BUNNYTHORPE–HAYWARDS CONDUCTOR RELACEMENT
Major Capex Proposal

Attachment A- Meeting the Requirements of the Transpower Capital Expenditure Input Methodology

Keeping the energy flowing

TRANSPOWER

Transpower New Zealand Limited The National Grid

1| Executive Summary

1.1 Proposal

Transpower New Zealand Limited (**Transpower**) is submitting the Bunnythorpe–Haywards Conductor Replacement Proposal (the **Proposed Investment**) to the Commerce Commission for approval. The Proposed Investment is for:

- Procuring, installing and commissioning Zebra ACSR conductor on the Bunnythorpe–Haywards A and B lines and decommissioning the existing conductor
- Works on the towers to enable the Zebra conductor to be operated at 75°C
- Procuring, constructing and commissioning substation facilities to facilitate the above connections and equipment
- Obtaining property rights and environmental approvals required for these works
- Installing alternative conductor technologies on a short section to evaluate their performance in coastal climatic conditions

The Proposed Investment is a "major capex proposal" as defined in Part 1 of the Transpower Capital Expenditure Input Methodology Determination, dated 31 January 2012 (the **Capex IM**). Transpower is applying to the Commission for approval of the Proposed Investment, so that Transpower can recover the costs relating to the project under the Individual Price-Quality Path Determination applicable to Transpower.[1]

1.2 Capex IM requirements

The Capex IM was issued by the Commerce Commission on 31 January 2012. The Capex IM contains a number of requirements Transpower must comply with in preparing a major capex proposal, and requirements the Commission must follow in determining whether to approve the major capex proposal.

In particular, the Commission may only decide to approve the proposed investment after:[2]

- it has consulted as required by the Capex IM; and
- has evaluated the proposal in accordance with Part 6 of the Capex IM, in particular:
    - whether what is proposed is consistent with the Capex IM, and the Commerce Act (Transpower Input Methodologies) Determination 2010);
    - the extent to which the proposal will promote the purpose of Part 4 of the Commerce Act 1986;[3]
    - whether the data, analysis, and assumptions underpinning what is proposed are fit for the purpose of the Commission exercising its powers under Part 4 of the Act, including consideration as to the accuracy and reliability of data and the reasonableness of assumptions and other matters of judgment;[4]
    - whether the proposed investment satisfies the Investment Test;[5]

[1] Clause 1.1.5(2) of Part 1 of the Capex IM (definition of 'proposed investment') and clause 3.3.2(1) of the Capex IM.
[2] Clause 3.3.3(3) of the Capex IM.
[3] Clause 6.1.1(2)(b) of the Capex IM.
[4] Clause C1(2)(a) and (b) of Schedule C of the Capex IM.
[5] Clause C1(2)(c) of Schedule C of the Capex IM.

- o having regard to the evaluation criteria in respect of specified approval components of the proposed investment, including major capex allowance, approval expiry date and major capex project outputs.

The Commission is required to publish its decision on whether it will approve or reject the proposal as soon as is reasonably practicable after making it.[6]

The purpose of this document is to satisfy the Commission that it can approve the proposal because:

- the agreed consultation process has been followed, including the agreed approach to ensure appropriate consideration of non-transmission solutions to meet the investment need;
- the proposed investment promotes the purpose of Part 4 of the Commerce Act 1986 and is consistent with the input methodologies;
- the data, analysis and assumptions underpinning the proposed investment are fit for the purpose of the Commission exercising its powers under Part 4 of the Commerce Act;
- the proposed investment satisfies the investment test; and
- the other evaluation criteria listed in Schedule C are satisfied.

[6] Clause 3.3.3(6) of the Capex IM.

TABLE OF CONTENTS

2| Introduction

This proposal (the **Proposed Investment**) comprises the reconductoring of transmission lines between Bunnythorpe and Haywards substations and associated tower and foundation works. The Proposed Investment is a "major capex project" as defined in part 1 of the Capex IM.

Clause 3.3.3(3) of the Capex IM provides that the Commission may only decide to approve the Proposed Investment after:

- consulting in any manner specified in clause 8.1.1 of the Capex IM
- evaluating the major capex proposal (and any further information that the Commission has requested) in accordance with Part 6 of the IM.

2.1 Proposal submitted as a major capex proposal

A "major capex proposal" is defined as a document identifying a "proposed investment" for which Commission approval is sought.[7] A "proposed investment" means a "major capex project" that Transpower seeks to have approved in terms of subclause 3.3.2(1) of the Capex IM.[8] A "major capex project" is defined as follows:[9]

"major capex project" *means a particular* ***project*** *of* ***major capex****-*

(a) undertaken to address a specific ***investment need****;*

(b) that is either or both of the following things:

(i) a ***transmission investment****, including a variant on another* ***transmission investment*** *by virtue of a non-negligible change in the* ***commissioning date assumption****; or*

(ii) a ***non-transmission solution****, including a variant on another* ***non-transmission solution*** *by virtue of a non-negligible change in the* ***completion date assumption****;*

Major capex is defined as follows: [10]

"major capex" *means* ***capital expenditure*** *that-*

(a) is incurred to:

(i) meet the ***grid reliability standards****; or*

(ii) provide a ***net electricity market benefit****;*

(b) is not incurred in relation to any of the following things:

(i) ***asset replacement****;*

(ii) ***asset refurbishment****;*

(iii) ***business support****; and*

(iv) ***information system and technology assets****; and*

(c) is forecast to be-

(i) included in a ***project*** *whose aggregate forecast* ***capital expenditure*** *exceeds the* ***base capex project threshold****;*

(ii) included in a ***programme*** *whose aggregate forecast* ***capital expenditure*** *exceeds the* ***base capex programme threshold****; or*

[7] Clause 1.1.5(2) of Part 1 of the Capex IM.
[8] Clause 1.1.5(2) of Part 1 of the Capex IM.
[9] Clause 1.1.5(2) of Part 1 of the Capex IM.
[10] Clause 1.1.5(2) of Part 1 of the Capex IM.

*(iii) a **non-transmission solution**;*

Our condition monitoring programme has identified the need to replace the conductors. Both lines are susceptible to accelerated deterioration due to harsh coastal climatic conditions present along most of the route.

Our planning studies have identified a need for additional capacity into the future. In dry year periods when South Island hydro generation is limited, there is benefit in providing some additional capacity to enable more electricity generated in the North Island to supply the lower part of the North Island and South Island. In this manner the Proposed Investment is capital expenditure to meet the Grid Reliability Standards.

The Proposed Investment is a particular project of major capex undertaken to address a specific investment need[11]. Major capex is defined, among other things, as capital expenditure which is forecast to be included in a programme whose aggregate forecast capital expenditure exceeds the base capex programme threshold[12]. This proposal has an aggregate forecast expenditure that exceeds the base capex programme threshold. Accordingly, we consider the Proposed Investment is appropriately categorised as a major capex proposal.

2.2 Overview of Major Capex Allowance and Major Capex Outputs

We expect the project to cost $151 million once commissioned. However, we are seeking Commerce Commission approval to recover the full costs associated with the Proposed Investment, up to a total amount of $161 million. This amount includes an allowance for uncertainties in the project costs and is the proposed Major Capex Allowance for the Proposed Investment.

2.3 Timing of proposal and approval expiry

We propose starting this work in 2013 and completing it in 2020.

We consider the commissioning date assumptions are reasonable having regard to the nature and complexity of, and need for, the works comprising the Proposed Investment.

In addition, we consider that an appropriate approval expiry date for this Proposal would be the last day of 2025.

[11] Capex IM, Part 1 definition of major capex project
[12] Capex IM, Part 1 definition of major capex

3| Capex IM requirements

As discussed in Section 2.1 of this document, the Proposed Investment is a major capex proposal that the Commission is required to consider and assess in accordance with the Capex IM.

This section describes the requirements under the Capex IM that Transpower must comply with when submitting a major capex proposal, and the evaluation process the Commission must follow in determining whether to approve the major capex proposal.

3.1 Commission's approval process

The Commission may only decide to approve the Proposed Investment after:[13]

- consulting in the manner specified in clause 8.1.1 of the Capex IM; and
- evaluating, in accordance with Part 6 of the Capex IM (including by reference to the Investment Test), the major capex proposal and any further information that was requested.

In addition:

- a major capex proposal must comply with the applicable information content requirements, including those set out in Schedule G of the Capex IM, and contain the certifications specified in clause 9.2.1 (being the Chief Executive Officer certification for major capex proposals); and
- the Commission may reject the major capex proposal where Transpower has not complied with clause 3.3.1 of the Capex IM (being the obligations relating to the consultation programme, the approach ensuring appropriate consideration of non-transmission solutions and approval time frames).[14]

3.2 Commission's Criteria for evaluating the Major Capex Proposal

The criteria for evaluating the major capex proposal are contained in Part 6 and Schedule C of the IM. In making its evaluation the Commission is entitled to take into account the views of any person it has consulted pursuant to clause 8.1.1 of the Capex IM and any other information that it considers relevant.[15] The Commission may also engage any appropriately qualified person to assist the Commission with its evaluation.[16] The criteria that the Commission will use in its evaluation are:[17]

- whether the proposal is consistent with the input methodology and, where relevant, the Commerce Act (Transpower Input Methodologies) Determination 2010;
- the extent to which the proposal will promote the purpose of Part 4 of the Act; and
- whether the data, analysis, and assumptions underpinning the proposal are fit for the purpose of the Commission exercising its powers under Part 4 of the Act, including

[13] Clause 3.3.3(3) of the Capex IM.
[14] Clause 3.3.3(4) of the Capex IM.
[15] Clause 6.1.1(1) of the Capex IM.
[16] Clause 6.1.1(1) of the Capex IM.
[17] Clause 6.1.1 and Schedule C of the Capex IM.

consideration as to the accuracy and reliability of data and the reasonableness of assumptions and other matters of judgement.

In addition:

- the Commission may not approve the Proposed Investment where it is not satisfied with one or more of the following proposed investment components:[18]
-
    - **major capex allowance;**
    - **maximum recoverable costs;**
    - **recovery scheme;**
    - **approved major capex project outputs;**
    - **approval expiry date;**
    - **P50;**
    - **commissioning date assumption; and**
    - **completion date assumption.**

- the Commission may not approve the Proposed Investment where, having evaluated the above investment components, it is not satisfied:

    - with the Proposed Investment in whole or in part,[19]
    - that the Proposed Investment satisfies the Investment Test.[20]

- the Commission must have regard to at least one of the following factors when evaluating the major capex proposal:[21]

    - whether the **proposed investment** and **investment options** reflect **good electricity industry practice**, are technically feasible, are possible in terms of Resource Management Act 1991 and other regulatory or property access requirements, and can be integrated into system and market operations;
    - whether the estimated time for the various project stages is reasonable in light of the proposed commissioning or **completion date**;
    - whether the **key assumptions** around outage planning are reasonable;
    - the extent to which Transpower has had regard to the views of interested persons as part of its consultation programme for **non-transmission solutions**; and
    - the impact of the **sensitivity analysis** on **electricity market benefit** or **cost elements** of the **proposed investment** and **investment options**.

The Capex IM also lists a number of evaluation techniques that the Commission may employ when undertaking the evaluations described above, including analysis of powerflow and dynamics in the grid, critiques of conceptual designs to derive cost and time estimates, cost benefit analysis of the Proposed Investment and investment options, critique of market development scenarios, unit rate benchmarking and any other technique or approach the Commission considers appropriate in the circumstances.[22]

[18] C1(2)(a) of Schedule C of Capex IM; components found in C1(1) of Schedule C of Capex IM. Note that the more specific criteria that are applied to each of the proposal criteria are discussed under the headings of the individual proposal criteria below.
[19] C1(2)(b) of Schedule C of Capex IM.
[20] C1(2)(c) of Schedule C of Capex IM. See discussion of the Investment Test at Section 3.3 of this document.
[21] C2 of Schedule C, General evaluation of major capex proposal.
[22] C6 of Schedule C of the Capex IM.

3.3 The Investment Test

The Investment Test is set out in Schedule D of the Capex IM, and is reproduced here for convenience. The definitions used in the Investment Test have been included in the Appendix to this Major Capex Proposal.

D1 Major capex - investment test

(1) The investment test is satisfied in respect of a **proposed investment** if the **proposed investment** is an **investment option** that-

(a) is sufficiently robust under **sensitivity analysis**;

(b) has a positive **expected net electricity market benefit** unless it is designed to meet an **investment need** the satisfaction of which is necessary to meet the deterministic limb of the **grid reliability standards**; and

(c) has-

(i) the highest **expected net electricity market benefit**, where only quantified **electricity market benefit or cost elements** are taken into account; or

(ii) the highest **expected net electricity market benefit** including a qualitative assessment to take into account the contribution of associated unquantified **electricity market benefit or cost elements**, if the **proposed investment** has a similar **expected net electricity market benefit** to the **investment option** with the highest **expected net electricity market benefit** where only quantified **electricity market benefit or cost elements** are taken into account.

(2) For the purpose of subclause (1)(c)(ii)-

(a) a similar **expected net electricity market benefit** is one where the difference in quantum, subject to subclause (3), is 10% or less of the aggregate **project costs** of the **investment option** to which the **proposed investment** is compared; and

(b) an **electricity market benefit or cost element** may be treated as unquantified where-

(i) the cost of calculating its quantum in accordance with clause D7(4) is likely to be disproportionately large relative to the quantum; or

(ii) its expected value cannot be calculated in accordance with clause D7(4) with an appropriate level of certainty due to the extent of uncertainties in underlying assumptions or calculation approaches.

(3) For the purpose of subclause (2)(a), the **Commission** may, at its discretion, adopt such an alternative percentage to 10% as proposed by **Transpower** in respect of a **proposed investment**.

Section 5 of this document describes how the Proposed Investment satisfies the Investment Test.

3.4 Proposed Investment Components

Section 6 of this document sets out the evaluation of each of the relevant approval components of the Proposed Investment.

3.5 Other Part 6 evaluation criteria

The Commission must consider certain other evaluation criteria under Schedule C of the Capex IM. We comment briefly on these criteria below.

3.5.1 Consistency with the input methodology

In our view, this major capex proposal is consistent with the Capex IM and the Commerce Act (Transpower Input Methodologies) Determination 2010.[23]

3.5.2 Promoting the purpose of Part 4 of the Commerce Act

In our view, the Proposed Investment promotes the purpose of Part 4 of the Commerce Act in being an investment consistent the Capex IM and the Commerce Act (Transpower Input Methodologies) Determination 2010. We are not aware of any specific reason why the Proposed Investment would not promote the purpose of Part 4 of the Commerce Act.

3.5.3 The suitability of the data, analysis and assumptions underpinning the proposal

In our view, the data, analysis, and assumptions underpinning this major capex proposal are fit for the purpose of the Commission exercising its powers under Part 4 of the Act. In particular, we have:

- applied evaluation techniques and cost/benefit calculation methodologies that are well established and understood by ourselves, the Commission and stakeholders with which we have consulted on the Bunnythorpe Haywards Conductor Replacement Proposal;

- consulted with interested stakeholders on investment need, investment options, assessment of electricity market benefit or cost elements and project costs, and the assumptions underpinning the major capex proposal as part of following the agreed consultation process.

3.6 Requirements applying to Transpower

3.6.1 Consultation requirements

Set out in Section 4 of this document is a discussion of how we have complied with clause 3.3.1 of the Capex IM (being the obligations relating to the consultation programme, the approach ensuring appropriate consideration of non-transmission solutions and approval time frames).

3.6.2 Information requirements applying to Transpower

The information requirements relating to major capex proposals are set out in clause 7.4.1 of the Capex IM and are as follows:

- major capex proposals must comply with Schedule G of the Capex IM and contain the chief executive officer certificates specified in clause 9.2.1 of the Capex IM[24];
- the number of investment options contained in a major capex proposal must be appropriate given the magnitude of the estimated capital expenditure and the complexity of the investment need associated with the proposed investment;[25]

[23] Clause 6.1.1(2)(a) of the Capex IM.
[24] See 4.2.7 Certification requirements which sets out the requirements contained in clause 9.2.1 of the Capex IM. Note that clause 7.4.1(4) of the Capex IM provides that one physical document may contain more than one of the certifications specified in clause 9.2.1 of the Capex IM.

- with respect to each investment option described in a major capex proposal, the-
    - specificity of information; and
    - rigour and comprehensiveness of the analysis,

  must be commensurate with the estimated capital expenditure and complexity of that option.[26]

Section 7 of this document comprises a table setting out the specific information requirements of Schedule G of the Capex IM and cross references to where the required information can be found in this document. We believe that the level of analysis and specificity of information provided in this proposal is commensurate with the estimate capital expenditure and complexity of the proposed option.

3.6.3 Certification requirements

Clause 9.2.1 of the Capex IM specifies the matters that the Chief Executive Officer must certify. Section 8 of this document sets out the required certifications.

[25] Clause 7.4.1(2) of the Capex IM.
[26] Clause 7.4.1(3) of the Capex IM.

4| Consultation and approach to consideration of non-transmission solutions

4.1 Notification

In accordance with clause 3.3.1 of the Capex IM, we notified the Commission in August 2013 of our intention to plan a major capex project that we considered may become a proposed investment.

4.2 Agreed consultation programme, approach to consideration of non-transmission solutions and approval timeframes

On 6 September 2013, we agreed with the Commission:[27]

- a consultation programme for a transmission investment or non-transmission solution, which provided in accordance with clause 8.1.3(1)(a) of the Capex IM for consultation by Transpower on such matters specified in Schedule I of the Capex IM as are applicable;
- an approach to ensure appropriate consideration of non-transmission solutions to meet the investment need, which provided in accordance with clause 8.1.3(1)(b) of the Capex IM for our consultation on such matters specified in Schedule I Division 2 of the Capex IM as are applicable; and
- approval timeframes.

The Commission agreed that we may withdraw the Bunnythorpe-Haywards lines A and B grid upgrade plan submitted under the Electricity Governance Rules and resubmit this investment proposal as a major capex proposal under the Capex IM. [28]

We also agreed with the Commission that we do not need to repeat the long list consultation, under the provisions of the Capex IM clause 8.1.3(2)(a)(v). Our long list consultation of October 2010 meets the requirements of the long list of consultation as per clauses I1 and I2 of Schedule I in the Capex IM [29].

4.3 Consultation

We have consulted with interested persons in accordance with the consultation programme.[30]

Our condition monitoring programme has identified the need to replace the conductors. We began investigation into replacing the conductor in 2010.

We have engaged with industry stakeholders during this investigation.

As a project driven by the need to replace conductor that is near the end of life, our engagement has also been with those people most affected by the work – landowners and key communities near the line. We sought input in August 2010 to verify the key assumptions to be used in our investigation and used these key assumptions to define the need – our long

[27] Clause 3.3.1(2) of the Capex IM.
[28] Letter to Siobhan Procter (Transpower) from Hazet Adam (Commerce Commission) 6 September 2013
[29] Letter to Siobhan Procter (Transpower) from Hazet Adam (Commerce Commission) 6 September 2013
[30] Clause 3.3.1(7) of the Capex IM.

list consultation. We also released a Request for Information (RFI) for this project in November 2010. From this RFI, five submissions were received by the closing date:

- Major Electricity Users Group
- Contact Energy
- Energy Managers Association of New Zealand
- Genesis Energy
- Powerco

Most submitters supported the need for the investigation, and the approach and assumptions being used. One submitter considered that a higher weighting should be given to generation that has not yet been committed. Another submitter questioned the demand forecast being used and the sufficiency of that for the investment envisaged. This submitter and one other also suggested more work was required on non-transmission alternatives – particularly given the deferral value of the required investment.

Following receipt of that feedback we:

- considered and incorporated the feedback where appropriate
- further developed the short list options
- developed the economic approach
- analysed the results
- published a draft investment proposal for consultation
- received feedback on the draft proposal; and
- prepared and submitted a Major Capex Proposal.

In September 2013 we published our short list consultation, including a draft investment proposal.

Three submissions were received. There was support for the draft proposal from all submitters, but a common theme of the generators' submissions was whether the proposed option provided a sufficient increase in capacity to future proof for growth.

Our studies showed that, using the 2010 SoO scenarios, our proposal provides adequate capacity for the future by providing an additional 47 MVA capacity over and above the existing conductor and find there are negligible constraints in the future with the proposed Zebra at 75°C conductor. Full details can be found in Attachment F.

See table 4-1 for a summary of communications to date.

4.4 Consideration of non-transmission solutions

We have followed the approach agreed with the Commission for consideration of non-transmission solutions.[31]

[31] Clause 3.3.1(7) of the Capex IM.

We have agreed with the Commission that non transmission solutions are not viable options for this investment and therefore we do not need to consider onn-transmission solutions, in accordance with clause 8.1.3(2)(b) of the Capex IM.

Table 4-1: Summary of communications to date

Date	Activity
August/September 2010	Letter and introductory factsheet detailing the need for the investigation, the types of options being considered, and next steps. Sent to landowners, MPs, local council representatives. Project set up on Grid New Zealand.
November 2010	Issued RFI to industry participants
March 2011	Meetings with Mayor/CEO of Kapiti Coast District Council (KCDC) and offer to brief others through letter. Follow up letter to KCDC. Briefing of Federated Farmers.
April 2011	Second factsheet to landowners and community stakeholders reinforcing the need for the project and also setting out three options being considered, the process by which an option is chosen and next steps. Workshop with council officers of relevant councils (5 April).
5 May 2011	Information day at Paraparaumu and Waikanae libraries setting out the process to date, the process ahead and the options on the table. Kapiti area chosen due to the potential impact of construction work on traffic and land use.
May-September	Continued briefings of key stakeholders – affected councils, MPs, community boards, NZTA.
October 2011	Issued consultation paper on our analysis and draft proposal.
November 2011	Submissions closed and summary published.
December 2011	Grid Upgrade Plan submitted to Commerce Commission, including an Attachment showing how we have had regard to submissions.
March 2012	Agreed with the Commission to undertake further work to reduce uncertainty in the cost estimates.
April 2012/ August 2013	Detailed work undertaken to reduce uncertainty in costs of reconductoring options.
September 2013	Publish revised investment proposal for consultation, using the Commerce Commission's Capex IM framework rather than the former Electricity Commission regime.
October 2013	Submissions closed
November 2013	Submit MCP
November 2013	Publish Summary of Submissions with MCP

5| Satisfying the Investment Test

5.1 Application of the Investment Test

Schedule D of the Capex IM sets out the criteria that the Proposed Investment must meet in order to satisfy the investment test (IT). For the purposes of this Proposed Investment, the Investment Test is satisfied if the Proposed Investment is an investment option that[32] (clauses relevant to this case in bold):

> ***(a) is sufficiently robust under sensitivity analysis;***
>
> ***(b) has a positive expected net electricity market benefit*** *unless it is designed to meet an investment need the satisfaction of which is necessary to meet the deterministic limb of the grid reliability standards;* ***and***
>
> ***(c) has***
>
> *(i)* ***the highest expected net electricity market benefit, where only quantified electricity market benefit or cost elements are taken into account;*** *or*
>
> ***(ii) the highest expected net electricity market benefit including a qualitative assessment to take into account the contribution of associated unquantified electricity market benefit or cost elements, if the proposed investment has a similar expected net electricity market benefit to the investment option with the highest expected net electricity market benefit where only quantified electricity market benefit or cost elements are taken into account.***

We consider that this document demonstrates that the Proposed Investment satisfies the indicated criteria and therefore meets the Investment Test.

5.2 Investment need

Our condition monitoring programme has identified the need to replace the conductors on the Bunnythorpe-Haywards A and B lines. Both lines are susceptible to accelerated deterioration due to harsh coastal climatic conditions present along most of the route. In 2005, a conductor on one line failed due to corrosion. Following this failure, we carried out targeted repair work on the worst affected sections in conjunction with a tactical upgrade to optimise the capacity of the existing conductor. This work was intended to defer the need for total conductor replacement by approximately ten years.

Recent surveys confirm the conductor must be replaced with all work complete by 2020. To go beyond this date would be an unacceptable public safety exposure.

Both lines are an important part of the backbone grid transferring power generated from renewable sources in the South Island to meet the need for electricity in the North Island. On occasions, they also supply power into Wellington and the South Island. From 2015, the two lines will serve a new connection at Paraparaumu to supply the Kapiti district. They will be

[32] Schedule D, Clause D1 (1) of the Capex IM.

required well into the future and the work we do now, which includes tower and foundation work as well as conductor replacement, will ensure they meet the Grid Reliability Standards for the expected life of the new conductor. Because the key driver of the need is condition, a non-transmission solution is not appropriate to meet the need (see section 4.4).

As the Proposed Investment is an investment option that is designed to meet an investment need on the non-core grid[33] it is necessary to meet the economic limb of the grid reliability standards. Accordingly, the Proposed Investment is required to have a positive net electricity market benefit in order to satisfy the Investment Test.

5.3 Calculation period

Applying the Investment Test involves assessing the electricity market benefit of various investment options, being the cost and benefits received or incurred by consumers in respect of the investment option during the calculation period, which is defined as the:[34]

> "20 year period commencing on the **commissioning date** of the last asset to be delivered by the **proposed investment**, save that where significant **electricity market benefit or cost elements** and **project costs** are expected to-
>
> (a) cease to arise or be incurred during that period; or
>
> (b) arise or be incurred thereafter,
>
> it means the period commencing on the **commissioning date** of the last asset delivered by the **proposed investment** and terminating on the last date that significant **electricity market benefit or cost elements** and **project costs** are expected to arise or be incurred;"

The conductor replacement will be fully commissioned in 2020. We have extended our analysis out to 2050 because transmission lines have an expected life of 30 or more years and it is expected that there will be significant benefits arising from any conductor replacement beyond 20 years.

5.4 Demand and generation scenarios

A demand and generation scenario is defined in clause D4 of Schedule D of the Capex IM as follows:

(1) Demand and generation scenario means-

(a) until a document described in paragraph (b) of this clause is published,-

(i) scenario specified as 'market development scenario' in the statement of opportunities published by the Electricity Commission in 2010; or

(ii) reasonable variation on a scenario referred to in sub-paragraph (i), that reasonably has regard to the views of interested persons;

(b) description of a hypothetical future situation relating to forecast electricity demand and generation published by the Ministry of Economic Development (or other agency which subsequently assumes the responsibility) for the purpose of the preparation or evaluation of major capex proposals; or

[33] Electricity Industry Participation Code 2010, Schedule 12.2, clause 2(2)(b).
[34] Clause 1.1.5(2) of the Capex IM

(c) reasonable variation on a description referred to in paragraph (b) that reasonably has regard to the views of interested persons.

To date there has been no document described in paragraph (b) published so we are required to use the demand and generation scenarios published as the MDS in the Electricity Commission 2010 Statement of Opportunities[35], or reasonable variations of them.

As described in the Proposal and in Attachment E, we have updated the 2010 MDS, to ensure the demand forecasts reflects our own 2013 Annual Planning Report forecast. New generation includes recently commissioned or committed generation projects.

We believe our modified MDS are a reasonable update on the original 2010 MDS and reasonably have regard to the views of interested persons. We found support for our approach through the draft proposal consultation.

5.5 Value of unserved energy

The Capex IM defines "value of expected unserved energy as follows":

value of expected unserved energy means-

(a) the appropriate cost per megawatt hour specified in or under clause 4 of Schedule 12.2 to the **code**; or

(b) another appropriate cost per megawatt hour, of expected unserved energy (as 'expected unserved energy' is defined in the **code)**.

The value of unserved energy is not applicable in this investment proposal.

5.6 Discount rate

In order to quantify the costs and benefits of the proposal, the electricity market benefit or cost element needs to be adjusted using the discount rate.

The discount rate is either:[36]

(a) a standard rate of 7%; or

(b) a non-standard rate other than 7% which is appropriate in the circumstances and subject to consultation under clause I3.

Our Investment Test analysis has been undertaken using the standard rate of 7%.

5.7 Analysis of Investment options

In order to assess whether the Proposed Investment satisfies the IT, the proposal must be measured against other investment options, so that it can be determined that the Proposed Investment has the highest expected net electricity market benefit.

Investment option is defined in Clause D2 of Schedule D of the Capex IM, as follows:

Investment option means a **major capex project-**

(a) other than one proposed to be fully funded under a **new investment contract**;

(b) designed to meet a particular **investment need**;

[35] http://www.ea.govt.nz/industry/ec-archive/soo/2010-soo/
[36] Clause D7(3) Schedule D of the Capex IM.

(c) that is technically feasible; and

(d) that is different to another **major capex project** designed to meet the same **investment need** at least in respect of its proposed **commissioning date** or **completion date** or date for proposed delivery of **major capex project outputs**, as the case may be, which difference must be material.

The following section describes the short-list options we considered in our Investment Test analysis and the derivation of those options from the long list of options.

5.8 The Options

A long list of possible options was developed and consulted on in October 2010[37]. The draft long list of options included:

- Replacing the conductor with the same (or modern equivalent) capacity
- Replace the conductor with one of a higher capacity
- Build a new line
- Duplexing the line
- Partially or wholly undergrounding line sections
- Integrated Operation with HVDC controls
- Non-transmission solutions such as local generation and demand-side options

Submissions to the consultation included:

- Major Electricity Users Group
- Contact Energy
- Energy Managers Association of New Zealand
- Genesis Energy
- Powerco

Most submitters supported the need for the investigation, and the approach and assumptions being used. One submitter considered that a higher weighting should be given to generation that has not yet been committed. Another submitter questioned the demand forecast being used and the sufficiency of that for the investment envisaged. This submitter and one other also suggested more work was required on non-transmission alternatives – particularly given the deferral value of the required investment.

This feedback was incorporated into the long list prior to producing a short list of options. We have included our assessment of the long list to short list process in Attachment C, Options and Costing report, and have summarised the key points below.

The short-list options were generated by ruling out long-list options that did not meet the need, were not feasible for this project or uneconomic – see Table 5-1.

[37] https://www.transpower.co.nz/sites/default/files/plain-page/attachments/REQUES%201_0.pdf

Table 5-1 Short Listing Summary

Long List		Short Listed	Comments
Non Transmission Options	Local Generation	X	The need (based on condition assessment and risk of conductor failure) is for a replacement conductor. As such, this option is not viable.
	Demand-side alternatives	X	Local demand has limited impact on the need for capacity on the BPE-HAY lines. It does not impact on the need for replacing the conductor. As such, this option is not viable.
Transmission Options	Replacing the conductor with the same (or modern equivalent) capacity	✓	This has been included in the short list.
	Replace the conductor with one of a higher capacity	✓	This has been included in the short list.
	Build a new line or duplex existing	X	This option has been discarded based on the cost being higher than other options.In addition it cannot be delivered in the time required
	Partially or wholly undergrounding line sections	X	This option has been discarded based on the cost being higher than other options. In addition it cannot be delivered within the time required
	Integrated Operation with HVDC controls	X	This option has not been included in the short list as the need is to replace the conductor.

A further assessment was then carried out on a range of options for replacing the conductor. Our analysis has shown that the costs of the larger conductor options would be twice as much as the short-listed options since the larger conductor options would effectively require the line to be rebuilt as a new line. They have not been included in the short list. The conductor types considered that fall into this category were Pheasant, Moa, and Chukar (AAAC).

We also considered duplexing the lines (replacing a single conductor with a double conductor). Once again this would result in significant tower reconstruction, putting the cost well above the alternatives in the short list.

New technology conductors were included in our high level assessment of conductor options. These were not included in our long list because of a combination of high losses and an unproven record in a high corrosive marine environment. These conductors have similar characteristics to the existing ACSR conductor type and would require a similar number of tower height increases as the other short-list options. However these conductors have a

higher procurement and installation cost than the short-listed conductors, therefore the use of these conductors was not considered further.

The four cheapest options that met the requirements, along with one to show the benefit of keeping the lines form our short listed options.

The five short-listed development plan options are shown in Table 5-2:

Table 5-2 Short listed options

Long List category	Short List Option
-	Dismantle A & B lines
Replace the conductor keeping the same (or modern equivalent) capacity	Simplex Goat ACSR/AC at 80°C
Replace the conductor keeping the same (or modern equivalent) capacity	Simplex Zebra ACSR/AC at 65°C
Replace the conductor and increase the capacity	Simplex Zebra ACSR/AC at 75°C
Replace the conductor and increase the capacity	Simplex Zebra ACSR/AC at 85°C

The need date for all the conductor replacement options is to have the conductor replacement completed by 2020.

Our economic analysis determines the electricity market benefit or cost elements of each option out to 2050, using the capital costs for each option and the resultant operating and maintenance costs. Detail on these costs and benefits are provided in Attachment E.

The electricity market benefit or cost elements are then discounted to a present value using the discount rate provided for in the Capex IM.

We believe our short list of options is appropriate and meet the requirements to be the investment options required to be evaluated in the Investment Test.

5.9 Assessment of expected net electricity market benefit

The analysis of expected net electricity market benefit where only quantified electricity market benefit or cost elements are taken into account, by MDS, are shown in Table 5-3.

Table 5-3 – Expected net electricity market benefit (present value 2013 $m) relative to Option 2 by MDS

Option	Description	MDS1	MDS2	MDS3	MDS4	MDS5	Relative Expected Net Market Benefit
1	Dismantle lines	-124.4	-74.3	-63.3	-843.5	-3172.4	-855.6
2	Goat at 80°C	0.0	0.0	0.0	0.0	0.0	0.0
3	Zebra at 65°C	17.6	19.7	12.3	18.7	33.7	20.4
4	Zebra at 75°C	15.4	15.7	5.7	20.5	63.8	24.2
5	Zebra at 85°C	9.2	9.7	-0.3	15.7	66.8	20.2

5.10 Assessment of unquantified electricity market benefit or cost elements

The net market benefit of options 3, 4 and 5 are within $4 million of each other. Given the uncertainty in inputs to the Investment Test analysis, these three options are considered equivalent, for all intents and purposes.

The Investment Test recognises this situation and allows the choice of proposal to be made on the basis of other, unquantified benefits. We have considered a range of unquantified benefits to see if they help differentiate between options 3, 4 and 5.

The qualitative benefits for Zebra at 85°C and Zebra at 75°C are the same and both are higher than Zebra at 65°C, hence those options are preferred. We have not been able to differentiate between Zebra at 85°C and Zebra at 75°C using unquantified benefits. However, taking the higher expected net electricity market benefit of Zebra at 75°C into account, we consider that Zebra at 75°C is preferred. Zebra at 75°C strikes a good balance between the level of works required on the circuits, electrical efficiency of the solution and allowing for the future.

The analysis supporting this conclusion is set out in the Proposal and in Attachment E.

Accordingly, we have undertaken a qualitative assessment taking into account the contribution to the expected net market electricity benefits of associated unquantified electricity market benefit or cost elements.

We consider:

- the cost of calculating the quantum (being the probability weighted average of the possible values) of the associated unquantified electricity market benefit or cost elements that have been assessed is likely to be disproportionately large relative to the quantum;

- the expected value of these associated unquantified electricity market benefit or cost elements cannot be calculated with an appropriate level of certainty due to the uncertainties in underlying assumptions or calculation approaches.

Details of our qualitative assessment of associated unquantified electricity market benefit or cost elements are summarised in Table 5-4 below and set out in full in the Proposal and in Attachment E.

Table 5-4 Qualitative assessment non-quantified benefits (NQB) and overall preferred option

Item	Goat 80°C	Zebra 65°C	Zebra 75°C	Zebra 85°C
Option	2	3	4	5
Relative Expected Net Electricity Market Benefit (ENMB)	0	20.4	24.2	20.2
Unquantified differences (UQB):				
• Optionality to further upgrade	✓	✓✓✓	✓✓	✓
• Consumer benefits through enhanced competition	✓	✓	✓✓	✓✓✓
• Minimises disruption	✓	✓	✓✓	✓✓✓
• Visual impact	✓✓	✓✓✓	✓✓	✓
• Operational benefits	✓	✓	✓✓	✓✓✓
• Aligns long term grid development	✓	✓	✓✓	✓✓
• Asset life	✓	✓✓✓	✓✓	✓
Overall ranking ENMB and UQB	4	3	1	2

5.1 Investment test results

Table 5-4 shows the overall ranking of Options 2, 3, 4 and 5 based on both the expected net electricity market benefits and a qualitative assessment of the unquantified electricity market benefit or cost elements.

In conclusion, having considered both quantified electricity market benefit or cost elements and unquantified benefits we consider that Option 4 (being the Proposed Investment) satisfies the Investment Test.

6 Approval Components for the Proposed Investment

The Commission may not approve the Proposed Investment where it is not satisfied with any one or more of the following proposed investment components:[38]

- **major capex allowance;**
- **maximum recoverable costs;**
- **recovery scheme;**
- **approved major capex project outputs;**
- **approval expiry date;**
- **P50;**
- **commissioning date assumption; and**
- **completion date assumption.**

This section evaluates each component in turn, setting out the specific factors that the Capex IM requires the Commission to have regard to in relation to that factor.

6.1 Major capex allowance

When evaluating the major capex allowance and maximum recoverable costs for proposed investments and investment options, the Commission must have regard to at least one of the following factors:[39]

- how major capex project outputs, key drivers, key assumptions, and cost modelling were used to determine the P50 and major capex allowance or maximum recoverable costs;
- what key assumptions were made regarding cost uncertainty in moving from a P50 forecast to the proposed major capex allowance or maximum recoverable costs;
- the capital costing methodology and formulation, including unit rate sources, the method used to test the efficiency of unit rates and the level of contingencies included;
- the impact of forecast costs on other costs, including the relationship with operating expenditure;
- mechanisms for controlling actual capital expenditure with respect to the major capex allowance or maximum recoverable costs; and
- the efficiency of the proposed approach to procurement of goods and services.

The expected cost (P50) of the Proposed Investment is estimated to be $151 million, once commissioned and the Major Capex Allowance is estimated to be $161 million. The difference between the two relates to the uncertainties around the project costs.

The uncertainties considered for this project are:

- scope allowance, to allow for scope differences in the project. The scope allowance diminishes as the project progresses through the to detailed design. Scope allowance

[38] C1(2)(a) of Schedule C of Capex IM; components found in C1(1) of Schedule C of Capex IM. Note that the more specific criteria that are applied to each of the proposal criteria are discussed under the headings of the individual proposal criteria below.
[39] C3 of Schedule C of the Capex IM.

is assumed to be a triangular distribution and we estimate both P50 and P90 allowances from that distribution.

- price uncertainty, to allow for possible market movements in the cost of components related to this proposal. Price uncertainty is assumed to be a triangular distribution and we estimate both P50 and P90 uncertainties from that distribution.
- construction uncertainty allows for unforeseen circumstances which may arise during construction. These may be related to extra costs incurred for bad weather, for instance. Construction uncertainty is assumed to be a triangular distribution and we estimate both P50 and P90 uncertainties from that distribution.
- commissioning uncertainty allows for construction periods which differ from our commissioning date assumption. The commissioning uncertainty diminishes as the project progresses from a conceptual design to detailed design. Commissioning uncertainty is assumed to be a triangular distribution and we estimate both P50 and P90 allowances from that distribution.

The P90 estimates of the uncertainties are used for the purposes of the Major Capex Allowance.

The difference between the Expected Cost and the Major Capex Allowance is therefore the sum of the difference between the cost estimate using P50 values of the uncertainties and P90 values of the uncertainties.

We recover the costs once the project is commissioned (completed) and the Major Capex Allowance to be approved by the Commerce Commission is expressed in final commissioning year dollars. This is shown in Table 6-1.

The relationship between the expected cost of the project and our Major Capex Allowance is shown in Table 6-1.

Table 6-1 of Major Capex Allowance

Expected Cost (2013 $m)	Inflation	Financing costs	Expected Cost (2020 $m)	Major Capex Allowance (2020 $m)
134.6	12.0	4.4	151.0	161.0

6.2 Maximum recoverable costs

The Capex IM defines “maximum recoverable costs” as the “maximum amount of major capex which is not included in a closing RAB value and is approved in respect of a non-transmission solution by the Commission, over the duration of the project, as recoverable costs.”.

This proposal does not include the use of non-transmission solutions and does not include any maximum recoverable costs (as they are not applicable to this proposal).

6.3 Recovery scheme

The Capex IM defines “recovery scheme” as the “specification for the systematic attribution of maximum recoverable costs to one or more disclosure years, including by way of formulae”.

This proposal does not include the use of non-transmission solutions, does not include any maximum recoverable costs and hence does not include a recovery scheme.

6.4 Approved major capex project outputs

The Commission must have regard to at least one of the following factors when evaluating proposed major capex project outputs:[40]

- the extent to which the major capex project outputs reflect the nature, quantum and functional capability of the transmission investment assets to be commissioned;
- the extent to which the major capex project outputs reflect the change in the functional capability of the grid as a result of undertaking the proposed investment;
- the extent to which the major capex project outputs are consistent with key assumptions used in determining the major capex allowance or maximum recoverable costs;
- the nature of the electricity market benefit or cost elements directly related to the supply of electricity transmission services taken into account in applying the investment test; and
- in the case of a non-transmission solution,-
    - the extent to which the major capex project outputs reflect the nature and quantum of any product or service provided to Transpower; and
    - the extent to which the major capex project outputs reflect the change in the functional capability of the grid resulting from the product or service provided to Transpower.

Our Investment Proposal comprises the following Major Capex project outputs:

- Procuring, installing and commissioning Zebra ACSR conductor on the Bunnythorpe–Haywards A and B lines and decommissioning the existing conductor
- Works on the towers to enable the Zebra conductor to be operated at 75°C
- Procuring, constructing and commissioning substation facilities to facilitate the above connections and equipment
- Obtaining property rights and environmental approvals required for these works
- Installing alternative conductor technologies on a short section to evaluate their performance in coastal climatic conditions

6.5 Commissioning date assumption

The Capex IM defines “commissioning date assumption” as “the assumption made as to the commissioning date of the last asset to be delivered by a major capex project” and “commissioning date” means date the asset is first commissioned.[41]

We will be starting work on this proposal in 2013 and commissioning each year as the work is completed. The last sections of conductor are expected to be replaced by Q4 2020.

6.6 Approval expiry date

The Commission must have regard to at least one of the following factors when evaluating a proposed approval expiry date:[42]

[40] C5 of Schedule C of the Capex IM.
[41] Clause 1.1.5(2) of the Capex IM.

- the effect of the proposed approval expiry date on the quantified and unquantified costs and benefits under the investment test;
- the effect of the changes to the commissioning date assumption or completion date assumption on the expected net electricity market benefit under the investment test;
- the effect of the proposed approval expiry date and the commissioning date assumption or completion date assumption in the major capex proposal;
- the sensitivity of the proposed approval expiry date to the key assumptions used in the major capex proposal;
- demand and generation scenarios; and
- sensitivity analysis.

We have concluded that an appropriate approval expiry date for this Investment Proposal would be 2025.

An approval expiry date should not be close enough to the completion date assumption that it is triggered by reasonable commissioning delays. In this case, 2025 is quite close to the completion date of Q4 2020, but given the relative complexity and size of this investment from a build perspective commissioning delays are possible which could delay for a year at a time. We feel that 2025, as an approval expiry date, is a point where it is clear that should the project still be incomplete at this time, something has changed and we should reassess.

6.7 Completion date assumption

The Capex IM defines "completion date assumption" as the "date that a non-transmission solution achieves completion" and "completion" means the provision of all services forecast to be delivered by the non-transmission solution." [43]

This proposal does not include the use of non-transmission solutions, hence we have not determined any completion date assumptions.

[42] C4 of Schedule C of the Capex IM.
[43] Clause 1.1.5(2) of the Capex IM.

7| Information Requirements for Major Capex Proposal

A major capex proposal must include the information listed or described in Schedule G of the Capex IM.

Set out in the table below is a list of the items of information required by Schedule G and where this information is located in the documentation for this major capex proposal.

Clause reference	***Disclosure requirement***	***Cross reference to location in documents***
G2(a) **Information on the investment need**	Explanation of the need for investment, including- Information on its nature, extent, location and timing;	Proposal – section 3 Attachment B – section 2 Attachment C
G2 (b)	Commentary as to how the **investment need** is consistent with the most recent **integrated transmission plan**;	Proposal is consistent with section 11.6 of the Annual Planning Report 2013
G2(c)	A summary of consultation participants' views on the **investment need** and how **Transpower** had regard to those views and if not, why not;	Attachment A – section 5 Attachment F
G3(1) **Information on relevant demand and generation scenarios**	Detailed description of each **relevant demand and generation scenario** that is a **market development scenario variation** or **MED scenario variation**, as the case may be;	Attachment E – section 2 and Attachment E - Appendix 1
G3(2)	In respect of- (a) each market development scenario variation or MED scenario variation, as the case may be, a description of it; (b) each market development scenario variation,- (i) explanation of the major variations between it and the **market development scenarios**; and (ii) the rationale for the variations; and (c) each **MED scenario variation**,- (i) explanation of the major variations between it and the	Attachment E – section 2 and Attachment E - Appendix 1

Clause reference	***Disclosure requirement***	***Cross reference to location in documents***
	current **MED scenarios**; and (ii) the rationale for the variations;	
G3(3)	In respect of each **relevant demand and generation scenario**,- (a) the relative weighting of each scenario; and (b) where that weighting was determined by **Transpower**, the methodology used to determine it; and	Attachment E – section 2 and Attachment E - Appendix 1
G3(4)	In respect of each **market development scenario variation** or **MED scenario variation**, as the case may be, summary of consultation participants' views on them.	Attachment A – section 5
G4(1) **Information relating to each investment option**	In relation to each **investment option** contained in the **major capex proposal**- (1) description of the **investment option**;	Attachment C –section 2
G4(2)	(2) **net electricity market benefit** of each **investment option** under each **demand and generation scenario**;	Attachment E – section 3
G4(3)	(3) in respect of each **investment option**, quantum of- (a) each electricity market benefit or cost element; (b) each **project cost**; (c) aggregate **electricity market benefit or cost element**; and (d) aggregated **project costs** on a **P50** basis, used to calculate each **net electricity market benefit**;	(a) Attachment E – section 3 (b) Attachment C – section 4 (c) Attachment E – section 3 (d) Attachment C – section 4
G4(4)	(4) methodology used to determine the quantum of all information	(a) Undertake a Solution Study Report for each Option (b) Estimate of costs from Transpower's Cost

Clause reference	***Disclosure requirement***	***Cross reference to location in documents***
	provided pursuant to subclause (3), including details commensurate with the estimated **capital expenditure** and complexity of the **investment option** of any- (a) internal and external benchmarking and how the results were applied; (b) relevant existing or proposed supply or procurement processes; (c) modelling tools or techniques; and (d) key publications and data sources;	estimating tool. (c) A detailed procurement plan will be developed upon approval of this proposal once we have commenced detailed design. (d) Attachment E – sections 2, 3 4 and 5 (e) Annual Planning Report https://www.transpower.co.nz/resources/annual-planning-report-2013 consultation documents https://www.transpower.co.nz/projects/bunnythorpe-haywards-and-b-transmission-line-investigation/bunnythorpe-haywards-and-b-0
G4(5)	(5) **key assumptions** used to determine the **net electricity market benefit** of each **investment option**, including- (a) discount rate; (b) calculation period; (c) cost per megawatt hour used to determine the value of expected unserved energy;	Attachment E – section 2 (a) 2.3, (b) 2.5 (c) N/A, 2.4
G4(6)	(6) **expected net market benefit** of each **investment option**;	Attachment E – section 3.4
G5(1) **Information relating to proposed investment only**	(1) identification of the **investment option** that is the **proposed investment**;	Proposal – section 5, Attachment E - section 3.4, Table 3-4

Clause reference	***Disclosure requirement***	***Cross reference to location in documents***
G5(2)	(2) detailed description of the components of the **proposed investment**, including at least- (a) identification of the extent to which the **proposed investment** is a **transmission investment** or a **non-transmission solution**; (b) a summary of requirements for completion, such as property or property right acquisition, resource management approvals, asset purchases, asset construction and site remediation; (c) any proposed **major capex allowance**; (d) where a **major capex allowance** is applicable, the **commissioning date assumption** and rationale for it; (e) any proposed **maximum recoverable costs**; (f) where **maximum recoverable costs** are applicable, the **completion date assumption** and rationale for it; (g) the estimated **P50;** (h) all relevant supporting technical information and costing information; (i) where the project is a **non-transmission solution**- (i) the proposed **recovery scheme**; and (ii) an explanation of the relationship between any proposed **major capex allowance** and any proposed **maximum recoverable costs** for that **non-transmission solution**; and (j) proposed **approval expiry date** and rationale for it;	(a) Proposal, section 2, Attachment A (b) Proposal – section 2 (c) Proposal – section 7 (d) Assumption: Proposal, section 2, rationale: Proposal section 3.1, Attachment B (e) N/A. This Attachment – section 6.2 (f) N/A (g) Proposal – section 7 (h) Proposal, Attachments B, C, D,and E, BPE-HAY Data File - MCA, BPE-HAY MCP Data File – Investment Test (i) N/A (j) This attachment, section 6.6
G5(3)	(3) detailed description of the rationale for seeking approval of the **proposed investment**;	Proposal, section 5, Attachment E, section 3

Clause reference	***Disclosure requirement***	***Cross reference to location in documents***
G5(4)	(4) summary of the key evidence that supports that rationale such as contracts, reports, memos, financial or other data, results of modelling exercises, customer documentation and letters, and statements from directors;	BPE-HAY MCP Data File - SDDP BPE-HAY MCP Data File - Investment Test Consultation: https://www.transpower.co.nz/projects/bunnythorpe-haywards-and-b-transmission-line-investigation/bunnythorpe-haywards-and-b-0 CEO Certificate: This attachment – section 8
G5(5)	(5) detailed commentary as to how the **proposed investment** is consistent with the most recent **integrated transmission plan**, and if not, why not;	First integrated transmission plan is yet to be published, however, proposal is consistent with section 11.6 of the Annual Planning Report 2013
G5(6)	(6) identification of anything associated with the **proposed investment** falling under any of clauses D5(1)(a) to D5(1)(g) that did not meet the definition of expected market benefit or cost element only by virtue of its being unlikely to affect the **net electricity market benefit** to an appreciable degree;	All benefit categories from a) to g) are included.
G5(7)	(7) description of considerations, assumptions and calculations used to determine that something falling under any of clauses D5(1)(a) to D5(1)(g) did not meet the definition of expected market benefit or cost element by virtue of its being unlikely to affect the **net electricity market benefit** to an appreciable degree;	N/A

Clause reference	***Disclosure requirement***	***Cross reference to location in documents***
G5(8)	(8) outcome of sensitivity analysis;	Attachment E – section 3.6
G5(9)	(9) description of the methodology applied in undertaking **sensitivity analysis**;	Attachment E – section 3.6
G5(10)	(10) explanation as to how robust the **proposed investment** is to **sensitivity analysis**;	Attachment E – section 3.6
G5(11)	(11) reasons for any selection of a- (a) discount rate other than 7%; and (b) calculation period other than 20 years; (c) cost per megawatt hour determined using paragraph (b) of the definition of value of expected unserved energy;	(a) N/A (b) Attachment E, section 2.5 (c) N/A
G5(12)	(12) a description as to how the **proposed investment** reflects **good electricity industry practice**;	Proposal, section 5.4
G5(13)	(13) rationale for determining that the **proposed investment** may satisfy the **investment test**, by reference to each subclause and paragraph of that test; and	This attachment – section 5. Proposal, sections 4 and 5. Attachment E – section 3
G5(14)	(14) a plan for monitoring costs, project milestones and deliverables that reflects the best information available to **Transpower**	A detailed plan will be developed once we obtain approval and commence detailed design.

Clause reference	***Disclosure requirement***	***Cross reference to location in documents***
G6(1) **Grid outputs**	In relation to each **investment option** contained in the **major capex proposal**- (1) specification of **approved major capex project outputs** that are proposed;	Proposal, section 2.
G6(2)	(2) quantum of each **approved major capex project output** that is proposed;	Proposal, section 2. BPE-HAY MCP Data File - MCA
G6(3)	(3) rationale for those **approved major capex project outputs** that are proposed including- (a) description of key factors and key assumptions relevant to their determination including the uncertainty associated with each such factor or assumption; and (b) explanation of the extent to which the quantum of each proposed major capex project output reflects: (i) the assets to be commissioned; (ii) the forecast changes to the functional capability of the grid; (iii) the quantum of forecast electricity market benefit or cost elements directly related to the supply of electricity **transmission services**; and (iv) in respect of a **non-transmission solution**, any service provided by a third party;	Attachment E – section 3.
G6(4)	(4) explanation of the relationship between the proposed **P50** and the quantum of each **approved major capex project output** that is	This document, section 6.1.

Clause reference	***Disclosure requirement***	***Cross reference to location in documents***
	proposed including the sensitivity of the quantum of each **approved major capex project output** that is proposed to changes in the **P50**, including commentary in terms of increases or decrease in the scope of the **project**;	BPE-HAY MCP Data File - MCA
G6(5)	(5) description of factors that may affect **Transpower's** ability to achieve each **approved major capex project output** that is proposed, including identification of each factor, with reasons, as within or outside **Transpower's** control; and	A detailed plan, including associated risks will be developed once we obtain approval and commence detailed design.
G6(6)	(6) in the case of a **non-transmission solution** description of the **transmission investment** it avoids in terms of both assets and expected costs avoided.	N/A
G7(a) Information on consultation	In respect of consultation, the specified information is a description as to how the consultation programme referred to in clause 3.3.1(2)(a)(i) was followed, including- (a) a list of the relevant consultation steps and confirmation by Transpower that each occurred;	Attachment F – sections 2 and 3
G7(b)	(b) a list of respondents to the consultation;	Attachment F – section 3
G7(c)	(c) a description of all issues raised by interested persons in response to **Transpower's** intended **major capex proposal**;	Attachment F – section 3
G7(d)	(d) a summary of the arguments raised in respect of each issue to which paragraph (c) applies; and	Attachment F – section 3
G7(e)	(e) in respect of the issues to which paragraph (c) applies, an explanation as to whether the **major capex proposal** accommodates the arguments referred to in paragraph (d);	Attachment E – section 2 Attachment F – section 3

Clause reference	***Disclosure requirement***	***Cross reference to location in documents***
	and (i) if so, how; and (ii) if not, why not;	
G8 (a) **Information on non-transmission solutions**	In respect of **non-transmission solutions**, a description as to how the requirements of Schedule I Division 2 were met, including- (a) summary of the process followed to identify and assess **non-transmission solutions**;	Attachment C – section 2.
G8(b)	(b) description of **non-transmission solutions** suitable to meet the relevant **investment need** identified either by **Transpower** or by consultation participants;	Attachment C section 2
G8(c)	(c) explanation as to how the **non-transmission solutions** to which paragraph (b) applies were taken into account when determining the **investment options** and applying the **investment test**; and	Attachment C section 2 This attachment, section 4.4
G8(d)	(d) description and justification of how any assets that would be **commissioned** by **Transpower** form part of the **non-transmission solution**.	N/A
G9 **Additional information**	any additional supporting material **Transpower** reasonably considers is relevant to the decision of the **Commission** under clause 3.3.3;	N/A

8| Chief Executive Certification

CHIEF EXECUTIVE OFFICER'S CERTIFICATION AS TO MAJOR CAPEX PROPOSAL (BUNNYTHORPE-HAYWARDS CONDUCTOR REPLACEMENT)

*(Transpower Capital Expenditure Input Methodology Determination 2012 Part 9 Clause 9.2.1) (the **Capex IM**)*

I, Patrick Clifford Strange, Chief Executive Officer of Transpower New Zealand Limited (**Transpower**) hereby certify, in relation to all information provided in accordance with Schedule G to the Capex IM with respect to the Bunnythorpe-Haywards Conductor Replacement Major Capex Proposal, that having made all reasonable enquiries, it is my belief that:

(a) the information was derived from and accurately represents, in all material respects, the operations of Transpower; and

(b) the proposed investment to which the information relates was approved in accordance with the applicable requirements of Transpower's director and management approval policies; and

(c) the major capex proposal complies, in all material respects, with the requirements of clause 7.4.1 of the Capex IM.

DATED:

PATRICK CLIFFORD STRANGE

