TRANSPOWER

Lower South Island: Major Capex Proposal Longlist Consultation

Overview

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Executive summary

Transpower is investigating potential electricity infrastructure investment in the Lower South Island in response to significant new renewable generation and demand growth. We define the Lower South Island as the region highlighted in Figure 1.[1]

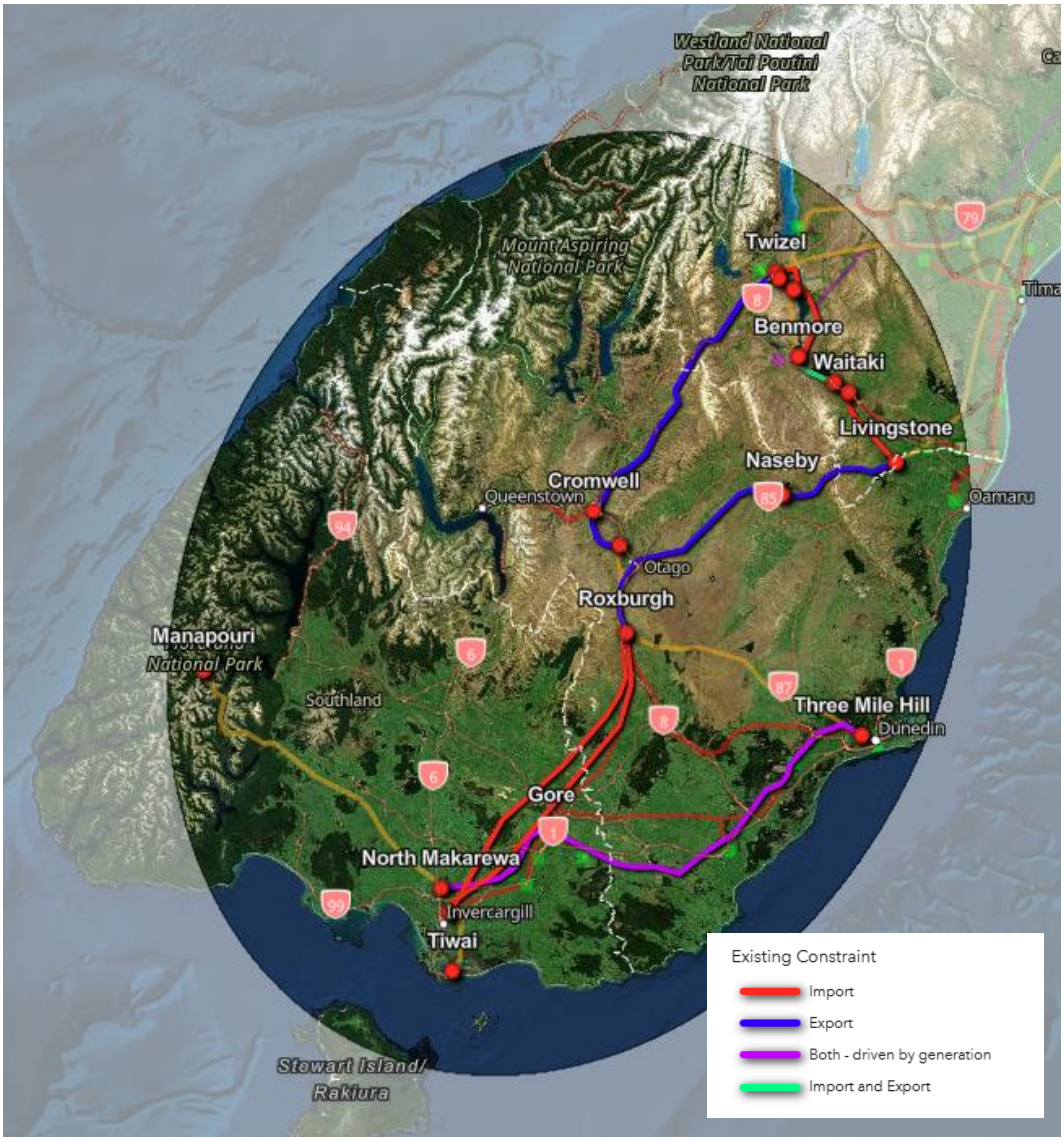

Figure 1: Geographic map of Lower South Island MCP thermal constraints

There is strong interest in both renewable generation development and new electricity demand across the Lower South Island. More than 2,500 MW of new solar, wind and battery energy storage system (BESS) projects are currently in Transpower's immediate connection pipeline[2], with further

[1] This figure also shows the transmission circuits where thermal import and export constraints have been identified as part of this major capex proposal (MCP) investigation. For more details on constraints see Section 2.2.

[2] At either delivery or investigation phase.

projects at earlier stages of development.[3] Demand forecasts also include substantial potential new electricity loads across the region.

The Lower South Island transmission network already experiences thermal and voltage stability constraints under high import and export conditions, even with all transmission circuits in service. These constraints are currently managed operationally. As generation and demand grow, they are likely to bind more frequently, and operational measures alone are not expected to remain sufficient. Import constraints are expected to be the more pressing driver for investment, particularly as large new loads connect in Southland. However, investment to increase export capacity may also be economically justified as generation in the region grows.

This consultation provides further information on this investment need and presents a longlist of components that could contribute to addressing it, including non-transmission solutions, upgrades to existing assets and new transmission assets. We have deliberately kept the longlist broad at this stage to consider how different investments could work together across the Lower South Island grid backbone.

We welcome feedback from mana whenua, councils, developers, local communities and other stakeholders. This feedback will help refine our understanding of potential generation and demand development, how the transmission network may need to respond, and which options should be investigated further.

[3] What's the latest with grid connections? | Transpower

1 Purpose

This longlist consultation is an early step in our Major Capex Proposal (MCP) investigation of potential transmission investment in the Lower South Island. It seeks feedback on the potential investment need, longlist of options, demand and generation scenarios, and key economic assumptions. Feedback will inform the shortlist of development plans and the future scenarios against which those plans are assessed.

We are undertaking this longlist consultation because we expect the shortlisted development plans arising from this process to exceed the $30 million threshold for a MCP.[4,5] Where investment to increase the capacity of Transpower's electricity grid is expected to exceed this threshold, we are required to submit an MCP to the Commerce Commission for approval to recover the costs of the investment from our customers. As the MCP, or components of it, may involve enabling investment undertaken ahead of firm generation or demand commitments, we may also consider non-standard assumptions and approaches where appropriate, as well as alternative funding arrangements.

This consultation will help us understand how future transmission capacity could support regional generation and demand growth. This requires credible demand and generation scenarios informed by an up-to-date understanding of potential projects and signals from developers. We seek feedback on:

- The definition of the investment need and the longlist of investment components that could enhance transmission capacity (Attachment 1);
- Potential generation and load projects, including size, timing and preferred connection location (Attachment 2); and
- The economic assumptions and parameters proposed for the analysis (Attachment 3).

[4] The base capex threshold is $30 million, as per Part 1 'General Provisions' of the Capex IM.

[5] We expect this, as most individual investment components in our long list (Table 4, Attachment 1) exceed the $30m threshold.

2 The need for investment

2.1 Regional background

The Lower South Island includes the cities of Dunedin and Invercargill, alongside important tourism and rural service centres such as Queenstown, Wānaka and Cromwell. The region is also home to New Zealand's largest electricity consumer, New Zealand Aluminium Smelter at Tiwai Point.

The region has a diverse and growing economy, supported by its productive land and natural resources. Key industries include agriculture, manufacturing, tourism, forestry, mining and fishing, which contribute significantly to both the regional economy and New Zealand's export sector. Continued economic development, alongside emerging industrial and electrification opportunities, is expected to contribute to growing electricity demand across the region. The region is also home to some of New Zealand's largest generation schemes and has significant potential for further generation development, particularly wind, as well as hydro, battery energy storage systems (BESS), and solar.

2.2 Emerging transmission constraints

The Lower South Island contains approximately 60% of the country's hydro generation capacity, much of which is typically exported through the Lower South Island transmission network and across the High Voltage Direct Current (HVDC) link. However, electricity can also be imported into the region, particularly during dry periods when regional hydro generation is lower.

High import conditions generally occur when generation at Manapouri, Roxburgh and Clyde is low, wind generation is low, and regional demand is high. Conversely, high export conditions can occur when hydro and wind generation are high and regional demand is low.

During periods of high import or export, electricity transfers can be limited by thermal, voltage and angular stability constraints:

- **Thermal:** N-1 thermal transmission constraints emerge under both high import and high export system conditions.
- **Voltage stability:** Static voltage stability limits can impact maximum Southland electricity imports and exports, with the level of transfer dependent on system conditions. For single phase-to-ground faults, dynamic voltage stability is not expected to bind before the thermal limits or static voltage stability limits.
- **Transient rotor angle stability:** Under some operating scenarios exports from the Otago-Southland region could be limited by transient rotor angle stability limits.

These constraints can affect transfers between Otago-Southland and the Waitaki Valley, which are connected by only three transmission circuits, and can also arise elsewhere in the Lower South Island network depending on system conditions. They are currently managed operationally, but as regional demand and generation increase, we expect them to bind more frequently and across a

wider range of conditions. This could increase reliance on operational measures that restrict network transfers, potentially contributing to higher wholesale electricity prices.

Figure 2 and Figure 3 show where these constraints occur, with further detail on the individual constraints and the conditions under which they arise provided in Attachment 1.

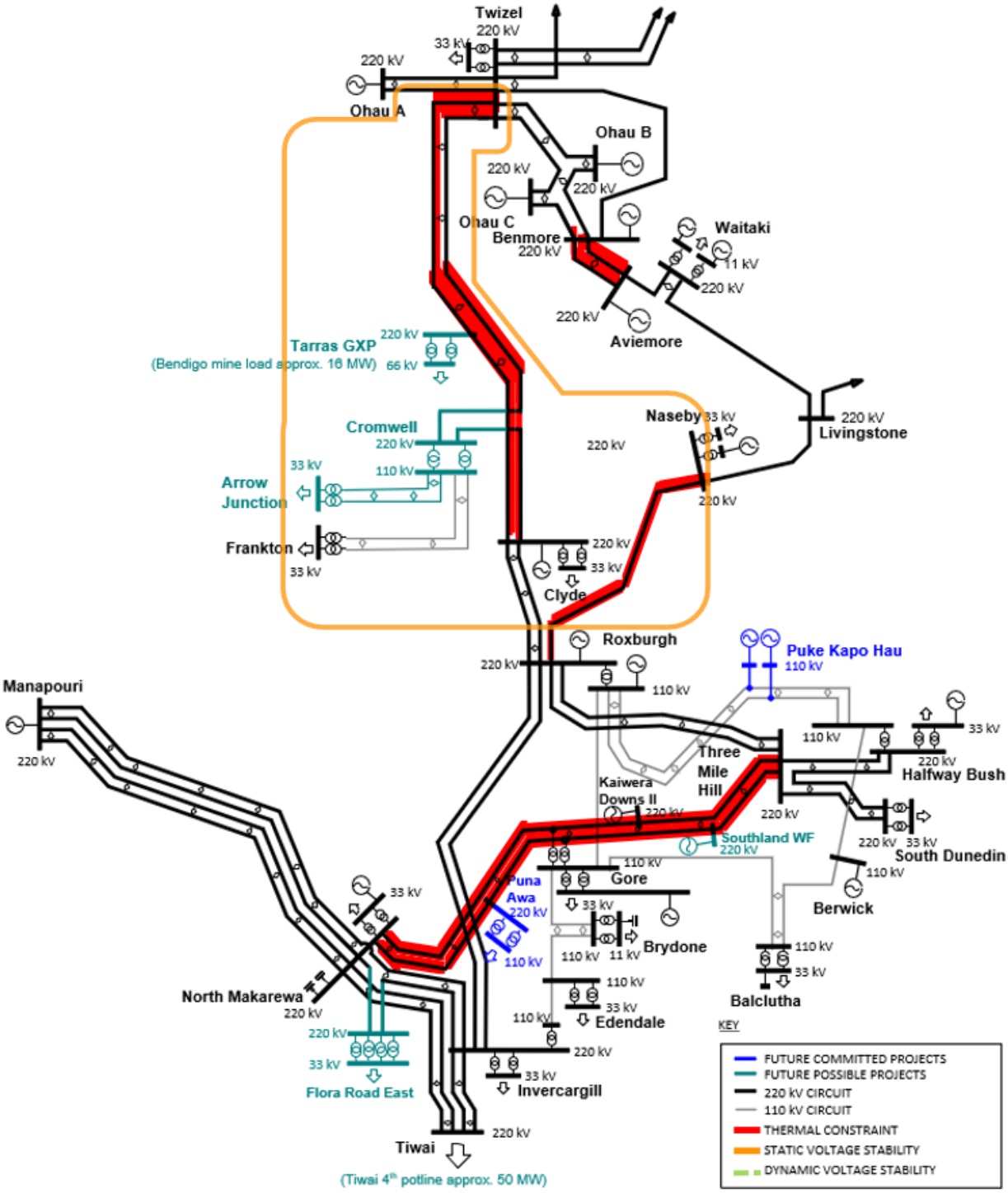

Figure 2: Existing Lower South Island export constraints

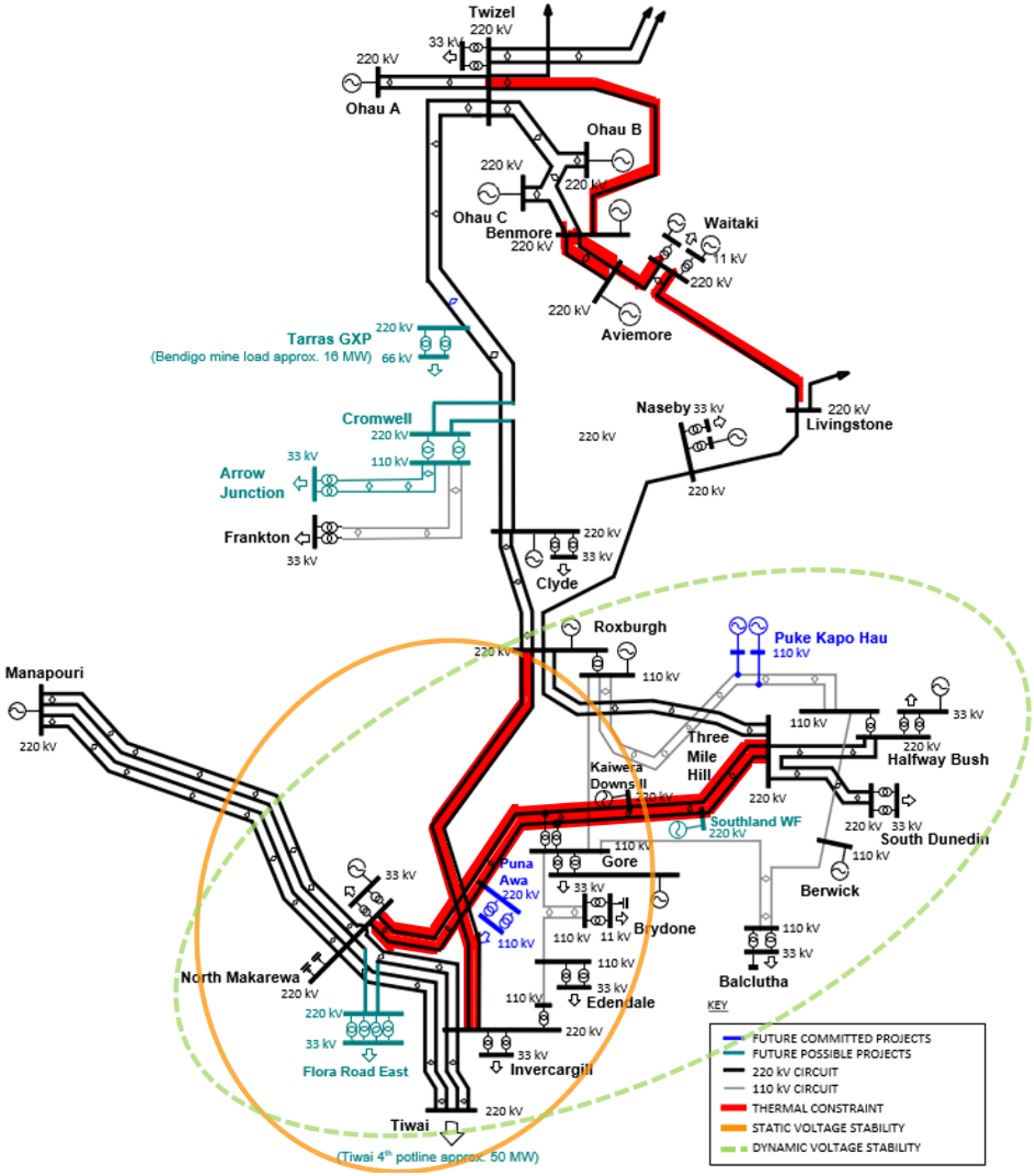

Figure 3: Existing Lower South Island import constraints

3 Longlist of options

We have developed a longlist of potential investment options identified as possible contributors to address the emerging system need in the Lower South Island. In summary, the longlist considers three broad categories:

- Transmission options – upgrading and enhancing existing assets
- Transmission options – building new assets
- Non-transmission solutions – e.g., flexible load, energy storage.

Attachment 1 contains the detailed longlist of investment options and discusses the criteria we will use when refining our longlist to a shortlist of development plans.

The Capex IM allows staged approval to help manage uncertainty about the need for investment. We have not yet determined whether we will stage this MCP. Feedback from this consultation will help us understand whether a staged approach is appropriate and, if so, how investment could be sequenced over time. We may also advance smaller, more readily deliverable investments ahead of the main MCP investments where they provide interim benefits.

4 Demand and generation scenarios

To explore where and when transmission constraints emerge under different future conditions, we will assess a range of demand and generation scenarios. Attachment 2 outlines the scenarios we propose to use for this MCP investigation. These are based on the Electricity Demand and Generation Scenarios (EDGS) variations in Transpower's benefit-based charges (BBC) Assumptions Book v3.0[6], and are supplemented by region-specific connection information to better reflect expected developments in the Lower South Island.[7] We welcome feedback on whether these proposed scenarios are appropriate for this MCP investigation.

4.1 Relevant regional projects

The future generation and load projects proposed for inclusion in our system analysis are primarily based on Transpower's published connection pipeline.[8] For generation, we have also cross-checked projects against other available information, including the Generation Stack Report[9] developed for Te Kanapu[10] and information published by developers. Potential step loads are listed in section 2.4 of Attachment 2 (Demand and Generation Scenarios), while potential generation projects are listed in section 3.3.

We are specifically consulting to confirm we have captured the right set of projects, and to refine the assumptions we use in our investigation, including:

- **Project awareness** - what information can you share about potential projects under consideration, including their likely capacity, operating profile, connection location and costs?
- **Project readiness and commitment** - what further information you can share about the maturity of your project (for example, key milestones achieved or remaining) to help us understand which projects are most likely to progress?
- **Connection timing** - what is your best estimate of when your project may be ready to connect (recognising this will be indicative and may change as development progresses)?

6 Transpower: Assumptions Book
7 The EDGS published by the Ministry of Business, Innovation and Employment (MBIE) maintain a primarily national outlook: Electricity Demand and Generation Scenarios (EDGS)
8 Transpower: What's the latest with grid connections?
9 Beca and Concept Consulting: 2025 Generation Stack Report
10 Transpower: About Te Kanapu | Transpower

4.2 Modelling approach

For this investigation, we use generation expansion and market dispatch modelling to understand the interdependencies between transmission investment and future generation and load development.

Firstly, we develop five demand forecasts, ranging from relatively conservative to more ambitious growth assumptions. These forecasts account for potential large step-load connections, which are particularly important in the Lower South Island given their potential scale and number. We may select a subset of these forecasts for detailed modelling to test a representative range of future demand pathways.

Alongside this, we develop a shortlist of grid development plans. Each plan comprises one or more transmission investments that would enhance the capability of the existing network or provide additional transmission capacity.

For each demand forecast and grid development plan being tested, we develop a corresponding generation expansion plan. This identifies the generation development required to meet forecast demand and is influenced by assumptions such as generation capital and operating costs, connection dates, capacities, and fuel costs. Because the grid development plans are likely to interact strongly with future generation development, our modelling will need to consider a range of generation expansion pathways.

Together, the demand forecasts, generation expansion plans and grid development plans provide the inputs to our market dispatch modelling. This modelling allows us to assess how different grid development plans affect generation investment, dispatch, curtailment and emissions, and will allow us to quantify the associated electricity market benefits relative to the cost of each plan.

5 Options assessment

Following this consultation, we will use the longlist of component options to develop a shortlist of development plans. We will assess each shortlisted plan using the Investment Test prescribed by the Capex IM. This involves comparing the plan's net benefits with a defined counterfactual, including relevant electricity market costs and benefits and, where material, other net economic benefits and unquantified benefits.

Applying the Investment Test requires a range of assumptions and parameters. Attachment 3 sets out these assumptions, including the modelling horizon, discount rate and our approach to valuing unserved energy, and invites stakeholder feedback on them.

- **Calculation period:** we propose using a calculation period to 2060, which we expect will extend at least 20 years beyond the commissioning date of the final investment. While this does not capture the full economic life of some investments, we consider it an appropriate balance between capturing long-term benefits and the increasing uncertainty associated with benefits further into the future.
- **Value of unserved energy**: the value of expected unserved energy is the assumed value to consumers of losing electricity supply because of an unplanned outage. As we are not planning to assess reliability benefits, we will not apply a value of expected unserved energy in our benefit analysis. However, we will consider deficit costs, loss costs and costs of curtailed renewable generation based on the generation dispatch modelling.
- **Discount rate:** the rate used to discount future costs and benefits to present values. We propose use of a default 5% real, pre-tax discount rate as per the Capex IM, with sensitivities of 3% and 7%.

6 Consultation process and scope

This consultation package comprises four documents:

- This longlist consultation Overview document
- **Attachment 1** (Need and Longlist of Options)
- **Attachment 2** (Demand and Generation Scenarios)
- **Attachment 3** (Investment Test Parameters).

The supporting attachments provide further information and include specific questions to help guide submissions. We invite written feedback on any aspect of this consultation package **from 26 November 2026 to 5 February 2027**. Please send your submissions or queries to grid.investments@transpower.co.nz. We will acknowledge receipt of all submissions by email.

Submissions will be treated as public unless confidentiality is requested. If your submission contains confidential information, please clearly identify the relevant sections. Please note that all submissions may be shared confidentially with the Commerce Commission and may inform Transpower's future MCPs. Transpower is also subject to the Official Information Act 1982.

7 Next steps

This longlist consultation is the first significant step in our regulated process to propose major investment on the transmission network. The next steps include:

- considering the feedback received in submissions and publishing a summary of submissions,
- developing and evaluating a shortlist of development plans, taking account of the information received in response to this consultation,
- publishing a shortlist consultation and engaging with a wide range of stakeholders on the appropriate level of transmission investment. This will include consulting on our application of the Investment Test, including our consideration of unquantified benefits and other net economic benefits, and
- submitting a proposal to the Commerce Commission.

8 Specific feedback we are seeking

We have included a series of questions that you may wish to consider when preparing your submission. These questions are intended to guide your response, but you are not required to answer all or any of them and are welcome to raise any other matters relevant to you. The questions are included throughout the three attachments and are also set out below for ease of reference.

We are able to treat submissions, or parts of submissions, as confidential where clearly marked. However, confidential information may need to be shared with the Commerce Commission. If only part of your submission is confidential, please clearly identify the relevant sections.

Attachment 1 sets out the investment need and the transmission constraints identified in the region. It asks the questions:

Q1. **Do you agree with our assessment of the investment need?**

Q2. **Do you consider our proposed lower-bound generation dispatch assumption (two Manapouri generation units and no local wind) reasonable for assessing investment need and timing?**

Q3. **Are there any other issues or considerations relating to the investment need that we should incorporate into the investigation?**

Q4. **Do you support our proposed approach of assessing rotor angle stability using three-phase faults and dynamic voltage stability using single-phase faults?**

Attachment 1 also outlines our proposed longlist of options from which we will develop a refined shortlist of development plans to meet the need:

Q5. **Are there any other options we should add to our longlist?**

Q6. **If new or upgraded shared transmission capacity were developed, which connection areas or locations would be most beneficial to you and why, for example, proximity to your projects, lower curtailment risk or fewer consenting barriers?**

Q7. **Are there any constraints or limitations we might not be aware of regarding our options?**

Q8. **Do you agree with our screening criteria? Is there anything you would change, remove or add?**

Q9. **Are you aware of, or able to provide, any non-transmission solutions that could help defer, reduce or avoid transmission investment in the Lower South Island? If so, please provide high-level details on the type, location and size of the solution.**

Attachment 2 describes the demand and generation scenarios we propose using in our investigation and asks the questions:

Q10. **Do you consider our demand assumptions appropriate for this investigation? If not, what changes would you suggest?**

Q11. **Are you aware of any planned or potential industrial, commercial, residential or other developments that could significantly affect electricity demand in the region and are not reflected in our assumptions? If so, please provide any information that could help inform our demand forecasts, such as the location, timing, capacity, likelihood and/or stage of commitment, and load profile of such development.**

Q12. **Do you agree with our proposal to use our BBC Assumptions Book v3.0 variations as the basis for our market scenarios for this investigation?**

Q13. **Do you consider our generation assumptions (including assumed capacities, costs and capacity factors) appropriate for this investigation? If not, what changes would you suggest?**

Q14. **Are you developing a generation project in the Lower South Island region? At what stage are you in developing it (e.g. investigating, consenting, in design, financial investment decision approved, in construction)? If there was sufficient transmission capacity, when would you expect your project to be commissioned?**

Q15. **Are you aware of any additional generation projects in or near the Lower South Island region that could materially affect our modelling for this investigation?**

Q16. **If you are considering a new or emerging generation or storage technology, such as pumped hydro or other long-duration storage, can you provide information on its development status and certainty, preferred grid connection, potential build capacity, indicative costs, expected commissioning date, and operating characteristics?**

Q17. **Do you support our use of four of the five EDGS scenarios (Reference, Environmental, Growth and Innovation), equally weighted, as the basis for our market modelling? If not, what would you recommend instead, and why?**

Attachment 3 describes the Investment Test parameters we propose using in our application of the Investment Test. The Investment Test is a cost-benefit analysis applied to a shortlist of options and is used to identify which option maximises net benefit to electricity consumers. In Attachment 3 we ask the questions:

Q18. **Do you consider the proposed calculation period to 2060 appropriate for this investigation? If not, what calculation period (or end year) would you suggest and why?**

Q19. **Do you agree with our proposal to not assess reliability benefits or apply a value of expected unserved energy?**

Q20. **Do you agree with our proposed use of the deficit cost tranches from Assumptions Book v3.0? If not, what changes would you suggest?**

Q21. **Are you able to provide information on your cost of non-supply or demand response, including how these may vary with the extent and duration of non-supply?**

Q22. **Do you consider a discount rate of 5% (with sensitivities of 3% and 7%) appropriate for this investigation?**

Q23. **Do you agree with our intention to use a counterfactual that proposes no transmission investment to resolve the identified need(s)?**

Q24. **Are there any other market costs or benefits which should be reflected in our Investment Test analysis?**

Q25. **Are there any unquantified benefits that should be considered in this investigation?**



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