TRANSPOWER

Waikoukou
22 Boulcott Street
PO Box 1021
Wellington 6140
New Zealand
P 64 4 495 7000
F 64 4 495 6968
www.transpower.co.nz

23 April 2025

Matthew Clark
Transpower and Gas Manager
Commerce Commission
PO Box 2351
WELLINGTON

Dear Matthew

Notice of intention to plan the HVDC Link Upgrade Programme major capex project.

This letter is notice under clause 3.3.1(1) of the Transpower Capital Expenditure Input Methodology Determination 2012 (**Capex IM**) of Transpower's intention to plan a major capex project (staged) which may become a proposed investment.

Investment need and potential project

We have identified some related issues associated with New Zealand's HVDC Link on Transpower's network.

The three existing HVDC submarine cables, each rated at 500 MW, are approaching the end of their operational life and will require replacement in the early 2030s. Asset inspections and asset health data indicate that they will reach end-of-life around 2032. Extending their use beyond this date significantly raises the risk of failure, which could disrupt HVDC operations and compromise electricity supply, particularly during dry years when North Island generation supports South Island demand.

The current cables also limit the HVDC Link's operational capacity to 1200 MW, despite the converters' combined capability of 1400 MW. This constraint results from the existing cable configuration: two cables connected to Pole 3 and one to Pole 2, restricting Pole 2's capacity to 500MW. Replacing the submarine cables presents an opportunity to assess cost-effective upgrades to the HVDC link's capacity.

Economic analysis under our Net Zero Grid Pathways Stage 1 Phase 1 project, showed that adding a fourth cable to increase capacity to 1400MW would provide a positive net market benefit under multiple demand growth scenarios.[1] This upgrade would increase the HVDC's northward capacity by 200 MW (15%), improving the HVDC Link's ability to transmit South Island hydro generation northward, particularly as the North Island's reliance on intermittent renewable generation (e.g. wind and solar) grows.

[1] HVDC capacity and potential enhancements were initially identified as part of the NZGP1 staged MCP and included in our NZGP long-list and subsequent NZGP1.1 MCP. NZGP1.1 envisaged a fourth cable would potentially be a future NZGP stage. However, due to the need to address HVDC control systems simultaneously, we are now commencing this as a new MCP.

Increasing the capacity of the HVDC link at the same time as replacing the existing cables is likely our only practical opportunity to do so. There are significant delivery efficiencies involved if we use a single cable-laying ship and coordinate the work. A large portion of the cable pricing is attributed to manufacturing setup and ship mobilisation to New Zealand. If we defer the capacity upgrade, future installation of a fourth cable would require a separate project, incurring substantially higher costs and meet potential market reluctance due to its relatively small scale.

Additionally, the HVDC control systems, commissioned in 2013, will require replacement by the early 2030s due to obsolescence. These bespoke systems manage Pole 2, Pole 3 and AC reactive power controls, playing a critical role in frequency keeping and round power. By 2032, the control systems will be nearly 20 years old, with their hardware platform becoming unsupported. Given the integrated control of both Pole 2 and Pole 3, system replacement will involve significant complexity, necessitating long lead times, detailed planning, and rigorous testing. Coordinating this with the cable replacement work will help minimise disruption, streamline implementation and allow Transpower to manage risks in procuring the necessary equipment.

The above issues are those that we are currently aware of, and further investigation may identify others.

Given these interdependencies, we propose investigating these requirements collectively to identify synergies and optimise investment; enabling a more beneficial solution overall than if we investigated these issues individually. In our view the requirements can, and should, be treated as a single investment need under the Capex IM. The investment need relates to the HVDC Link, including addressing the condition of the cables and control systems and related projects, so we are calling the potential project the *HVDC Link Upgrade Programme major capex project*.

Potential staging

Due to the bespoke nature of the HVDC control systems and the required design, we must seek market pricing before finalising these costs. These costs are unlikely to be available for some time and will only be determined after we have submitted our proposal for the replacement cables. Accordingly, we propose that the HVDC project is treated as a major capital project (stage) with the following potential stages:

Stage	What's likely to be included
Stage 1	• four new HVDC submarine cables, increasing the nominal HVDC transfer capacity north from 1200 MW to around 1400 MW; • new cable termination stations and associated equipment located at Oteranga Bay (North Island) and Ōraumoa Fighting Bay (South Island); • an additional filter bank at Benmore to facilitate operation at around 1400 MW; • works to increase the Pole 2 overload capacity at Haywards and Benmore; • procuring, constructing and commissioning new submarine cable storage facility and associated equipment to house spare cable lengths for future maintenance and repairs; • recovering and disposing of the three existing submarine cables after decommissioning.,
Stage 2	• designing, procuring, constructing and commissioning new HVDC control system equipment and facilities at Haywards and Benmore.

Future stages will be reviewed at each stage of the project.

We plan to seek approval for the first staging project (Stage 1), which will consist of the proposed investments listed in the table above. We expect the overall capex of stage 1 will exceed $30m as well as in aggregate across all stages.

The HVDC Link Upgrade Programme major capex project is a new project. There are no previously approved staging projects for it.

Treatment of Non-transmission Solutions

Non-transmission solutions (NTS) will not be considered as investment options in the investigation. Given the condition-based need to replace the HVDC cables, the scale of the load and the obsolescence of the control system, we believe that NTS are unlikely to provide a viable alternative to retaining an operational HVDC link between the North and South Island electricity networks.

Proposed timetable

Subject to agreement with the Commission, our high-level timetable for this investigation is as follows:

Date	Action
April 2025	Publish short list consultation
May 2025	Short list consultation closes
August 2024	Submit major capex proposal (Stage 1)
December 2025 (estimated)	Submit major capex proposal (Stage 2)

We first consulted on HVDC capacity options during our NZGP long-list consultation in August 2021. Throughout 2024 we have been engaging with stakeholders regarding the future of the HVDC link and the condition based issues affecting the existing cables.[2] Given the limited options available to address the investment need, we propose that it is reasonable to exclude the Long-list consultation (as specified in Schedule I) and instead we propose proceeding directly to the short-list consultation in accordance with clause 8.1.3(2)(b).

Our intent is to consult on the demand forecasts and key assumptions we should use for this project as part of our short-list consultation. We will also consult on our short-list of options and the preliminary application of the Investment Test.

We look forward to working with the Commission to agree on the timetable, including the approval timeframe, and the other matters in clause 3.3.1(3) of the Capex IM.

Yours sincerely

Stephen Jones
Grid Investment Group Manager

[2] Discussion paper - Examining the purpose and future role of our HVDC link - March 2024 and HVDC Cable Replacement and Enhancement Information and Consultation paper – August 2024