

**Final decision on Transpower's application to amend the project outputs and major capex allowance for Upper South Island reliability stage 1 project [2015] NZCC 4**

**Date of Decision:** 26 February 2015

**The Commission:**

S Begg

P Duignan

Dr S Gale

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## Executive Summary

- X1 Transpower New Zealand Limited submitted an application to amend the major capex allowance and approved project outputs for its Upper South Island reliability (Stage 1) project.
- X2 We have decided to amend the project outputs, P50 and major capex allowance of the Upper South Island reliability project as requested by Transpower New Zealand Limited.
- X3 Amending the project outputs will affect the cost of this investment to the users of Transpower New Zealand Limited's services, and the P50 and major capex allowance for the project are now set at \$6.57 million and \$7.99 million respectively (in 2018/19 prices).
- X4 We consider that:
  - X4.1 Transpower New Zealand Limited has provided sufficient evidence to support the conclusion that bussing the 220 kV transmission lines by construction of new switching stations at Orari and Rangitata is a likely future option.
  - X4.2 Transpower New Zealand Limited has provided sufficient evidence to support the amendment for securing the designations and property rights ahead of and separate from the Upper South Island reliability Stage 2 project for construction of new switching stations at Orari and Rangitata.
  - X4.3 It is appropriate to make changes to the project outputs and expenditure allowance to the already approved project outputs and adjust the maximum expenditure allowance of the Upper South Island reliability (Stage 1) project by way of an amendment.
- X5 In November 2014 we invited interested parties to submit their views on our draft decision (and cross-submit their views on the submissions of others). We received three submissions (and no cross-submissions). All submissions supported our draft decision.
- X6 Our final decision is essentially unchanged from our draft decision. We have corrected an error (of stating the P50 and major capex allowance in 2014/15 prices) and now state the amended P50 and major capex allowance in 2018/19 prices.

# 1. The application and our decision

## Purpose

- 1.1 On 27 August 2014, Transpower New Zealand Limited (Transpower) applied to amend the approved major capex allowance and the approved major capex project outputs (outputs) for the Upper South Island Reliability Stage 1 Project (USI Stage 1).<sup>1</sup> Transpower revised the amended major capex allowance and outputs it sought in a letter it sent to us on 18 November 2014.<sup>2</sup>
- 1.2 We are required to evaluate and make a decision on this application in accordance with the Transpower Capital Expenditure Input Methodology Determination (Capex IM).<sup>3</sup>
- 1.3 This paper explains our decision to amend the approved P50 and major capex allowance and outputs for USI Stage 1.<sup>4</sup>

## Our decision is to amend the outputs, P50 and major capex allowance

- 1.4 We have amended the outputs of USI Stage 1 as requested by Transpower in its letter of 18 November 2014.
- 1.5 We are satisfied that Transpower's reasons for amending the outputs of the project and its application have met the evaluation criteria for approving amendments to the outputs of a major capex project.<sup>5</sup> In particular, we consider that:
  - 1.5.1 Transpower has provided sufficient evidence to support the conclusion that bussing the 220 kV transmission lines by construction of new switching stations at Orari and Rangitata is a likely future option.

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<sup>1</sup> Transpower New Zealand Limited, *Upper South Island reliability Stage 1 Application for Amendment to the approved Major Capex Project outputs and increase in the Major Capex Allowance* 27 August 2014.

<sup>2</sup> Transpower New Zealand Limited "Revision to amendment to the approved major capex project outputs and increase in the major capex allowance for the USI Reliability Stage 1 Project" 18 November 2014.

<sup>3</sup> Commerce Commission Transpower Capital Expenditure Input Methodology Determination [2012] NZCC 2.

<sup>4</sup> Details of the Commission's initial decision, and reasons for that decision, to approve Transpower's USI stage 1 proposal are set out in Commerce Commission, *Decision and reasons on Transpower's Upper South Island Reliability Stage 1 Major Capex Proposal*, 13 February 2013.

<sup>5</sup> These evaluation criteria are set out in clause 6.1.1 of the Capex IM.

- 1.5.2 Transpower has provided sufficient evidence to support the amendment for securing the designations and property rights ahead of and separate from the Upper South Island reliability Stage 2 project for construction of new switching stations at Orari and Rangitata.
- 1.6 Amending these outputs will affect the cost of this investment to the users of Transpower's services. Transpower requested, and we have decided to, amend the P50 and major capex allowance for USI Stage 1 to \$6.57 million and \$7.99 million respectively in 2018/19 prices.
- 1.7 Further detail on the amended outputs and major capex allowance is set out in Chapter 2 of this paper.

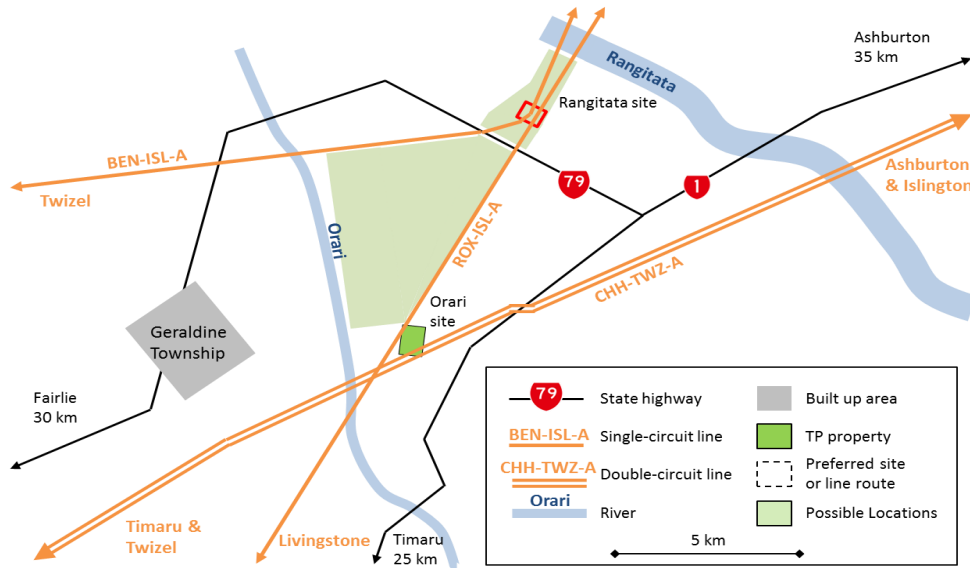
### **Background to Transpower's amendment application**

- 1.8 Transpower sought our approval to amend the outputs of USI Stage 1 to enable it to proceed with certain planning and preparatory work associated with constructing the Orari and Rangitata switching stations.
- 1.9 The purpose of the switching stations is to interconnect (bus) all four 220 kV circuits from the Waitaki Valley to Christchurch together around the midpoint in the circuits just north of Geraldine. Halving the circuit lengths reduces the impact of the loss of a circuit supplying the upper South Island and also increases the voltage stability limit into the region.<sup>6</sup>
- 1.10 Figure 1.1 shows the location of the proposed switching stations to which the output amendments relate. The proposed location for the Rangitata switching station is indicative and will depend on where Transpower can buy a suitable property for this switching station. Transpower already owns the site at Orari.

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<sup>6</sup> Voltage stability limit determines the amount of electricity that can be transmitted over the circuits.

**Figure 1.1: Orari and Rangitata switching stations**



### Submissions on our draft decision

1.11 Our draft decision, released 25 November 2014, was to:

- 1.11.1 approve the outputs proposed by Transpower in its application (as revised on 18 November 2014); and
- 1.11.2 amend the previously approved P50 and major capex allowance to \$6.57 million and \$7.99 million respectively.<sup>7</sup>

1.12 We asked for views on our draft decision from interested persons. In particular we sought feedback on:

- 1.12.1 Transpower's application, as revised on 18 November 2014;
- 1.12.2 our approach to assessing Transpower's application as an amendment to the USI Stage 1;
- 1.12.3 our evaluation of Transpower's application; and
- 1.12.4 whether there is any further information that we should consider before making our decision.

<sup>7</sup> The draft decision stated these figures to be in 2014/15 prices. For our final decision we have updated these figures to be in 2018/19 prices for the reasons stated below in paragraphs 1.17-1.19.

1.13 The submissions we received on our draft decision were from:

1.13.1 Genesis Energy;<sup>8</sup>

1.13.2 Fonterra;<sup>9</sup> and

1.13.3 The Major Electricity User's Group (MEUG).<sup>10</sup>

1.14 We asked for cross-submissions on our draft decision but did not receive any.

*Review of submissions*

1.15 All submissions supported Transpower's application (as revised on 18 November 2014) and none considered there was further information that we should consider before making our final decision. Notably, Genesis commented that any increase in expected capex costs is a concern as it will ultimately be borne by consumers, but considered that Transpower's revised application provides sufficient information to justify the increase.

1.16 Fonterra agreed with our approach to assessing Transpower's application (MEUG and Genesis did not directly comment on our approach) and all submitters agreed with our evaluation and conclusion. MEUG also noted this was a pragmatic step in a likely sequence of staged investments to manage future upper South Island needs.

*Update from draft decision – approved major capex allowance is now in 2018/19 prices*

1.17 Transpower's application to amend the outputs, P50 and major capex allowance for USI Stage 1 was based on an assumed completion date for the project being 2018, and suggested a P50 and major capex allowance that factored in inflation and financing costs to recognise that they would likely be reflected in the regulated asset base in three years' time.<sup>11</sup>

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<sup>8</sup> Genesis Energy "Submission on Upper South Island major capex amendment application" (11 December 2014).

<sup>9</sup> Fonterra "Submission on Upper South Island major capex amendment application" (15 December 2014).

<sup>10</sup> MEUG "Submission on Upper South Island major capex amendment application" (16 December 2014).

<sup>11</sup> Transpower New Zealand Limited "Upper South Island reliability stage 1: Application for amendment to the approved major capex project outputs and increase in the major capex allowance" (27 August 2014), pp 4, 17-18. The 18 November 2014 revisions to the application did not alter this assumption and similarly factored in inflation and financing costs to Transpower's revised figures.



- 1.18 Our analysis in the draft decision was also undertaken on this basis with P50 and major capex allowances therefore being set on 2018/19 prices, as illustrated in Tables 3.1 and C1 in the draft decision.<sup>12</sup> Our analysis shows our decision always contemplated amending the P50 and major capex allowance in 2018/19 prices, as recognised by the incorporation of inflation (CPI) and financing costs which are forward-looking measures.
- 1.19 In other places in our draft decision, the P50 and major capex allowance were stated to be in 2014/15 prices but this did not reflect the analysis in the remainder of our decision, or in Transpower's application. Our final decision corrects this error and identifies the amended P50 and major capex allowance as being in 2018/19 prices. The use of 2018/19 prices is also consistent with our approach to previous approvals where approvals are specified in the prices of the expected year of completion for the major capex project.

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<sup>12</sup> Commerce Commission "Upper South Island Reliability Stage 1 Application for amendment to the approved major capex project outputs and increase in the major capex allowance (Draft decision and reasons paper)" 25 November 2014, pp 15 and 52.

## 2. Reasons for our decision

2.1 This chapter sets out what we have approved and what we are not approving based on Transpower’s application, and the reasons for making these decisions.

### What we are approving

2.2 We are approving an increase in the approved P50 and major capex allowance of USI Stage 1 to \$6.57 million and \$7.99 million respectively in 2018/19 prices.<sup>13</sup>

**Table 2.1: Summary of key components of P50 and major capex allowance**

	USI Stage 1 allowance approved on 11 February 2013 in 2014/15 prices (\$m)	USI Stage 1 forecast end costs in 2014/15 prices (\$m) <sup>14</sup>	USI Stage 1 Amendment revised additional expenditure in 2014/15 prices (\$m) <sup>15</sup>	CPI (\$m)	Financing costs (\$m)	USI Stage 1 Amendment revised additional expenditure in 2018/19 (\$m)
P50	4.51	2.50	3.49	0.10	0.48	6.57
P90	4.99	2.61	4.44	0.18	0.76	7.99

2.3 Transpower has already completed the following outputs of USI Stage 1:

- 2.3.1 a new 220 kV bus coupler and associated switchgear at Islington substation. The bus coupler and switchgear are incorporated into the Christchurch Reactive Power Controller scheme;
- 2.3.2 an additional discriminating zone (zone F) for the Islington 220 kV bus bar protection;

<sup>13</sup> Further details on the costs are shown in table D1 of this paper.

<sup>14</sup> This column shows the forecast end costs for the outputs “Bus Coupler and monitoring” and “Orari design and Preliminaries” shown in Table D1. In Table 2.1, the P50 and P90 estimates for investigations, shown in the last row of the existing outputs in Table D1, are included in the column titled “USI Stage 1 Amendment revised additional expenditure in 2014/15 prices”.

The difference between the 2013 approved allowances (shown in column 2 of Table 2.1) and the forecast end costs (shown in column 3 of Table 2.1) is due to less than forecasted cost of procuring and installing the bus coupler and a reduced scope of the Orari design and preliminaries work pending our decision on this application to amend the original major capex proposal. Further details are in Transpower’s application - “Upper South Island reliability stage 1: Application for amendment to the approved major capex project outputs and increase in the major capex allowance” (27 August 2014), p 14.

<sup>15</sup> This column shows the total forecast costs for the ‘additional outputs’ and the ‘investigations’ in row 3 of the ‘existing outputs’ categories shown in Table D1.

- 2.3.3 10 load monitoring units installed in substations in the upper South Island, excluding the VoLL studies. VoLL studies are included in the Stage 1 outputs;
  - 2.3.4 solution study reports on two different configurations for Orari switching station, including cost estimates within +/- 30%; and
  - 2.3.5 a study area report of the transmission line route selection process, being the initial step in obtaining the required designation/consents.
- 2.4 Our decision is to amend the project outputs of USI Stage 1 by allowing the addition of further project outputs as requested by Transpower.<sup>16</sup>
- 2.4.1 undertaking preliminary processes substation, lines and site planning necessary for obtaining designations and easements necessary for Orari and Rangitata switching stations;
  - 2.4.2 obtaining designations for substations at the two sites, and any transmission line realignments at each site;
  - 2.4.3 purchasing land at Rangitata for the second switching station;
  - 2.4.4 purchasing easements for any transmission line realignments at each site; and
  - 2.4.5 transferring the final costs of land (after subdivision of land not required for transmission services) and easements required for the two switching stations and line realignments at Orari and Rangitata, to the regulatory asset base.
- 2.5 In making our decision we have also removed the output 'the initial stage of a detailed solution for the preferred Orari switching station configuration' from the USI Stage 1 project outputs, as proposed by Transpower. The initial stage of a detailed solution is replaced by the investigations required for the notice of requirement required to gain the designations, and these investigations are subsumed into the amended outputs.

### **What we are not approving**

- 2.6 We have not approved the next stage of the USI development programme, the USI Stage 2 project (USI Stage 2).
- 2.7 Although the USI Stage 2 project options were reviewed as part of the evaluation of the proposed amendment, Transpower is not applying for approval of USI Stage 2.

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<sup>16</sup> Transpower revised the expenditure and outputs in its application in a letter it sent to us on 18 November 2014.

Review of the USI Stage 2 options was only undertaken to ascertain whether construction of switching stations at Orari and Rangitata is a likely option in the future.

### **The reasons for our decision**

2.8 There are three key questions that we need to examine in assessing whether the proposed amendment promotes the purpose of Part 4:

2.8.1 Is it likely that the development requiring two 220 kV switching stations, Orari and Rangitata, will actually be required in the future, and what is the likely timing of the investment?<sup>17</sup>

2.8.2 Is it beneficial to consumers for Transpower to secure the designations and property rights by the end of 2018, without confirmation of the need date for the switching stations or approval of a major capex project for the switching stations?<sup>18</sup> and

2.8.3 Are the additional costs to consumers reasonable?<sup>19</sup>

*Is it likely that 220 kV switching stations will actually be required in the future?*

2.9 We are satisfied that there is a likely need for further investments to increase the capacity of transmission into the upper South Island in the future. We are also satisfied that construction of switching stations at Orari and Rangitata is a likely option.

2.10 We agree with Transpower's studies that the transmission network into Islington substation will need to be upgraded to increase the transmission capacity of the 220 kV circuits supplying the upper South Island. The next major transmission investment will be USI Stage 2.

2.11 The need date for the USI Stage 2 investment is uncertain. The need date is dependent on demand growth and the amount of new schedulable generation in the upper South Island. Based on the current Transpower forecast the next investment could be needed as early as 2022.

2.12 Transpower has considered a number of investment options and the two most likely to proceed first in the future are dynamic voltage support, such as Static Var

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<sup>17</sup> Discussed in Attachment B.

<sup>18</sup> Discussed in Attachment C.

<sup>19</sup> Discussed in Attachment C.

Compensators (SVCs) in the Christchurch area, or bussing the four circuits to the upper South Island in the Orari/Rangitata area.<sup>20</sup>

- 2.13 We are satisfied that bussing the four circuits to the upper South Island by constructing switching stations at Orari and Rangitata area is among the reasonable options that were assessed by Transpower for increasing the capacity of transmission into the region. Transpower identified two options for bussing – bussing all four circuits at Orari or bussing two circuits at Orari and the other two at Rangitata.
- 2.14 We are satisfied that, based on the analysis Transpower has undertaken, the options with two switching stations are more cost effective than the options with one switching station.
- 2.15 Approving this amendment affects the balance between options for USI Stage 2. The solution will be biased toward the two switching station option, but it does not rule out other options for USI Stage 2. We do not consider that choosing the two switching station option disadvantages consumers.
- 2.16 Since the one switching station option is more expensive than the two switching station option, we are satisfied that the two switching station option can be considered as the likely option for assessment of the USI Stage 1 amendment application.
- 2.17 Our reasons for this assessment are set out in Attachment B.

*Is it beneficial to consumers for Transpower to proceed with the amendment?*

- 2.18 Assuming that two switching stations are a likely option the next question is whether it is beneficial to consumers to secure the designations and property rights by the end of 2018, without confirmation of the need date for a major capex project for the switching stations.
- 2.19 Transpower has identified that securing designations and property rights prior to the main project, can in some circumstances reduce both the delivery and cost uncertainty and that separating the two activities may reduce the risk of higher compensation costs, construction delays and construction acceleration costs.
- 2.20 There is considerable uncertainty in demand forecast and the need date for USI Stage 2. In reality demand forecasts can be either greater or less than predicted and securing the designations and property rights early reduces the delivery uncertainty and the switching station can be approved much closer to the need date when more up to date information will be available.

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<sup>20</sup> Bussing the lines is joining all four 220 kV circuits from the Waitaki Valley to Christchurch together near Geraldine which is approximately halfway between them. Bussing is done either in switching stations or in substations.

- 2.21 The land use in the area of the proposed Orari and Rangitata switching station has changed and is continuing to change from mainly extensive unirrigated pastoral and cropping farming, to intensive dairy farming supported by irrigation.
- 2.22 Transpower has provided a reasonably comprehensive list of items that it has had to remove or relocate for other projects and the indicative costs for undertaking the work. It is difficult to forecast what the avoided costs would actually be, as the construction of any structures or amenities is controlled by the land owner.
- 2.23 Securing the Rangitata site and easements for transmission line alterations will restrict construction of structures and amenities, and avoid what could be costly exercise to remove or relocate at a later date.
- 2.24 Approval of the proposed amendment will provide greater certainty of our intentions to the local lines companies as they consider future augmentation of their networks, to the wider local community, and landowners that will be affected by the realignment of the transmission lines.
- 2.25 As part of our review we have modelled a number of scenarios and compared the net present values and also looked at the qualitative benefits. We have used the information that Transpower supplied on the potential risks and associated costs and we have looked potential cost increases for scenarios. Considering the results of the financial and qualitative analysis together we consider that the option for securing the designations and property rights by the end of 2018 has a higher overall benefit than the other three options considered.

#### *Costs to consumers*

- 2.26 In its USI Stage 1 amendment application Transpower proposed transferring the full value of its parcel of land that it owns at Orari into its regulatory asset base. We did not consider that the full site is required long term and it is not beneficial to consumers to transfer the full value of the Transpower owned land at Orari into the regulatory asset base. On this basis we asked Transpower to explain why it needed the complete site when it was securing designations and property rights as part of the amended output.
- 2.27 Transpower subsequently revised the amended output and the value for the Orari land to be transferred into the regulatory asset base. The expected expenditure for the Orari site has reduced from \$1.48 million to \$0.73 million.<sup>21</sup>
- 2.28 The land purchased at Rangitata will be specifically sized for the new switching station site. Based on the information provided by Transpower in the amendment

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<sup>21</sup> While Transpower's initial application for amendment estimated the P50 cost at \$1.48 million (being the full value of the Transpower owned land at Orari), in its revisions to its application for amendment, Transpower revised its P50 estimate to \$0.73 million. This reduction in expected expenditure for the Orari site is reflected in Table D1 in the line item "existing property".

application and supplementary information, Transpower intends purchasing only enough land for a switching station at Rangitata. On this basis we consider that the allowance for the Rangitata land is reasonable.

- 2.29 All of the cost of securing the designations will be transferred to the regulatory asset base and will be part of the charges to consumers. To minimise the cost to consumers, Transpower should only do the absolute bare minimum work required to produce the necessary documentation required to obtain the designations.
- 2.30 Our assessment of the reasonableness of the costs to consumers is set out in more detail in Attachment D.

### **Conclusion**

- 2.31 In relation to the Capex IM, our review of the investment test shows that:
  - 2.31.1 the expected net electricity market benefits of all the USI Stage 2 options are similar but options with dual switching stations provide marginally higher benefits;
  - 2.31.2 when sensitivity analysis is undertaken, the benefits for the options and the ranking of them changes but our assessment of the unquantified benefits favours options with two switching stations;
  - 2.31.3 approving this amendment affects the balance between options for USI Stage 2, as the solution will be biased toward the two switching station option, but it does not rule out the other options for USI Stage 2;
  - 2.31.4 approving the amendment based on the two switching station option does not have any negative impact on consumers;
  - 2.31.5 securing the designations and property rights is a relatively low cost way of preserving future options; and
  - 2.31.6 although there is uncertainty around the need date for the switching stations, considering both the quantified and unquantified benefits, our conclusion is that it is beneficial to consumers for Transpower to secure the designations and property rights by the end of 2018 as proposed by Transpower in its application.
- 2.32 We have reviewed the outputs and costs provided by Transpower and as a result Transpower have revised the outputs and expenditure downwards. We are now satisfied with the revised outputs and expenditure provided by Transpower.

## **Attachment A: Process and evaluation approach to Transpower's application**

- A1 This attachment sets out:
- A1.1 why Transpower needs our approval to amend the outputs and increase the expenditure for a major capex proposal,
  - A1.2 why we consider it appropriate to approve the application by way of an amendment, and
  - A1.3 our evaluation approach to assessing the application.

### **Why Transpower needs our approval to amend the outputs for the project**

- A2 The price and quality of the service that Transpower supplies to consumers is regulated under Part 4 of the Commerce Act 1986 (The Act). This service is the delivery of electricity through the national grid (also called the transmission network). The national grid connects the generators of electricity to large electricity consumers and to electricity distribution businesses, who then connect to smaller electricity consumers.
- A3 The rules relating to Transpower's major capex investments are set out in the Transpower Capital Expenditure Input Methodology Determination (Capex IM).<sup>22</sup>
- A4 The Capex IM requires Transpower to seek approval for major capex projects in the national grid, and to deliver these projects to a set of approved components in order to recover the full cost of its major capital investments from consumers.<sup>23</sup>
- A5 The Capex IM requires Transpower to seek approval if Transpower wants to increase the expenditure above the maximum capex allowance amount approved by us for the major capex proposal, or vary the project outputs. If Transpower does not apply to amend the outputs or expenditure or we decide not to approve the requested amendment, Transpower may not be able to recover the full cost of its investment.

### **Why it is appropriate to treat this as a major capex project amendment**

- A6 We do not consider that a major capex proposal for the next stage of upper South Island development, the Upper South Island reliability Stage 2 project (USI Stage 2 project), is warranted at this time. This would involve the Commission having to consider a project well in advance of the need for major grid upgrades and with considerable uncertainty over costs, electricity demand and timing of the

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<sup>22</sup> These components are set out in clause 3.3.3(5) of the Capex IM.

<sup>23</sup> Ibid.



investment, and any new generation plant that may affect the timing of this investment.

- A7 Transpower is correct to consider that the expenditure associated with the upper South Island development programme is major capex, and that it should be assessed under the major capex framework in the Capex IM. The Capex IM does not permit sections of major capex projects or programmes to be funded from the base capex pool; this would distort the incentives on Transpower, reduce the effectiveness of reporting and compromise the ability of stakeholders to provide their views.
- A8 We consider the amendments requested by Transpower are best examined under the major capex project amendment framework.
- A9 We consider the amendments requested are in line with the intent and nature of the USI Stage 1 project; completing the immediate 'must do' grid upgrades and undertaking preliminary work to assess and refine the opportunities for the upper South Island development programme. This was to ensure the best case for the upper South Island development programme could be identified and selected, before significant investment in infrastructure upgrades are required.
- A10 Transpower's preliminary analysis has identified some additional work that is still within this initial phase of development. We are satisfied that it is still appropriate for this further work to be considered an amendment and not a new major capex proposal.
- A11 However, we consider it is appropriate to apply aspects of the major capex proposal process to our evaluation of this amendment, and we intend to use them in conjunction with the amendment evaluation provisions specified in the Capex IM. These are relevant because approval of the amendment would predispose the eventual upper South Island development in Stage 2 to the investment options with two switching stations. This has increased the scope of our approval process beyond what otherwise might be undertaken for an amendment of this size.
- A12 The aspects of the major capex process that we are using in our evaluation are:
- A12.1 publishing a draft decision and seeking views from interested parties on the application and our draft decision (this is optional for amendments, but required for other major capex proposals);
  - A12.2 consulting on the application and our draft decision as if the application was a major capex proposal, but taking into account the relatively small size of the investment and the timing of the holiday break; and
  - A12.3 applying relevant evaluation criteria for evaluating major capex proposals from Schedules C and D of the Capex IM.
- A13 We do not consider that our approach to evaluation of the amendment requires Transpower to comply with all provisions for major capex proposals, because

compliance with all of the provisions would be overly burdensome for an amendment of this nature.

- A14 The addition of these outputs will conclude the USI Stage 1 project and any new outputs will be considered as part of a new MCP.

### **Our evaluation approach**

- A15 By appropriately framing the evaluation and analysis of the USI Stage 1 amendment application we can deliver:

A15.1 a robust decision;

A15.2 demonstrated compliance with the Capex IM; and

A15.3 effective communication with stakeholders.

- A16 Transpower is seeking to amend the project because the results of its USI Stage 1 investigations have produced more information on the USI Stage 2 options than was available when the USI Stage 1 proposal was submitted. This information has led Transpower to propose some work from USI Stage 2 project should be moved into USI Stage 1.

- A17 Evaluating the amendment proposal based on this information allows the Commission to decide if what has been proposed promotes the long term benefit of consumers, and if Transpower is correctly incentivised to invest efficiently.

- A18 We have evaluated the USI Stage 1 amendment application in line with the requirements of the Capex IM (clause 3.3.4(2)(c)).

- A19 Our evaluation approach focused first on the specific requirements for the evaluation of amendments (clause 6.1.1(5)), and then it incorporated relevant major capex proposal evaluation requirements in Schedules C and D of the Capex IM in order to develop our views on specific matters relating to the application.

- A20 The information generated by this process fed in to the general evaluation requirements specified in 6.1.1(2) (what is proposed is consistent with input methodologies, fit for our purpose and promotes the purpose of Part 4).

- A21 Based on this evaluation we consider that the draft decision meets the requirements of the Capex IM.

- A22 We consider that the data, analysis and assumptions underpinning what is proposed by Transpower are fit for purpose, including consideration as to the accuracy and reliability of data and the reasonableness of the assumptions and other matters of judgement.

- A23 Transpower has already delivered the majority of the original outputs of USI Stage 1. For the original outputs the original expected net electricity market benefit will

remain unchanged. Transpower has already incurred capital expenditure for the original outputs but not for the additional outputs that it is proposing.

## **Attachment B: Approach to assessing Transpower's amendment application**

- B1 This attachment sets out our approach to the evaluation of the USI Stage 1 amendment in order to make a decision that complies with the requirements of the Capex IM.
- B2 We have confirmed that Transpower has complied with the requirements for submitting an application, as specified in the Capex IM (clause 7.4.2).
- B3 We evaluated the USI Stage 1 amendment application in accordance with the requirements of the Capex IM (clause 3.3.4(2)(c)). The amendment proposed by Transpower extends the scope of USI Stage 1. It also affects the investment options available for future stages of the USI development programme.
- B4 As a result we have utilised much of the major capex proposal evaluation provisions for our decision on the application, in addition to the amendment evaluation criteria we are required to use. We consider this approach promotes the purpose of Part 4.
- B5 This means the evaluation criteria we applied and the consultation we carried out matched, as closely as practical, the more extensive major capex proposal evaluation and consultation requirements. Our evaluation approach focused first on the specific requirements for the evaluation of amendments (clause 6.1.1(5)). Then it incorporated the major capex proposal evaluation requirements in Schedules C and D in order to develop our views on specific matters relating to the application.
- B6 The information generated by this process fed into the general evaluation requirements specified in clause 6.1.1(2) (what is proposed is consistent with input methodologies, fit for purpose and promotes the purpose of Part 4).
- B7 Based on this evaluation we consider that the final decision meets the requirements of the Capex IM.

### **Analysis framework and the relevant key factor**

- B8 We must evaluate an amendment application from Transpower under clause 6.1.1(5) of the Capex IM. This clause has several components that are discussed below. To evaluate the amendment application we must first identify the 'key factor'.
- B9 We consider that the key factor relevant to the proposed amendment is: Transpower has obtained information, as a result of investigations specified in the USI Stage 1 approval, that has led it to apply to undertake the work identified in the amendment now, rather than deferring the work and including it in Stage 2 of the project.

### Evaluation under the amendment provisions of the Capex IM

- B10 Under the Capex IM (clause 6.1.1(5)(a)(i)) we must evaluate the extent to which this key factor was reasonably foreseeable by Transpower before USI Stage 1 was approved in February 2013. We consider that it was foreseeable that new information might arise during the project, but there was no practical reason or necessity for Transpower to do anything in advance of that information being generated. It was recognised at the time of USI Stage 1 approval that the costs for different options were still uncertain and that a decision on the different options could not be made at that time.<sup>24</sup>
- B11 We must also evaluate the extent to which this key factor was or is within Transpower's control clause 6.1.1(5)(a)(ii).
- B12 We consider that Transpower has little control over the factors which may make it desirable to shift some of the work identified from USI Stage 2 to USI Stage 1. First, the application arises from information that is generated from its ongoing investigations. Transpower cannot be taken to have been able to control or predict the specific outcomes of its investigations. Second, the factors which support the proposal include matters such as changes in land use which are outside Transpower's control.
- B13 As we have considered the key factor was outside of Transpower's control we must carry out more evaluation under clause 6.1.1(5)(b).
- B14 This evaluation is of Transpower's mitigation strategy and actions in relation to the key factor (clauses 6.1.1(5)(b)(i) and (ii)).
- B15 There is no apparent strategy formally defined to specifically address the key factor, and we do not consider that one could have been usefully formulated. Transpower has carried out investigations in relation to the project. Transpower has responded in a pragmatic manner to new information, as a reasonable and prudent transmission system owner would be expected to. This is as much of an applicable mitigation strategy as can be expected in light of the possible outcomes that new information could generate.
- B16 The mitigation actions Transpower has taken in relation to the key factor is to send us an application requesting changes to USI Stage 1. This comprises both the choice to apply to amend USI Stage 1 and the matters proposed in the application itself. We will consider the reasonableness and extent of these actions in our evaluation of the application.

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<sup>24</sup> Commerce Commission decision and reasons on Transpower's Upper South Island Reliability Stage 1 Major Capex Proposal, 13 February 2013.

### **Applying Schedules C and D to the application**

- B17 As the application affects the investment options for the upper South Island development programme, we consider that is appropriate to apply the evaluation criteria specified for new major capex proposals, ie, Schedules C (major capex proposal evaluation criteria) and D (major capex investment test).
- B18 The analysis will also inform the next two requirements for evaluation of the USI Stage 1 amendment;
- B18.1 the extent to which the expected net electricity market benefit would be materially lower as a result of the amendment (clause 6.1.1(5)(c)); and
- B18.2 how much major capex has Transpower incurred up to the date of application for the amendment (clause 6.1.1(5)(d)).
- B19 In using applicable parts of Schedules C and D of the Capex IM to direct our evaluation of the application we are able to form a view of the reasonableness and extent of the mitigation actions taken by Transpower. That is, does what it has proposed meet the general requirement of clauses C1 and C2 of the Capex IM, promote the purpose of Part 4, and address the criteria specified in clauses 6.1.1(5)(a) and (b).
- B20 As the application is an amendment we have had to adapt our application of the criteria. For example, as we are considering an amendment to a proposed investment rather than testing a full suite of investment options as for a new major capex proposal, our explanation for the application of the investment test needs to reflect this if the analysis is to make sense.
- B21 Key to our decision are the provisions in Schedule C concerning the Commission being satisfied, in whole and in part, with what has been proposed or with its specific components. If we are not satisfied we may not approve what has been proposed.
- B22 In addition we may not approve the application if the investment test has not been satisfied.
- B23 The investment test is not satisfied if the proposal does not result in the highest net electricity market benefit. We also note that the option with the highest result is indicative that this option is in the long term benefit of consumers.
- B24 As this is an amendment, it is appropriate to use the information in the original USI Stage 1 project and Transpower's response to clause 6.1.1(5)(c), ie, the extent to which the expected net electricity market benefit would be materially lower as a result of the amendment, to inform our analysis.
- B25 Schedule C provides general evaluation criteria clause (C2) to test the reasonableness of the proposed investment and investment options. This includes whether the proposed investment and investment options:

- B25.1 reflects good electricity industry practice;
  - B25.2 are technically feasible;
  - B25.3 are able to be implemented in terms of the statutory planning process under the Resource Management Act 1991, other regulatory consents, and obtaining property and access rights;
  - B25.4 can be integrated in the system and market operations; and
  - B25.5 whether the estimated time required for construction, consultation, meeting statutory planning and other regulatory requirements, and obtaining property and access rights prior to a proposed commissioning date or completion date is reasonable.
- B26 There are also specific evaluation criteria in relation to considering costs clause (C3) and major capex outputs clause (C5). We must be satisfied with these components before we can give approval. These allow us to test the reasonableness and extent of Transpower's proposal against defined factors.
- B27 We set out our assessment against the evaluation criteria in Schedules C and D of the Capex IM in attachments B and C.

## Attachment C: Analysis of Transpower's investment options

- C1 In this attachment we present the results of our review of the investment options against the criteria for evaluating major capex proposals set in the Capex IM.<sup>25</sup>
- C2 The criteria for evaluating major capex proposals are set out in Schedule C and D of the Capex IM.
- C3 The Capex IM does not require us to consider all the criteria set out in clauses in Schedule C. Clause C1 sets the components of the project we must evaluate. Clauses C2 and C6 provide further details to inform our assessment of the components.<sup>26</sup> The components relevant to this application are the expenditure allowance, P50 and project outputs.<sup>27</sup> Discussions of our assessment of these components are in Attachment B.
- C4 In this attachment, we present our review of the factors that inform our decision to approve the amendment. These factors are whether:
- C4.1 there will be a need for the investments within the planning horizon; and
  - C4.2 Transpower's preferred option of two new switching stations at Orari and Rangitata is a likely investment option.
- C5 In coming to a decision on the above factors, we evaluated the application against the following clauses of the Capex IM:
- C5.1 relevant parts of clause C2, which include C2(a)(i) to C2(iv), C2(b) and C2(e);
  - C5.2 relevant parts of clause C6. We covered C6(b) and C6(c) in our assessment of costs and C2(d) in our assessment of whether there is a need for Stage 2 investment; and
  - C5.3 clause D1. Other clauses in Schedule D provide further details on the criteria set out in clause D1.
- C6 We have not evaluated the application against the following clauses of the Capex IM because they are either not relevant to the application or discussed in Attachment B.

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<sup>25</sup> The investment options consist of projects for Stage two, three and four. In this attachment, we have used the terms 'investment options for Stage 2' and 'proposed investment for Stage 2' when limiting our discussions to the projects proposed for Stage 2.

<sup>26</sup> For example, assessment of whether the proposal reflects 'good electrical industry practice' informs our assessment of the major capex project outputs.

<sup>27</sup> Clauses C3 to C5 provide further details on evaluating the components set out in clause C1.



- C6.1 Clauses C3 to C5 provide further details on evaluating the components set out in clause C1 and are discussed in Attachment B.
- C6.2 Clause C2(c) recommends assessing that the key assumptions around outage planning are reasonable. Since outages are not required for buying properties and seeking environmental consents, this clause is not relevant.
- C6.3 Clause C2(d) recommends assessing the extent that Transpower had considered the views of interested parties in seeking non-transmission solutions. Since non-transmission solutions are not required for buying property and seeking environmental consents, this clause is not relevant. As mentioned in the application, non-transmission solutions will be considered for Stage 2.
- C6.4 Clause C6(a) is associated with analysis of the power flow and dynamics in the grid. We evaluated this as part of the USI Stage 1 major capex proposal.
- C7 In the following sections we discuss:
- C7.1 whether the investment for USI Stage 2 will be required;<sup>28</sup>
- C7.2 the investment options that Transpower considered;<sup>29</sup>
- C7.3 whether the investment options are technically feasible, implementable from a regulatory perspective and can be integrated into the transmission system;<sup>30</sup> and
- C7.4 the expected net electricity market benefits including:<sup>31</sup>
- C7.4.1 the expected net electricity market benefits;
- C7.4.2 the expected costs of the investment options;
- C7.4.3 results of the sensitivity analysis; and
- C7.4.4 the unquantified benefits.

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<sup>28</sup> Capex IM, clause C6(d).

<sup>29</sup> Capex IM, clause 7.4.1.

<sup>30</sup> Capex IM, clauses C2(a) (ii) to (iv). C2(b) and C2(c) relate to construction but this amendment is only for securing designations and property rights so do not apply to this application. Similarly, C2(d) does not apply because it is related to a non-transmission solution.

<sup>31</sup> Capex IM, schedule D1 (1) and D1 (2).

- C8 Although the amendment application is only for securing the designations and property rights, the USI Stage 2 options had to be analysed to show that there is likely need for the switching stations and to assess the need date. Some of the analysis of the USI Stage 2 options undertaken now may be useful when an MCP for USI Stage 2 is submitted in the future.

### **Whether the proposed investment will be required**

- C9 The need for investments to increase the capacity of transmission grid arises when peak demand exceeds the existing transmission capacity. To assess when additional investments are required, planning engineers need to make assumptions on how peak demand is expected to increase (demand forecasts) and the manner in which new generation may develop (generation scenarios). These assumptions can have a significant influence on the need for and the need date of investments to increase capacity of the transmission grid.<sup>32</sup>
- C10 To satisfy ourselves that there would be a need to invest within the planning horizon, we reviewed Transpower's demand forecasts. The Capex IM sets out that we should consider the assumptions that underpin the demand forecast and generation scenarios.<sup>33</sup> These assumptions forecast the need for and the need date of transmission investments.
- C11 We have not discussed Transpower's assumptions on generation scenarios in this paper because Transpower has not amended the generation scenarios from those in the major capex proposal for USI Stage 1. Our assessment of the generation scenarios is available in the reasons and decision paper on the USI Stage 1 major capex proposal.<sup>34</sup>
- C12 Our findings are that we are satisfied that there is a need for ongoing investments to increase the transmission capacity into the upper South Island.<sup>35</sup> However, the timing of the next Stage of the upper South Island development programme (USI Stage 2) remains uncertain.

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<sup>32</sup> For the purpose of meeting the deterministic limb of the grid reliability standard, Transpower does not consider intermittent generation sources because generation that influence transmission limits must be available at peak demand. The grid reliability standards are set out in clauses 12.55 to 12.58 of the Electricity Industry Participation Code.

<sup>33</sup> Capex IM, clause C6(d).

<sup>34</sup> Transpower MCP and our reason and decision paper are available at <http://www.comcom.govt.nz/regulated-industries/electricity/electricity-transmission/transpower-major-capital-proposal/upper-south-island-grid-upgrade-stage-1/>.

<sup>35</sup> Transpower use the term 'reliability'. The investments increase the capacity of the transmission grid.

C13 In the remainder of this section we present:

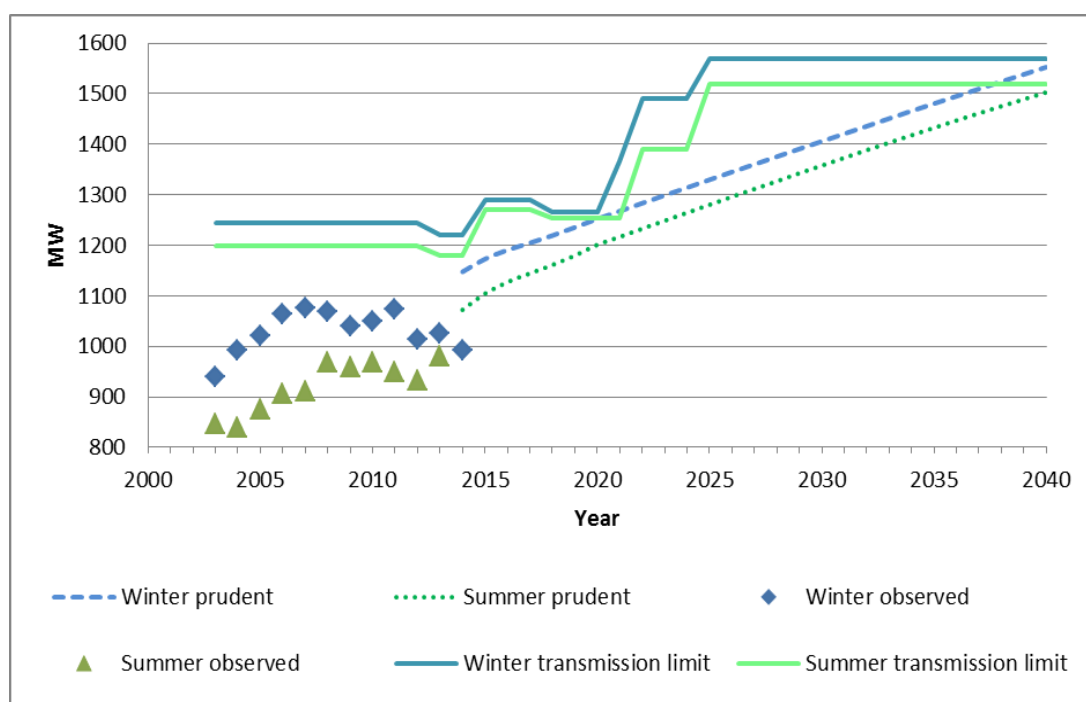
C13.1 our views on Transpower's demand forecast; and

C13.2 our assessment of the likely need date for the Stage 2 investment.

*Transpower's demand forecast seems to be optimistic*

C14 Figure C1: shows the summer and winter historical peak demands, Transpower's prudent demand forecasts and the transmission limits, both current and after further investments, for the upper South Island.<sup>36</sup>

**Figure C1: Observed demand, forecast and transmission limit for upper South Island**



C15 Figure C1: shows there is about 200 MW of margin between the current demand and the transmission limit.<sup>37</sup> For example the winter peak demands for the last three years have been around 1000 MW and the winter transmission limit is more than 1200 MW.<sup>38</sup>

<sup>36</sup> We have produced this graph from the information supplied by Transpower. Transpower's more detailed graphs are available in the application: Transpower "Upper South Island reliability Stage 1 Application for amendment to the approved MCP outputs and increased in MCA" (August 2014); pp 29-30 and Table A2-1, pp.27-28.

<sup>37</sup> It is worth noting that there are two types of transmission limits - voltage and thermal limits. Once peak demand reaches thermal limit, new transmission lines are required.

<sup>38</sup> The changes in the limits, shown in Figure C1:, are due to Transpower either investing in the grid (increase in limits) or retiring existing plant (decrease in limits).

- C16 Since the peak demand is about 83% of the transmission limit, Transpower will most likely need to increase transmission capacity in the foreseeable future. The exception will be if network peak demand remains constant through demand side participation or because developments in new generation, including distributed generations, keep up with increases in demand.
- C17 Transpower forecasts that the next investment is required by 2022. This is based on the following assumptions by Transpower on peak demand and generation scenarios:
- C17.1 either winter peak demand will increase at an average rate of about 1.5% per annum until 2022 or summer peak demand will increase at an average rate of about 1.8% per annum until 2022;
  - C17.2 there will not be any new schedulable generation in the upper South Island until 2022; and
  - C17.3 there needs to be a margin of about 100 to 150 MW between currently observed demand and the start of the prudent forecast because of inter-year variation in demand and new, mainly irrigation, developments.<sup>39</sup>

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<sup>39</sup> Transpower “Upper South Island reliability Stage 1 Application for amendment to the approved major capex project outputs and increased in major capex allowance” (August 2014); pp 29-30 and Table A2-1, p.25.

*Realistic need date for Stage 2 investment*

C18 Table C1: shows the expected need date for the USI Stage 2 investments depends on the different generation scenarios and demand forecasts.<sup>40</sup>

**Table C1: Need date for the next investment based on generation scenarios**

Generation scenario	Expected need date based on prudent forecasts	Expected need date based on expected forecasts
No new generation in the upper South Island	2022	2029
MDS1 – sustainable path	2022	2070
MDS2 – South Island wind	2022	2040
MDS3 – medium renewables	2022	2044
MDS4 – coal	2022	2032
MDS5 – high gas discovery	2022	2036

C19 The need date for the next investment based on the prudent demand forecasts for all generation scenarios is 2022, because Transpower has assumed that there will not be any schedulable generation development in the upper South Island until after 2022. The earliest need date based on expected demand forecasts is around 2029.

C20 In Attachment B, we comment on the implication of the need date to this application to amend the USI Stage 1 project outputs.

### **The investment options that Transpower has considered**

C21 We are satisfied that Transpower has considered a sufficient number of investment options for evaluating this amendment. However, when developing the proposal for Stage 2, Transpower needs to include demand response as an economic means of delaying the need date for the Stage 2 investment.

C22 Our analysis also indicates that an option that includes installing more than one SVC before building the switching stations may provide higher expected net market benefits. We recommend that Transpower considers this as an investment option when developing the major capex proposal for USI Stage 2. Our observation does not affect our decision to amend Transpower application. It could have some effect on

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<sup>40</sup> Generation scenarios MDS1 to MDS5 are based on the scenarios in the Statement of Opportunities 2010 produced by the former Electricity Authority. Transpower modified these scenarios when it prepared the major capex proposal for USI Stage 1.

the expected net electricity market benefits of obtaining property rights and consents for the switching stations, now rather than later, but we do not consider that it makes a material change to our decision on the amendment.<sup>41</sup>

- C23 Table C2: below shows the investment options for the upper South Island development programme including those in the major capex proposal for USI Stage 1.

**Table C2: Investment options that Transpower considered**

Option number	Plan in Stage 1 major capex proposal	Plan in this amendment
1	<b>Bus coupler 6 at Islington,<sup>42</sup> refurbish SVC3 at Islington and switching stations at Orari.<sup>43</sup></b>	
1a		Three SVCs and new lines between Islington, Ashburton and Twizel substations.
1b		SVC, two switching stations and thermal uprate of north half line, and new north and south half lines. <sup>44</sup>
2	Bus coupler 6 at Islington, decommission SVC3 at Islington and switching stations at Orari.	
2a		One switching station and thermal uprate of north half line, SVC and new north and south lines. <sup>45</sup>
2b		One switching station, SVC and new north and south half lines.
3	Bus coupler 6 at Islington, refurbish SVC3 at	

<sup>41</sup> The more Transpower defers constructing the switching stations, the less benefit there is obtaining designations early.

<sup>42</sup> Bus coupler at Islington was the proposed investment for Stage 1 and is now installed. The preferred options are in bold.

<sup>43</sup> SVCs, synchronous condensers and statcoms are devices that provide dynamic reactive power. They need mid-life refurbishments that add to the overall cost of using them in the system.

<sup>44</sup> The new lines planned will be higher capacity lines replacing the existing Islington-Livingstone line section between Islington and Orari (north half line) and Islington-Tekapo B line section between Orari and Tekapo B (south half line). These lines are identified in Figure B1 below.

<sup>45</sup> Note that Transpower's comment in s4.1 of its application refers to the planning protocol for thermal upgrade of the line. Transpower will not undertake that part of planning at this stage. Transpower "Upper South Island reliability Stage 1 Application for amendment to the approved MCP outputs and increased in MCA" (August 2014), p.15.

Option number	Plan in Stage 1 major capex proposal	Plan in this amendment
	Islington and new SVCs.	
3a		<b>Two switching station and thermal uprate, SVC and new north half line and south half lines.</b>
3b		Two switching stations, new north and south half lines.
4	Bus coupler 6 at Islington, decommission SVC3 at Islington and new SVCs. <sup>46</sup>	
5	Bus coupler 6 at Islington, refurbish SVC3 at Islington, new synchronous condensers and new SVCs.	
6	Bus coupler 6 at Islington, refurbish SVC3 at Islington and new statcoms.	

C24 All the investment options are a series of projects that provide incremental increases in capacity. We consider that the staged approach is a better approach than providing one-off high capacity solution that can be very expensive and cannot be readily adjusted to respond to changes in the environment.

C25 The series of projects that Transpower has considered are:

C25.1 SVCs at existing substations near Christchurch;

C25.2 single switching station at Orari and thermal upgrade of existing lines;

C25.3 two switching stations at Orari and Rangitata and thermal upgrade of existing lines; and

C25.4 new lines from Twizel into Christchurch along various routes.<sup>47</sup>

C26 Transpower used the above projects to develop six investment options. These six investment options set out long term development plans for transmission into the upper South Island.

C26.1 The first stages of the plan are expected to provide sufficient capacity to meet expected demand until the 2050s. These stages comprise medium cost investments such as:

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<sup>46</sup> This option is effectively the first part of option 1a in the amendment.

<sup>47</sup> The investment options for Stage 2 are one of the first three projects in this list.

- C26.1.1 SVCs or other dynamic voltage support devices; and
- C26.1.2 New switching stations at Orari and Rangitata along with thermal uprating of the line between the switching stations and Islington.
- C26.2 In the latter half of this century new transmission lines are likely to be required unless there are appropriate levels of investment in generation in the upper South Island.
- C26.3 In preparing the development plans, Transpower also considered and discarded HVDC tap-off and series capacitors due to cost. We agree that at this Stage these options are not cost effective. However, in future they may be viable alternatives to building new transmission lines.
- C27 As seen in Table C2: Transpower has eliminated some of the investment options it considered in its USI Stage 1 major capex proposal. Transpower has advised that following further investigations, it has established that refurbishing the SVC at Islington, or installing new synchronous condensers or statcoms were not economical solutions.<sup>48</sup> For these reasons, Transpower has ruled out its options 1, 3, 5 and 6 that were included in the USI Stage 1 major capex proposal.
- C28 We are satisfied that at this stage of the planning process, the above projects are suitable for the purpose of the investment tests. Since significant investments following the completion of USI Stage 2 will not be required until around 2050 it is possible that by that time other options may be more economic.
- C29 We describe the proposed investment for USI Stage 2 below.

*Proposed investment for Stage 2 is two switching stations*

- C30 Transpower's preferred investment option for USI Stage 2 is switching stations at Orari and Rangitata.
- C31 Figure C2: shows the location of the proposed sites and Figure C3: below shows an enlarged view of the area.<sup>49</sup>

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<sup>48</sup> Transpower "Upper South Island reliability Stage 1 Application for amendment to the approved major capex project outputs and increased in major capex allowance" (August 2014); pp 29-30 and Table A2-1, p.34. If the relative costs between statcoms and SVCs change, Transpower may reconsider statcoms.

<sup>49</sup> Source: Transpower "Upper South Island reliability Stage 1 Application for amendment to the approved major capex project outputs and increase in major capex allowance" (August 2014); p.6.



Figure C2: Location of the sites for the switching stations

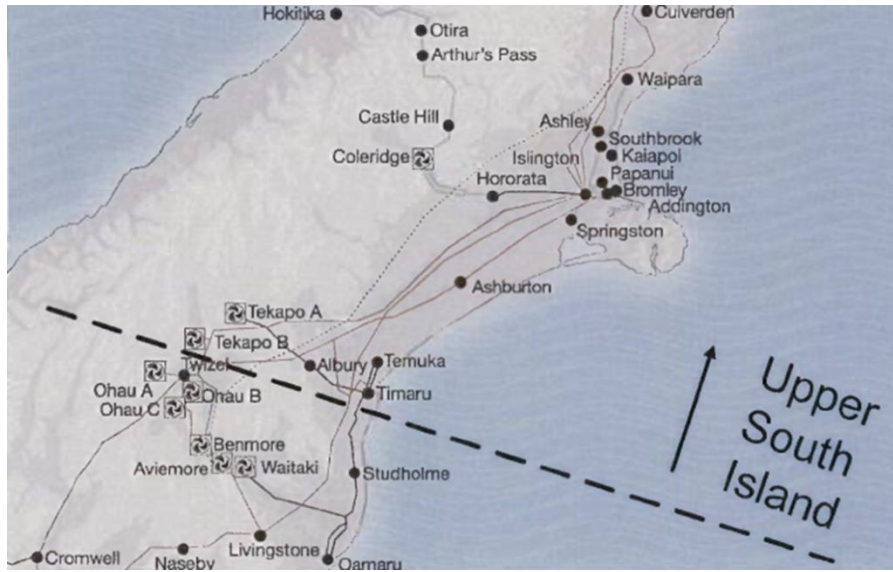
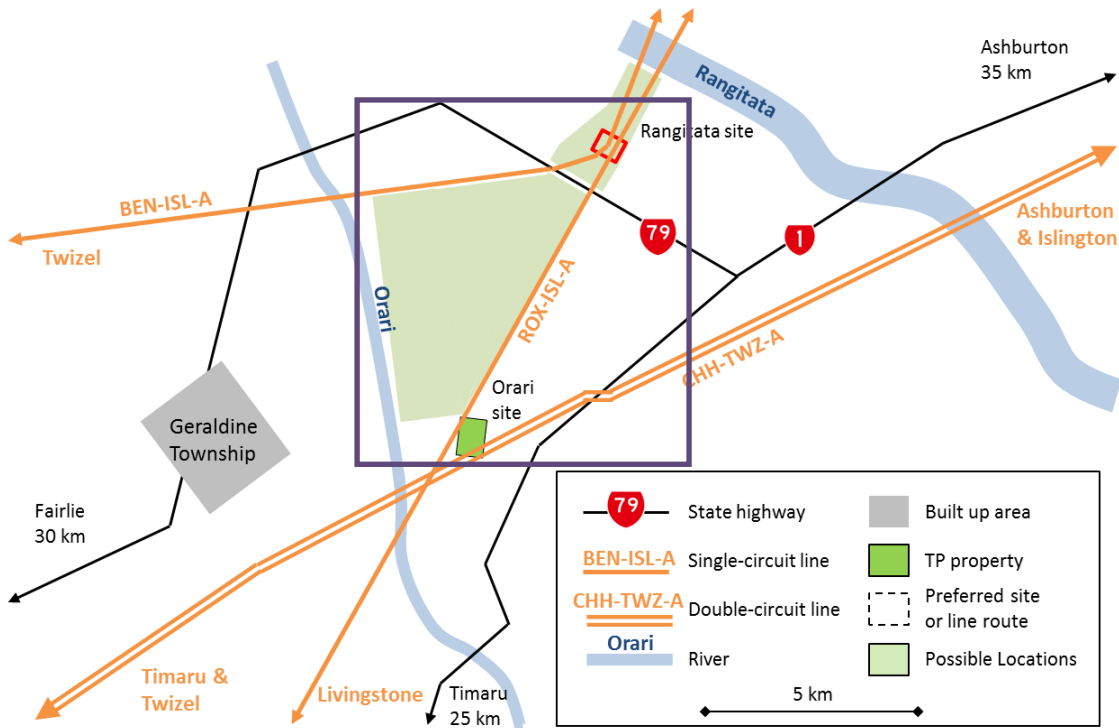


Figure C3: Orari and Rangitata switching stations



C32 Transpower owns the parcel of land identified as the 'Orari site' and plans to build one switching station at this site. Transpower will need to buy suitable land near the Rangitata River area for the second switching station.

## **The investment options are feasible and can be integrated into the system**

C33 In this section, we present our findings against the relevant evaluation factors set out in clause C2 of the Capex IM. We evaluated whether the proposed investment and investment options:

- C33.1 reflect good electricity industry practice;
- C33.2 are technically feasible,
- C33.3 are able to be implemented in terms of the statutory planning process under the Resource Management Act 1991, other regulatory consents, and obtaining property and access rights;
- C33.4 can be integrated in the system and market operations, and
- C33.5 whether the estimated time required for construction, consultation, meeting statutory planning and other regulatory requirements, and obtaining property and access rights prior to a proposed commissioning date or completion date is reasonable.

### **We are satisfied that the two switching stations solution is technically feasible**

C34 Based on our analysis we consider that the two switching stations solution is technically feasible.<sup>50</sup>

C35 Transpower needs to study the consequences of high impact low probability events before committing to the next phase in USI Stage 2.

#### *High impact low probability events at Orari could cause major interruptions of supply*

C36 A high impact low probability (HILP) event could affect three of the four circuits supplying the upper South Island.

C37 Transpower has stated that it has not carried out a review of HILP events at the switching stations.<sup>51</sup> We strongly recommend that Transpower carries this out before it commits to other work in its amendment application.

C38 In the initial design of the line realignment proposed by Transpower, we identified that there was the possibility of an HILP event that would cause major interruptions to supply in the upper South Island. While Transpower subsequently resolved this issue, we suspect there could be other issues of similar nature.

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<sup>50</sup> Capex IM, clause C2(a)(ii).

<sup>51</sup> Transpower "Response to Q006 – resilience to HILP events", (24 September 2014).

*Access to Rangitata switching station can be restricted during flooding*

- C39 Transpower's system solution report mentions that access to both sites could be difficult during major flooding.<sup>52</sup>
- C40 While the switching stations themselves are not located in high flood zone, access to the Rangitata switching station will be affected during flooding. Transpower has advised that it has reasonable options for accessing this site under the conditions of severe flooding.
- C41 We expect Transpower to include suitable mitigation measures so that transmission into the upper South Island will not be compromised during such events.

**All investment options reflect good electricity industry practice**

- C42 All investment options are a combination of building one or two switching stations, installing SVCs and constructing new lines. All of these projects are standard solutions for transmission system.
- C43 We are satisfied that the investment options reflect good electricity industry practice.

**The statutory planning process, obtaining regulatory consents and securing property rights**

- C44 The Capex IM requires us to assess whether the proposal can be implemented in terms of environmental planning process, regulatory consents and obtaining property and access rights.<sup>53</sup>
- C45 The key reason for this amendment is for Transpower to seek designations and property rights for the next stage of the upper South Island development plan. The outcome of this will provide certainty that the proposed solution can be implemented in terms of the environmental and property considerations mentioned above.

**We are satisfied that the solution be integrated into the system and market operations**

- C46 One possible disadvantage of the two switching station solution is that only one circuit connects the Orari and Rangitata switching station (ORI-RAG circuit). An outage of this circuit would remove this interconnection and possibly affect the capacity of remaining circuits.
- C47 Transpower has advised that the results of its studies show that an outage of the ORI-RAG circuit will not affect the operational transmission capacity into the upper

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<sup>52</sup> Orari Switching Station – Solution Study report, Doc No 602279393-rpt-02 AECOM 25 March 2013.

<sup>53</sup> Capex IM, clause C2(a)(iii).

South Island.<sup>54</sup> Availability of this circuit is not the binding constraint for operational purposes.

- C48 Transpower has advised this in its capacity of the system planner and we see no reason to disagree. Based on this advice, we accept that the switching stations can be integrated into the system and market operations.

**We are satisfied that the two switching stations provide higher expected net electricity market benefits than other options**

- C49 The investment test in the Capex IM requires that:

C49.1 the proposed investment must be the investment option with the highest net electricity market benefit, including any qualitative benefits; and

C49.2 the results of the investment test must be sufficiently robust under sensitivity analysis.<sup>55</sup>

- C50 The results of the investment test show that any of the six investment options is suitable as the preferred investment. The expected net electricity market benefits of all the options are similar but options with dual switching stations provide marginally higher benefits.<sup>56</sup>

**The estimated time required for construction, consultation, meeting statutory planning and other regulatory requirements, obtaining property and access rights prior to a proposed commissioning date or completion date**

- C51 This criterion requires us to assess whether Transpower has allowed sufficient time for obtaining property rights and consents and constructing the assets prior to a proposed commissioning date or completion date.
- C52 Since this application is not associated with construction and commissioning, it does not have a proposed commissioning or completion date. For this reason, reviewing this criterion is not relevant to this application.
- C53 When sensitivity analysis is undertaken, the benefits for the options and the ranking of them changes, but our assessment of the unquantified benefits favours options with two switching stations. On this basis it is reasonable to assume that the two

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<sup>54</sup> Transpower's email 'USI Stage 1 amendment' dated 23 June 2014. (Steve Haultain). The operational transmission capacity is set by considering the effect of an outage of the circuit that transmits the most electricity. Transpower has advised that after the project, the limiting circuit will be Bus C at Ashburton 220 kV substation.

<sup>55</sup> Capex IM D1.

<sup>56</sup> Although the difference in benefits between options is within the level of accuracy of the calculations.

switching station options are a likely future development option for the USI Stage 2 project.

- C54 Approving this amendment affects the balance between options for USI Stage 2, as the solution will be biased toward the two switching station option, but it does not rule out the other options for USI Stage 2.
- C55 In the following sections, we set out the results of our analysis on:
- C55.1 the expected net electricity market benefits of the investment options;
  - C55.2 the electricity market costs of the investment options;
  - C55.3 the results of the sensitivity tests; and
  - C55.4 our assessment of the unquantified benefits.

### The expected net electricity market benefits are very similar

C56 Table C3: shows the six investment options and their expected electricity market costs, expected electricity market benefits, expected net electricity market benefits, and relative expected net electricity market benefits.<sup>57</sup>

**Table C3: Investment options and their electricity market costs and benefits**

Options for the development plans <sup>58</sup>		Electricity market cost	Electricity market benefit	Expected net electricity market benefit	Relative expected net electricity market benefit <sup>59</sup>
1a	Three SVCs and new lines between Islington, Ashburton and Twizel substations.	28.6	917.1	888.5	-5.7
1b	SVC, two switching stations and thermal uprate of north half line, and new north and south half lines.	22.9	917.1	894.2	0.0
2a	One switching station and thermal uprate of north half line, SVC and new north and south lines.	28.1	917.1	889.0	-5.3
2b	One switching station, SVC and new north and south half lines.	32.1	917.1	885.0	-9.3
3a	<b>Two switching station and thermal uprate, SVC and new north half line and south half lines.<sup>60</sup></b>	<b>22.9</b>	<b>917.1</b>	<b>894.2</b>	<b>0.0</b>
3b	Two switching stations, new north and south half lines.	34.6	917.1	882.5	-11.7

<sup>57</sup> All costs and benefits are NPVs in \$millions. Source of Table is Transpower “Upper South Island reliability Stage 1 Application for amendment to the approved major capex project outputs and increase in major capex allowance” (August 2014); Table A2-7, p.43.

<sup>58</sup> The investment option for Stage 2 will be the first projects from the development plans.

<sup>59</sup> Relative net electricity market benefits are relative to the expected net electricity market benefits for option 3a. Option 3a is also the preferred option.

<sup>60</sup> Transpower’s preferred investment.

- C57 The results show that the relative expected net electricity market benefits are only marginally higher for the options with two switching stations with thermal uprating of the lines between Orari and Islington. These are options 1b and 3a.
- C58 We note that Transpower used a calculation period of more about 80 years in its investment test. We tested the rankings of the options using a calculation period of 30 and 40 years. 30 years is closer to the calculation period set out in the Capex IM. We discuss these results in the section on ‘sensitivity analysis’ below.
- C59 The expected net electricity market benefit of an investment option is the average of the net electricity market benefit under each demand and generation scenario. The net electricity market benefit of an investment option is the difference between the total electricity market benefits and the total electricity market costs of the investment option under each demand and generation scenario.
- C60 Because the expected electricity market benefits of all options are similar, we evaluated the investment options by comparing the electricity market costs of each of the six investment options.<sup>61</sup> Electricity market costs include all costs incurred by consumers. These costs include capital and operations and maintenance costs of the investment options and all modelled projects. They also include the costs of losses and demand side participation.<sup>62</sup>

### **The expected electricity market costs**

- C61 We consider that some of the estimated capital costs are high and have used sensitivity analysis to assure ourselves that these do not affect the ranking of the options. The high estimated costs do not affect our decision on the major capex allowance for this application.
- C62 The electricity market costs comprise of the cost of capital, operating the maintenance, and transmission losses due to the project. Table C4: shows the components of the electricity market costs for the six options.<sup>63</sup>

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<sup>61</sup> We did not review in detail Transpower’s calculations of the electricity market benefits. Since we are only interested in the relativity of benefits between options, the actual value of the expected electricity market benefits does not affect our conclusion. We considered the electricity market costs because these depend on the investment options.

<sup>62</sup> Capex IM clause D5 defines the Electricity market costs and project costs. Modelled projects are projects that likely to be needed after the investment option is completed.

<sup>63</sup> All costs are NPVs in \$millions. Source of Table is Transpower “Upper South Island reliability Stage 1 Application for amendment to the approved major capex project outputs and increase in major capex allowance” (August 2014); Table A2-4, p.40.

**Table C4: Electricity market costs**

<b>Investment options</b>	<b>Expected Capital cost</b>	<b>Expected cost</b>	<b>Expected Operation and Maintenance costs</b>	<b>Expected reactive losses</b>	<b>Expected transmission losses</b>	<b>Expected electricity market costs</b>
1a	SVCs, new line	26.4	0.5	1.8	0.0	28.6
1b	SVC, 2 switching stations, SVC, uprate and new line	22.4	0.3	1.0	-0.8	22.9
2a	1 switching station, SVC, uprate and new line	27.9	0.3	0.3	-0.3	28.1
2b	1 switching stations, new north half line	32.0	0.3	0.2	-0.3	32.1
3a	2 switching stations, uprate, new line	24.0	0.3	0.3	-1.7	22.9
3b	2 switching station new north half line	35.8	0.3	0.2	-1.7	34.6

- C63 Table C4: shows that the expected operation and maintenance costs and losses are low compared to the capital costs. For this reason, we have focused our evaluation on Transpower's estimates of the capital costs.
- C64 When reviewing Transpower's cost estimates, we performed a desk top assessment to establish whether the relativity between the costs of each of projects, including the modelled projects, is reasonable. We consider that our approach provides appropriate results for ranking the investment options.
- C65 In the paragraphs below we summarise our findings on the following:
- C65.1 estimated cost of SVCs;
  - C65.2 estimated cost of switching stations;
  - C65.3 estimated costs of the line deviation; and



C65.4 estimated costs for the new transmission lines.

*Estimated costs are fit for the investment test*

C66 We consider that the estimated costs for the projects are fit for applying the investment test.<sup>64</sup>

C67 Transpower's estimated cost of building new transmission lines is about \$3.4 million per kilometre of line. This is higher than the current rate of building similar lines, but as building new lines are common to all options, we are satisfied that the higher cost is not distorting the results of the investment test.

*Estimated cost of switching stations appears to be high*

C68 We consider that the estimated costs for the switching stations are higher than the current costs. But even with the higher cost estimates, options with switching stations provide higher expected net electricity market benefits.

C69 Table C5: shows Transpower's estimated cost for the switching stations.

**Table C5: Switching stations costs**

Cost elements	One switching station and line deviation	Two switching stations option
	(\$m)	(\$m)
Rangitata switching station	0	20
Orari switching station	31	23
New line	28	0
Termination costs	10	13
Property & consents		
<b>Total</b>	69	56

C70 The Rangitata switching station is similar to the Drury substation in South Auckland that was delivered for about \$13 million. Therefore we expected a similar cost for Rangitata. Transpower explained that the Drury switching station was delivered below the estimated costs of \$20 million because of very competitive tenders for civil works and favourable exchange rates. Transpower also advised that the estimates for Drury and Rangitata are the same.<sup>65</sup>

<sup>64</sup> Capex IM, clause C6(c).

<sup>65</sup> Transpower "USI Stage 1 amendment application - Q002". Estimate for Rangitata in 2012 was about \$20 million.

- C71 Transpower's explanation of the delivered cost of Drury is not consistent with the details of the estimated cost it provided us.<sup>66</sup> Transpower's estimated cost shows that the total estimated cost of civil and building works is \$4.3 million and the total foreign exchange component is \$4.5 million. Even significant savings on these components do not fully explain the \$7 million difference between the estimated and delivered cost of Drury switching stations.
- C72 We therefore maintain our view that Transpower's estimated cost of building the switching stations is high. We expect more realistic costs when Transpower submits an major capex proposal for the switching stations. For the purpose of this amendment, however, we are satisfied that the higher estimate of costs do not affect the ranking of the options.

*Estimated cost of line deviation to Orari appears to be high*

- C73 Transpower's estimated cost for deviating the Benmore Islington A line into Orari switching stations is \$4 million per kilometre. This unit rate is more than 30% higher than the costs of recently delivered projects. Transpower explains the reasons for the high costs as:
- C73.1 the short length of the line increases the unit rates due to largely fixed costs associated with design management, contractor setup, project management and environmental protocols;
  - C73.2 intensive farming with irrigators means that it may not be possible to get a straight line route for the transmission line. This will increase construction costs; and
  - C73.3 uncertainty in the geotechnical ground conditions that will affect the design of the tower foundations.
- C74 The effect of an over estimated line deviation cost is that the investment test will favour options without a line deviation. We therefore considered this in our sensitivity analysis. Our results show that options with the two switching stations provide marginally better expected net electricity market benefits than the one switching station option.

**The sensitivity tests support Transpower's preferred option**

- C75 Transpower has presented the results of its sensitivity analysis in Table A2.9 of its application.<sup>67</sup> Transpower considered sensitivity analysis on high and low growth in demand, high and low development in additional generation, changes in capital costs, foreign exchange rates, discount rates, cost of losses and value of lost load.

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<sup>66</sup> Transpower spreadsheet 'Single and dual site cost summary from Tees' (June 2014).

<sup>67</sup> Transpower "Upper South Island reliability Stage 1 Application for amendment to the approved major capex project outputs and increase in major capex allowance" (August 2014); p.48.

We are satisfied that the sensitivities that Transpower has considered meet the requirements of the Capex IM.<sup>68</sup>

C76 Transpower has concluded that the results of the sensitivity analysis do not explicitly favour any one investment option. But there is a preference towards options 1b and 3a, both of which include two switching stations.<sup>69</sup>

C77 As mentioned above, we had some concerns on the relative costs between the one and two switching station options and we wanted to test the sensitivity of the results to the calculation period. We present the results of our sensitivity tests in Table C6: below. The sensitivities we considered were:

C77.1 decreasing the capital cost of deviating the Benmore Islington line A into Orari substation for a single switching station option; and

C77.2 the relativity of costs between the options with the switching stations and the option with SVCs. We reduce the calculation period to 30 and 40 years to look at the impact of these costs.

C78 The results of the sensitivity analysis show that:

C78.1 the relative expected net electricity market benefits of the options with two switching stations still remains higher even with a reduced capital cost of deviating the line; and

C78.2 with a shorter calculation period, options 1a and 1b, the options with SVCs provide higher benefits. The effect on ranking of the options was similar and we present the results of the 40 year test below.<sup>70</sup>

**Table C6: Sensitivities expected net electricity market benefits relative to option 3a**

Investment option	1a	1b	2a	2b	3a	3b
	SVCs & line	SVC & 2 switching stations	1 switching station, thermal upgrade	1 switching station, new line	2 switching stations, thermal upgrade	2 switching stations, new line
<b>Base result</b>	-5.8	<b>0.0</b>	-5.3	-9.3	<b>0.0</b>	-11.7

<sup>68</sup> Capex IM, clause D8.

<sup>69</sup> As mentioned above, the main difference between options 1b and 3a is sequencing of the projects. Option 1a proposes to install SVC first and switching stations second. Option 3a proposes switching stations first and an SVC later.

<sup>70</sup> Note that there would be a series of projects after 2055.

<b>Calculation period reduced to 2055</b>	<b>4.3</b>	0.1	-5.2	-3.5	0.0	-6.3
<b>Cost of line deviation reduced by \$3m/km</b>	-4.3	<b>0.0</b>	-4.1	-8.1	<b>0.0</b>	-11.8

Note: \$m are in 2014 prices. The options with the highest expected net electricity market benefits are bolded.

### Unquantifiable benefits favour SVCs followed by switching stations

- C79 Since the results of the investment test support any of the investment options, Transpower and the Commission considered unquantifiable benefits.<sup>71</sup>
- C80 Our assessment of unquantified benefits is that an option with SVCs followed by switching stations at Orari and Rangitata provides the best long term benefits for consumers.
- C80.1 SVCs provide the highest expected net electricity market benefits when we consider a 30 to 40 year calculation because of their lower capital costs. This indicates that option 1a is a better option in the initial stages.
- C80.2 In the longer term option 1a includes a significant transmission line from Twizel to Ashburton. Transpower has estimated the cost of this line as over \$500 million, which is more than the cost of the 400 kV line between Whakamaru and Brownhill.<sup>72</sup> We consider that it is beneficial to try and avoid such large one-off investments. Therefore, option 1a as proposed by Transpower can be risky.
- C80.3 Switching stations at Orari and Rangitata will remove the need for the line between Twizel and Ashburton. Although other lines may need to be built, there can be a staged construction of the lines from Twizel to Orari/Rangitata first and then construction of a line between Orari/ and Rangitata and Islington at a later date. Being able to construction a line from Twizel just to Orari/ and Rangitata rather than all the way to Ashburton reduces the overall costs to consumers.
- C80.4 A lower cost option may be to install the optimum number of SVCs first (similar to option 1a) and then build the two switching stations. This is a hybrid between option 1a and 1b. We recommend that Transpower explores this option as part of its USI Stage 2 investigation.

<sup>71</sup> Transpower analysis of unquantified benefits is presented on pages 44-45 of the "Upper South Island reliability Stage 1 Application for amendment to the approved major capex project outputs and increase in major capex allowance" (August 2014).

<sup>72</sup> Transpower "USI Stage 1 Amendment investment test" spreadsheet; (28 August 2014).

## Conclusions

- C81 In relation to the Capex IM, our review of the investment test shows that:
- C81.1 the expected net electricity market benefits of all the options are similar but options with dual switching stations provide marginally higher benefits;
  - C81.2 when sensitivity analysis is undertaken, the benefits for the options and the ranking of them changes but our assessment of the unquantified benefits favours options with two switching stations;
  - C81.3 approving this amendment affects the balance between options for USI Stage 2, as the solution will be biased toward the two switching station option, but it does not rule out the other options for USI Stage 2;
  - C81.4 approving the amendment based on the two switching station option does not have any negative impact on consumers; and
  - C81.5 securing the designations and property rights is a relatively low cost way of preserving future options.

## Attachment D: Analysis of requirements for designations and property rights

- D1 In this attachment, we present our review of the factors that inform our decision to approve the amendment. These factors are whether:
- D1.1 The amended outputs and cost are reasonable; and
  - D1.2 Securing the designations and property rights by the end 2018 is beneficial to consumers.
- D2 In coming to a decision on the above factors, we evaluated the application against the following clauses of the Capex IM:
- D2.1 relevant parts of clause C2, which include C2(a)(iii) and C2(b);
  - D2.2 relevant parts of clause C3, which include C3(a) to C3(d), in our assessment of costs;
  - D2.3 relevant parts of clause C4, which include C4(a), in our assessment of costs;
  - D2.4 relevant parts of clause C5, which include C5(a) and C5(c), in our assessment of the outputs;
  - D2.5 relevant parts of clause C6, which include C6(b) and C6(e), in our assessment of costs; and
  - D2.6 relevant parts of clause D1 which include D1(1)(a) and D1(1)(c), in our assessment of benefits.
- D3 In the following sections we discuss:
- D3.1 why is the investment required;
  - D3.2 when are the switching stations needed;
  - D3.3 is this a strategic property purchase;
  - D3.4 what are the benefits of securing designations and property rights early;
  - D3.5 breakdown of the additional expenditure requested;
  - D3.6 minimising the costs and risks to consumers; and
  - D3.7 what are the reasonable costs to be included in the RAB.

### **Why is the investment required?**

- D4 Transpower has investigated a number of options for increasing the transmission capacity into the upper South Island. Bussing the four Waitaki Valley to Christchurch 220 kV transmission circuits in the Geraldine area, is the likely long term solution with the preferred bussing solution the construction of two switching stations, one at Orari and the other at Rangitata, as shown in Figures C2 and C3. The objective of the amendment is to secure the designations and property rights for the switching stations and transmission line deviations.

### **When are the switching stations needed**

- D5 As discussed in Attachment B, the need date for the next investment is uncertain. Depending on demand growth and the amount of new schedulable generation in the USI, the next investment could be needed either as early as 2022 or not needed until 2029 or possibly later. Based on the information supplied by Transpower, for the purpose of this assessment we are assuming that the investment will be needed closer to the 2022 date.
- D6 We consider that the need for further investments to increase the capacity of transmission into the upper South Island is likely. The only scenario in which investment may not be required is if new schedulable generation developments in the upper South Island keep up with increases in demand.

### **Why is this an amendment to the USI Stage 1 project and not a strategic property purchase under Base Capex?**

- D7 In its RCP2 expenditure proposal Transpower included expenditure for strategic property purchases and this has been included in the base capex allowance for RCP2. Transpower stated in the project overview document for the strategic property purchases that “The programme is to purchase property that is of strategic value in an economically efficient manner. Any property purchased would be included in our RAB. Such property may relate to potential future grid enhancements, (such as ‘project related’), or the management of existing works (such as an alternate to noise mitigation). Project related purchases occur after a need is identified but before project funding is secured from the regulator.”
- D8 It is likely that the purchase of a site at Rangitata, a proportion of the Orari site that Transpower already owns, and easements for transmission line alterations at both sites would normally meet the criteria for strategic property purchases, but for the USI development programme. These were not included in the strategic properties expenditure in RCP2 because:
- D8.1 the USI Stage 1 project is already in progress as a MCP and includes preliminary design and investigations work for the Orari switching station, so we consider this to be a project related purchase; and

- D8.2 the amendment is not just for the purchase of the land and easements but is also for gaining designations for the project.

**In the context of this project, what are the benefits of securing designations and Property rights early?**

- D9 We agree with Transpower that securing designations and property rights prior to the main project, can in some circumstances reduce both the delivery and cost uncertainty. Separating the two activities may reduce the risk of higher compensation costs, construction delays and construction acceleration costs.
- D10 Transpower have stated that its current prudent demand forecast suggests that the investment will not be required before 2022, and there are always uncertainties with demand forecasts and with the USI now having significant summer demand, it needs to be able to mobilise quickly if forecasts change.<sup>73</sup>
- D11 While we agree with Transpower that there is considerable uncertainty, in reality demand forecast can be either greater or less than predicted. Securing the designations and property rights early reduces the delivery uncertainty and the switching station can be approved much closer to the need date when more up to date information will be available.
- D12 Transpower have stated that approval will provide greater certainty of our intentions to the local lines companies as they consider future augmentation of their networks, to the wider local community, and landowners that will be affected by the realignment of the transmission lines.<sup>74</sup> We agree that these are benefits that can be considered as part of the assessment of the amendment application.
- D13 As part of its investigations for a new transmission line to connect the existing Benmore Islington 220 kV transmission line to a proposed switching station at Orari Transpower commissioned Boffa Miskell to undertake investigation of the land in the area and the result of the work was the identification of an area of approximately 40 square km located between the existing BEN-ISL-A transmission line in the north, the Main South Rail line and State Highway 1 in the south, Geraldine in the west, and Rangitata in the east.<sup>75</sup>
- D14 Although Transpower is no longer recommending a one switching station option for USI Stage 2, the report covers the area where the existing Orari land owned by

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<sup>73</sup> Upper South Island reliability Stage 1 application for amendment to the approved major capex project outputs and increase in major capex allowance (August 2014), section 5.1.3

<sup>74</sup> Upper South Island reliability Stage 1 application for amendment to the approved major capex project outputs and increase in major capex allowance (August 2014), section 5.1.4

<sup>75</sup> Transpower "USI Stage 1 amendment application - Q005". Further details on the land use changes at the proposed sites



Transpower and the general area where the Rangitata switching station would likely be located.

D15 In its amendment application Transpower states that<sup>76</sup>:

“The land use in the area of the proposed Orari and Rangitata switching station has changed and is continuing to change from mainly extensive unirrigated pastoral and cropping farming, to intensive dairy farming supported by irrigation. Much of this irrigation is supplied by the large Rangitata South Irrigation scheme covering 16,000 ha - the first stage of which were commissioned in October 2013. Centre-pivot irrigators and on-farm irrigation storage ponds are becoming a significant feature of the area. Neither activity is conducive to the construction of high voltage switching stations or power lines.”

D16 While we do not disagree with the statements on the change in land use, the statement is a general comment on the 40 square km area and it does not appear to take into account the fact that:

D16.1 the switching stations are in relatively specific areas and the Orari is already owned by Transpower;

D16.2 the switching stations will be close to existing 220 kV transmission lines through the area; and

D16.3 the presence of the existing 220 kV transmission lines restricts the installation or use of pivot irrigators.

D17 The proposed location of the northern site at Rangitata is directly below two existing transmission lines so it is unlikely that this would be affected by the installation of pivot irrigators, and there is already an irrigation pond in the vicinity. At Orari the switching station will be on land owned by Transpower so there are no land use change risks alterations to the existing lines will tend to be in the relatively narrow land areas between the existing transmission lines and the Transpower owned land so again pivot irrigators will be unlikely.

D18 We do accept that smaller scale irrigation schemes and irrigation ponds are possible on the Rangitata site and transmission line easements and there would be costs to remove or relocate them if they were constructed.

D19 In the supplementary information it supplied, Transpower has discussed the potential cost of removal or relocation of structures and amenities from sites or transmission line easements.<sup>77</sup> Transpower has provided a reasonably

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<sup>76</sup> Upper South Island reliability Stage 1 Application for amendment to the approved major capex project outputs and increase in major capex allowance (August 2014), Section 3.3.3.1

<sup>77</sup> Transpower “USI Stage 1 amendment application - Q004”. Further details on the land use changes at the proposed sites

comprehensive list of items that it has had to remove or relocate for other projects and the indicative costs for undertaking the work. It is difficult to forecast what the avoided costs would actually be, as the construction of any structures or amenities is controlled by the land owner.

- D20 Securing the Rangitata site and easements for transmission line alterations will restrict construction of structures and amenities, and avoid what could be costly exercise to remove or relocate at a later date. It is difficult to forecast what the avoided costs would actually be, as the construction of any structures or amenities is controlled by the land owner.
- D21 Although Transpower has not provided a forecast of the potential financial exposure for relocating structures and amenities, we consider that the risks articulated by Transpower are reasonable, and overall Transpower has provided sufficient justification.
- D22 Transpower has discussed the potential increases in the land values due to irrigation and dairying. Transpower has indicated that one of the risks is that there is a trend of increasing land value, with increases over and above inflation. Transpower has forecast rises from a current value of \$47k per hectare to \$70k per hectare in 2023.<sup>78</sup>
- D23 This only affects the Rangitata site and any easements for line alterations as Transpower already owns the site at Orari. Calculating the net present value of \$47k per hectare in 2014 and \$70 k per hectare in 2023 indicates that there is little financial benefit of bringing forward the purchase just based on a land value increase point of view. While we consider that the increase is speculative, we included the values in the scenario analysis we undertook.
- D24 As part of our review we have modelled a number of scenarios and compared the net present values and also looked at the qualitative benefits. We have used the information that Transpower supplied on the potential risks and associated costs and we have and looked potential cost increases for four scenarios.
- D24.1 Option 1: Secure designations and property rights early.
- D24.2 Option 2: Secure designations and property rights in 2020 as part of construction project need date of 2022.
- D24.3 Option 3: Secure designations and property rights in 2024 as part of construction project need date of 2026.
- D24.4 Option 4: Secure designations and property rights in 2027 as part of construction project need date of 2029.

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<sup>78</sup> Transpower “USI Stage 1 amendment application - Q004”. Further details on the land use changes at the proposed sites

- D25 When developing the costs for each option we increased a number of the risk costs over time to reflect the increase in risk and also included the accelerated land cost stated by Transpower assuming that it would continue at a similar rate out into the future. The analysis was undertaken on the expected costs, and the net present values are brought back to a 2014/2015 base. Using option one as the base case, the net present cost of option 2 was only 1% less than option 1 and options 3 and 4 were 18 % and 31% less than option 1 respectively.
- D26 We also undertook a qualitative analysis of four of the benefits for each option:
- D26.1 certainty of the forecast cost for Stage 2;
  - D26.2 certainty of transmission development for landowners;
  - D26.3 establishing a more accurate need date; and
  - D26.4 the probability that the project would be delivered on time.
- D27 The benefits were rated on a scaled of 1 to 10 and were also weighted. The results of this analysis showed the qualitative benefits for option 1 were significantly higher than those for the other three options.
- D28 Looking at the results of the financial and qualitative analysis together we consider that option 1 has a higher overall benefit than the other three options.

### Breakdown of the additional expenditure requested

D29 The breakdown in the expenditure is shown in Table D1.<sup>79</sup> The expenditure is lower than that shown in the USI Stage 1 amendment application because Transpower have reviewed the original estimates, and have reduced the forecast expenditure.

**Table D1: Proposed expenditure**

		Revised expenditure 18 Nov 2014		Changes from amendment application	
		P50	P90	P50	P90
Existing Outputs	Bus Coupler and Load Monitoring	\$2,140,000	\$2,250,000	-\$410,000	-\$600,000
	Orari Design and Preliminaries	\$360,000	\$360,000	\$0	\$0
	Investigation	\$370,000	\$380,000	\$10,000	-\$20,000
Additional outputs	Substation Planning	\$130,000	\$150,000	\$0	\$0
	Lines Planning	\$490,000	\$510,000	\$0	\$0
	Designations	\$940,000	\$1,210,000	\$0	\$0
	Existing Property	\$730,000	\$940,000	-\$750,000	-\$540,000
	New Property and Easements	\$600,000	\$900,000	\$0	\$0
	Project Management and Site Investigations	\$230,000	\$350,000	-\$160,000	-\$70,000
	Total in 2014/15 prices	\$5,990,000	\$7,050,000		
Inflation	\$100,000	\$180,000	-\$10,000	-\$10,000	
Financing costs	\$480,000	\$760,000	\$80,000	\$80,000	
Total in 2018/19 prices	\$6,570,000	\$7,990,000			
Less Approved MCA	\$4,510,000	\$4,990,000			
Proposed increase to MCA	\$2,060,000	\$3,000,000	\$1,240,000	-\$1,150,000	

D30 We have reviewed the costs proposed by Transpower in accordance with the Capex IM, Schedule C3. We consider that the costs, and the CPI and IDC assumptions are reasonable considering the scope of work that is proposed.

### Minimising risk and costs to consumers

D31 As noted above, separating out the designations and property rights from the construction reduces the cost uncertainty and efficiencies for the Stage 2 project caused by construction delays. Separating the two activities also reduces the risk of

<sup>79</sup> This material is drawn from Transpower's request to revise its application for amendment in Transpower New Zealand Limited "Revision to amendment to the approved major capex project outputs and increase in the major capex allowance for the USI Reliability Stage 1 Project" 18 November 2014. Available on our website <http://www.comcom.govt.nz/regulated-industries/electricity/electricity-transmission/transpower-major-capital-proposal/amending-the-allowance-and-outputs-for-the-upper-south-island-stage-1-project/>.

higher compensation costs and construction acceleration costs having to be paid to secure property rights.

- D32 Obtaining designations and property rights prior to confirmation of the need date will result in consumers funding the investment at an earlier time and this needs to be balanced off against the benefits of securing the land earlier. The annual cost of consumers for the work in the amendment is about \$0.27 million.
- D33 If the switching stations do not go ahead in the future then Transpower would be able to dispose of the sites and the proceeds from the sale of the land would go back to consumers, but the costs associated with the designations and easements would be sunk costs as there would be little or no resale benefits. The expected value of the sunk cost would be about \$2.6 million.
- D34 There is uncertainty around the timing of the USI Stage 2. As discussed earlier the earliest forecast need date is 2022, but the need date could be considerably later than this. To minimise the risk and cost to consumers Transpower should only do the absolute bare minimum design and engineering work required to produce outline drawing environmental assessments etc. that are required to obtain the designations.

#### **The value of the Rangitata and Orari sites to be included in the RAB**

- D35 Transpower can include the cost of strategic property purchases and easements in the regulatory asset base, including the costs associated with the purchasing the property and easements.
- D36 In its USI Stage 1 amendment application Transpower proposed transferring the full value of its parcel of land that it owns at Orari into the regulatory asset base. We did not consider that the full site is required long term and it is not beneficial to consumers to transfer the full value of the Transpower owned land at Orari into the regulatory asset base. We considered that there needs to be enough land retained for the switching station plus land for access to the switching station, a reasonable margin for future expansion, and a buffer for noise mitigation.
- D37 On this basis, we asked Transpower to explain why it needed the complete site when it was securing designations and property rights as part of the amended output. Transpower have subsequently revised the amended output and the value for the Orari land to be transferred into the regulatory asset base. The expected expenditure for the Orari site has reduced from \$1.48 million to \$0.73 million.
- D38 The land purchased for the Rangitata will be specifically sized for the new switching station site to secure future transmission service delivery. Based on the information provided by Transpower in the amendment application and supplementary information, Transpower intends purchasing only enough land for a switching station at Rangitata. On this basis the full cost of the land purchase should be allowed to be included in the regulatory asset base.

- D39 In supplementary information supplied by Transpower it states that “we are concerned that the Commission will set a precedent where a strategic land purchase must remain on our shareholder account until such time as design is completed to a level that optimises the land footprint placed on the regulatory asset base. There will be instances where detailed design cannot be completed to this level many years in advance of build as a variety of drivers may change in the meantime”.
- D40 We not consider that any precedent is being set around timing of when the land value can enter the regulatory asset base. The Orari land is a special case where the switching station footprint is significantly less than the total land area owned by Transpower. As Transpower is proposing to obtain designations as part of the amendment, Transpower will have to produce an outline plan for the Orari switching station and line deviations which locks in the precise footprints so there is no reason why Transpower cannot dispose of the excess land.

### **Conclusion**

- D41 In Attachment C it we concluded that overall it was likely that the transmission system supplying the USI will require augmentation in the future, although the timing is uncertain.
- D42 Consideration of both the quantified and unquantified benefits favours options with two switching stations, at Rangitata and Orari.
- D43 Approving this amendment affects the balance between options for USI Stage 2, as the solution will be biased toward the two switching station option, but it does not rule out the other options for USI Stage 2.
- D44 We have reviewed the outputs and costs provided by Transpower and as a result Transpower have revised the outputs and expenditure downwards. We are now satisfied with the revised outputs and expenditure provided by Transpower.
- D45 Although there is uncertainty around the need date for the switching stations, considering both the quantified and unquantified benefits, our conclusion is that it is beneficial to consumers for Transpower to secure the designations and property rights by the end of 2018 as proposed by Transpower in its application.