the cost overruns which have the greatest impact on the amended MCA.

We have applied the standard of a diligent and prudent operator to Transpower's conduct

- 2.49 Under our framework costs are avoidable if a diligent and prudent operator in Transpower's position would not have incurred the costs. Transpower could have done so either through foreseeing and controlling the key factors driving the costs, or by devising and implementing an appropriate strategy to mitigate the impact of the key factors.
- 2.50 In the Issues Paper we indicated that we could apply a standard of good electricity industry practice (GEIP) to evaluate Transpower's conduct. In response to this, Genesis Energy suggested that GEIP should not be the only benchmark that we should use.²⁴ MEUG stated that GEIP should be used only as a minimum standard, and that "best or frontier performance" would be more appropriate.²⁵
- 2.51 Additionally, Pacific Aluminium noted that the conduct GEIP implies will vary based on context.²⁶
- 2.52 We disagree that a best or frontier standard of performance is the appropriate standard. The Electricity Commission indicated that the standard of "diligence and prudence" would apply to assessing (interim) major capital expenditure project overspends under its regime.²⁷ This standard is consistent with the one we have used, and is a standard that Transpower would reasonably have anticipated would apply.

How we have decided whether to amend the outputs

- 2.53 We must apply the same criteria when assessing Transpower's application to amend the outputs as we do when assessing Transpower's application to amend the MCA. These criteria are set out in Table 2.1 above. Additionally, in both cases, promoting the purpose of Part 4 is our overriding consideration.

²⁴ Genesis Energy "Cross-submission on application for \$70m NIGUP overspend" 31 January 2014, page 2.

²⁵ Major Electricity Users' Group "Submission to the Commerce Commission on Issues Paper for amending the allowance and outputs for the NIGU Project" 17 January 2014, para 11-12.

²⁶ Pacific Aluminium "Submission to the Commerce Commission on Issues Paper for amending the allowance and outputs for the NIGU Project" 17 January 2014, para 4-6.

²⁷ Electricity Commission "Letter regarding interim grid expenditure" 19 December 2007.

- 2.54 However, unlike an amendment to an MCA, we do not have discretion to specify other outputs for the project as we can only accept or reject the output amendments Transpower sought.²⁸
- 2.55 The appropriate standard to apply when assessing proposed output amendments is whether or not the proposed amendments are consistent with the purpose of Part 4. We will usually only decline an application to amend an output where the amendment would be inconsistent with the long-term benefit of consumers and the outcomes listed in section 52A(1)(a) to (d) of the Act.

How our decision takes effect

- 2.56 Having made our decisions on how to amend the MCA and outputs for the NIGU Project, our decisions takes effect as set out below.

Giving effect to our amended MCA

- 2.57 All costs above the amended MCA are treated as an overspend. This overspend is subject to a major capex overspend adjustment.²⁹
- 2.58 The overspend adjustment requires Transpower to bear the full cost of the present value of the after-tax revenue for costs above the amended MCA. This adjustment flows through to the revenue calculation mechanism via Transpower's individual price-quality path (IPP).
- 2.59 In its application, Transpower proposed a voluntary reduction in the amount it will recover from consumers. While we appreciate this voluntary approach which assisted us in our identification of avoidable costs, we nevertheless consider that avoidable costs should be dealt with by applying the processes set out in the IMs.

Giving effect to the amended outputs decision

- 2.60 Having accepted Transpower's proposed output amendments, the amended outputs now replace the originally approved outputs when we apply the outputs adjustment mechanism under clause 3.3.7(2) of the Capex IM.

²⁸ Capex IM, cl 3.3.4(4)(d).

²⁹ Capex IM, cl 3.3.7 and cl B4.

3. How we have determined an amended MCA

Purpose of chapter

- 3.1 In this chapter we set out our decision on Transpower's application to amend its MCA for the NIGU Project, and the reasons for our decision. Specifically, this chapter covers:
- 3.1.1 our decision to amend the MCA for the NIGU Project from \$824 million to \$876.3 million;
 - 3.1.2 our evaluation of Transpower's application;
 - 3.1.3 how our decision promotes the purpose of Part 4; and
 - 3.1.4 additional matters that put our decision in context.

We have amended the MCA to \$876.3 million

- 3.2 Our decision is to amend the MCA for the project from \$824 million to \$876.3 million. This is \$52.3 million more than was originally approved, but is \$17.7 million less than the amended MCA Transpower applied for.
- 3.3 Applying the approach set out in Chapter 2, we have determined that \$17.7 million of the \$70 million overspend was avoidable. This amount was caused by out of sequence construction work. This out of sequence work was itself caused by out of sequence property access during construction.³⁰
- 3.4 It is appropriate that Transpower bear all \$17.7 million of these avoidable costs, but Transpower should be able to recover the remaining \$52.3 million in costs greater than the originally approved MCA from consumers.
- 3.5 Our decision promotes the long-term benefit of consumers by promoting the incentives for Transpower to make appropriate investments, and to deliver these efficiently, while ensuring that Transpower does not pass on the avoidable costs we have identified to consumers.

³⁰ Although Transpower included these costs in its proposed amended MCA, it undertook to not recover them from consumers via a voluntary adjustment. As we stated in Chapter 2, the normal operation of the Capex IM process is the appropriate way to give effect to our decision. For Transpower's proposed approach, see NIGUP amendment application, Appendix 2, page 122.

We have evaluated Transpower's application

- 3.6 We have applied the approach outlined in Chapter 2 in evaluating Transpower's application and the additional information that Transpower provided at our request. Specifically we have:
- 3.6.1 evaluated Transpower's application on the basis of the \$894 million amended MCA it applied for;
 - 3.6.2 identified the key factors which led to cost overruns; and
 - 3.6.3 assessed whether any of these key factors led to avoidable costs.

Transpower's application seeks an amended MCA of \$894 million

- 3.7 The NIGU Project was approved by the Electricity Commission in July 2007 with an MCA of \$824 million.³¹ As noted above in paragraph 2.32, this allowance does not represent the baseline for efficient costs of the project.³²
- 3.8 Transpower has requested that we amend the maximum allowance to the actual cost of \$894 million, an increase of \$70 million (or 8.5%) over the original maximum allowance.³³ We have used this amount as the starting point for our evaluation.
- 3.9 A detailed explanation of the differences between the original MCA and the amended MCA Transpower is seeking is given in Attachment B.

Key factors that led to Transpower's expenditure above the originally approved MCA

- 3.10 Our Issues Paper outlined and sought views on the key factors that led to the expenditure above the originally approved MCA that Transpower seeks to recover in its application.
- 3.11 Our proposed key factors included the set of key factors identified by Transpower in its application:
- 3.11.1 the original MCA calculation;³⁴
 - 3.11.2 property acquisition; and
 - 3.11.3 the construction of the 400 kV overhead line.

³¹ Transpower "NIGUP – Application for approval, amended proposal" 20 October 2006, page 7.

³² The maximum allowance was considered by Transpower to be the P90 cost required to deliver the entire scope of the project.

³³ NIGUP amendment application, page 10.

³⁴ We have not investigated this as a source of avoidable costs, as by definition cost overruns caused by under-forecasting cannot be avoidable.

- 3.12 In our Issues Paper we proposed additional key factors as being relevant to assessing the amendment application:
- 3.12.1 project management and governance;
 - 3.12.2 the Alliance Contract; and
 - 3.12.3 the need date.
- 3.13 These six key factors, and wider issues relating to the project delivery timeframes, led to the expenditure above the originally approved MCA.
- 3.14 We received submissions on our Issues Paper which supported our proposed key factors.
- 3.14.1 Pacific Aluminium’s Issues Paper submission supports the Commission’s proposed areas of investigation as “this is likely to address the areas where inefficiencies yield material extra cost.”³⁵
 - 3.14.2 MEUG in its Issues Paper submission notes that “the scope of inquiry set out by the Commission... is both more comprehensive and more appropriate [than that proposed by Transpower in its application].”³⁶
- 3.15 The Commission and other parties identified both the system need date for the project, and the subsequent timeline compression as areas for further investigation.
- 3.15.1 Our expert reports into the Alliance Contract,³⁷ property acquisition strategy,³⁸ and MEUG’s cross-submission on the NIGU Project expert reports all supported our proposal to investigate the need date.³⁹
 - 3.15.2 Conversely Transpower did not consider the 2013 project need date to be a potential source of avoidable costs.⁴⁰

³⁵ Pacific Aluminium, “Submission to the Commerce Commission on Issues Paper for amending the allowance and outputs for the NIGU Project” 17 January 2014, para 3.

³⁶ Major Electricity Users’ Group, “Submission to the Commerce Commission on Issues Paper for amending the allowance and outputs for the NIGU Project” 17 January 2014, para 15.

³⁷ Strata “Alliance Contract report” (report to the Commerce Commission, July 2014) para 26.

³⁸ Calverton, “Property and easement acquisition report” (report to the Commerce Commission, June 2014) page 22-23.

³⁹ Major Electricity Users Group, “Cross-submission on expert reports for Transpower NIGU Project” 8 September 2014, para 5-6.

⁴⁰ Transpower “Submission to the Commerce Commission on Calverton property and easement acquisition report” 1 September 2014, page 2-5.

- 3.16 Following the criteria set out in clause 6.1.1 of the Capex IM, we investigated whether these six key factors, including wider issues relating to the project delivery timeframe, led to any avoidable costs.

Our investigation found that some of the key factors led to avoidable costs

- 3.17 This section outlines the main findings supporting our decision. This section is only a summary of our analysis. Where relevant, we cross reference to the relevant technical attachments (Attachments C to G), or reference the expert reports we commissioned for a more detailed discussion.
- 3.18 We have found that Transpower was overoptimistic in its planning for the project by delivering what it forecast was an eight-year project in five years, leading to a compressed timeframe. Transpower's deficiencies in planning and failure to mitigate the effects of the compressed timeframe appropriately, led to \$17.7 million in avoidable costs, specifically relating to out of sequence construction of the 400 kV lines as a result of out of sequence property access.

Project management and governance

- 3.19 Our evaluation of Transpower's general project management and governance has not identified any avoidable costs. For further detail on our analysis of project management and governance refer to Attachment C.
- 3.20 There was optimism bias in the planning stages of the NIGU Project. This meant that the budget and plan at approval were inadequate to deliver the scope of the project.
- 3.21 Therefore the additional expenditure above the original MCA mostly reflects the unavoidable costs required to deliver the project, as opposed to avoidable costs which were incurred in addition to necessary costs.⁴¹ Overruns caused by forecast errors, even those caused by optimism bias, are not of themselves avoidable costs.
- 3.22 Forecast adequacy is still important in this context. A failure to forecast adequately, and consequently delivering a project reactively, may lead to greater costs than what the case would have been had forecasts been accurate.

⁴¹ As discussed, we have found that \$17.7 million of the \$70 million expenditure above the approved MCA are avoidable costs.

- 3.23 There are areas where Transpower's project management and governance can be improved. An independent quality assurance review carried out at the end of the NIGU Project found that "[They had] an incomplete picture as to the operation and effectiveness of the project as a whole, and whether value for money has been obtained."⁴²
- 3.24 Despite the theoretical linkage between project management maturity and project costs, the areas for improvement we have identified are general in nature, and do not establish any avoidable costs.
- 3.25 In cases where we can establish that a key factor has caused avoidable costs, but are not able to accurately determine the quantum of those costs, using our best estimate (such as a point within a range of plausible values) may be appropriate. This would have the effect of sharing the costs between Transpower and consumers.
- 3.26 However, in the case of the NIGU Project, we have not established that there is a causal link between project management and a specific increase in costs. As such, the sharing of the remaining \$52.3 million suggested by MEUG and supported by M. Melhuish is not appropriate.⁴³ To do so would likely undermine Transpower's incentives to innovate and to invest. This would not promote the long-term benefit of consumers.
- 3.27 Our recommendations for areas of improvement for Transpower and our discussion of options for our major capex regime in the future are discussed in Attachment I.⁴⁴

Property rights acquisition

- 3.28 Our conclusion is that Transpower's acquisition of property did not lead directly to any avoidable costs.
- 3.29 We commissioned an expert report from Calverton that evaluated Transpower's property rights acquisition strategy and implementation.⁴⁵ For a detailed summary of Calverton's report on property acquisition refer to Attachment D.

⁴² IQANZ "North Island Grid Upgrade Project Independent Quality Assurance Follow-up Health Check and Close-out Review Detailed Report" 11 September 2013, page 3.

⁴³ MEUG "Submission on NIGU draft decision", 23 April 2015, page 2. M Melhuish "Submission: NIGU Capex allowance", 4 June 2015, page 1.

⁴⁴ For the sake of completeness, we note that not all areas for improvement we have identified involve conduct that falls short of that expected of a diligent and prudent operator in Transpower's position.

⁴⁵ Calverton, "Property and easement acquisition report" (report to the Commerce Commission) June 2014

- 3.30 As a general conclusion, Calverton considers that much of the additional cost incurred by Transpower came about as a result of unexpected and uncontrollable events. Calverton also identified areas of Transpower's performance that could have been better.
- 3.31 Having considered Calverton's findings and other relevant material, we do not consider that any avoidable costs can be directly or solely attributed to the property acquisition process. We do consider that the property acquisition plans and costs were optimistic, and that this had an influence on other areas of the project.
- 3.32 Calverton identified that onerous access conditions initially acted as a barrier to effective negotiation. The delays these caused are partly responsible for Transpower engaging in out of sequence construction, and therefore for cost overruns in that area. This is discussed in more detail below in paragraphs 3.39 to 3.45.

Alliance Contract

- 3.33 Our conclusion is that Alliance Contract arrangements did not lead to any avoidable costs.
- 3.34 We commissioned an expert report by Strata into the selection and performance of the Alliance Contract. For a detailed summary of Strata's report on the Alliance Contract refer to Attachment E.
- 3.35 Strata's main recommendation, based on the analysis framework and scope of the review, was "that the Commission ... does not make any adjustment to the application with regard to the structure, and operation of the Alliance Contract."⁴⁶
- 3.36 Transpower was the recipient of a favourable arbitration result in the dispute between itself and Balfour Beatty United Group Limited (BBUGL), its partner in the Alliance Contract.
- 3.37 The dispute resolution transferred \$32.9 million of costs related to scope change requests to BBUGL, and so reduced the overall cost of the project to Transpower.⁴⁷ As a result consumers will pay less for the NIGU Project than they might have otherwise have had to.

⁴⁶ Strata "Alliance Contract report" (report to the Commerce Commission, July 2014) para 25.

⁴⁷ Ibid, para 101.

- 3.38 MEUG's submission on our draft decision stated that Transpower may have had to bear these costs if they had not been carried by BBUGL. However, the fact that BBUGL had to bear these costs suggests that Transpower's contract management in this area was reasonable and prudent.⁴⁸

400 kV line construction costs

- 3.39 We have concluded that \$17.7 million of the costs of constructing the 400 kV line were avoidable. These costs were caused by out of sequence construction work.
- 3.40 A detailed analysis on construction costs can be found in Attachment F. We provide a summary below.
- 3.41 In its application, Transpower stated that it considered it was not appropriate to recover \$18 million in costs from consumers because this represented the costs due to suboptimal sequencing of construction activities.⁴⁹
- 3.42 In response to our questions, Transpower clarified that \$17.7 million of costs were caused by the Alliance having to work out of sequence. This was due to not having the necessary property access and rights in the same sequence as tower construction work.⁵⁰
- 3.43 We agree with Transpower that this out of sequence work could have been avoided. Transpower should have planned better, and taken all reasonable steps possible to acquire property rights in a manner that reduced or eliminated the need for out of sequence work.
- 3.44 One of the options Transpower had was to require less onerous access conditions when negotiating with landowners. Calverton noted that these onerous conditions likely contributed to protracted negotiations.

A further factor likely to have alienated landowners was Transpower's draft easement document which was held by some to have particularly onerous conditions relating to access.

There was a progressive increase in both easement and freehold acquisitions after August 2009 when the Transpower Board approved revised (ie less restrictive) negotiating parameters for property acquisition team.⁵¹

⁴⁸ MEUG "Submission on NIGU draft decision" 23 April 2015, page 2.

⁴⁹ NIGU amendment application, page 5.

⁵⁰ Transpower "Response to question: Derivation of the \$18 million" 30 June 2014.

Transpower "Response to question: 400kv line construction cost breakdown" 30 June 2014.

⁵¹ Calverton "Property and easement acquisition report" (report to the Commerce Commission, June 2014) page 9.

- 3.45 A key assumption in Transpower’s plan for the NIGU Project was sequential construction. Given the recognised risk posed by lack of sequential access, a prudent and diligent operator in Transpower’s position would have taken additional steps to control these risks and mitigate their effects.

System need date for the line

- 3.46 Our conclusion is that work required to meet the system need date for the line did not lead to any avoidable costs. For detailed analysis on the need date refer to Attachment G.
- 3.47 Transpower suggested in its application that the requirement to meet the need date resulted in cost overruns of \$22 million. In its submissions on our draft decision MEUG argues that these costs were avoidable, as they were due to optimism bias and behaviour which fell short of GEIP.⁵²
- 3.48 As discussed in Attachment C, Transpower underestimated costs, time, and risk in the NIGU Project. This led to the approved MCA being less than what the project required to deliver the scope of works, and Transpower’s view of the time available for different tasks being optimistic. This also meant that the project had limited timing flexibility.
- 3.49 We agree with MEUG that a diligent and prudent operator would have planned for possible changes to the need date and to the project work plan to allow for changes in consumer demand throughout the duration of the project.⁵³
- 3.50 However, Transpower’s decisions and actions regarding the need date did not fall short of the conduct expected of a diligent and prudent operator given the information available, and the circumstances in which Transpower found itself at the relevant times.
- 3.51 Transpower reviewed the need date in 2008 before entering into the Alliance Contract. It further reviewed the need date during the course of the delivery of the project. When it became apparent from the 2012 demand forecast that the need date had shifted and construction could have been deferred, the interest during construction costs made deferral uneconomic.

⁵² MEUG “Submission on NIGU draft decision” 23 April 2015, page 2.

⁵³ Ibid, page 2

- 3.52 Given Transpower's reviews of the demand forecasts throughout the duration of the project, and its actions to minimise additional costs, we do not consider that there is a sufficient basis to find that a diligent and prudent operator in Transpower's position would have taken additional mitigation actions that would have avoided the \$22 million costs.
- 3.53 Accordingly, we do not consider that Transpower should bear the additional \$22 million costs incurred to meet the need date.⁵⁴ This issue is discussed in more detail at the end of Attachment C.

Our decision promotes the purpose of Part 4

- 3.54 As discussed Chapter 2, our amended MCA must be consistent with our overarching goal of promoting the long-term benefit of consumers as set out in section 52A of the Act.
- 3.55 Our decision promotes the long-term benefit of consumers by preserving the incentives for Transpower to make appropriate investments and to deliver these efficiently.
- 3.56 Allowing Transpower to recover the \$17.7 million avoidable costs would disincentivise it from improving efficiency in the delivery of its investments, contrary to the requirement in section 52A(1)(b). Our decision means Transpower will bear these costs it should have avoided, and that consumers will not have to pay for these inefficient costs.
- 3.57 However, preventing Transpower recovering the remaining \$52.3 million would likely be detrimental to Transpower's incentives to invest and to provide services at a quality that reflects consumer demand. This would be contrary to the requirements of sections 52A(1)(a) and (b).
- 3.58 Our decision provides Transpower with investment incentives that are consistent with promoting the long-term benefit of consumers. We accordingly disagree with MEUG and M. Melhuish that any part of the remaining additional cost of \$52.3 million should be borne by Transpower.⁵⁵

⁵⁴ Ibid, page 2

⁵⁵ M. Melhish "Submission: NIGU Capex allowance" 4 June 2015, page 1; and MEUG "Submission on NIGU draft decision, 23 April 2015" 21 May 2015, para. 6(a).

- 3.59 We note that Transpower also identified the \$17.7 million of additional costs as a result of late planning and undertook not to recover these costs from consumers. We are encouraged that Transpower has both identified these additional costs in its application and has acknowledged it should not recover these additional costs from consumers.
- 3.60 The NIGU Project was challenging and complex, with multiple interlinking issues. It is not practical to undertake a full bottom-up review of the project. Our decision has identified the material avoidable costs incurred from our identified key factors.

Context for understanding our decision

- 3.61 Our decision to amend the MCA should be viewed in context. While the factors below have not influenced our decision, they are useful as a sense check on the decision we have arrived at.
- 3.62 The circumstances around this project were unique. The NIGU Project was the largest and most complex project undertaken by Transpower in many years, and involved multiple interlinking issues. This contributed to the originally approved MCA being optimistically low.
- 3.63 Transpower has absorbed approximately \$50 million of additional costs related to property acquisition which it is not able to recover from consumers under its IPP.
- 3.64 BBUGL absorbed \$33 million dollars in project costs because the independent expert brought in to settle the dispute between the Alliance parties arrived at this conclusion.⁵⁶
- 3.65 The overall cost (per km) of the project is, broadly speaking, comparable to transmission projects of a similar scale overseas.⁵⁷

⁵⁶ Strata "Alliance Contract report" (report to the Commerce Commission, July 2014) para 101.

⁵⁷ For a more detailed explanation of this comparison, see Attachment B, paragraphs B18 to B26.

4. How we have evaluated the output amendments

Purpose of this chapter

- 4.1 This chapter outlines our decision to accept the four output amendments proposed by Transpower.

Transpower has proposed changes to the outputs for the NIGU Project

- 4.2 The NIGU Project was approved by the Electricity Commission with a set of outputs which effectively set the scope of the project.⁵⁸ These outputs are listed in full in Table H1 in Attachment H.
- 4.3 Transpower did not deliver all the approved outputs, and has proposed a set of amendments to these outputs.⁵⁹
- 4.4 Transpower has applied to the Commission to amend these undelivered outputs. The outputs adjustment under clause 3.3.7(2) of the Capex IM will apply if we do not grant the amendment resulting in a reduction in the amount Transpower can recover from consumers for the NIGU Project.
- 4.5 We estimate that the reduction in scope due to the change in what Transpower delivered has reduced the actual project costs by approximately \$30 million.

The amendment application was been modified

- 4.6 Transpower modified its original amendment application to include an additional output amendment on 3 March 2015.⁶⁰ We published a copy of the letter requesting this modification, and sought the views of interested parties on it.
- 4.7 Transpower has also clarified the wording of the outputs it proposed in its application.⁶¹
- 4.8 The list of amendments to the outputs Transpower has proposed is set out in Table 4.1 below.

⁵⁸ Electricity Commission “Final Decision on Transpower’s North Island Grid Upgrade Proposal” 5 July 2007, para 2.1.1.

⁵⁹ NIGUP amendment application, page 125.

⁶⁰ Transpower “Letter to the Commission, North Island Grid Upgrade Project - Application for amendment to the approved major capex project output” 3 March 2015.

⁶¹ Transpower “Response to question: NIGU grid outputs” 3 March 2015.

Table 4.1: NIGU Project output amendments proposed by Transpower

| Transpower's proposed outputs |
|---|
| Procure, construct, commission and operate the necessary substation / transition station facilities near the existing Whakamaru substation (Air Insulated Switchgear [AIS]), a transition station in the vicinity of the South Auckland urban boundary (AIS), and Pakuranga substation (AIS). |
| Procure, construct, commission and operate by 2010: <ul style="list-style-type: none"> • 200MVAR of new static reactive plant at Otahuhu substation, and • 100MVAR of new static reactive plant at Penrose substation, and • 50MVAR of new static reactive plant at Hepburn Road substation. |
| Obtain designations, easements, resource consents and property purchases necessary for all the above works. The acquisition of easements over Auckland Council and Crown reserve land, to allow for the future installation of new 220kV underground cables from Brownhill substation to Otahuhu substation, may be deferred until such time that Transpower determines it reasonably necessary to acquire the easements, having regard to the proposed commissioning date of the new underground cables. |
| Procure, construct, commission and operate a 220 kV switching station in the vicinity of Drury by 2010 and upgrade the 220 kV Otahuhu – Whakamaru C line by 2011. |

How we made our decision to accept the proposed outputs

- 4.9 To make our decision on the proposed outputs we applied the evaluation criteria in the Capex IM.⁶² Our approach to these criteria is set out in Chapter 2. See Attachment H for more details on how the evaluation was carried out. Our decision on outputs does not affect our decision on the MCA.
- 4.10 Our decision to accept all the proposed outputs does not result in any further adjustment to the amended MCA.
- 4.11 We note MEUG's support for our decision to amend Transpower's outputs.⁶³
- 4.12 Where Transpower requests us to amend the outputs for a major capex project, we may make a corresponding amendment to the MCA to reflect these changes. However, for the reasons below, this is not relevant to our current decision.
- 4.13 In assessing Transpower's actual costs, we are examining what it has actually delivered in the NIGU Project. As the proposed changes to the outputs will reflect what has actually been delivered, the changes in outputs are already taken into account in our decision on the MCA, so no further change to the amended MCA is required.

⁶² Capex IM, cl 3.3.4(2)(c).

⁶³ MEUG "Submission on NIGU draft decision, 23 April 2015" 21 May 2015, para. 4.

4.14 Had we found avoidable costs in the NIGU Project in excess of \$70 million, we would have considered lowering the amended MCA below the original MCA, as we stated in our Issues Paper.⁶⁴ The possible reduction would have been up to the difference in value of the undelivered outputs. In this case, this would have been about \$30 million.

Our decision promotes the purpose of Part 4

4.15 Any amendments to the outputs must be consistent with promoting the long-term benefit of consumers as. In particular, any amendments must promote Transpower's incentives to invest appropriately and to increase efficiency.

4.16 Transpower should be able to recover the costs for implementing the air insulated switchgear solution at Pakuranga substation. The outcome resulted in lower prices for consumers, with no material reduction in the level of transmission service provided.

4.17 Transpower should be able to recover the costs for delivering an equivalent solution in spreading the installation of static reactive support over separate substations. The cost to consumers was not materially different to the planned approach and there is no reduction in the level of transmission service provided.

4.18 Delaying the acquisition of easements in Crown and Council land for the future Otahuhu to Brownhill cable route avoids consumers having to pay for investments before they are required.

4.19 It is appropriate to update the commissioning date for the Otahuhu to Whakamaru C line thermal uprating, as this only clarifies an ambiguity in the original drafting of the output. This has no detrimental impact on consumers.

⁶⁴ Commerce Commission "Amending Transpower's allowance and outputs for the North Island Grid Upgrade Project: Issues Paper" 29 November 2013, para 2.8.

Attachment A: Summary of Transpower's application

Purpose of this attachment

- A1 The purpose of this attachment is to:
- A1.1 summarise Transpower's application to amend the MCA and outputs for the NIGU Project; and
 - A1.2 provide a timeline of events relevant to Transpower's application.
- A2 This information has been included to provide the reader with the factual context necessary to understand our decision. It is not intended to be comprehensive. Transpower's application is available on our website.⁶⁵

Summary of Transpower's application

- A3 On 30 September 2013, we received Transpower's proposal seeking approval of additional costs and changes to four outputs for its NIGU Project which was commissioned in October 2012, eight months ahead of the planned need date of June 2013.

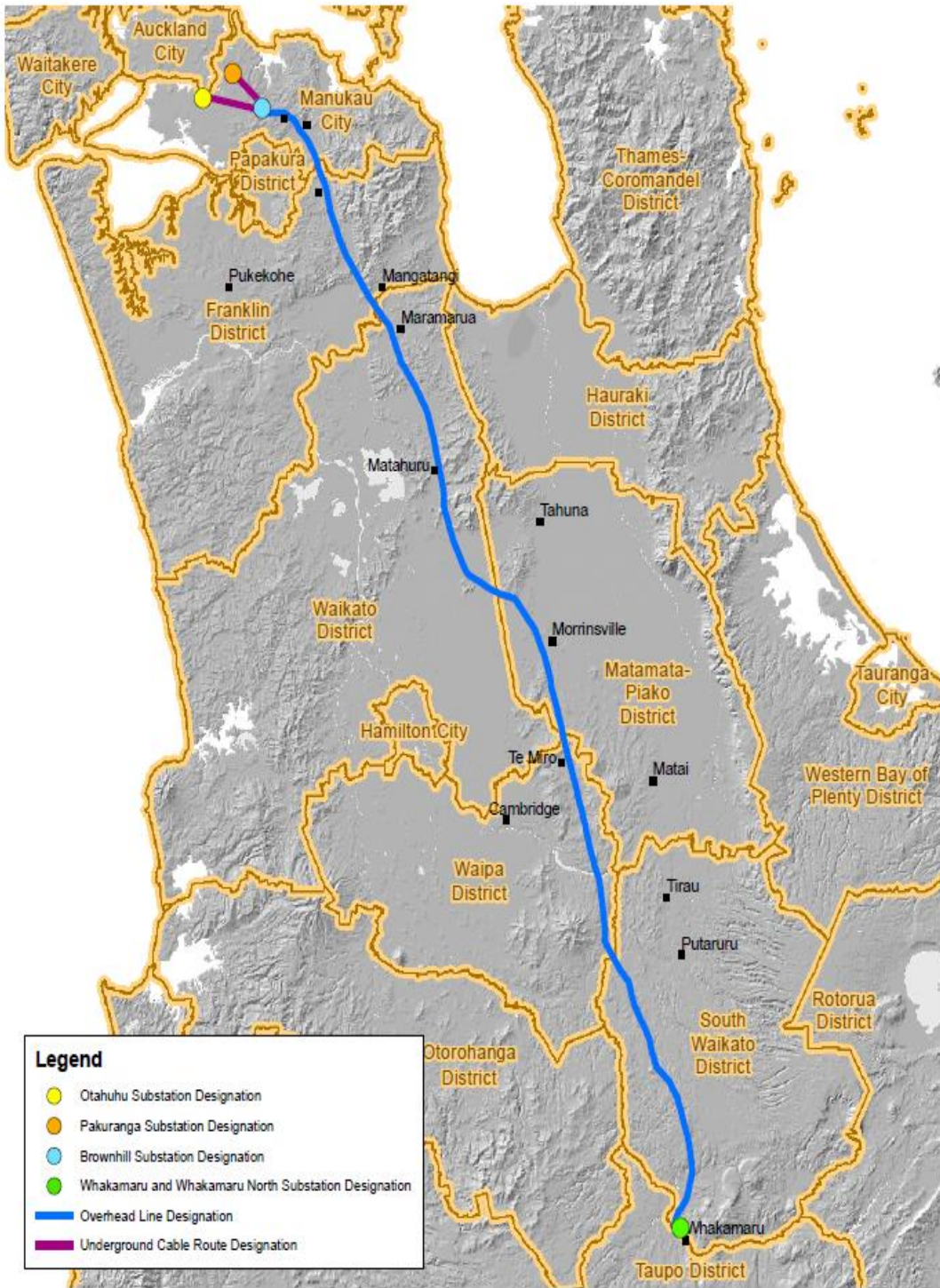
A brief description of the NIGU Project

- A4 The NIGU Project built a new 400 kV-capable transmission line from Whakamaru in the central North Island to Pakuranga in South Auckland, a distance of 196 km. The main components of the project – which are illustrated in Figure A1 – were:
- A4.1 186 km of 400 kV overhead lines strung on 426 towers from Whakamaru North substation to Brownhill substation;
 - A4.2 10 km of dual 220 kV underground cables from Brownhill substation to Pakuranga substation;
 - A4.3 three new substations at Pakuranga, Otahuhu and Brownhill and the extension of the existing Whakamaru substation; and
 - A4.4 the acquisition of properties or property rights for 318 properties to construct the transmission line, lay the cable and enable the substation projects.⁶⁶

⁶⁵ <http://www.comcom.govt.nz/regulated-industries/electricity/electricity-transmission/transpower-major-capital-proposal/amending-the-allowance-and-outputs-for-the-north-island-grid-upgrade-project/>

⁶⁶ Transpower secured easements over all properties except for two kilometers of properties along the cable route between Brownhill to Otahuhu that crosses Auckland Council and Crown reserve land. This land is designated therefore the landowners can call to be compensated for this land at any time.

Figure A1: NIGU Project transmission line route



- A5 The project also included three deferral projects intended to delay the system need date, giving Transpower more time to complete the main project. These were:
- A5.1 the construction of a new switching station at Drury;
 - A5.2 the thermal uprating of the Huntly-Hamilton-Whakamaru section of the Otahuhu-Whakamaru C line; and
 - A5.3 the installation of 350 MVar static compensation in the Auckland region to defer the forecast system need date for the transmission line from 2010 to 2013.
- A6 Transpower plans to install an underground cable from the Brownhill substation to the Otahuhu substation when required. The application forecasted a need date for this cable of 2021. The approved MCA did not include an allowance for installing the cable. However, the MCA did recognise the cost of acquiring easements over the land.

Transpower's proposal asks for an increase in the MCA to \$894 million and to amend four project outputs

- A7 The MCA for the NIGU Project was \$824 million.⁶⁷ Transpower is seeking an increase to \$894 million.⁶⁸ Without an amendment, Transpower cannot recover more than \$824 million from consumers.
- A8 Table A1 is a financial summary of the NIGU Project. It shows:
- A8.1 the MCA based on forecast nominal expenditure given assumed consumer price index (CPI) and foreign exchange (FX) rates and a targeted completion date of 2011;
 - A8.2 the MCA adjusted for differences between the forecast and actual CPI and FX rates over the course of the project. This adjusted allowance is what would have been approved by the Electricity Commission if CPI and FX rates were able to be forecast accurately;
 - A8.3 how Transpower allocated the \$824 million across the main subprojects/reporting categories it used to provide updates to its board;

⁶⁷ Transpower "NIGUP – Application for approval, amended proposal" 20 October 2006, page 7.

⁶⁸ NIGUP amendment application, page 10. Although, Transpower seeks to increase the allowance to \$894 million from \$824 million, it has stated that it only intends to recover \$874 million of expenditure.

- A8.4 the nominal sum of actual expenditure (\$894 million) incurred by Transpower to deliver the project, which it commissioned in October 2012; and
- A8.5 each subproject/reporting category in Table A1 is inclusive of any interest during construction incurred by Transpower.

Table A1: Transpower's accounting for costs

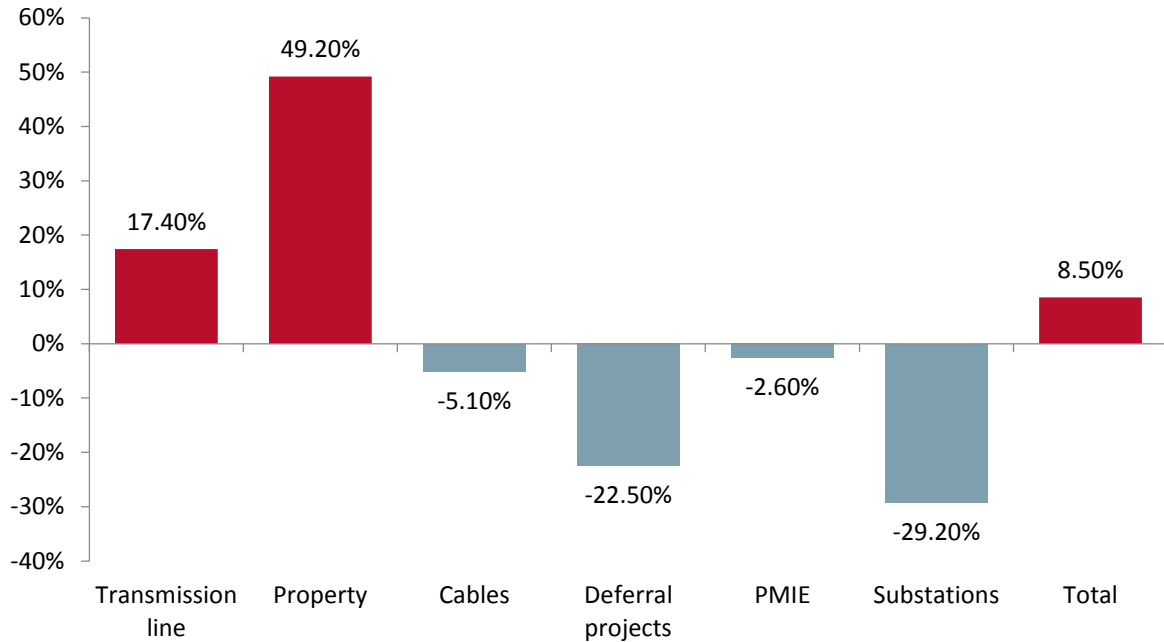
| | Transmission Line | Property | Cables | Deferral Projects | PMIE⁶⁹ | Substations | Total |
|--|------------------------------|-----------------|---------------|------------------------------|--------------------------|--------------------|--------------|
| MCA (\$m) | | | | | | | 824 |
| Adjusted allowance for actual CPI/FX (\$m) | | | | | | | 744 |
| Transpower's forecast cost (\$m)⁷⁰ | 340 | 126 | 158 | 49 | 38 | 113 | 824 |
| Actual spend (\$m) | 399 | 188 | 150 | 38 | 39 | 80 | 894 |
| Variance of actual spend to Transpower's budget (\$m) | 59 | 62 | -8 | -11 | 1 | -33 | 70 |
| Variance of actual spend to adjusted allowance (\$m) | | | | | | | 150 |

⁶⁹ Project management, investigations, and environmental

⁷⁰ After the Electricity Commission approved this project, Transpower allocated the MCA across all sub-projects in the manner shown in this row. We refer to this as the forecast costs.

A9 Figure A2 shows the percentage variances for the subprojects actual costs against their forecast costs.

Figure A2: NIGU Project variance of actual spend to Transpower's budget



Transpower's summary of key factors

- A10 Under the Capex IM, Transpower is required to provide a description of the key factors which led to it making the application.
- A11 Transpower set out what it considered to be the key factors that led to its application in sections 6 to 12 of the application.⁷¹ Table A2 below provides a summary of the key factors which Transpower considers led to the overspend.

⁷¹ NIGUP amendment application, Appendix 3. The information requirements in Schedule H of the Capex IM require Transpower to explain what key factors, in its view, led to the application.

Table A2: Transpower's key factors leading to its application

| Key factor | Contributing factors |
|--|---|
| Inappropriate Major Capital Allowance calculation | Assumption that cost categories were independent was incorrect |
| Actual Brownhill-Whakamaru transmission line property costs exceeded those included in the Electricity Commission approval | Actual costs exceeded estimated costs Some actual costs were not included in the original estimates Protracted approvals |
| Actual Brownhill-Whakamaru transmission line costs exceeded those included in the Electricity Commission approval | Actual costs exceeded estimated costs Some actual costs were not included in the original estimates Protracted approvals Late planning Limited access |

Timeline of events relevant to Transpower's application

A12 Table A3 below provides a timeline of events that are relevant to Transpower's application to amend the MCA and outputs of the NIGU Project.⁷²

Table A3: Summary of events leading to the amendment application

| Date | Event | Description |
|-----------------|---|--|
| 2003 | Transpower begins planning for the NIGU Project | Transpower forms an internal NIGU team to commence planning work, engage with affected landowners, and prepare for the regulatory process. |
| Oct 2004 | Consultation with land owners begins | Transpower begins early consultation with land owners and communities who may be impacted by the planned transmission line route. |
| Sep 2005 | Initial proposal submitted to the Electricity Commission | Transpower submits the original Grid Upgrade Project for the NIGU Project to the Electricity Commission on 30 September 2005. This proposal comprised building a 400 kV line and installing 400 kV transformers by 2013. |
| Jan 2006 | Wide corridor within the indicative route alignment was established | Corridor selection is an iterative process. Transpower established a broad corridor to enable it to consult on and refine the route of the transmission line. |
| 2006 | Transpower commissioned BBUGL and DownerEDI to prepare bids for the contract for \$1 m each | BBUGL is a joint venture between Belfour Beatty (UK) and United Group of Australia. |
| Oct 2006 | Amended proposal submitted to the Electricity Commission | Transpower withdraws and amends its original proposal in response to feedback from the Electricity Commission. Its amended proposal now reflected the installation of the 400 kV Transformers being deferred. |
| May 2007 | Property acquisition begins | Transpower starts the process of acquiring easements and signed the first easement agreement in May 2007. |
| May 2007 | Transpower lodges "Notice of Requirement" | Transpower lodges "Notices of Requirements" under the Resource Management Act 1991, with seven local councils. |
| Jul 2007 | Electricity Commission approves the NIGU Project | This was the amended proposal Transpower submitted to the Electricity Commission in October 2006 and the one we have decided to amend. |

⁷² Unless mentioned otherwise, the information in this table is from the document: NIGUP amendment application, pages 13-17.

| Date | Event | Description |
|-----------------|--|---|
| Mar 2008 | Hearing of 'Notice of requirements' began | A Ministry for the Environment Board of Inquiry began hearings of the Notices of Requirements and applications for resource consent. |
| May 2008 | Transpower Board approved \$278.5 m for the construction of 400 kV line | The BOI hearing included the competitively established price of \$235.3 m. The \$278.5 m excluded insurance, financing costs and management costs that were not part of the project Alliance. ⁷³ |
| Sep 2008 | Designations and consents required for the project are approved | The Board of Inquiry released its final report approving the necessary designations and consents for the project. |
| Sep 2008 | Transpower entered a Project Alliance Agreement for the construction of the 400 kV transmission line | Transpower and their alliance partner BBUGL used an alliance structure to deliver the 400 kV line. The Alliance Leadership Team had three senior managers from Transpower and three from BBUGL. ⁷⁴ |
| Jan 2010 | Site work started | 40% of property rights still outstanding. ⁷⁵ |
| Jul 2011 | All property rights secured | Transpower obtained easements on 318 properties crossed by the 400 kV line. ⁷⁶ |
| Oct 2012 | 400 kV line commissioned | \$399 m for 186 km of 400 kV line. |

⁷³ NIGUP amendment application, page 69.

⁷⁴ Ibid, page 69.

⁷⁵ Ibid, page 77.

⁷⁶ Ibid, page 58.

Attachment B: Summary of cost overruns

Purpose of this attachment

- B1 This attachment provides a quantitative account of the cost overruns relative to the original MCA, and the difference between the actual and ‘target cost estimate’ (TCE) of the costs of constructing the 400 kV transmission line.⁷⁷
- B2 In this attachment we discuss:
- B2.1 the difference between actual costs and original MCA;
 - B2.2 the costs borne by Transpower and BBUGL;
 - B2.3 the effect of CPI, FX and undelivered outputs on the MCA;
 - B2.4 the construction cost of the 400 kV transmission line; and
 - B2.5 NIGU 400 kV line cost compared to other transmission line costs.

Comparison between actual costs and the original MCA

- B3 Table B1 below shows a summary of the actual and the estimated costs of the NIGU Project. The Electricity Commission approved the total MCA of \$824 million rather than the individual components of the cost estimates that made up the MCA.
- B4 The actual cost of the project is \$978 million. This cost is calculated as the sum of nominal expenditure as it was incurred and interest during construction over the duration of the project.
- B5 The \$978 million contains \$84 million of costs that Transpower does not intend to include in the NIGU Project costs.⁷⁸
- B6 Table B1 also shows the difference between the ‘actual cost that Transpower intends to include in its asset base’ and the originally approved MCA.⁷⁹ As shown, the overspend was associated with the construction of the 400 kV transmission line and acquisition of the property rights for this line (NIGU property) projects.

⁷⁷ The target cost estimate was the cost BBUGL estimated when it tendered for constructing the 400 kV line.

⁷⁸ As discussed later in this attachment, this \$84 million was absorbed by Transpower and BBUGL.

⁷⁹ The cost categories for the original MCA and those used in the project are different, so Transpower was not able to provide components of MCA by the cost categories. Summaries are in tables 4-6 and 4-7 of Transpower’s application. For our purposes we have used the reallocated costs as shown in Table 4-7 of Transpower’s application.

Table B1: Actual versus estimated costs

| Projects | Actual cost (\$m as spent) | MCA costs reallocated after approval (\$m, 2011)⁸⁰ | Difference between actual costs and MCA (\$m)⁸¹ | Estimated cost (P50)⁸² (\$m, 2011) |
|--|---------------------------------------|--|---|--|
| 400 kV Transmission line | 399 ⁸³ | 340 | 59 | 313 |
| NIGU property | 187 ⁸⁴ | 113 | 74 | 122 |
| Cables | 150 ⁸⁵ | 162 | -12 | 144 |
| Deferral projects | 38 ⁸⁶ | 49 | -11 | 45 |
| Investigations and Environment | 39 ⁸⁷ | 38 | 1 | 38 |
| Substations | 80 ⁸⁸ | 122 | -42 | 102 |
| Transpower's requested allowance | 894⁸⁹ | | | |
| Additional 400 kV lines cost borne by BBUGL | 33⁹⁰ | | | |
| Additional property costs borne by Transpower | 51 | | | |
| Total | 978 | 824 | 70 | 764 |

⁸⁰ NIGUP amendment application, pages 28-29.

⁸¹ Note that the MCA is in 2011 prices while 'actual spend' is nominal. The difference arises from differing accounting treatment of these numbers.

⁸² NIGUP amendment application, page 23.

⁸³ Ibid, page 69.

⁸⁴ Ibid, page 52.

⁸⁵ Ibid, page 91.

⁸⁶ Ibid, page 99.

⁸⁷ Ibid, page 108.

⁸⁸ Ibid, page 37.

⁸⁹ Transpower's cost is \$894 million but the total of this column is \$893 million. The difference is due to rounding. The same applies to the total in the column 'Difference between actual costs and MCA'.

⁹⁰ Strata "Alliance Contract report" (report to the Commerce Commission, July 2014) para 101.

- B7 The combined cost for the 400 kV transmission line and NIGU property projects is approximately \$133 million more than Transpower allocated. This represents a 30% cost overrun above the estimated cost allocated, and is the reason we have focused our investigations on these two areas.
- B8 The \$133 million overrun was partly compensated by approximately \$63 million of cost savings in the deferral, substations and cables projects.⁹¹

Costs borne by Transpower and BBUGL

- B9 The total cost of constructing the 400 kV line was approximately \$432 million. Transpower included \$399 million in its MCA application. BBUGL has absorbed the remaining \$33 million.⁹² This was mainly due to sharing of risks between Transpower and BBUGL under the Alliance Contract which is discussed in Attachment E.
- B10 Transpower bore approximately \$51 million of losses on the re-sale of properties it purchased to obtain easements. According to the Transpower Input Methodologies,⁹³ Transpower is unable to treat the gains or losses on purchase and sale of property as regulated income or expenses.⁹⁴

Effect of CPI, FX, and undelivered major project outputs on expenditure above the MCA

- B11 The approved MCA includes forecasts for CPI and FX and sets a number of major project outputs that the project must deliver. Undelivered major project outputs effectively reduce the scope of the project.⁹⁵
- B12 Figure B1 shows the effects of the disparity between actual and forecast values of CPI and FX, the major project outputs not delivered, and our decision.
- B12.1 Transpower has advised that CPI and FX rate disparities total \$80.3 million; \$50.8 million for CPI disparities and \$29.5 million for FX disparities.⁹⁶
- B12.2 We estimate the value of the undelivered major capex project outputs to be \$30 million.⁹⁷

⁹¹ Numbers in the table add to \$64 million due to rounding.

⁹² Strata "Alliance Contract report" (report to the Commerce Commission, July 2014) para 101.

⁹³ Commerce Commission "Transpower Input Methodologies Determination" 29 June 2012, cl 2.2.7.

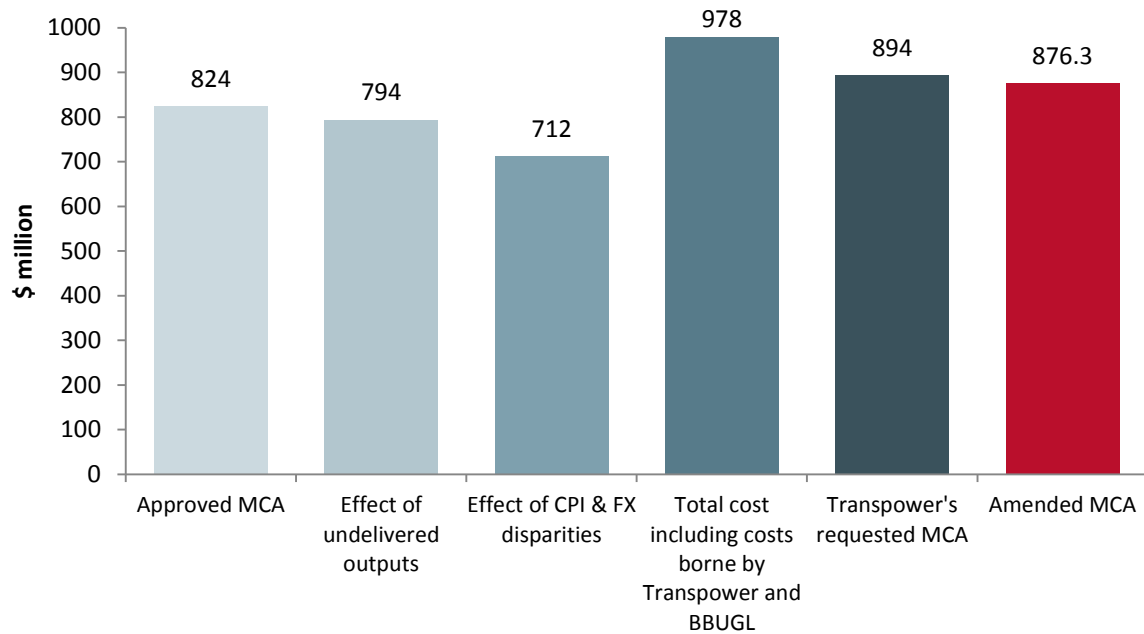
⁹⁴ The full cost of any land that Transpower purchases is not included in the regulatory asset base (RAB) (ie, costs recovered through regulated income) so that consumers are not exposed to risk of the eventual profit or loss made on land Transpower buys for the purpose of securing easements. Profit or loss on sale of land depends on when Transpower decides to buy or sell the land, and any changes it has made to the property before the sale. Such decisions are solely Transpower's. (Commerce Commission "Transpower Input Methodologies Reasons paper" December 2010, para 4.4.103).

⁹⁵ The impact of undelivered outputs is discussed in Chapter 4 and Attachment H.

⁹⁶ Transpower "NIGUP – CPI and FX adjustments" 26 November 2013.

- B13 A better reflection of cost overruns is achieved by taking into account the changes in forecast versus actual CPI, FX, and project outputs, rather than as a simple comparison of the approved MCA and the actual incurred costs.

Figure B1: Comparison of forecast and actual spend



⁹⁷ Refer to Attachment H for further details.

Cost overruns due to the construction of the 400 kV transmission line

B14 Table B2 below shows the 400 kV transmission line cost by cost element.⁹⁸

Table B2: 400 kV line costs by cost element

| Cost elements | Value (\$m, as spent) |
|--|-----------------------|
| Direct cost of constructing of the 400 kV line | 313.0 |
| Profit and overhead | 18.8 |
| Transpower direct project costs | 19.5 |
| Hedging – procurement costs | 9.6 |
| Known risk provisions | 1.5 |
| Financing costs | 43.1 |
| Arapuni-Pakuranga line dismantling ⁹⁹ | -6.7 |
| Total | 398.8 |

B15 For the purpose of assessing avoidable costs associated with the 400 kV transmission line, we focused on the direct cost of constructing the line, \$313 million.¹⁰⁰ We separated this cost into two categories.

B15.1 The ‘original TCE’, which was the cost BBUGL estimated when it tendered for constructing the 400 kV line.

B15.2 The ‘cost overruns’ that includes all costs above the original TCE.

B16 Table B3 below shows the direct cost of constructing the 400 kV line by work packages Transpower used for managing costs.¹⁰¹

B17 The first column from the left in Table B3 lists the work packages. The second shows the target estimate costs at the time when the tender was prepared and the third shows the actual (direct) costs of constructing the 400 kV line. The fourth and fifth show the cost overruns and the sixth includes the reasons for the cost overruns.

⁹⁸ NIGUP amendment application, page 71.

⁹⁹ Transpower treated the cost of dismantling the Arapuni-Pakuranga line as opex. \$6.7 million of the cost of dismantling the Arapuni-Pakuranga line has been deducted from the 400 kV transmission line costs.

¹⁰⁰ We provide details of our evaluation in Attachment F.

¹⁰¹ Transpower “Response to question: 400 kV line construction cost breakdown by driver”. All costs are \$million, as they were incurred.

Table B3: Details of cost of the 400 kV line

| Work package | Original TCE | Actual cost ¹⁰² | Variance between TCE and actual costs | | Causes of the cost overrun (variance between TCE and actual costs) ¹⁰³ |
|-------------------|--------------|----------------------------|---------------------------------------|------------|---|
| | | | Total | By drivers | |
| Engineering | 5.6 | 6.9 | 1.3 | 1.3 | Tower and foundation design |
| Procurement | 66.9 | 69.7 | 2.8 | 2.8 | Increased price of tower steel and reduced price of conductor |
| Warranty | 0 | 1.1 | 1.1 | 1.1 | |
| Tower erection | 18.6 | 25.0 | 6.4 | 2.0 | Low productivity rates – unskilled work force |
| | | | | 1.0 | Unavailability of tower steel |
| | | | | 1.1 | Winter working (meet need date) |
| | | | | 1.3 | Out of sequence work |
| | | | | 1.0 | Late access |
| Site preparations | 31.9 | 51.5 | 19.6 | 4.2 | Sites not surveyed before cost estimates were prepared |
| | | | | 6.9 | Deal with larger foundation and meet need date |
| | | | | 0.2 | Resource consent requirements to preserve topography |
| | | | | 3.2 | Meet need date |
| | | | | 1.3 | Out of sequence work |
| | | | | 0.5 | Changed land use |
| | | | | 3.0 | Underestimate in TCE |
| | | | | 0.3 | Safety |

¹⁰² These are the costs to Transpower, rather than cost of constructing the 400kV line. In its documents, Transpower refers to the actual costs as FEC which means forecast end costs.

¹⁰³ The drivers in bold indicate our view of the costs that could have been avoided.

| Work package | Original TCE | Actual cost | Variance between TCE and actual costs | | Causes of the cost overrun (variance between TCE and actual costs) |
|------------------------------------|--------------|-------------|---------------------------------------|-------------|--|
| | | | Total | By drivers | |
| Foundation | 22.9 | 48.3 | 25.4 | 22.5 | Lack of site-specific geotechnical knowledge. Significant increase in depth and diameter |
| | | | | 0.5 | Winter working and using larger drilling and piling rigs |
| | | | | 1.4 | Out of sequence work |
| | | | | 0.9 | Underestimate in TCE |
| Stringing | 13.8 | 36.1 | 22.3 | 3.1 | Out of sequence stringing |
| | | | | 3.2 | Maintain programme |
| | | | | 1.5 | Equinoxial wind |
| | | | | 0.3 | Corrosion of conductor stored at the port |
| | | | | 9.2 | Omitted scope for hurdles and nets – crossing 110 kV lines, roads etc. |
| | | | | 5.0 | TCE underestimate |
| Indirect costs | 32.8 | 49.8 | 17.0 | 4.0 | Additional resource to complete work by system need date – larger |
| | | | | 10.6 | Out of sequence working – consequential costs |
| | | | | 0.8 | Underestimate of safety training |
| | | | | 1.6 | Supergang accommodation |
| Monopoles | 0 | 8.5 | 8.5 | 8.5 | BOI requirements |
| Consumables | 4.8 | 10.5 | 5.7 | 5.7 | Increased labour and equipment |
| Existing 110 kV lines | 0.1 | 2.9 | 2.8 | 2.8 | Under forecasted costs of scaffolding |
| Arapuni-Pakuranga line dismantling | 4.3 | 6.7 | 2.4 | 2.4 | Addition resources required to dismantle the Arapuni-Pakuranga costs are separated from the 400 kV line costs in the RAB |
| Sale of assets | 0 | -4.0 | -4.0 | -4.0 | Sale of vehicles and equipment |
| Total | 202 | 313 | 111 | | |

400 kV lines costs compared to other transmission line costs

- B18 The delivered cost of the 400 kV line of \$399 million is approximately \$2.1 million per km in 2011 prices.
- B19 Balfour Beatty, one of the Alliance participants, has stated that the cost of the NIGU 400 kV transmission line was consistent with the cost of other lines it had built around the world.¹⁰⁴
- B20 It is difficult to validate such a claim because of the many site-specific factors that affect design and the cost of high voltage transmission lines. These factors include ground conditions, terrain, and wind loading.
- B21 Instead of benchmarking, we have sense-checked Balfour Beatty's statement on costs against the unit costs of a 275 kV line BBUGL built in Australia and the 220 kV Wairakei-Whakamaru C line Transpower commissioned in 2014.
- B22 Balfour Beatty stated that it built a 275 kV line in Australia at a cost of \$1.3 million per km, and that a 400 kV line costs between 30-50% more than a 275 kV line.
- B23 The NIGU 400 kV line cost about 40% more than the Australian 275 kV line. Allowing for the difference in the Australian/New Zealand dollar exchange rate at that time, the per kilometre cost of the NIGU 400 kV line appears comparable with that of the 275 kV line.
- B24 The Wairakei-Whakamaru line cost about \$1.7 million per km.¹⁰⁵ Accounting for the difference in the capacity, performance and construction of the NIGU 400 kV line and the Wairakei-Whakamaru C line, the unit cost appears broadly comparable.
- B25 The Wairakei-Whakamaru C line is a much shorter line and therefore is expected to have a higher per kilometre cost. However, the NIGU 400 kV line is designed to operate at a much higher voltage, was built to a higher reliability standard, and has much greater capacity than the Wairakei-Whakamaru C line. As such, it is understandable that the unit cost of the NIGU line is higher.
- B26 The unit cost of the NIGU 400 kV line is about 24% more than the expected unit cost of the Wairakei-Whakamaru C line which is within the 30-50% range indicated by Balfour Beatty.

¹⁰⁴ Transpower "Submission to the Commerce Commission on Issues Paper for amending the allowance and outputs for the NIGU Project" 17 January 2014, page 43.

¹⁰⁵ Also note that the estimated cost is in 2013 prices.

Attachment C: Project management and governance

Purpose of this attachment

- C1 The purpose of this attachment is to discuss the findings of our evaluation of project management and governance of the NIGU Project as it relates to the amendment application.
- C2 This attachment discusses why project management and governance is an important issue to consider in our evaluation, and presents our findings on these matters, including our views on the role of optimism bias.

Summary

- C3 As our evaluation of project management and governance has not identified any material avoidable costs, we have not reduced the MCA requested by Transpower for reasons related to project management and governance.
- C4 Our evaluation of project management and governance has not identified any sufficient reason not to accept the output amendments proposed by Transpower. We encourage Transpower to amend the project outputs it developed, where these changes promote the long-term benefit of consumers.
- C5 Our investigation identified optimism bias as a significant concern with the management and governance of the project. Optimism bias was present throughout the planning and development of the NIGU Project. This bias meant that the project plan and budget used to justify the MCA were not sufficient to deliver the scope of the works.
- C6 We have concluded that most of the overspend was not due to avoidable costs being incurred in delivering the NIGU Project. It is instead largely the result of the actual costs required to deliver the NIGU Project being in excess of Transpower's estimated P90 value of project costs.¹⁰⁶
- C7 In the sections below we provide background on:
 - C7.1 our reasons for evaluating project management and governance in the NIGU Project; and
 - C7.2 the process used in our investigation.

¹⁰⁶ The P90 is the term used for the 90th percentile. Using a P90 estimate means that in 90% of the cases the actual value will be equal to or lower than the P90 value, but in 10% of cases it will be higher.

Project management and governance in the NIGU Project

- C8 We consider that we needed to evaluate project management and governance in the NIGU Project to properly assess Transpower’s application.
- C9 The NIGU Project was the first large scale transmission line project that Transpower had undertaken in over twenty years. We consider that Transpower started the project without sufficient knowledge of what it would involve.
- C10 For example, Transpower’s independent quality assurance review considered that the line construction was a learning process for all parties,¹⁰⁷ and Transpower became aware during the project that the compulsory acquisition process could not be used as it had planned.¹⁰⁸
- C11 We separately identified both project management and project governance as issues for our evaluation of the amendment application in the Issues Paper.¹⁰⁹
- C12 While set out separately in the Issues Paper, we consider project governance to be an integral part of project management. This is not the governance function of the organisation in general, but only in relation to the NIGU Project. For the remainder of this attachment we treat these as one issue under the overall heading of project management.
- C13 In submissions on the Issues Paper, MEUG and Pacific Aluminium agreed with our proposal to investigate these aspects of the NIGU Project.¹¹⁰ MEUG also highlighted concerns with project management in its submission on the Alliance report.¹¹¹

¹⁰⁷ IQANZ “North Island Grid Upgrade Project Independent Quality Assurance Follow-up Health Check Review” March 2012, page 3.

¹⁰⁸ Calverton "Property and easement acquisition report" (report to the Commerce Commission, June 2014) page 40.

¹⁰⁹ Commerce Commission "Amending Transpower's allowance and outputs for the North Island Grid Upgrade Project: Issues Paper" 29 November 2013, para 4.3.1.

¹¹⁰ Major Electricity Users' Group “Submission to the Commerce Commission on Issues Paper for amending the allowance and outputs for the NIGU Project” 17 January 2014, para 17.

Pacific Aluminium “Submission to the Commerce Commission on Issues Paper for amending the allowance and outputs for the NIGU Project” 17 January 2014, para 9 and para 11.

¹¹¹ Major Electricity Users' Group “Submission to the Commerce Commission on Strata Alliance contract report and Calverton property and easement acquisition report” 1 September 2014, para 4.

How we evaluated project management in the NIGU Project

- C14 We formed our views on project management in the NIGU Project based on our examination of:
- C14.1 the three external reviews of the NIGU Project carried out by Independent Quality Assurance New Zealand Limited (IQANZ);
 - C14.2 our assessment of Transpower’s application, supporting information, and responses to the questions we asked Transpower using a project management assessment framework; and
 - C14.3 the findings of our expert reports into the property and Alliance Contract aspects of the NIGU Project.¹¹²
- C15 Our findings are set out in the section below.

Our findings in relation to project management for the NIGU Project

- C16 In this section we discuss how we concluded that we should not adjust the MCA requested by Transpower on the basis of project management considerations. We discuss why we consider optimism bias was a significant factor in the NIGU Project.

We have not reduced the MCA due to our project management findings

- C17 We do not consider that our evaluation of project management and governance has identified any material avoidable costs. We have therefore not reduced the MCA requested by Transpower under this key factor.
- C18 This is despite an independent quality assurance review, carried out at the end of the NIGU Project, finding:

[We] have an incomplete picture as to the operation and effectiveness of the project as a whole, and whether value for money has been obtained.¹¹³

- C19 Transpower has spent more on the project than it forecast the likely maximum amount of the project to be, ie \$824 million. This maximum figure was above the expected cost of project, ie, \$764 million. It should also be noted when considering the cost forecasts that Transpower has delivered a lesser scope of works than that proposed in the original approval.

¹¹² The findings of these reports are discussed in Attachments D and E.

¹¹³ IQANZ “North Island Grid Upgrade Project Independent Quality Assurance Follow-up Health Check and Close-out Review Detailed Report” 11 September 2013, page 3.

- C20 However, no out of scope costs appear to have been included and, at various points in the project contractors have delivered cost effective solutions and Transpower has sought least cost outcomes.
- C21 We consider Transpower has spent more on the project because it was optimistic at the planning stage of the NIGU Project. This means Transpower underestimated the costs, risks and timeframes that made up the plan to deliver the project. This is a recognised issue with large infrastructure projects and is discussed in the optimism bias section below.
- C22 The costs spent above both the expected costs and the MCA for the project are, for the most part, the realisation of the actual costs required to deliver the project scope to the plan.
- C23 Our investigation into project management covered a wide range of material, as described in paragraph C14. This included Transpower's original work on the NIGU Project, its project planning and implementation, through to its post project reviews. In addition to the issue of optimism bias, we also evaluated other aspects of project management. Our findings on these aspects are discussed below.
- C24 There are opportunities for Transpower to demonstrate improvements in project management. This is discussed in Attachment I, as are options for improvement for the Commission to consider.
- C25 The opportunities available to Transpower do not represent specific costs that Transpower should not recover in the amended MCA for the NIGU Project.
- C26 There are recognised linkages between project management maturity and project outturn costs. However applying generalised formula, averages or benchmarks from other projects will not sufficiently identify any avoidable costs in the NIGU Project.
- C27 Disallowing the recovery of costs on the basis of potentially materially inaccurate findings would not promote certainty, or provide an effective incentive for Transpower to improve.
- C28 In this context, it does not promote the long-term benefit of consumers to expose Transpower to incentives that are ineffective and potentially perverse, or to unnecessarily reduce the certainty of the incentive regime.

Optimism bias in the NIGU Project

C29 This section sets out a description of optimism bias, why we consider it occurred in NIGU Project, and the effects it had on our decision on the MCA and outputs.

Optimism bias

C30 Cost overruns in large infrastructure projects are not unknown. The World Bank coined a term for the reason behind situations like this, the “EGAP Principle” (Everything Goes According to Plan).¹¹⁴

C31 These cost overruns are undesirable but familiar, and the reasons behind them have been investigated.

A main cause of overruns is a lack of realism in initial cost estimates. The length and cost of delays are underestimated, contingencies are set too low, changes in project specifications and designs are not sufficiently taken into account, changes in exchange rates between currencies are underestimated or ignored, so is geological risk, and quantity and price changes are undervalued as are expropriation costs and safety and environmental demands.¹¹⁵

C32 While not all the points made above apply to the NIGU Project, we consider that there is a strong correspondence between the factors Transpower has identified and those described above.

C33 According to Deloitte, major infrastructure project cost overruns are often the result of several key factors that include:¹¹⁶

C33.1 inadequate ongoing governance and risk management;

C33.2 a lack of appropriate governance and decision making; and

C33.3 inadequate risk management, including poor transparency of information and remediation activities.

¹¹⁴ Bent Flyvbjerg, Mette Skamris Holm, and Søren Buhl, "Underestimating Costs in Public Works Projects: Error or Lie?" *Journal of the American Planning Association*, vol. 68, no. 3, Summer 2002, pages 279-295.

¹¹⁵ Flyvbjerg, Bent et al "Megaprojects and Risk: an anatomy of ambition" 2003 Cambridge University Press.

¹¹⁶ Deloitte Energy and Resources, Rath, M et al "Major water capital projects Critical factors for improving outcomes" March 2010.

C34 Deloitte goes on to say:

Inadequate contingency within cost estimates is a consistent cause of cost overruns in the water industry. Inadequate contingency is directly linked to inadequate assessment of project risk. This can be attributed to the impact and probability of risk occurring being underestimated, or risks eventuating during the project that had not been identified at the point of the design cost forecast.

Failing to carry out a proper risk identification process early in the conceptual design stage jeopardises project success in a number of ways, including budget, timelines and functionality.

Failing to ask the right questions during the design phase may result in a flawed initial design, often leading to significant changes to be made at a higher cost than initially planned. Assumptions made in the initial design create additional risk, which needs to be adequately costed into contingency values.¹¹⁷

C35 These findings are also broadly applicable to other major infrastructure projects and to the NIGU Project in particular.

C36 Investigations specific to electricity transmission investments show that, on average, these projects' actual costs are 8% over their budget. The NIGU Project is more than twice this amount, and has had the scope reduced due to output adjustments.¹¹⁸

Evidence of optimism bias in the NIGU Project

C37 We consider that there is sufficient evidence to conclude that optimism bias occurred in the NIGU Project.

C38 Below we discuss the findings in relation to:

C38.1 timing assumptions;

C38.2 cost estimates and contingencies; and

C38.3 the treatment of risk.

Optimism bias in timing assumptions

C39 The evidence does not support Transpower's assertion that regulatory delays were unforeseen. Transpower may have underestimated the time these decisions would take, but it was not unaware of the time they could take.

¹¹⁷ Ibid.

¹¹⁸ The P50 or expected cost of the NIGU Project was \$764 million to deliver all outputs.

- C41 Transpower states “The process for environmental consenting via a Board of Inquiry on a de novo application took significantly longer than anticipated.”¹¹⁹
- C42 Transpower also states “The delay was therefore due to factors which could not reasonably be anticipated, and which are not attributable to Transpower.”¹²⁰
- C43 The Board of Inquiry process took from 9 August 2007 to 18 September 2009, ie, slightly over two years.¹²¹ However, BECA reported in 2005 that:
- Transpower considers that this process, including appeals to the Environment Court, is likely to take up to 24 months from lodgement with the councils.¹²²
- C44 Transpower’s NIGU application also states:
- Given the management strategies in place, it is reasonable to assume that the shortest timetable would be 6 months and the longest might be two years, though there is a possibility this might extend to three years or beyond if the risk management strategies fail.¹²³
- C45 We consider that Transpower was well aware of the potential time for environmental consenting, but it was optimistic in assuming the decisions would not delay the project.
- C46 We also note Transpower’s view that, had matters proceeded as it had planned “The alternative of council hearings, however, followed by Environment Court hearings would likely have been more difficult to conclude.”¹²⁴
- C47 Transpower’s letter to the Electricity Commission, when it submitted the NIGU Project for approval on 20 October 2006, was proposing an approval decision from the Electricity Commission on 19 December 2006.¹²⁵

¹¹⁹ NIGUP amendment application, page 4.

¹²⁰ Ibid, page 19.

¹²¹ Ibid, page 18.

¹²² BECA “Implementation Strategy North Island 400 kV Grid Upgrade” 1 July 2005, Appendix B, page 53.

¹²³ Transpower “North Island Grid Upgrade Project - Amended Proposal Attachment C: Project delivery risks” 20 October 2006, page 5.

¹²⁴ Transpower “NIGU Project Management, Environmental and Investigations PIR” 27 September 2013, page 16.

¹²⁵ Transpower “Submission of Amended Auckland Grid Upgrade Proposal” 20 October 2006. Available at: <http://www.ea.govt.nz/dmsdocument/4546>.

C49 BECA had advised Transpower that:

The EC has already confirmed that it will fully consider all the possible alternatives to Transpower's proposal for a 400 kV transmission line and that it will consult widely ahead of making a decision.¹²⁶

C50 BECA also advised Transpower that the Electricity Commission decision taking longer than Transpower expected was the highest scoring risk to the project (this was shared with geotechnical risk and the moving of transformers).¹²⁷

C51 Evans and Peck also advised Transpower:

In some key areas E&P considers further development of the mitigation plans will be needed to adequately deal with the residual risks, particularly in regard to meeting the target delivery date for the transmission line. E&P has been advised that no float exists in the program with current expectations regarding the granting of designations and the gaining of site access.¹²⁸

C52 Transpower clearly understood the risk of delays to its regulatory timeframes. However, these risks, and the flow on effects to the project, were optimistically underestimated.

Optimism bias in cost estimates and contingencies

C53 We consider that Transpower's costing and allowance for contingencies was optimistic.

C54 Transpower states the price accuracy used in the project approval application range from 5% to 12.5%.¹²⁹ However, documentation also shows a different view:

In view of these assumptions and limitations, the accuracy of the cost estimates is considered to be within -7% and +25%... It is important to note that in the draft Electricity Commission (EC) decision an accuracy of $\pm 10\%$ is quoted.¹³⁰

C55 Transpower also stated that:

Plus or minus 30% is a standard way of pricing up jobs that go to ComCom. Estimates based on old knowledge and no information available on which to base the estimates. Optimistic budget used.¹³¹

¹²⁶ BECA "Implementation Strategy North Island 400 kV Grid Upgrade" 1 July 2005, Appendix B1.

¹²⁷ Ibid, Appendix G3.

¹²⁸ Evans & Peck "Project Implementation Strategy – Review" 17 August 2005, page 12.

¹²⁹ NIGUP amendment application, page 36.

¹³⁰ Transpower "NI 400 kV Transmission Lines Revised Estimated Costs for the Ormiston Road – Whakamaru" 23 May 2006, page 5.

C56 Transpower has identified scope, budget, cost and time estimate errors:

Time pressure meant there was a lack of review and structure by project group therefore was not enough time to review accurately (let errors go through) between original GUP and amended GUP. Decision was made to revisit at a later stage if required.¹³²

What was designed for the original GUP in terms of the capacity underwent a major change in the revised GUP. There wasn't enough time to re-price to a similar level of accuracy.¹³³

C57 The impact of this was that:

Contingency was drawn on from day one. Eg access tracks and landscaping had insufficient budget allowance (ie excluded costs for property sweeteners). GUP budget was \$1.5m and actual \$32m [and]... Not being able to find the estimate means that we can't now define what the specific areas of cost overruns are for the ComCom.¹³⁴

C58 Contingency management was also critiqued by Transpower:

The use of contingency is unclear. No documented procedures on use and authority. PM unsure how to use the money, whether it can be accessed and procedure to follow.¹³⁵

C59 Transpower also notes:

Project budgets can be hit hard by inadequate pre-approval investigations of things such as geotechnical conditions, the extent of earth works and civil works, system protection (esp consequential works at other substations) and telecommunications. Some preliminary design is needed in order to establish reasonably accurate costs.¹³⁶

¹³¹ Transpower "Project Closeout & Post-Implementation Review (PIR) Report Substations General North Island Grid Upgrade Project" 18 September 2013, page 18.

¹³² Ibid.

¹³³ Ibid, page 19.

¹³⁴ Ibid, page 18.

¹³⁵ Ibid, page 20.

¹³⁶ Ibid, page 19.

C60 Transpower states that it omitted the costs of nets, hurdles and crossings from its cost forecasts.¹³⁷ Temporary disturbance compensation was not also included.¹³⁸ Additional costs were required to meet landowners' requirements for easement compensation, and other property related costs.¹³⁹ Transpower also shows that additional costs were incurred to meet the requirement for installing monopole structures.¹⁴⁰

C61 Transpower's response to the Electricity Commission, on matters relating to the items above, was it had budgeted appropriately for these items at the time of approval.¹⁴¹ We consider Transpower was aware, based on the view expressed by stakeholders and its response, of the potential for these costs to be significantly larger than it budgeted.

C62 IQANZ notes that the:

Original Alliance cost estimations were also overly optimistic for property, and hampered by the inability to conduct site surveys and access to property. This was not adequately provided for within the contingency. The mitigated risk amount (circa \$2.7M) was also significantly inadequate for the Alliance programme.¹⁴²

C63 IQANZ also finds a key lesson is:

Where possible, [to] secure further information (such as geotechnical surveys, ground-based route site inspections) to more accurately inform cost modelling. Ensure adequate contingency is provided for where this information is not available.¹⁴³

¹³⁷ NIGUP amendment application, page 85.

¹³⁸ Ibid, page 64.

¹³⁹ Ibid, page 52.

¹⁴⁰ Ibid, page 85.

¹⁴¹ Transpower "NIGU Proposal – final questions" 11 June 2007. Available at: <http://www.ea.govt.nz/dmsdocument/7029>

¹⁴² IQANZ "North Island Grid Upgrade Project Independent Quality Assurance Follow-up Health Check and Close-out Review Detailed Report" 11 September 2013, page 9.

¹⁴³ Ibid, page 13.

Optimism bias in the treatment of risk

C64 We consider that Transpower was optimistic in the risk allowances it used for the NIGU Project. Transpower states:

With the benefit of perfect hindsight, the amount of contingency built into the original approval amount was too small. The P50 of \$764 million included a scope allowance of 15% over all the NIGU projects. This has proved to be unrealistic, given the early stage of design process and incomplete information on geotechnical and other site-specific conditions along the line route on which the cost estimates were based, and should have been higher.¹⁴⁴

C65 Transpower also states that the P90 MCA calculation was flawed and lacked, for example, consideration that 400 kV lines construction was dependent upon securing property access.¹⁴⁵

C66 In planning documents for NIGU Transpower observed:¹⁴⁶

Foundation installation rates are based on conceptual designs assuming average soil conditions over the whole route.

No allowance has been made for landowner lockout, out of sequence staged work or delays due to other factors such as consents required for the works.

A realistic estimation of costs for new access tracks, bridges and upgrading of existing bridges/tracks can only be made after finalisation of tower sites and agreements with landowners. A provisional sum has been included to cover these costs.

¹⁴⁴ NIGUP amendment application, page 28.

¹⁴⁵ Ibid.

¹⁴⁶ Transpower "NI 400 kV Transmission Lines Revised Estimated Costs for the Ormiston Road – Whakamaru" 23 May 2006, page 5.

C67 Part of Transpower's treatment of assumptions was described as:¹⁴⁷

Uncertainties related to designations, consents and easements:

a) The impact of uncertainties relating to uncertainties related to Project timing, easement costs, and capital cost cash flows will be evaluated through sensitivities that will examine the potential range of impact on the proposed project and alternatives.

b) With respect of project evaluations:

the first step should be done based on a system that reflects the direct system needs (i.e., free of designations, consents and easements and other delivery risk); and

the second step is to explicitly and transparently consider such risks in relation to project timing so that Transpower can adequately manage those risks.

C68 Geotechnical issues were identified as being an issue. Transpower states that:

Geotechnical conditions along the final overhead transmission line route varied from those anticipated by BBUGL and Transpower based on the limited geotechnical data that Transpower was able to obtain during the planning phase.¹⁴⁸

C69 As noted above, BECA identified geotechnical risk as being the highest equal ranking risk to the project.¹⁴⁹ The mitigation Transpower identified was to provide "comprehensive geotechnical and topographical information" with tender documentation.¹⁵⁰

C70 When it became apparent to Transpower that landowners were not going to allow access for it to obtain comprehensive geotechnical and topographical information, it was appropriate for Transpower to review its risks. Particularly the risks due to the lack of geotechnical information, potential for out of sequence work and impact on access tracks.

C71 Transpower proceeded with letting the Alliance Contract, which was seen as necessary to address its concern over meeting the need date.

¹⁴⁷ Transpower "North Island Grid Upgrade Project Amended Application Attachment J Assumptions" 20 October 2006, page 7.

¹⁴⁸ NIGUP amendment application, page 81.

¹⁴⁹ BECA "Implementation Strategy North Island 400 kV Grid Upgrade" 1 July 2005, Appendix G, section G.3.

¹⁵⁰ Transpower "North Island 400 kV Grid Upgrade Project Project implementation Strategy" 6 July 2005 Appendix B, item B1.3.

- C72 We note IQANZ found that, in addition to ‘significantly inadequate’ risk allowance in the Alliance project:

risk and issues registers were not always kept up to date, and risk and issues were not always adequately reported. Our previous reviews also found a number of areas where risks and their mitigation, could have been improved.¹⁵¹

- C73 We also observe the following findings from Transpower relate to the reasons behind optimism bias, identified by the experts in the section above.

The project lacked a proper Governance and reporting structure - lack of executive decisions. The project had no governance over the investigation stage. Also a culture of off the cuff "sort it out later". Lack of direction for the project. Inability to make cost effective decisions. Time wasted.¹⁵²

Amended GUP - disciplines around governance and responsibility. Alliance was set up to manage risk, however there was no true Alliance governance (ie clarity around who owned the risks and lack of action when issues occurred). Values placed on the risks were never adequate. There was no governance and a lack of impartial input.¹⁵³

Effect of optimism bias on projects

- C74 In general there are two effects of optimism bias in projects, neither of which is desirable.
- C75 Strategically, less efficient projects may be selected for approval as the cost benefit analysis is biased by the forecaster.
- C76 Tactically, there will be difficulties when delivering a project that has been subject to optimism bias in the planning. The project will be forced to react to ‘unforeseen’ events and expedite progress in order to take account of longer than planned task times. Such a reaction may come at higher costs than if the events had been appropriately planned. It is partly on this basis that MEUG argues that the \$22 million in additional costs incurred to meet the need date were avoidable costs.
- C77 In relation to the NIGU Project we consider that optimism bias has led to a situation where the original budget and plan required to deliver the scope of works was inadequate.

¹⁵¹ IQANZ “North Island Grid Upgrade Project Independent Quality Assurance Follow-up Health Check and Close-out Review Detailed Report” 11 September 2013, page 10.

¹⁵² Transpower “Project Closeout & Post-Implementation Review (PIR) Report Substations General North Island Grid Upgrade Project” 18 September 2013, page 20.

¹⁵³ Ibid, page 19.

- C78 We consider that, on the whole, Transpower was overoptimistic in its planning for the NIGU Project. As a result, when matters unfolded differently to what was planned, Transpower had placed itself in a position where it was forced to react to events. Its reaction appears to be driven by its need date constraint.
- C79 Transpower has represented that the need for the increased MCA is due to unforeseen costs, underestimation of risks and insufficient time due to unforeseen delays. We consider that this aligns with factors that have been linked to optimism bias.
- C80 However, we do not consider that there is a sufficient basis to find that avoidable costs were incurred due to optimism bias. While unanticipated additional costs may have been incurred, we do not consider they were necessarily avoidable.
- C81 While we further agree with MEUG that a transmission company applying GEIP would have planned for possible changes to the need date and the changes to the works time it had assumed to meet the need date as the needs of consumers changed, we do not consider Transpower's behaviour to be unreasonable or imprudent when reacting to changes in timing estimates, costs estimates and contingencies.¹⁵⁴
- C82 In particular, we consider that Transpower appropriately sought to use commercial tendering, and other methods, to manage matters when cost, scope or risk has been different to the original plan.
- C83 As we have not found that Transpower failed to mitigate appropriately we do not consider that Transpower's optimism bias in itself is a sufficient cause to characterise the additional \$22 million as avoidable costs as suggested by MEUG.¹⁵⁵

¹⁵⁴ MEUG "Submission on NIGU draft decision", 23 April 2015 page 2.

¹⁵⁵ Ibid.

Attachment D: Property

Purpose of this attachment

- D1 The purpose of this attachment is to discuss the property analysis work we have undertaken, and the findings and conclusions we have reached.
- D2 This attachment also discusses why we consider property is an important issue to consider as part of our evaluation of the NIGU Project amendment application.

Summary

- D3 Our conclusion is that there should be no reduction in the MCA requested by Transpower in relation to the property aspects of the NIGU Project.
- D4 These matters are discussed in the sections below, following the background to property in the NIGU Project and how our investigation is set out.

Background

- D5 In the sections below we provide background on:
- D5.1 property, in relation to the NIGU Project;
 - D5.2 our reasons for considering property in our investigations; and
 - D5.3 the process used in our investigations.

Property in the NIGU Project

- D6 Access to property was a key input for, and risk to, the NIGU Project. In addition to purchasing specific sites, Transpower had to obtain consents, designations, easements, and access arrangements in order to successfully deliver the project.
- D7 Approximately 310 properties were involved in the project, covering nine Territorial Local Authorities. A Board of Inquiry was also established, to decide on the consents and designations required for the project under the Resource Management Act.
- D8 This normally would have been done by individual Territorial Local Authorities, but the Minister for the Environment of the time called the project in under the provisions of the Resource Management Act.

- D9 Transpower estimated that the P90 level of costs for property was \$125.7 million. Transpower subsequently forecasted an end cost for property as \$187.4 million. This is an increase of \$61.7 million over the previously estimated P90 cost.¹⁵⁶
- D10 Transpower identified this \$61.7 million difference as a significant part of the costs incurred over the MCA, and is one of the factors that led Transpower to apply for an amendment to the MCA.
- D11 Transpower also attributes the time taken for the regulatory approvals and securing access to property as leading it to incur additional costs. This was due to the construction timeframe being compressed compared to the plan at the time of approval, and Transpower had to expedite work in order to meet its commissioning date of 2013.
- D12 It is a matter of record that there was significant opposition to the project from landowners. Transpower relies on good relationships with landowners in order to operate the grid. Transpower also planned to use compulsory acquisition, under the Public Works Act, to force landowners to sell.

Why we investigated property

- D13 As indicated in the NIGU Issues Paper, we considered that property was important for our evaluation of the NIGU Project amendment application. Property related costs were a material item for Transpower and this was an activity in which Transpower had not had experience of the scale, and processes involved, before starting the NIGU Project.¹⁵⁷

Process used in our investigations

- D14 As a result of the potential concerns we had with property matters in the NIGU Project, we engaged Calverton Business Consulting Group (Calverton) to provide us with advice.
- D15 Calverton were instructed to follow the analysis framework developed in line with the Capex IM evaluation criteria for assessing amendments. We worked with Calverton and Transpower to investigate relevant issues, including holding several workshops and requesting additional information from Transpower.

¹⁵⁶ Transpower "NIGU proposal – final questions" 11 June 2007, page 8. Available at <http://www.ea.govt.nz/dmsdocument/7029>.

¹⁵⁷ Commerce Commission "Amending Transpower's allowance and outputs for the North Island Grid Upgrade Project: Issues Paper" 29 November 2013, para 4.37.

- D16 Calverton produced the report “Evaluating Transpower’s property and easement acquisition strategy and implementation for the NIGU Project.”¹⁵⁸ We published this report on our website and asked for submissions.
- D17 Calverton’s main finding, based on the analysis framework and scope of the review, was that no avoidable costs were incurred in acquiring the property rights by the 2013 need date. It was left to the Commission to consider if Transpower could have changed the need date, and the impact of any change.
- D18 We received submissions and cross-submissions on the Calverton report from MEUG and Transpower. These have been published on our website.¹⁵⁹
- D19 We have considered Calverton’s findings, the submissions we have received and additional information from other aspects of our investigation. This is discussed in the next section.

Findings and conclusions

- D20 In this section we discuss:
- D20.1 our conclusions in relation to the consideration of property matters;
 - D20.2 Calverton’s findings; and
 - D20.3 the views of submitters.

Our conclusions regarding property aspects of the NIGU Project

- D21 There are two property related decisions we have to make in relation to the NIGU Project amendment. These are:
- D21.1 a decision on the amended MCA for the project; and
 - D21.2 decisions on the amendments on approved major project outputs that relate to property.

Our conclusion on the avoidable costs relating to property

- D22 We agree with Calverton that, based on the evaluation framework, there were no material avoidable costs incurred in relation to property for the NIGU Project.

¹⁵⁸ This is available on our website at <http://www.comcom.govt.nz/dmsdocument/12240>.

¹⁵⁹ <http://www.comcom.govt.nz/regulated-industries/electricity/electricity-transmission/transpower-major-capital-proposal/amending-the-allowance-and-outputs-for-the-north-island-grid-upgrade-project/>

D23 Consequently, for the property aspects of the NIGU Project, we consider that our decision should not contain any reduction to the amended MCA proposed by Transpower.

Amending the approved major capex outputs affecting property

D24 Transpower has proposed amending the approved major capex project output in relation to obtaining property rights for the Otahuhu to Brownhill cable route.

D25 We consider that, while there are some issues related to this decision, there is no material reason to reject the amendment.

Calverton's findings

D26 Calverton did not find, based on the scope of the review and the evaluation framework, that any actual costs were avoidable in relation to property matters for the NIGU Project.

D27 Calverton did report several matters that we consider are of interest. These are that Transpower:

D27.1 invariably underestimated property costs;

D27.2 increased its payments the closer it got to its target date; and

D27.3 overestimated its ability to obtain property rights.

D28 Explanations and our views on these matters are provided below.

Transpower's estimation of property costs

D29 Transpower's firm view at the time of approval was that the cost it forecast was appropriate to cover the delivery of the NIGU Project, with appropriate allowances for risk and unforeseen matters.

D30 For the property related aspects of the project this P90 estimate was \$125.7 million. Transpower now forecasts the property end cost to be \$187.4 million. This increase was attributed to a failure to account for specific costs, underestimation of payments to landowners and higher internal costs.¹⁶⁰

¹⁶⁰ NIGUP amendment application, page 52.

- D31 We note that Transpower was specifically asked about these costs at the time of approval, and responded to the Electricity Commission that it considered its figures were adequate.¹⁶¹
- D32 This adds to Transpower's statements that its treatment of risk in establishing the expected costs and P90 figures gave rise to unrealistic results that ignored the potential for one risk to affect other parts of the project.¹⁶²
- D33 Calverton show that the compensation Transpower paid was much closer to landowner's valuations than Transpower's assessments.¹⁶³ Compensation was between 100% and 177% of Transpower's assessment. While some difference is expected in commercial negotiations, the frequency and extent to which differences actually occurred is consistent with an underestimation of costs by Transpower.

The effect of time on the property settlement prices

- D34 The Calverton analysis also suggests that Transpower settled closer to landowners' assessments as the project progressed.¹⁶⁴
- D35 It is noted that the project plans and costs at approval were based on obtaining property rights before construction. This was to enable geotechnical investigations to inform the risks and price for line construction, and to ensure optimal sequencing of work once investigations were complete.

Transpower's ability to secure property rights

- D36 It appears that Transpower was optimistic in its initial assessment of the plan and significantly overestimated its ability to secure property rights in a manner consistent with its target commissioning date.
- D37 Transpower's application makes frequent mention of the unforeseen regulatory delays that led to increased project costs and a lack of progress with landowner negotiations.¹⁶⁵
- D38 While claiming that the Board of Inquiry caused delays, Transpower has also stated the "alternative of council hearings, however, followed by Environment Court hearings would likely have been more difficult to conclude".¹⁶⁶

¹⁶¹ Transpower "NIGU proposal – final questions" 11 June 2007, page 8. Available at <http://www.ea.govt.nz/dmsdocument/7029>.

¹⁶² NIGUP amendment application, page 28.

¹⁶³ Calverton "Property and easement acquisition report" (report to the Commerce Commission, June 2014) page 34.

¹⁶⁴ Ibid.

¹⁶⁵ NIGUP amendment application, page 5.

- D39 Calverton states that it does not consider Transpower was able to foresee some issues, being focused on the engineering and construction challenges rather than property access.¹⁶⁷
- D40 Calverton also states that a more cost effective result may have been achieved if Transpower had foreseen the difficulties it would encounter with property.¹⁶⁸
- D41 Transpower did have limited practical experience in obtaining property rights. At the time of planning the project, Transpower assumed that it would have access to properties before construction started.
- D42 Transpower planned on the basis that it would be able to readily obtain regulatory consent and secure property rights from landowners. It intended to use compulsory acquisition to obtain property where landowners were unwilling to grant them those rights.
- D43 Transpower required access to property in order to:
- D43.1 ensure efficient construction in a sequential manner (as the costs for the project were based on); and
 - D43.2 mitigate the geotechnical risk it faced in assuming average ground conditions. Geotechnical information was identified as essential to reduce construction risk and ensure the construction contract could be developed appropriately.
- D44 Transpower's plan was based on using the compulsory acquisition process to obtain property rights where there was not a negotiated agreement with the landowner.
- D45 It later became obvious to Transpower that the risk of using compulsory acquisition was higher than it had appreciated, both in terms of cost and in the time it might take for the issue to be fully resolved through the courts.
- D46 In addition, Transpower realised that the use of compulsory acquisition for the NIGU Project had the potential to affect its relationship with landowners. Transpower relies heavily on the goodwill of rural landowners for reasonable access to its grid.

¹⁶⁶ Transpower "NIGU Project Management, Environmental and Investigations PIR" 27 September 2013, page 16.

¹⁶⁷ Calverton "Property and easement acquisition report" (report to the Commerce Commission, June 2014) page 22.

¹⁶⁸ Ibid.

- D47 This plan, and management of the project, continued despite the clear public sentiments arising in opposition to the project and in relation to land access, as well as timelines extending well beyond Transpower's estimates.
- D48 When it became apparent that the reality was going to be different and that the planning had been optimistic, it appears Transpower proceeded by making adjustments to address emerging problems without fully considering the flow on impact to the project cost and time.

The views of interested persons

- D49 MEUG, in the case of the Otahuhu Cable subproject, highlighted the issue of actual costs being materially higher than those forecast and questioned if good practice was followed.¹⁶⁹ Transpower states that the costs were made on the best information available at the time, and relied on assumptions.¹⁷⁰
- D50 Transpower also states that, despite Calverton finding that costs increased the closer agreements were reached to the Transpower's target date, the costs would have been similar if the target was extended.¹⁷¹ Transpower believed that landowners were holding out for the best deal they could obtain.
- D51 We note that while Transpower has said the regulatory processes prevented it negotiating effectively with landowners, which in turn led to delays and cost increases, it also appears that landowners were delaying settling in order to obtain the best deal.
- D52 The issue raised by MEUG referred to in paragraph D49 highlights the difference between the costs used to justify the approval and plan for the delivery of a project, and those costs that are recovered from consumers. We discuss this in the attachment on project management and governance (Attachment C).
- D53 We share MEUG's concern over the issue of forecast error. However, we consider that Transpower was not able to avoid the property costs incurred.
- D54 If Transpower had obtained better information and properly accounted for risk in developing its application to the Electricity Commission, then the property and other costs could have been foreseen.

¹⁶⁹ Major Electricity Users' Group "Cross-submission on expert reports for Transpower NIGU Project" 8 September 2014, para 6.

¹⁷⁰ Transpower "Submission to the Commerce Commission on Calverton property and easement acquisition report" 1 September 2014, page 5.

¹⁷¹ Ibid, page 4.

D55 However based on the evidence we have, we cannot establish that, with better foresight, Transpower could have avoided the property costs while meeting the 2013 commissioning date.

Proposed amendment to approved major capex project output for property

D56 Transpower has to deliver the approved major capex project outputs for the NIGU Project. If an output is not delivered, Transpower will face a financial adjustment to its allowable revenue under the provisions of the Capex IM.

D57 We must decide if the amended outputs have not been met, and an incentive adjustment is required, after any decision on the amendment application has been made. Given we have decided to approve the outputs amendments proposed by Transpower, no incentive adjustment will be required. This is further discussed in Attachment H.

D58 Transpower has not achieved one of the approved major project outputs. It is seeking to defer the acquisition of the easement for cables from Brownhill to the Otahuhu substation.

D59 Transpower estimates that the costs for obtaining the easement in the future are \$5 million, and states that there are no issues preventing the securing of the easement at a later date. This is because the land is reserves owned by the Crown or local government.

D60 In the draft decision, we noted that Transpower's programme report shows that the former Manukau City Council had an issue with granting this easement. Transpower has clarified that this matter was related to a separate NIGU Project cable easement in the same area, and was successfully resolved.¹⁷²

D61 We still consider that there are opportunities for Transpower to improve its treatment of costs, benefits, risks and related decision making in future projects. This is further discussed in Attachment I.

¹⁷² Transpower "Submission on NIGU Project draft decision" 20 May 2015, page 8

Attachment E: Alliance Contract

Purpose of this attachment

- E1 The purpose of this attachment is to set out the background and reasons for the findings regarding the Northern Grid Alliance (the Alliance) established to construct the 400 kV lines component of the NIGU Project.
- E2 This attachment discusses why we consider the Alliance is an important issue to focus on as part of our decision on amending the MCA of the NIGU Project.

Summary

- E3 Our conclusion is that there should be no reduction in the MCA requested by Transpower in relation to the Alliance.
- E4 Transpower was the recipient of a favourable finding from the independent expert brought in to decide on a dispute between Transpower and the other party to the Alliance. This decision materially reduced the amount that consumers will pay for the NIGU Project.
- E5 We provide a background to the Alliance Contract below, followed by a discussion on our findings.

Background

- E6 In the sections below we provide background on:
 - E6.1 the Alliance;
 - E6.2 our reasons for considering the Alliance in our investigations; and
 - E6.3 the process used in our investigations.

Background to the Alliance

- E7 An alliance is a contracting model that differs to a standard construction contract in that the parties are intended to work constructively together in order to achieve the best outcomes for the project. This style of contracting is considered to be superior to deal with situations where a project scope cannot be well defined or other constraints exist.
- E8 The other party to the Alliance was BBUGL a joint venture formed by Balfour Beatty of the UK and the United Group of Australia. Under the Project Alliance Agreement, BBUGL and Transpower formed a separate commercial entity, the Alliance.

- E9 The Alliance was established to deliver the new 400 kV overhead line from Whakamaru North Substation to the Brownhill Transition Station. It was also to dismantle the existing 110 kV line from Arapuni to Pakuranga.
- E10 The Alliance was based on a pain/gain sharing arrangement when the actual costs were compared to the target costs.¹⁷³ This was intended to incentivise the Alliance to outperform the target cost.

Our investigation of the Alliance

- E11 We considered that the Alliance was an important area for our investigations as it touched on a number of key issues, such as:
- E11.1 it was the first alliance agreement that Transpower has entered into;
 - E11.2 it was a large, complex and key aspect of the NIGU Project that Transpower had no recent experience in, and faced a number of significant risks; and
 - E11.3 it represents a significant portion of the overall project costs (\$399 million).
- E12 As a result of the potential concerns we had with the Alliance we engaged Strata to provide advice on the Alliance.
- E13 Strata was instructed to follow the analysis framework developed in line with the Capex IM evaluation criteria for assessing amendments. We worked with Strata and Transpower to review the Alliance, including holding several workshops and requesting additional information from Transpower.
- E14 Strata produced the "Report on the Transpower New Zealand Ltd NIGUP Alliance Contract Arrangements" on 30 July 2014.¹⁷⁴ We published this report on our website and asked for submissions.
- E15 Strata's main finding, based on the analysis framework and scope of the review, was "that the Commission ... does not make any adjustment to the application with regard to the structure, and operation of the Alliance Contract."¹⁷⁵

¹⁷³ Pain/gain sharing is an incentive mechanism. It means that if the actual costs for the Alliance were lower than the target cost, the Alliance would gain the difference. Alternatively the Alliance would bear the difference (pain) if the actual costs were greater than the target cost. As Alliance partners, Transpower and the contractor shared the pain/gain share on a 50:50 basis.

¹⁷⁴ Available at <http://www.comcom.govt.nz/dmsdocument/12241>

¹⁷⁵ Strata "Alliance Contract report" (report to the Commerce Commission, July 2014) para 25.

- E17 Strata also made observations about the following areas of the Alliance:
- E17.1 the decision to enter into the Alliance;
 - E17.2 governance in the operation of the Alliance;
 - E17.3 the treatment of risk in the Alliance; and
 - E17.4 management of the Alliance relationship.
- E18 We have considered Strata’s findings, the submissions we have received and additional information from other aspects of our investigation. This is discussed in the next section.

Our findings and conclusions

- E19 We consider that Strata’s recommendation that we not reduce the MCA proposed by Transpower in relation to the structure and operation of the Alliance, is appropriate.
- E20 We have not identified any material avoidable costs in relation to the structure and operation of the Alliance.
- E21 As a result our decision on the MCA for the NIGU Project will not include any reduction in relation to the Alliance.

Views of submitters

- E22 In its submission on the Alliance report, MEUG objected to allowing Transpower to recover the overspend. It proposed that the NIGU subprojects be considered separately by the Commission.
- E23 We consider that this approach is not permissible under the input methodologies, as was identified by Transpower in its cross-submission on 8 September 2014.¹⁷⁶ Major capex projects are approved in their entirety and Transpower may spend up to the MCA in order to deliver the project outputs.
- E24 Transpower disputed many of Strata’s findings in its submission. Some of Transpower’s rebuttal appears to be valid, as is discussed below. However other matters are not well supported by evidence and the dispute is based on the conclusion that these are “complex issues where reasonable minds may differ.”¹⁷⁷

¹⁷⁶ Transpower “Cross-submission on MEUG submission on Strata Report” 8 September 2014.

¹⁷⁷ Transpower “Submission to the Commerce Commission on Strata Alliance contract report” 1 September 2014, page 3.

- E25 We consider Strata’s observations, including taking account of the findings in relation to the issues around Transpower’s analysis of identifiable and foreseeable risks, are appropriate matters to address in future discussions with Transpower.

The decision to enter into a relationship contract

- E26 We consider that, at a high level, the decision and approach to follow an alliance contracting model was well founded and had potential to bring many benefits to the project.
- E27 Transpower’s decision to restrict its shortlist to two parties, and paying them \$1 million each to prepare a final bid, was identified as a concern by Strata. Transpower has provided a robust justification for this course of action. We recognise that Transpower was able to secure significant intellectual property and experience, particularly around safety, as a result of its negotiations and contract structure.
- E28 In reviewing material supplied by Transpower we have seen that there was a comprehensive project management process followed by the Alliance. However there were issues, identified by the independent quality review, that risk management and governance needed strengthening.
- E29 There is clear evidence of regular quality and cost reviews, audits and safety culture built into the Alliance component of the NIGU Project controlled by BBUGL.

Governance of the Alliance

- E30 Strata identified that Transpower’s CEO acting as the NIGU Investment Project Owner role may have compromised the governance framework. Transpower disputed that governance was compromised in its submission on Strata’s report.¹⁷⁸
- E31 We have not identified any avoidable costs arising from this matter.
- E32 IQANZ identified that the Alliance governance issues needed to be addressed in 2009. This was not done, at least in part, until 2012 after construction had commenced and the opportunity to optimise delivery and reduce costs had passed.
- E33 Transpower has also self-identified that there were issues with the governance of the Alliance in its post project reviews.¹⁷⁹

¹⁷⁸ Strata "Alliance Contract report" (report to the Commerce Commission, July 2014), page 35 to 36.

¹⁷⁹ Transpower "Project Closeout & Post-Implementation Review (PIR) Report Substations General North Island Grid Upgrade Project" 18 September 2013, page 19.

- E34 It appears that having the CEO in the Investment Project Owner role went against the approved and documented programme management plan, and Transpower’s own internal processes for governance. Our evaluation of proposals under the Capex IM relies on Transpower adhering to approved and documented policies and processes.
- E35 Our finding that Transpower does not necessarily follow internal policies and processes may have an influence on how we evaluate future proposals from Transpower.

Implications of the treatment of risk in the Alliance

- E36 When the Alliance was formed there was a significant amount of unresolved risk remaining. This was due to the land access required (to ensure optimal construction sequencing) not being obtained, and the geotechnical investigations required to inform its tendering for line construction remaining incomplete.
- E37 In Strata’s view it was questionable at the least that the Alliance should have been formed with these risks unresolved, and the flow on implications to the project apparently not considered.
- E38 We have not identified any avoidable costs incurred in the NIGU Project as a result of this decision.
- E39 We consider that there are two main implications that arose from the decision to form the Alliance under these conditions.
- E39.1 The unresolved matters contributed to the dispute in the Alliance.
- E39.2 Transpower’s planning was based on these matters being resolved – its risk allowance was inadequate compared to the actual need.

The Alliance dispute

- E40 The Alliance parties had differing views as to the classification and treatment of these matters. This resulted in \$63.5 million of unresolved variations accumulating. At this time Transpower was withholding \$17.5 million of the Alliance profit and overhead under the pain share provisions of the PAA.
- E41 Strata considered that BBUGL “took a significant hit” after an independent expert was brought in to resolve these differences. This resulted in a benefit to Transpower, and consumers, by effectively reducing a component of the NIGU Project costs.
- E42 We acknowledge that absent Transpower’s negotiation position, consumers may have had to face additional costs that instead were borne by the other party to the Alliance. However Strata did note that this “may make major contractors cautious in future interactions with Transpower.”

Inadequately managed risk

- E43 The NIGU Project approval was based on having full land access for construction, sequential working and average ground conditions. In part due to these risks crystallising when land access was not achieved as originally planned and geotechnical issues were uncovered, material differences to the plan were encountered.
- E44 The effects of this are discussed in Attachment C. We do not consider that this led to any avoidable costs.
- E45 Transpower entered into the Alliance with this risk but did not appropriately manage it, as the IQANZ findings show:

Original Alliance cost estimations were also overly optimistic for property, and hampered by the inability to conduct site surveys and access to property. This was not adequately provided for within the contingency. The mitigated risk amount (circa \$2.7M) was also significantly inadequate for the Alliance programme.¹⁸⁰

The original risk contingency allowed for by the Alliance in their agreed price was inadequate, and risks were not adequately provisioned for within the ongoing cost forecasts until the cost re-forecasting exercise in 2011. Out of sequence property access and delays, and unknown soil conditions were mitigated through bringing on larger machinery (with the need to upgrade access roads as a result), and tower and foundation design flexibility, but at much greater cost to the project.¹⁸¹

Alliance relationship

- E46 The alliance concept was considered key to mitigate the risks of access, delay, and geotechnical issues. It was recognised that Transpower would need to invest in establishing an alliance culture.
- E47 Strata raised a number of concerns with Transpower's actions in relation to maintaining a sustainable alliance culture.
- E48 A fully effective alliance does not appear to have been fully realised, with parties ending in what appears to be a contractor/client dispute. In this case, it was the counter party to Transpower that suffered.
- E49 It would appear that the choice to put these scope difference matters aside arose from the lack of clarity at the beginning of the project, with a strong component of that being the two key risks around access and geotechnical issues.

¹⁸⁰ IQANZ "North Island Grid Upgrade Project Independent Quality Assurance Follow-up Health Check and Close-out Review Detailed Report" 11 September 2013, page 9.

¹⁸¹ Ibid, page 10.

E50 It is also apparent that issues arose in establishing effective governance.

However, unsatisfactory performance after a change in the Alliance Facilitators led to their dismissal and they were not replaced. Accordingly processes allowed for in the initial Project Alliance Agreement (such as scope changes) and alliance behaviours were not adequately understood or adhered to, and as a result of all of the above the initial governance was weak.¹⁸²

E51 Transpower also acknowledges that there were governance and management issues related to the Alliance identified by IQANZ that could have been improved.

¹⁸² IQANZ “North Island Grid Upgrade Project Independent Quality Assurance Follow-up Health Check and Close-out Review Detailed Report” 11 September 2013, page 5.

Attachment F: Construction costs

Purpose of this attachment

- F1 This attachment outlines the results of our assessment of avoidable costs due to the construction of the 400 kV line.

Why we are assessing the 400 kV line construction costs

- F2 We are assessing the 400 kV line construction costs because of the significant overruns in the actual costs of building the 400 kV line compared with the estimated costs (cost overruns).
- F3 As discussed in Attachment B, the direct cost of the constructing the line of \$313 million was \$111 million above the contractor's estimate of \$202 million (the TCE).¹⁸³
- F4 Since the direct cost of constructing the 400 kV line was about 50 percent more than the TCE, we considered there could be avoidable costs associated with delivering the 400 kV line project.

Summary of our findings

- F5 We have determined that \$17.7 million of line construction costs due to out of sequence work were avoidable.¹⁸⁴
- F6 Most of the construction costs overruns (apart from the cost identified above) were for scope of works required to build the line. These costs were due to underestimated volumes, work omitted from the scope, or requirements imposed as part of the resource consents or costs required to meet the need date. The evidence we have does not establish that these costs were avoidable.

¹⁸³ Refer to paragraph B15 and Table B3.

¹⁸⁴ Transpower recognised that this cost was avoidable and proposed to not recover it from its consumers.

Our approach to evaluating the cost of constructing the 400 kV line

- F7 We have applied the approach set out in Chapter 2 to Transpower’s conduct in two stages:
- F7.1 when Transpower (strictly the Alliance) established the cost of constructing the 400kV line at the time it awarded the construction contract (this is the TCE);¹⁸⁵ and
 - F7.2 when Transpower approved scope of works and costs in addition to the target estimate cost.
- F8 We present our results in the following sections.
- F8.1 Forecast error and the project life cycle.
 - F8.2 How Transpower established the TCE.
 - F8.3 Cost overruns by cost drivers.
 - F8.4 Costs overruns we found to be avoidable.
 - F8.5 Costs overruns we did not find to be avoidable.
 - F8.6 Response to submissions on our Issues Paper concerning the cost of constructing the 400 kV line.

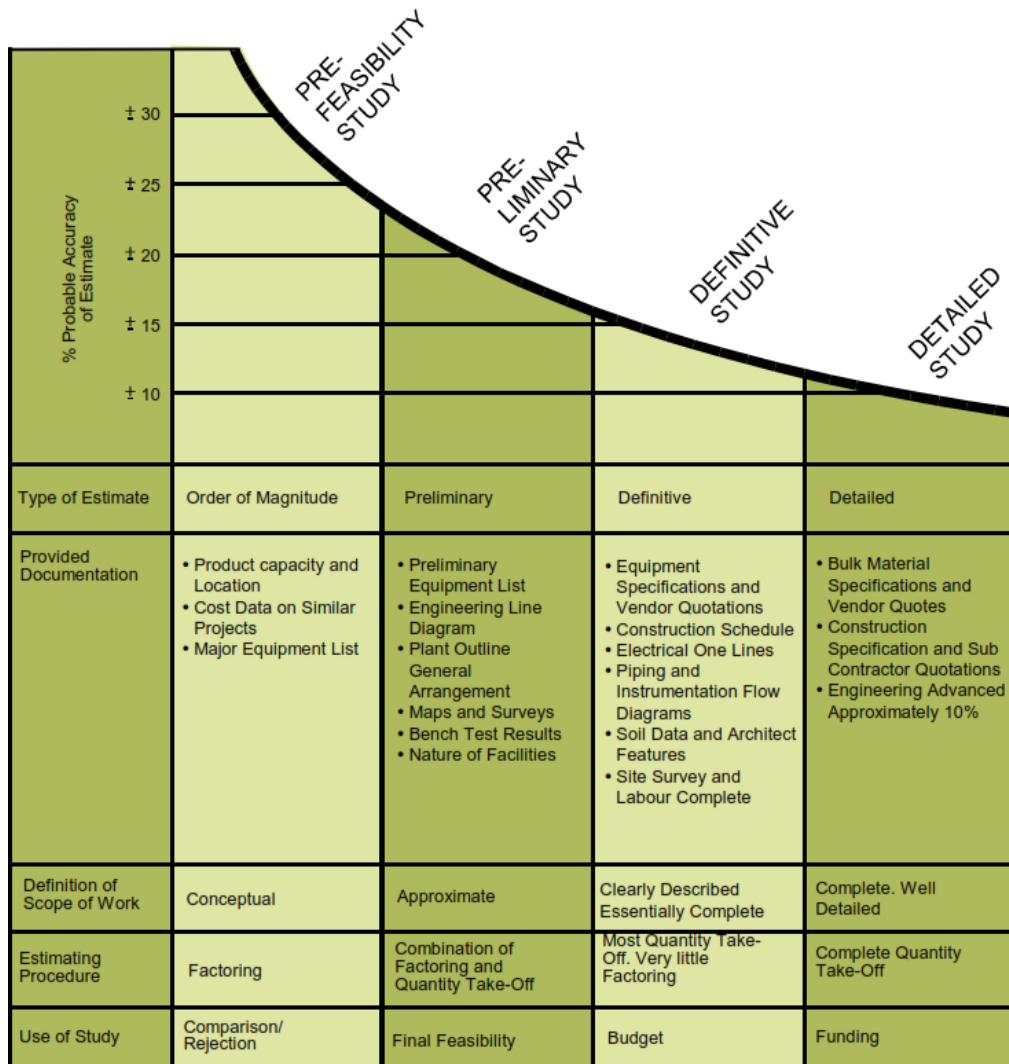
Forecast error and the project life cycle

- F9 Figure F1 over the page shows the relationship between accuracy of the cost estimates and the project life cycles at which the cost estimates are prepared. The project budget is set after the ‘definitive study’ phase of a project life cycle.
- F10 In order to minimise the cost of developing project proposals, Transpower seeks regulatory approval of the preferred investment after the preliminary study stage of the project life.¹⁸⁶ At this stage of the project life cycle, the accuracy of the cost estimates is typically between 20 to 30% depending on the nature of the project.
- F11 We accept that actual costs may exceed the approved MCA. In these cases, Transpower can apply for an increase in the MCA to recover the additional costs, as it has done for the NIGU Project.

¹⁸⁵ Transpower refers to the initial costs as the ‘target cost estimate’ which was produced by the tenderers before Transpower selected the successful tenderer.

¹⁸⁶ This is so that Transpower does not have to do definitive studies for all the investment options.

Figure F1: Project life cycle stages and accuracy of cost estimates



- F12 The Capex IM does not apply direct financial incentives to the accuracy of the project cost figures that Transpower provides when seeking approval for a project. We recognise that it is difficult to obtain fully accurate values at the stage where the Commission approves a project.
- F13 If Transpower were to be incentivised according to the accuracy of the project costs used for obtaining approval, it is likely the risk involved would affect Transpower's decision to invest.
- F14 Alternatively these incentives could cause Transpower to require a premium for an investment or over-compensate for the risk in all items of a project. This behaviour may lead to an unnecessarily high MCA being approved for a project, and therefore a weaker incentive to control costs.

How Transpower established the TCE

- F15 Table B2 above shows the components of the TCE.
- F16 Transpower used a reasonable process and reasonably qualified experts to estimate the TCE. For this reason, we consider that the TCE did not include any avoidable costs and we have therefore not examined the TCE any further.
- F17 In late 2005, Transpower invited high voltage transmission line contractors to register their interests to build a 400 kV line.¹⁸⁷ Transpower then selected two applicants to prepare tenders. Transpower funded the investigation to ensure that the tenderers understood the scope and risks of the project. Transpower staff, supported by local consultants, assisted the tenderers.
- F18 Transpower retained some of the risks of the project, particularly those around:¹⁸⁸
- F18.1 access to 31 tower sites;
 - F18.2 changes in actual depth of the tower foundations;
 - F18.3 mitigation for earth potential rise (EPR);
 - F18.4 foreign exchange and raw material cost escalation;
 - F18.5 landowner payments; and
 - F18.6 responding to changes in scope due to resource consent conditions.¹⁸⁹
- F19 The tenderers produced an estimate of cost.¹⁹⁰ The estimated cost of the successful tenderer became the original TCE once the tender was accepted.
- F20 We are satisfied that the process used to identify the scope and the target estimate cost reflected the practice of a diligent and prudent operator. The process was designed to minimise the risk in overestimating the scope of works through competitive tendering and involving Transpower staff in scoping the project.

¹⁸⁷ NIGUP amendment application, page 73.

¹⁸⁸ As we will discuss later in this attachment, these risks incurred some of the cost overruns between the original target cost estimate and project end costs. The first three risks added an extra \$30.8 million to the direct cost of constructing the 400kV line.

¹⁸⁹ NIGUP amendment application, pages 74-75.

¹⁹⁰ This estimate is referred to as the 'best and final offer'.

F21 Produced in the manner described above, the target estimate cost is unlikely to have included any estimates of costs that would be avoidable under our assessment framework. Therefore, we have focused our analysis on whether Transpower was diligent and prudent when it incurred costs above the TCEs.

Cost overruns by cost drivers

F22 Table F1 over the page shows cost overruns by cost drivers and is derived from Table B2 in Attachment B above.¹⁹¹ Table F1 allows us to group the cost overruns by drivers. We use this information to assess whether any of the cost overruns due to each of the cost drivers were avoidable.

F23 This table shows the cost overruns in two groups. Those we found to be avoidable and those we did not find to be avoidable. We explain our reasons below.

¹⁹¹ In the first column of Table F1 we have listed the cost drivers that are shown in the last column of Table B1. The next five columns of Table F1 show the categories of work packages that are shown in the first column of Table B1. This allows us to group the cost of different work packages by the drivers of cost overruns.

Table F1: Costs above the original TCE by cost drivers

| Drivers of cost overruns | Work packages | | | | | Total |
|--|---------------------------|-------------|----------------|-------------|------------------------|--------------------|
| | Site preparation & access | Foundation | Tower erection | Stringing | Indirect & other costs | |
| Costs we found to be avoidable | | | | | | |
| Out of sequence work | 1.3 | 1.4 | 1.3 | 3.1 | 10.6 | 17.7 |
| <i>Total avoidable costs</i> | <i>1.3</i> | <i>1.4</i> | <i>2.3</i> | <i>3.4</i> | <i>10.6</i> | <i>17.7</i> |
| Costs we did not find to be avoidable | | | | | | |
| Sites not surveyed | 4.2 | 22.5 | | | | 26.7 |
| Additional work to meet need date | 10.1 | 0.5 | 1.1 | 4.7 | 5.6 | 22.0 |
| Underestimate in TCE | 3.0 | 0.9 | | 5.0 | 15.8 | 9.7 |
| Omitted scope | | | | 9.2 | 1.1 | 9.2 |
| Safety | 0.3 | | | | | 0.3 |
| Late access | | | 1.0 | | | 1.0 |
| Non-availability or corrosion of material | | | 1.0 | 0.3 | | 1.3 |
| Low productivity | | | 2.0 | | | 2.0 |
| Changed land use | 0.5 | | | | | 0.5 |
| Resource consent requirements | 0.2 | | 8.5 | | | 8.7 |
| Sale of assets | | | | | -4.0 | -4.0 |
| <i>Total not avoidable</i> | <i>18.3</i> | <i>23.9</i> | <i>13.6</i> | <i>19.2</i> | <i>18.5</i> | <i>93.5</i> |
| Total costs overruns | 19.6 | 25.3 | 14.9 | 22.3 | 29.1 | 111.2 |

All costs are in \$million and nominal as they were incurred.

Cost overruns we found to be avoidable

- F24 We assessed whether costs were avoidable by considering:
- F24.1 whether the additional work associated with any cost overruns was necessary to build the line by the need date;
 - F24.2 how Transpower evaluated and approved the additional work that caused the cost overruns;
 - F24.3 Transpower's mitigation strategy and actions in minimising these costs and challenging the scope changes; and
 - F24.4 how the Alliance delivered any necessary additional work.
- F25 We have taken the view that there are no avoidable costs if the additional work was delivered through competitive tendering.
- F26 In the following paragraphs we discuss our reasons for considering whether any of the component of costs were avoidable. As shown in Table F1 above, these costs are due to out of sequence work.

Avoidable costs due to out of sequence work

F27 Transpower originally identified about \$18 million of costs caused by the contractor having to work out of sequence.¹⁹² Transpower stated:

The fragmented access to property did result in some avoidable cost being incurred by the NIGU Alliance, despite active management of these risks. Earlier planning of the NIGU Project as a whole would likely have delivered the necessary property rights earlier, avoiding the \$17.7 million of Alliance costs we have already identified. These were attributable to fragmented works, increased consumable items and additional resources and mobilisation deployed to achieve commissioning by the need date and minimise further cost to the Project.¹⁹³

Construction of the overhead line for the Project was extremely challenging with suboptimal sequencing impacting the cost of foundation, tower erection and conductor stringing works.

This could have been avoided had the necessary property rights been obtained earlier and/or the Project timetable allowed for more time to obtain them. Delays caused by the prolonged regulatory process were out of Transpower's control. However, it is acknowledged that had Transpower started planning earlier, some of this additional cost may have been avoided.¹⁹⁴

F28 A diligent and prudent operator would have explored and taken actions to avoid these costs because:

- F28.1 one of the assumptions in the planning of the project and consequentially a requirement in the project plan was that all property access would be obtained before starting construction;
- F28.2 the project strategy, plan and risk management was to have access to all properties before tendering the construction contract in order to inform the construction tender;
- F28.3 it would have taken account of the consenting approval timeframe, identified before approval as ranging from six months to three years as a risk to securing access from landowners;¹⁹⁵ and
- F28.4 this would have allowed for sequential access for the planned construction and mitigation of the geotechnical risk from unforeseen ground conditions.

¹⁹² Sequential working is building the line from one end to the other in sequence.

¹⁹³ Transpower "Submission to the Commerce Commission on Strata Alliance Contract report" 1 September 2014, page 2.

¹⁹⁴ NIGUP amendment application, page 8.

¹⁹⁵ Transpower "North Island Grid Upgrade Project - Amended Proposal Attachment C: Project delivery risks" 20 October 2006, page 5.

F29 Other options were available to Transpower. For example, Transpower could have negotiated with more favourable access conditions to better engage the landowners. As observed by Calverton, some conditions in the easement documents were a barrier to negotiation and a change in negotiating conditions helped with the acquisition process. Calverton notes:

A further factor likely to have alienated landowners was Transpower's draft easement document which was held by some to have particularly onerous conditions relating to access.¹⁹⁶

There was a progressive increase in both easement and freehold acquisitions after August 2009 when the Transpower Board approved revised (ie less restrictive) negotiating parameters for property acquisition team and then the final BOI decision received.¹⁹⁷

F30 The factors leading to these costs were foreseeable. The consequence of working out of sequence is well known in the field of building transmission lines. BBUGL explains:

Transmission line construction efficiency relies on timely sequential working. Ideally, from one end of the line to the other end in absolute sequence so that the efficiency operations can be optimised by working from one tower to the next with no unnecessary mobilisation, demobilisation or out of sequence movements of plant, equipment and manpower.

It is not simply delay in access but the non-sequential access that was finally granted that increased the cost of construction through inefficient working and stand down time.¹⁹⁸

F31 Transpower has stated that the Board of Inquiry process, which influenced its ability to obtain easements, was not under its control. While we agree with Transpower, the procurement of easements was partly within Transpower's control, irrespective of the BOI process.

F32 Transpower also recognises that it would be inappropriate to recover costs from the consumers due to suboptimal sequencing of work.¹⁹⁹

F33 We therefore consider that the \$17.7 million of costs caused by the contractor having to work out of sequence were avoidable.

¹⁹⁶ Calverton Business Consulting Group "Evaluating Transpower's property and easement acquisition strategy and implementation for the NIGU Project" 30 June 2014, page 49.

¹⁹⁷ Ibid, page 9.

¹⁹⁸ Transpower "Issues Paper Submission to the Commerce Commission on Issues Paper for amending the allowance and outputs for the NIGU Project" 17 January 2014, page 42.

¹⁹⁹ NIGUP amendment application, page 5.

Costs overruns we did not find avoidable

F34 Table F1 shows the cost overruns where the evidence we have does not establish that these costs were avoidable.

F35 The drivers for these cost overruns are:

F35.1 sites which were not surveyed;

F35.2 additional work required to meet the need date;

F35.3 underestimate in the TCE or omitted scope;;

F35.4 safety, changed land use, and regulatory requirements;

F35.5 late access;

F35.6 unavailability or corrosion of material; and

F35.7 low labour productivity.

F36 The works that led to these overruns were managed by robust processes, which ensured that only work necessary to construct the line got approved. In addition, the contract arrangement did not allow BBUGL to gain from the cost of delivery of the works. Rather, it adjusted the profit and overhead amount that was based on a pain/gain share principle.²⁰⁰

F37 In the following sections, we provide specific reasons why we consider that the cost overruns listed above were for changes to the scope of works necessary to deliver the project.

Costs due to sites not surveyed

F38 The \$22.5 million for foundations and \$4.2 million for site access were additional costs incurred because sites had not been surveyed at the time the TCE was prepared.²⁰¹ These costs were classified as ‘remeasurable items’ when Transpower engaged tenderers to scope and price the 400 kV line construction work. Transpower’s terms allowed the target estimate costs to be adjusted after the site surveys were completed.

F39 Site investigations after the Alliance Contract was awarded revealed that the tower foundations had to be a lot larger than that allowed for in Transpower’s initial costing and by the tenderers.

²⁰⁰ Transpower “Response to question: Scope changes” June 2014.

²⁰¹ NIGUP amendment application, page 71.

- F40 Transpower states the cost of changes in actual depth in foundation (and therefore volume of works) was adjusted for actual quantities using the tendered rates generally set at the time of tender.²⁰² This means that if the tenderer had prior knowledge of the quantity of the works, the value of these cost elements would be the same in the original and adjusted TCE.
- F41 Transpower explains the process it used to approve remeasurable items, which was:
- F41.1 remeasurable items were the subject of a thorough approval process;
 - F41.2 the case for any remeasurement had to be either in accordance with the pre-approved decision making matrix, or otherwise made specifically to the Alliance Leadership Team; and
 - F41.3 remeasurement requests submitted to the Alliance Leadership Team required evidence that exceeding the baselines for the remeasurable items was necessary and were being delivered in a cost efficient manner.²⁰³
- F42 Transpower had a robust process to approve the additional quantity of the remeasurable work. This process is explained in Transpower's response to our questions.²⁰⁴ Based on the process described in Transpower's response, we are satisfied that the costs of these work packages were set by a robust process.
- F43 We have no basis to conclude that these additional costs due to change in volumes following site surveys were avoidable.
- F44 Pacific Aluminium raised a number of issues about these cost overruns, particularly those due to tower foundations.²⁰⁵

In section 8.13 of its application, Transpower refers to actual concrete used in tower foundations being 20,000 cubic metres against a budgeted 8,000 cubic metres. This is a 250% increase over the budget and indicates a poor understanding of ground conditions. This is an area that needs careful examination by the Commission given the actual cost of \$48.3 m is nearly double the budgeted cost of \$24.8m.

²⁰² Ibid, page 82.

²⁰³ Transpower "Response to question: Examples of cost challenge/efficiency targets applied by Transpower" July 2014.

²⁰⁴ Ibid.

²⁰⁵ Pacific Aluminium "Submission to the Commerce Commission on Issues Paper for amending the allowance and outputs for the NIGU Project" 17 January 2014, para 17-18.

The Commission needs to understand exactly what assessment of ground conditions was performed other than actual site investigations. The \$5.9m increase in cost due to ‘unforeseen’ tomo formation is surprising. Given the well known volcanic ash composition of the southern Waikato, tomo formation should have been anticipated and a mitigation strategy designed and costed in the approved budget.

- F45 We agree with Pacific Aluminium’s observation, that the scope of work and the estimated cost of the foundations were poorly estimated.
- F46 In Chapter 3 and Attachment C, we identified that most of the cost overrun were due to optimism bias in Transpower’s project management. This is one example of optimism bias.
- F47 The under estimation of the scope of foundation works has not resulted in avoidable costs. All works in addition to those identified in the TCE were approved via a robust process that ensured that the works were necessary to construct the transmission line.

Additional work required to meet need date

- F48 Transpower incurred \$22 million of additional costs to meet the need date.
- F49 We were not able to reasonably conclude that costs associated with meeting the need date were unavoidable. Our reasons are discussed in Attachment G.

Costs due to underestimation or omission in scope

- F50 \$35 million of costs were due to underestimated or omitted scope of works. The reasons for these costs are:
- F50.1 incorrect assumption on the cost of access to some towers;²⁰⁶
 - F50.2 foundation costs;²⁰⁷
 - F50.3 omitted scope for hurdles and nets when stringing over commercial and farming operations, and 110 kV lines and roads;²⁰⁸
 - F50.4 tender error around stringing productivity and costs; and²⁰⁹
 - F50.5 consequential indirect costs.

²⁰⁶ NIGUP amendment application, page 79. These are costs that arose during construction after the adjustments for re-measure.

²⁰⁷ Ibid, pages 81-82 and 87.

²⁰⁸ Ibid, page 85.

²⁰⁹ Ibid, pages 79 and 85. Hurdles and nets over commercial and farming and farming operations were a requirement of the easement agreement.

- F51 Transpower describes the process for managing scope changes in response to our questions.²¹⁰ The process is summarised below.
- F51.1 Scope change only applied to circumstances defined in the Project Alliance Agreement, otherwise the Alliance Leadership Team decided scope changes on a case by case basis.
- F51.2 Transpower assessed all submissions for scope changes from the Alliance and submitted its assessments to the Transpower members of the Alliance Leadership Team. Transpower members of the Alliance Leadership Team finalised the request with the Alliance Leadership Team.
- F51.3 Where it was not possible to fully define the extent of the scope, a closely managed process was used.
- F52 The challenge process Transpower used to approve scope changes was such that by late 2011, the Alliance had to use consultants (WT Partners) to help with the decision making.
- F53 We are satisfied that the scope changes associated with the construction activities mentioned above were appropriately challenged by Transpower and the Alliance Leadership Team before approval and the work was carried out under competitively priced tenders.²¹¹ The process reflected a diligent and prudent approach.
- F54 In addition, Transpower has advised that the contractor shared some of the additional costs due to the underestimation of scope.²¹²

Costs due to safety, changed land use and regulatory requirements

- F55 We are satisfied that the costs of work packages that were due to resource consent requirements or safety requirements were carried out according to the scope change process described above. These cost components include:
- F55.1 mitigating earth potential rise; and
- F55.2 constructing access tracks and preparing sites in a manner that preserved their topography.²¹³

²¹⁰ Transpower “Response to question: Scope changes” July 2014.

²¹¹ Transpower “Response to question: Examples of cost challenge/efficiency targets applied by Transpower” July 2014.

²¹² NIGUP amendment application, pages 79 and 84.

²¹³ Ibid, page 85. The designations also required monopoles at Karapiro and Brown Hill. Transpower has not isolated these costs as resource consent requirements.

Cost due to late access

- F56 Transpower has identified \$1 million in cost due to late access.
- F57 Transpower has stated that these costs were due to land owners not giving timely access to remove the Arapuni-Pakuranga 110 kV line.
- F58 We consider that these costs were not within Transpower's control, and therefore not avoidable.

Unavailability or corrosion of material

- F59 Transpower identified \$1 million in costs due to the unavailability of tower steel, and \$0.3 million due to the corrosion of conductor materials while in port.
- F60 The costs classified by Transpower as being due to the unavailability of tower steel relate to the Alliance choosing to use a staggered and targeted procurement approach. Given the high number of site-specific tower designs, there were instances of the right site and the right steelworks not being available at the same time.²¹⁴
- F61 The alternative considered by the Alliance was ordering all steelwork at once, and storing it until it was required. However, Transpower estimates that the cost of an appropriate storage facility and the double handling this would have caused would have led to additional costs of \$1.3 million. Given the higher estimated cost of the alternative, the approach Transpower adopted was a reasonable response to the circumstances.²¹⁵
- F62 Following questions from the Commission, Transpower clarified that the costs classified as due to corrosion were a result of quality assurance measures taken to investigate conductor material suspected of being corroded, and of the delays caused by this investigation.²¹⁶
- F63 As the installation of defective conductor material could have significant cost and reliability implications, the investigation and delay were consistent with what a prudent operator would have done given the circumstances.

²¹⁴ Transpower "Response to question: Availability of steel and conductor corrosion" 10 April 2015, page 3.

²¹⁵ Ibid.

²¹⁶ Ibid, page 4.

Tower erection costs due to low productivity rates

- F64 One of the factors that led to additional expenditure in tower construction was low productivity rates. Transpower explains the reason for the low productivity as:
- F64.1 BBUGL's cost estimate for tower erection was based on using a mix of local and overseas skilled workforce to assemble and erect transmission towers;
 - F64.2 the change in microeconomic environment due to the global financial crisis led to restrictions in getting work visas for foreign workers. Transpower was required to train and use local workforce before it could bring foreign workers;
 - F64.3 Transpower recruited and trained local workers, but due to the specialised nature of the work using locally trained workers affected early performance on the job which led to additional costs;
 - F64.4 ultimately Transpower was able to bring in appropriately skilled foreign workers; and
 - F64.5 the increase in labour costs associated with bringing in additional overseas labour to compensate for poor productivity by local staff meant that installation costs exceeded the allocated budget.²¹⁷
- F65 Based on the information provided by Transpower, we consider that this cost was not avoidable.

²¹⁷ NIGUP amendment application, pages 83-84; and Transpower "Response to question: Labour productivity and skilled overseas labour" March 2015.

Attachment G: Need date

Purpose of this attachment

- G1 This attachment:
- G1.1 explains our views on Transpower's approach to re-assessing the system need date;
 - G1.2 explains why we consider Transpower did not act unreasonably in attempting to deliver the 400 kV line by 2013; and
 - G1.3 sets out our future expectations on assumptions that affect system planning criteria.

Why we are looking at the need date

- G2 Transpower identified that a major contributor to the overspend was the requirement to meet the project time table.²¹⁸ The project time table was set by the system need date of 2013.
- G3 The expert reports we commissioned on property and easement acquisitions and Alliance Contract arrangement also identified that meeting the 2013 system need date incurred costs that could likely have been avoided if Transpower had more time to deliver the project.
- G4 MEUG submitted that:
- G4.1 the Commission should ensure that it fully understands when Transpower became aware that the need date had moved, because there is inconsistency in the timeline as told by Transpower;²¹⁹ and
 - G4.2 Transpower's focus on completing the project without a continuous and robust process for evaluating the basic reason for the project was not efficient, prudent or GEIP.²²⁰
- G5 We assessed the options available to Transpower to defer the need date for the 400 kV line and whether it acted reasonably when making its decisions.

²¹⁸ NIGUP amendment application, pages 80, 83. (In response to an information request regarding the 400 kV line construction cost, Transpower identified that \$16.1 million of expenditure was to meet the need date).

²¹⁹ Major Electricity Users Group "Cross-submission on expert reports for Transpower NIGU Project" 8 September 2014, para 5.

²²⁰ Major Electricity Users Group "Cross-submission on NIGU Project Amendment Issues Paper" 31 January 2014, para 7.

Summary of our findings

- G6 We consider that Transpower’s decision to commission the 400 kV line by 2013 was not unreasonable. Transpower’s actions were due to its concern on the security of supply to Auckland and the impact on the electricity market if the line was not built by the system need date.
- G7 At the time of project approval, there were differing views between the Electricity Commission and Transpower on the system need date of the new line. The difference was due to their planning assumptions. The Electricity Commission’s planning assumptions were that all generation except Otahuhu B would be available during peak demand, in line with the n-g-1 planning criteria. This resulted in a need date of 2015.
- G8 Although Transpower used the same planning criteria as the Electricity Commission, Transpower assumed that along with Otahuhu B power station two other major power stations would not be available during peak demand. This assumption resulted in a need date of 2013 for the new line.
- G9 In its decision paper, the Electricity Commission recommended that Transpower should review the need date, but did not explicitly recommend a review in the light of its planning assumptions.²²¹
- G10 Transpower considered that the Electricity Commission’s approval also included approval of its need date, since the Electricity Commission did not comment that Transpower planning assumptions were incorrect.²²²
- G11 Transpower was also of the view that requiring all generation in the area to be running was not good practice.²²³ It did not amend its planning assumptions in any future reviews of the need date. Rather, Transpower reviewed the need date only with respect to demand forecasts.
- G12 Transpower reviewed the need date in 2008 before entering into the Alliance Contract. In 2008, peak demand forecast, by both Transpower and the Electricity Commission did not support deferring the project. At this time, the full impact of the global financial crisis was not yet apparent so there was no reason for Transpower to anticipate reduced demand because of this factor. Within the constraints of reviewing demand forecasts, Transpower’s decision to go ahead with the site works was not unreasonable.

²²¹ Electricity Commission “Final decision on Transpower’s North Island Grid Upgrade Proposal” 5 July 2007, para 9.3.1.

²²² Transpower “Response to question: The difference in views on the system need date” March 2015.

²²³ Transpower “Email SSG EC and Transpower on the need date at the time of approval” 27 January 2015.

- G13 For future reliability investment proposals reviewed by us, we will not accept Transpower using planning assumptions that effectively modify the security criteria set out in the Electricity Industry Participation Code (Code).²²⁴
- G14 Going forward, if Transpower justifies the need or timing of projects using planning assumptions that modify the security criteria set out in the Code, we expect such projects to have positive expected net electricity market benefits.²²⁵

Our approach to evaluating Transpower’s review of the system need date

- G15 We reviewed the publicly available information on the discussions on the need date between Transpower and the Electricity Commission when the Electricity Commission assessed Transpower’s grid upgrade proposal in 2006 and 2007.
- G16 We also reviewed Transpower’s answers to our questions on the need date and the evidence presented by Transpower at the Board of Inquiry in 2008.
- G17 We also considered submissions and cross-submissions on our Issues Paper, draft decision and other expert reports. We did not undertake an independent study of the need date.
- G18 We present the results of our evaluation below.

Need date was uncertain between 2013 and 2017

- G19 In its application to the Electricity Commission, Transpower proposed a system need date for the new line (need date) as 2013.
- G20 The Electricity Commission’s analysis indicated an earliest need date of 2015. This was due to a different set of planning assumptions than Transpower’s. The Electricity Commission’s assumptions were that generation at Huntly and Taranaki would be fully available during an Otahuhu B outage in accordance with the agreed ‘n-g-1’ security criteria used by Transpower.²²⁶

²²⁴ The Code is available at: <https://www.ea.govt.nz/code-and-compliance/the-code/>.

²²⁵ Capex IM, cl D1.

²²⁶ n-g-1 is a system security standard. When applied to the transmission network, n-g-1 means that the grid should be able to supply its maximum expected peak demand with one generator and one transmission line (usually the one transmitting the most power) out of service.

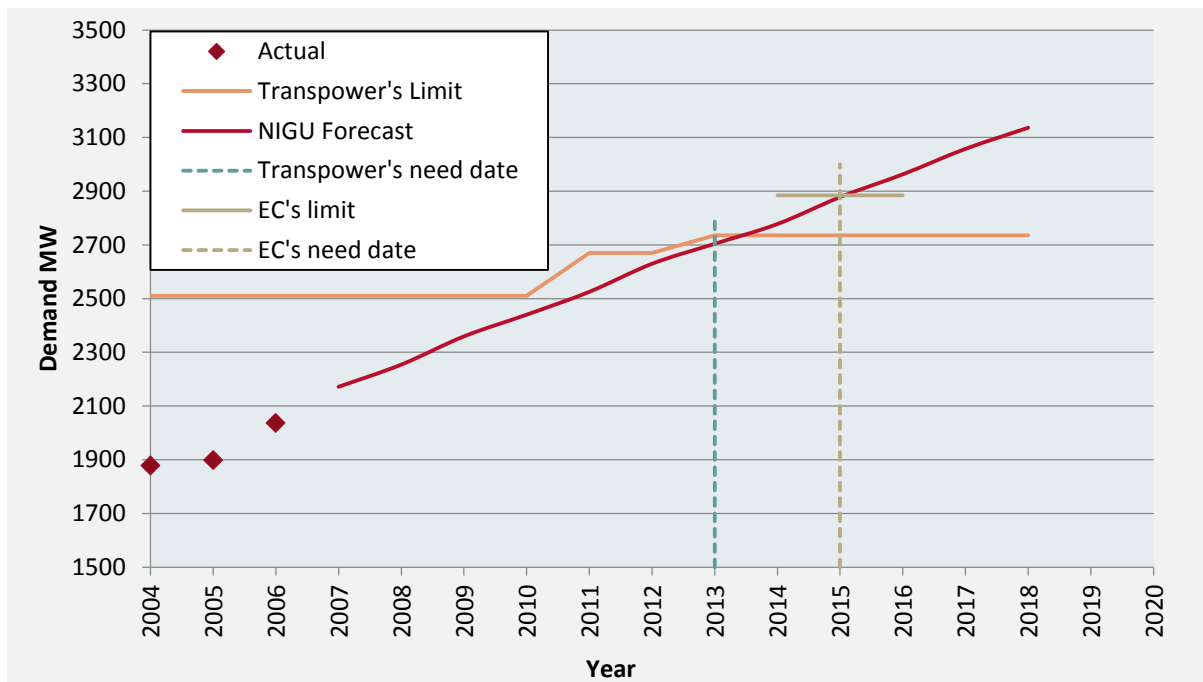
- G22 Transpower's analysis was based on the assumption that New Plymouth and Huntly should not be 'constrained-on' and that allowance should be made for coincident outages at New Plymouth and one major Huntly unit, as well as at Otahuhu B. As noted by the Electricity Commission's consultant, Transpower's planning assumptions effectively corresponded to the security criteria of n-2g-New Plymouth Station-1.

It appears that the primary reason for the discrepancy between the need dates results from our assumption that generation at Huntly and Taranaki will be fully available during an Otahuhu B outage in accordance with the agreed 'N-G-1' security criteria (apart from reduced Huntly output in summer and extreme summer).

In contrast Transpower appears to take the view that New Plymouth and Huntly should not be 'constrained-on' and that allowance should be made for coincident outages at New Plymouth and one major Huntly unit, as well as at Otahuhu B. This would correspond to the 'N-2G- New Plymouth Station-1' security criteria which is significantly more onerous than the agreed 'N-G-1' criteria.²²⁷

- G23 Figure G1 below shows the relationship between prudent demand forecast, transmission limits and system need date. This figure does not show the increase in the transmission limit provided by the 400 kV line.
- G24 The increase in the transmission limit between 2010 and 2013 is due to the deferral projects that Transpower commissioned in this period.
- G25 The differing assumptions used by Transpower and the Electricity Commission give rise to the different transmission limits shown below and therefore the different need dates for the new line.

²²⁷ System studies group NZ Limited, "Transmission Augmentations into Auckland: Technical Review of Transpower's Amended Proposal" January 2007, pages 9-10. Available at <http://www.ea.govt.nz/about-us/what-we-do/our-history/archive/operations-archive/grid-investment-archive/gup/2005-gup/north-island-grid-investment-proposal/decision-january-2007-history/>.

Figure G1: Prudent demand forecast, transmission limits and need date

- G26 Transpower acknowledged the Electricity Commission’s views but observed that the 2015 system need date would require New Plymouth and Huntly running which would undermine the efficiency of the market. The Electricity Commission writes:

Transpower’s reply states that deferral of the need date would require a number of generators to be constrained-on (specifically Huntly and New Plymouth units), and that this would significantly undermine the efficiency of the electricity market in New Zealand.²²⁸

- G27 The Electricity Commission concluded that the need was uncertain but between 2013 and 2017.

As discussed above, there is uncertainty as to the need date for the Proposal. These dates range from 2013 to 2017. The Commission has continued to assume a need date of 2013, but notes that there may be an opportunity to delay construction if the Proposal is approved. It may be appropriate if the Proposal is approved to recommend to Transpower that it keeps the need for investment under review and seek to avoid unnecessary early expenditure while ensuring security of supply.²²⁹

- G28 However, the Electricity Commission did not explicitly recommend that Transpower review the need date in the light of the planning assumptions. The recommendations of the Electricity Commission are quoted below.

²²⁸ Electricity Commission, “Economic Analysis of the Revised North Island Grid Upgrade Project” 23 February 2007, page 28.

²²⁹ Electricity Commission “Economic Analysis of the Revised North Island Grid Upgrade Project” 23 February 2007, para 3.1.17.

Transpower should use efficient project management techniques to manage project costs and risks and, on an ongoing basis, will review the need date for the Proposal in light of changing circumstances, keeping in mind the need to avoid unnecessary early expenditure while ensuring that the relevant assets are commissioned before they are needed²³⁰

G29 Transpower's response to the Electricity Commission's recommendations, as recorded in the EC decision paper was:

(a) Transpower has committed to the matters specified in recommendation (a) as part of both the Proposal, and during the recent Grid Upgrade and Investment Review Policy process undertaken by the Commission and Transpower. Transpower will also review the need date for the Proposal in light of changing circumstances, including information from customers, updated statements of opportunities, and the system security forecast.²³¹

Demand forecasts did not support deferral until 2012 forecasts

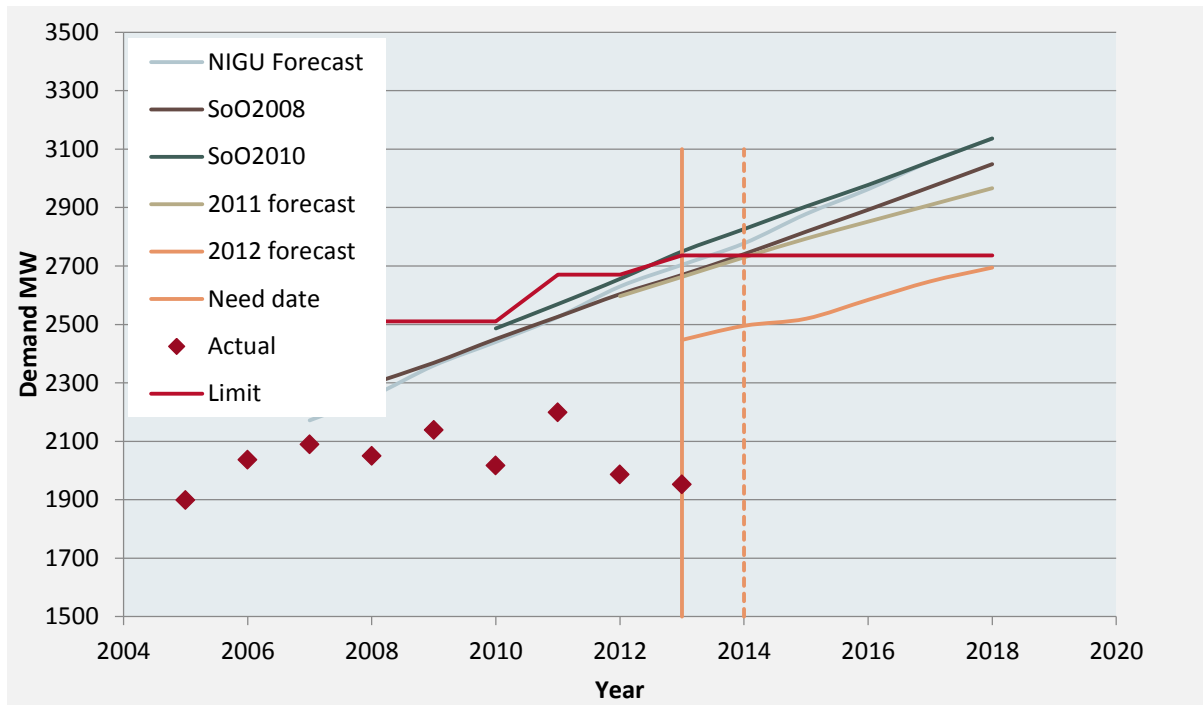
G30 In this section we consider when Transpower became aware that the need date could be deferred based on prudent demand forecasts. As mentioned in paragraph G4 above, MEUG stated that the Commission should establish when Transpower first became aware that the need date could be shifted.

G31 Figure G2 below shows the prudent demand forecasts between 2008 and 2012 and the forecast used to prepare the grid upgrade plan. The NIGU demand forecast and the Statement of Opportunities (SoO) 2008 and SoO2010 were prepared by the Electricity Commission.²³² The 2011 and 2012 demand forecasts were prepared by Transpower.

²³⁰ Electricity Commission "Final decision on Transpower's North Island Grid Upgrade Proposal" 5 July 2007, para 9.3.1(a).

²³¹ Ibid, para 9.3.3(a).

²³² SoO is the 'Statement of Opportunities'. These are documents the Electricity Commission produced to identify opportunities for the development of the electricity system over a 30 year horizon.

Figure G2: Prudent demand forecasts up to 2012

G32 As seen in Figure G2, demand forecast in the SoO2008 and the SoO2010 did not change materially from the forecasts used to prepare the NIGU proposal. The 2008 demand forecast predicted a need date of 2014 and that in SoO2010 revised the forecast need date to 2013. It was not until the 2012 forecast that demand forecast supported deferring the construction of the 400 kV line.

G33 We conclude that:

G33.1 the prudent demand forecast did not change enough to delay the need date until the 2012 forecast;

G33.2 the 2012 demand forecast established that the need date could be deferred; and

G33.3 based on the financial evidence provided by Transpower, we are satisfied that by 2012 it was not cost effective to defer completion of the 400 kV line.²³³

²³³ Transpower "Response to question: Economic studies relating to changing/not changing the commissioning date" July 2014.

Transpower’s decision was based on providing a satisfactory level of security

G34 Transpower did not consider that it was required to review the need date using an amended planning assumption. Transpower states:

..the [Electricity] Commission concluded there was uncertainty around the need date, because it was based on forecast demand and generation assumptions, on which reasonable minds could differ. However, they did not conclude that our analysis was incorrect, and accepted our analysis and assumed need date as the basis for its decision.

Our approach during implementation of the NIGU Project was the same as for other major capex projects and consisted of reviewing new demand forecasts. If any new forecast impact on the need date and commissioning date of planned major capex projects, we undertake further analysis.²³⁴

G35 Transpower retained its planning assumptions because it considered that running all available generation in the area to meet expected demand did not provide a satisfactory level of security. Transpower states:

Significantly, one reason the Electricity Commission considered a later need date feasible was that 2014 summer and 2015 winter demand could be met if all commissioned upper North Island, Waikato and Taranaki generation was running.

In our view requiring all generation in the area to be running is not good electricity industry practice. Such a situation would not provide a satisfactory level of security (including in situations of planned and unplanned outages of generation units) and market prices would likely be high. Hence we did not agree that the need date could be deferred and maintained our view that a 2013 need date was appropriate.²³⁵

G36 Given Transpower’s concerns on the electricity market and security of supply, and the acceptance of system need date by the Electricity Commission, Transpower’s decision to retain its generation assumptions were not unreasonable.

The 2013 system need date did not incur other avoidable costs

G37 There were no requirements on Transpower to reconsider the need date using a different set of planning assumptions than those used to prepare its major capex proposal in 2006.

G38 We are satisfied that from 2005 to 2011 peak demand forecasts by both the Electricity Commission and Transpower did not change sufficiently to affect the system need date, based on the planning assumptions Transpower used.

²³⁴ Transpower “Response to question: The difference in views on the system need date” March 2015.

²³⁵ Ibid.

- G39 Given that this project was to ensure security of supply to Auckland, Transpower's decision to start the works in 2008 was not unreasonable.
- G40 We are therefore unable to conclude that the system need date, or the resulting compressed delivery timeframes, led to avoidable costs other than those Transpower has identified in its application.²³⁶

Transpower's criteria for reliability investments

- G41 Transpower used planning assumptions that effectively made the security criteria set out in the Code more stringent, as observed by the Electricity Commission's consultant. This impacted on the timing of the NIGU project.
- G42 While we have accepted that Transpower's review of the 2013 system need date was not unreasonable in the particular circumstances of this case, our acceptance should not be seen as an indication that we will accept similar planning assumptions in future proposals.
- G43 Projects that are proposed to meet the deterministic limb of the grid reliability standards should be justified according to the security criteria set out in the Code.²³⁷
- G44 If Transpower proposes major capex projects using planning assumptions that effectively modify the security criteria in the Code, then under the Capex IM such projects will be required to be justified as economic investments, both in terms of need and timing.
- G45 Economic investments should have positive expected net electricity market benefits.²³⁸ Economic consideration on timing should include assessing expected costs to the market of out-of-merit generation against the expected cost to consumers of delivering projects earlier than necessary.

²³⁶ NIGUP amendment application, page 5.

²³⁷ Electricity Authority "Electricity Industry Participation Code" 2 March 2012, schedule 12.2, para 2.

²³⁸ Capex IM, cl D1(1)(b).

G46 The inputs include, but should not be limited to:

- G46.1 the expected duration of time when peak demand exceeds the transmission limit,²³⁹
- G46.2 the probability of coincidental outages of the main generator affecting transmission (eg Otahuhu B in the case of NIGU) and a binding transmission line at the time of peak demand; and
- G46.3 the expected cost of constrained-on generation to allow for the above contingencies.

G47 The grid reliability standards as defined in the Code are:

The grid reliability standards

- (1) The purpose of the grid reliability standards is to provide a basis for Transpower and other parties to appraise opportunities for transmission investments and transmission alternatives.
- (2) For the purpose of subclause (1), the grid satisfies the grid reliability standards if-
 - a. the power system is reasonably expected to achieve a level of reliability at or above the level that would be achieved if all economic reliability investments were to be implemented; and
 - b. with all assets that are reasonably expected to be in service, the power system would remain in a satisfactory state during and following a single credible contingency event occurring on the core grid.

²³⁹ High winter peak demands, as predicted by the prudent demand forecasts, are only likely to occur during exceptionally cold winters. High peak demand only exceeds capacity for short periods in the first few years, typically two to ten hours per year.

Attachment H: Outputs

Purpose of this attachment

H1 The purpose of this attachment is to explain our decision on the proposed amendments to the outputs for the NIGU Project.

Summary

H2 We have decided to amend the outputs for the NIGU Project as proposed by Transpower. We consider that amending the outputs is consistent with the purpose of Part 4.

H3 The requirements and reasons for our decision are set out in the sections below.

Why Transpower has asked for amendments to outputs

H4 The NIGU Project was approved by the Electricity Commission under the EGRs. This approval included a set of outputs that the project was to deliver, as proposed in Transpower's application to the Electricity Commission.²⁴⁰ These are set out in Table H1 below.

H5 These outputs are approved major capex project outputs under the Capex IM.²⁴¹ The Capex IM has an incentive framework that encourages Transpower to deliver the outputs it has proposed.²⁴²

H6 In delivering the NIGU Project, Transpower has identified that it has not delivered all of the outputs it committed to when it sought approval for the NIGU Project.

H7 In Transpower's original application it requested us to amend three of the outputs.²⁴³ Transpower subsequently wrote to us, requesting a further output amendment.²⁴⁴ Transpower has also clarified the wording of the outputs it is proposing.²⁴⁵ The proposed outputs for amendment are set out in Table H2 below.

²⁴⁰ Electricity Commission "Final Decision on Transpower's North Island Grid Upgrade Proposal" 5 July 2007, para 2.1.1. For major capex projects approved under the Electricity Governance Rules, these outputs were presented in the grid upgrade proposal in a yellow box.

²⁴¹ Capex IM, cl 1.1.4(2)(c).

²⁴² Capex IM, cl B5.

²⁴³ NIGUP amendment application, page 125.

²⁴⁴ Transpower "North Island Grid Upgrade Project -Application for amendment to the approved major capex project output" 3 March 2015.

²⁴⁵ Transpower "Response to question: NIGU grid outputs" 3 March 2015.

- H8 The criteria for our evaluation and the process for making a decision on the amended outputs are set out in the Capex IM.²⁴⁶ This is similar to the evaluation and decision criteria for amending the MCA for the NIGU Project.
- H9 The difference between the two evaluations is that we must either accept or reject the outputs Transpower has proposed, rather than specifying them ourselves.²⁴⁷

Approved major capex project outputs

- H10 The outputs that Transpower proposed and were approved as part of the approval of the NIGU Project are listed in Table H1.

²⁴⁶ Capex IM, cl 3.3.4.

²⁴⁷ This decision constraint is specified in clause 3.3.4(4)(d) of the Capex IM which states that “the amended approved major capex project outputs are those proposed by Transpower”. Having made our final decision on the amendments to the NIGU Project, we are now required to assess whether the outputs (as amended) have been delivered (Capex IM clause 3.3.6). This is a separate process in the Capex IM to this amendment decision. The results of the achievement of outputs decision then flows through to the calculation of the major capex project output adjustment (Capex IM clause 3.3.7). The process for this calculation is specified in the Capex IM (Capex IM Schedule B clause B5).

Table H1: NIGU Project outputs at the time of approval

| Approved major capex project outputs for the NIGU Project |
|---|
| Procure, construct, commission and operate a 220kV switching station in the vicinity of Drury and upgrade the 220kV Otahuhu – Whakamaru C line by 2010. |
| Procure, construct, commission and operate 350MVAR of new static reactive plant at Otahuhu substation by 2010. |
| Procure, construct, commission and operate a new double-circuit, steel lattice tower, overhead transmission line of approximately 190km from a new substation near the existing Whakamaru substation to a new transition station in the vicinity of the South Auckland urban boundary, that is capable of: <ul style="list-style-type: none"> • 220kV operation; and • future 400kV operation of around 2700MVA, subject to later Commission approval of and Transpower commissioning of 220kV-400kV transformers and associated switchyards near the existing Whakamaru substation and in the vicinity of the South Auckland urban boundary. |
| Procure, construct, commission and operate two underground cables from the new transition station in the vicinity of the South Auckland urban boundary to Pakuranga substation that: <ul style="list-style-type: none"> • are capable of 220kV operation; and • have a continuous rating of around 660MVA per set of cable |
| Procure, construct, commission and operate the necessary substation / transition station facilities near the existing Whakamaru substation (Air Insulated Switchgear [AIS]), a transition station in the vicinity of the South Auckland urban boundary (AIS), and Pakuranga substation (Gas Insulated Switchgear [GIS]). |
| Plan the works, including the acquisition of designations, consents and easements to allow for future upgrade to 400kV operation through future addition of: <ul style="list-style-type: none"> • new 400/220kV transformers and associated works near the existing Whakamaru substation to interconnect with the existing 220kV system; • a new switchyard in the vicinity of the transition station with new 400/220kV transformers and associated works; • new overhead lines or underground cables to connect the new switchyard with the new transition station; • new 220kV underground cables to Otahuhu substation; and • extensions to the Otahuhu switchyard(s). |
| Carry out the works necessary to convert and connect the existing 110kV Otahuhu-Pakuranga line to 220kV operation, for which it is already designed and consented; |
| Dismantle the existing 110kV Arapuni to Pakuranga transmission line |
| Obtain designations, easements, resource consents and property purchases necessary for all the above works. |
| Plan for a commissioning date for the major projects above of 2011 to prudently allow for potential delays due to delivery, designation, consenting and easement risks. |

Transpower's proposed output amendments

H11 Transpower's amendment application and subsequent letter with an additional proposed output amendment set out the proposed outputs amendments. We asked Transpower to clarify the wording of the proposed text.²⁴⁸ The amended outputs Transpower proposed are set out in Table H2 below.

Table H2: NIGU Project output amendments proposed by Transpower

Transpower's proposed outputs

Procure, construct, commission and operate the necessary substation / transition station facilities near the existing Whakamaru substation (Air Insulated Switchgear [AIS]), a transition station in the vicinity of the South Auckland urban boundary (AIS), and Pakuranga substation (AIS).

Plan the works, including the acquisition of designations, consents and easements to allow for future upgrade to 400kV operation through future addition of:

- 200MVAR of new static reactive plant at Otahuhu substation, and
 - 100MVAR of new static reactive plant at Penrose substation, and
 - 50MVAR of new static reactive plant at Hepburn Road substation.
-

Obtain designations, easements, resource consents and property purchases necessary for all the above works. The acquisition of easements over Auckland Council and Crown reserve land, to allow for the future installation of new 220kV underground cables from Brownhill substation to Otahuhu substation, may be deferred until such time that Transpower determines it reasonably necessary to acquire the easements, having regard to the proposed commissioning date of the new underground cables.

Plan for a commissioning date for the major projects above of 2011 to prudently allow for potential delays due to delivery, designation, consenting and easement risks.

H12 We discuss our analysis of the proposed amendments to the outputs in the sections below.

²⁴⁸ We considered the direct replacement of outputs with the supplied text does not provide a comprehensive statement describing the output, and may have additional impact on the project scope.

Interaction of outputs decision and MCA decision

- H13 Our decision on outputs does not affect our decision on the MCA.
- H14 The evaluation approach we have followed for the amended MCA decision is to assess the actual costs incurred and identify any avoidable costs.
- H15 In assessing Transpower's actual costs, we are examining what it has actually delivered in the NIGU Project. As the proposed changes to the outputs will reflect what has actually been delivered, the changes in outputs are already taken into account in our decision on the MCA, so no further change to the amended MCA is required.
- H16 We estimate that, if Transpower had delivered the outputs as originally proposed, an additional \$30 million of costs would have been incurred in delivering the NIGU Project.²⁴⁹
- H17 The proposed change to these outputs is an effective scope reduction. This means the potential floor for the amended MCA decision could have been lowered below the original MCA by approximately \$30 million, to approximately \$794 million, to take account of the scope reduction.
- H18 However, this would only be applicable if the amount of the avoidable costs warranted the amended MCA being lower than the original MCA.
- H19 We have not identified sufficient avoidable costs to reduce the MCA from the \$894 million Transpower has requested, to below the originally approved MCA of \$824 million.

Assessment of the proposed outputs

- H20 Our decision is to accept all of Transpower's proposed output amendments.
- H21 In making our decision on the proposed outputs we must apply the evaluation criteria specified in the Capex IM.²⁵⁰ These are the same criteria used for our decision on the amended MCA, as set out in Chapter 2.
- H22 We consider that the decision to accept the proposed output amendments promotes the purpose of Part 4 by promoting Transpower's incentives to invest appropriately and to increase efficiency.

²⁴⁹ This is \$25 million saving for the GIS as budgeted by Transpower and \$5 million for the deferred cable route easements.

²⁵⁰ Capex IM, cl 6.1.1.(5).

Key factors relevant to the proposed output amendments

H23 Below we discuss the key factors identified for the proposed amendments to the outputs and the subsequent analysis that is required under the Capex IM.

Pakuranga substation output key factor

H24 We consider that the change to the Pakuranga air insulated switchgear versus gas insulated switchgear output was foreseeable, having been discussed with the Electricity Commission in the development of the project approval.

H25 The Pakuranga substation was built with air insulated switchgear, when the approval and associated costing was based on the more expensive gas insulated switchgear. There is no material change in the functional capability of the grid as a result of the change.

H26 The Electricity Commission recommended Transpower to make the case for the cheaper air insulated switchgear at the designation and consent hearings. Transpower was able to convince the BOI that the lower cost option was acceptable.

H27 The key factor was that the consent conditions for the substation, which would be given after the project approval under the Resource Management Act, was outside of Transpower's control at the time of project approval.

H28 The mitigation plan was to seek financial approval for the more expensive gas insulated switchgear option, and commit to seeking the lower cost option when applying for designation and resource consents. This mitigation plan was successfully carried out and resulted in a lower cost for consumers.

H29 Had Transpower built the gas insulated switchgear version of the substation, as it had approval to do, the NIGU Project would have cost approximately \$25 million more. Transpower subsequently transferred the savings from the reduced scope to offset other costs in the project.

Static reactive plant output key factor

H30 We consider that the key factor that has led to the change in the static reactive plant output is that Transpower discovered, after approval, that circumstances directed it to deliver a different solution to the specified output.

H31 Essentially, Transpower's planning did not accurately reflect the issues that it would face with its assets and delivery programme.

H32 The content and interactions of Transpower's plans and deliver programme appears to have been foreseeable, and within Transpower's control, at the time of approval.

- H33 The internal project to deliver the alternative output was signed off by Transpower in August 2007; one month after the Electricity Commission approved the NIGU Project.²⁵¹
- H34 There does not appear to have been a mitigation plan in place prior to Transpower discovering its planned solution was not appropriate.
- H35 In the application Transpower states that the delivered outcome was the optimised solution.²⁵² However we note that Transpower's other documentation states.

Initially it was intended to install the required additional static reactive plant at Otahuhu as 250 Mvar by winter 2008, and an additional 100 Mvar by winter 2009. Due to the short timeframe of this project, and the other major works planned for Otahuhu it was identified that delivery by winter 2008 at Otahuhu would not be achievable. Subsequently it has been agreed to focus on the installation of 150 Mvar through the 110 kV network in Auckland by winter 2008, with the final 200 Mvar being installed on the 220 kV at Otahuhu by Winter 2009 in conjunction with the Otahuhu 220 kV Diversity Project.²⁵³

- H36 The mitigation action undertaken was to develop and implement an alternative, post approval.
- H37 The implemented solution appears to deliver essentially the same functionality as the approved output. The changed output also appears to have been delivered for a similar cost to Transpower's estimated P90 value of the original output.

Deferral of easements output key factor

- H38 Transpower planned and developed its costs for the project on the basis of obtaining all easements. Transpower subsequently changed its mind, after approval, about the need for all the easements in order to secure the cable route in the future.
- H39 We note that while Transpower is satisfied that the approach it has taken was the lower cost option,²⁵⁴ it has not undertaken a specific cost benefit analysis to inform this decision.²⁵⁵
- H40 In principle, we agree that deferring capital expenditure that is not yet necessary to meet the grid reliability standards or to deliver the most economic benefit is to the benefit of consumers.

²⁵¹ Transpower "Response to question: Scope changes" July 2014.

²⁵² NIGUP amendment application, page 125.

²⁵³ Transpower "Response to question: Scope changes" July 2014 (Specifically: Hepburn Road Project Approval Document).

²⁵⁴ NIGUP amendment application, page 126.

²⁵⁵ Transpower "Response to question: Project management environmental and investigations" June 2014.

- H41 Our decision on the amendment of this output only applies for the purpose of deciding if the outputs have been met for the NIGU Project when we consider whether there should be a major capex outputs adjustment.²⁵⁶
- H42 Specifically, once the NIGU Project has been closed off, the approval for expenditure to deliver an output ends. No further costs can be recovered from consumers in relation to this project. Future expenditure to acquire easements for future work will either need to be carried out as base capex (assuming it meets the requirements), or will require future Commission approval. Our acceptance of this amended output is not approval of any future expenditure by Transpower.

Timing of Otahuhu to Whakamaru C thermal upgrade output key factor

- H43 In proposing the output amendment, Transpower seeks to clarify the timing of the Otahuhu to Whakamaru C thermal upgrade component of this output. The thermal upgrade was completed in 2011, while the output can be read as requiring it to be done by 2010.
- H44 Transpower has stated that the way this output was originally drafted was ambiguous. The 2010 date it included was intended to be for the Drury substation component of the output. It was not in reference to the Otahuhu to Whakamaru C thermal upgrade component, which would follow on as soon as was practical.
- H45 We consider that Transpower's explanation is consistent with the plan detailed in the original application.²⁵⁷ We consider that this means that Transpower foresaw the issue and acted in accordance with its plan.

Expected net electricity market benefits

- H46 Transpower has stated that there is no material change to the expected net electricity market benefit as a result of the amendments to the outputs.²⁵⁸
- H47 We do not consider that there is any reason to conclude that the expected net electricity market benefits would be materially lower as a result of the amendments to the outputs proposed.

Extent to which capital expenditure has been committed

- H48 We consider Transpower had effectively incurred all of the capital expenditure for the project when it made its application to amend the outputs.

²⁵⁶ Capex IM, cl 3.3.7.

²⁵⁷ Transpower "NIGUP – Application for approval, amended proposal" 20 October 2006, page 103.

²⁵⁸ NIGUP amendment application, page 127.

H49 We consider the extent to which capital expenditure has occurred is informative, but does not direct our decision. In this decision we are examining a completed project and assessing if Transpower's conduct was prudent and diligent.

Submissions on the proposed output amendments

H50 Our Issues Paper discussed the output amendments that Transpower proposed in its application.²⁵⁹

H51 In submissions on our Issues Paper and Transpower's application, Pacific Aluminium was generally supportive of the amended outputs.²⁶⁰

H52 No submissions were received opposing the changes in outputs that Transpower had proposed. We note MEUG's support for our decision to amend Transpower's outputs.²⁶¹

²⁵⁹ Commerce Commission "Amending Transpower's allowance and outputs for the North Island Grid Upgrade Project: Issues Paper" 29 November 2013, para 5.2.

²⁶⁰ Pacific Aluminium "Submission to the Commerce Commission on Issues Paper for amending the allowance and outputs for the NIGU Project" 17 January 2014, para 21.

²⁶¹ MEUG "Submission on NIGU draft decision, 23 April 2015" 21 May 2015, para. 4.

Attachment I: Potential improvements

Purpose of this attachment

- I1 The purpose of this attachment is to set out observations from our NIGU Project analysis where we consider that:
 - I1.1 Transpower's demonstration of performance in planning and delivering projects can be improved; and
 - I1.2 we can potentially make changes to how we operate within the framework of the input methodologies.
- I2 The intent in setting out these options is to encourage behaviour that promotes the purpose of Part 4 in the future.
- I3 This attachment, and the potential improvements, does not form part of our decision on the amended MCA and outputs.

Introduction

- I4 In this attachment we:
 - I4.1 provide an introduction to the issue of potential improvements, including the status of the options we have outlined;
 - I4.2 explain why we are suggesting that improvements could and should be made; and
 - I4.3 set out what improvements can be made by Transpower and by us.
- I5 We carried out our evaluation of the NIGU amendment application, and associated information supplied by Transpower, as required by the Capex IM. During this process we identified areas where we considered there was potential for Transpower to improve its demonstration of performance.
- I6 These areas were based on the gaps we observed in the information we were supplied with relating to recognised good practice project management, stakeholder expectations, central government requirements for business cases, monitoring and benefits realisation.
- I7 Similar themes were identified in the NIGU Project independent quality assurance reports, the expert reviews we commissioned for property and the Alliance, and by Transpower itself.
- I8 MEUG, Pacific Aluminium, and Genesis all expressed concerns in their submissions over how some aspects of the NIGU Project were planned and delivered.

- I9 In addition to this we identified areas where we could improve how we operate under the framework of the input methodologies to promote the long-term benefit of consumers.
- I10 These matters are to some degree interrelated; we look forward to discussions with Transpower on how future improvements can best be developed.

Status of potential improvements in this attachment

- I11 These recommendations for Transpower have no enforceable basis under the input methodologies or IPP that applies to Transpower.
- I12 We will ensure that any clarifications to the processes we use to implement the input methodologies, or policy changes in how the input methodologies are applied, will be signalled to Transpower and stakeholders.

Why we are suggesting improvements can and should be made

- I13 The purpose of Part 4 applies to Transpower, requiring that it has incentives to improve its efficiency.
- I14 We are concerned that an independent review of the NIGU Project found that “we have an incomplete picture as to the operation and effectiveness of the project as a whole, and whether value for money has been obtained.”²⁶²
- I15 We recognise that project management has strong linkages with project cost and delivery. Mature project management allows for the efficient delivery of work and effective management of risk.
- I16 We have not identified any avoidable costs due to project management in our evaluation, but we are unable to reach the conclusion that good practice project management was carried out in delivering the NIGU Project. As such, there is the opportunity for Transpower to improve its demonstration of performance in project management.
- I17 The issues identified in the NIGU investigations have also been encountered in our evaluation of Transpower’s base capex and opex expenditure proposals, and in previous major capex decisions. We have provided feedback to Transpower on issues identified in the latest base capex and opex expenditure proposal.
- I18 As part of the second regulatory control period, Transpower will be developing and publishing a business improvement initiative plan.²⁶³ Progress against this plan will be reported on in Transpower’s integrated transmission plan.

²⁶² IQANZ “North Island Grid Upgrade Project Independent Quality Assurance Follow-up Health Check and Close-out Review Detailed Report” 11 September 2013, page 3.

- I19 We have identified below the potential areas of improvement, both for Transpower and for our own processes within the framework of the Capex IM.

Improvement for our processes leading to decisions under the Capex IM

- I20 Improvements from us could include:

- I20.1 encouraging stage gate approvals for major capex projects and programmes;
- I20.2 active monitoring of commitments and undertakings made by Transpower;
- I20.3 rejecting non-conforming proposals under the Capex IM;
- I20.4 carrying out summary and analysis on completed projects; and
- I20.5 providing incentives to maximise consumer benefits, ie, appropriately delaying projects.

- I21 Each of these is discussed below.

Stage gate project approvals

- I22 Recent proposals we have approved, such as the USI Stage 1 and USI Stage 1 amendment, have been based on a stage gate approach. Transpower and stakeholders appear to view this positively.
- I23 In the stage gate approach the project only has approval to proceed to a certain point and then additional funding is provided after justification is provided and assessment has been carried out. This ensures that changing circumstances are considered and the project is developed with the best information available.
- I24 In most cases the initial stage funding will be for investigations to refine costs and properly account for risks. This will allow Transpower to develop proposals only as far as is required. This means options can be kept open while necessary investigations, the costs of which Transpower can recover, are carried out.
- I25 This may allow us to put in less effort and have a faster turnaround for some proposals. This is relevant for proposals with a high level of risk, eg, if a large expenditure decision was required with higher uncertainty of costs and the future environment.

²⁶³ Commerce Commission "Transpower Individual Price-Quality Path Determination 2015" 28 November 2014, para 27.

Active monitoring of Transpower's undertakings

- I26 In the NIGU Project approval process, Transpower undertook various commitments to the Electricity Commission:
- I26.1 to use good practice project management;
 - I26.2 to undertake periodic external reviews and demonstrate business improvement to its Board; and
 - I26.3 to review the project need date.
- I27 These were in the grid upgrade proposal application for approval, and also in responses to questions raised by the Electricity Commission. These questions came from the Electricity Commission's own observations, and from specific matters raised by interested persons during the approval process.
- I28 From our investigation it appears that these undertakings were technically addressed. However we consider they represent a missed opportunity to demonstrate engagement with stakeholders, and to not just deal with their issues in a strict sense.
- I29 In the case of the NIGU Project, we consider that many of the issues raised by stakeholders related closely to the key factors that led to the overspend. Early engagement on these matters may have avoided the need for the amendment application for some if not all of the expenditure above the original MCA.
- I30 These undertakings by Transpower do not have legal standing in the approval process. However such commitments may provide some assurance that, in the face of uncertainty, a decision to approve a proposal is more consistent with the purpose of Part 4 than declining it.
- I31 We consider that the use of such a mechanism will require a positive demonstration from Transpower that its commitments are embedded into the project delivery, and that active engagement with relevant stakeholders and their issues is carried out. This demonstration would be of assistance when linked with the stage gate approach, through it enabling additional stakeholder scrutiny and engagement.
- I32 Demonstration of the success of the mechanism in meeting commitments may enable us to speed up our approval of future proposals.

Rejecting non-conforming proposals under the Capex IM

- I33 We may decide to reject a non-conforming proposal submitted by Transpower.
- I34 We must be satisfied that the information we receive from Transpower is fit for our purpose. In addition, in order to approve a major capex proposal, we must also be satisfied with that proposal in whole and in part.
- I35 While we are mindful of Transpower's incentives to invest, these investments are paid for by consumers and we must be mindful of their interests too.
- I36 While rejection of a proposal might be challenging to Transpower, we consider it would promote the long-term benefit of consumers that Transpower develops proposals that are fit for purpose.

Summary and analysis

- I37 We have the ability to undertake summary and analysis of information provided by Transpower.
- I38 This summary and analysis could include reviews of the information provided by Transpower to answer the question 'do we have a complete picture as to the operation and effectiveness of the project as a whole, and whether value for money has been obtained'?
- I39 The findings of this summary and analysis may influence our, and stakeholders, views on future proposals made by Transpower. It may also influence the information Transpower provides to, and how it engages with, stakeholders.

Incentive to delay projects when maximising consumer benefits

- I40 We found that Transpower has no incentive to delay an approved project, even where doing so would result in significant benefits to consumers.
- I41 There may be cases where it is for the long-term benefit of consumers that committing funds on an approved project is delayed.
- I42 We note that Transpower has voluntarily delayed the Clutha Upper Waitaki Lines Improvement Project as demand has changed.
- I43 However once a project is approved there is no direct incentive for Transpower to do this. Nor is there an incentive to actively seek ways to delay spending approved capital or to otherwise seek to maximise consumer benefits.

- I44 We have not developed a view on either the need, or the mechanism to provide this incentive.²⁶⁴
- I45 We would need to evaluate the issue and consider the best approach to balance capex and opex, and the other incentives in place, before implementing any resulting policy.

Improvements for Transpower

- I46 We identified the following potential areas of improvement for Transpower;
- I46.1 demonstrate that all aspects of project management are carried out in line with a recognised methodology;
 - I46.2 update unit costs used to develop proposals based on Transpower's experience of actual costs;
 - I46.3 identify, evaluate and reflect risk in the development of proposals and project plans;
 - I46.4 apply a stage gate approach to proposed programmes of work, and to the implementation of approved projects where appropriate;
 - I46.5 actively address the prospect of optimism bias in projects; and
 - I46.6 share the outcomes of post project reviews with stakeholders and, where appropriate, enter issues into the quality improvement function of the asset management system.²⁶⁵

Demonstrating achievement of project management standards

- I47 While Transpower has indicated it followed good practice project management in the NIGU Project, we do not consider that it has fully demonstrated this.
- I48 Having staff trained to use a recognised project management methodology is a good start. It is essential to demonstrate that this training, and the principles it embodies, are actively employed in the course of delivering a project if assertions are to carry any weight.

²⁶⁴ One option is that we may be able to reward Transpower for this behaviour by the use of discretionary terms in the revenue adjustments made under the Capex IM.

²⁶⁵ Including matters like the demonstration of benefits achieved, success measures met, lessons learned and demonstration of addressing stakeholder issues.

- 149 Independent reviews and internal audits, at appropriate frequency and coverage, could assist in demonstrating this. Ideally this would be against the specified requirements of any project management methodology that Transpower has adopted.
- 150 Regular project health checks would also help to demonstrate good practice project management. A quality management system (as is already embedded in the PAS 55 asset management system Transpower has adopted) would help ensure that all issues identified are recorded and resolved.

Demonstration of effective feedback for cost estimate updating

- 151 The cost estimates that make up a project's total cost are frequently derived from a business's most recent experience. In this way there is a feedback loop ensuring the most likely and most accurate estimates are used in developing a future project.
- 152 Transpower has identified that issues with this feedback loop were encountered in the NIGU Project. We identified similar issues with the pricing models used to develop the RCP2 expenditure proposal.
- 153 We consider that post project reviews that analyse why forecast costs differed to actual costs incurred would be valuable. An effective feedback system would ensure that the appropriate changes are used for the next work estimation iteration.
- 154 We recommend that Transpower demonstrates that the reviews occur, the feedback loop is in place, the price book costs are fully documented and any adjustments are validated.

Accounting for risk in project costs and timelines

- 155 We consider that not fully accounting for risk was an issue that led to the NIGU amendment application. Issues with the treatment of risk included that risks were underestimated in terms of their likelihood and impact, and the interaction of risks was not sufficiently taken into account.
- 156 Risk is a significant issue that must be evaluated when justifying expenditure. We would like to see lessons learnt from the NIGU Project being implemented in future proposals.
- 157 This would involve Transpower demonstrating that risks have been appropriately identified and their effects on the proposal being developed. Feedback from earlier post project reviews and lessons learnt would be a key part of this demonstration.
- 158 This would lead to establishing an appropriate recognition of the uncertainty in a project. Actively managing the risk allowance due to project progress and updated information should also deliver benefits.

- I59 An increased focus on risk may lead to Transpower seeking staged approval of projects, when it considers that the risks may lead to an unacceptable level of accuracy in relation to the entire project.

Internal project stage gates

- I60 Stage gating is a recognised aspect of good project management.
- I61 Stage gate approval for a project means that approval is not unconditionally given at the outset for the entire project. Approval only applies until the next stage is reached, at which point approval is sought again; taking all new information and relevant factors into account.
- I62 This concept applies during the entire planning and delivery of the project. It is not simply refining the cost and scope up to the point of committing funds or starting to build assets.
- I63 This is complementary to, not the same as, seeking staged approval for a project or programme from the Commission.
- I64 We recognise that once Transpower has approval from us for a project there is no requirement that it implements the stage gate approach. However, we do not consider that adopting this approach would affect Transpower's incentives to invest.
- I65 If Transpower were to adopt and report on its internal stage gates, stakeholders could be assured that the most up to date information is being considered, and assets are not being built simply because approval was given some time ago.

Taking account of optimism bias

- I66 Our investigation into the NIGU Project led us to consider that optimism bias was an influence on Transpower needing to make the application.
- I67 In addition to the specific matters discussed in this attachment, Transpower should demonstrate it is taking an active role in ensuring that optimism bias is not occurring in proposals.
- I68 This could be achieved by ensuring the possibility of optimism bias is specifically considered in its internal challenge and review process.

Carrying out and sharing post project reviews with stakeholders

- I69 A recognised aspect of good project management is carrying out post project reviews in order to establish, among other things, that planned outcomes were achieved and any lessons are learnt.

- I71 Projects are justified on the basis of the outcomes that will be achieved and the resulting benefits that will be delivered.
- I71.1 As consumers are asked to pay for the project they should be confident that the benefits have, or will, be realised.
- I71.2 Benefits realisation should be based on demonstration of outcomes, and take into account variations of planned to actual factors. Assurance that benefits have been delivered is ideally based on evidence stakeholders have access to.
- I71.3 Proof that this evaluation has been done will assist in assuring stakeholders that the next proposal is justified. A lack of proof may result in stakeholders not being satisfied that a future project will deliver the benefits claimed.
- I72 We consider these lessons learnt provide Transpower with an opportunity to improve.
- I72.1 As Genesis submitted, there would be benefits if Transpower demonstrated that the lessons it has learnt in a project have been incorporated in to the business.²⁶⁶
- I72.2 These lessons are valuable; consumers have paid for Transpower to learn them, and it should not just be filed and made available for later projects to review if it wishes.
- I72.3 We note that the quality improvement system, that is a key part of Transpower's PAS 55 asset management system, would seem an obvious place for these issues to be recorded and demonstrably incorporated into the business.

²⁶⁶ Genesis Energy "Cross-submission on application for \$70m NIGUP overspend" 31 January 2014, page 2.

Glossary

| | |
|--------------|--|
| Actual spend | The \$894 million Transpower spent delivering the project which it would be able to recover under the Transpower and Capex IMs |
| AIS | Air Insulated Switchgear |
| BBUGL | Balfour Beatty United Group Limited |
| BOI | Board of Inquiry |
| Capex IM | Transpower Capital Expenditure Input Methodologies determination 2012 |
| CPI | Consumer price index |
| EGR | Electricity Governance Rules |
| EV | Economic Value |
| FX | Foreign exchange |
| GEIP | Good electricity industry practice |
| IM | Input methodology |
| IPP | Individual price-quality path |
| IQANZ | Independent Quality Assurance New Zealand |
| MCA | Major capex allowance |
| MEUG | Major Electricity Users' Group |
| NIGU | North Island Grid Upgrade |
| NIGUP | North Island Grid Upgrade Project |
| Outputs | Approved major capex project outputs |
| RAB | Regulatory asset base |
| TCE | Target cost estimate |
| USI | Upper South Island |