New zealand grid modernization

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Net Zero Grid Pathways is a multi-year programme of work through which Transpower will investigate, plan, consult on and seek investment approval for large projects to deliver the transmission system New Zealand needs to electrify our economy and meet decarbonisation targets in the future.

Net Zero Grid Pathways (NZGP) looks at the system-wide requirements and dependencies that will enable new generation to connect to the grid, accommodate both new and growing customer load bases, move power to where it"s needed, and continue to provide a secure and reliable power system.

The work in this programme is complementary to Transpower"s annual maintenance, refurbishment, enhancement and development work that extends the life of our existing grid assets. It also complements Transpower"s work connecting new generation to the grid - NZGP is the enabling work on the grid to ensure that when new generation is ready to be connected, the grid can take the additional electricity and shift it to where it"s needed (while maintaining our customers" expectations of power quality, system security and reliability).

NZGP relies on key Transpower documents as inputs, such as our Transmission Planning Report and Asset Strategies and Asset Management Plan. The thinking and development is also driven by Transpower"s research work in Whakamana i Te Mauri Hiko and associated monitoring reports, alongside other industry and government reports and activity. We rely strongly on industry consultation as we develop our proposed projects and timings.

In the past, significant investments have usually been proposed individually to our investment regulator, the Commerce Commission. Through NZGP, we will propose tranches of investment to the Commerce Commission in a "staged MCP" process. This will provide efficiencies and recognises the projects enable system-wide network benefits when delivered as a coordinated programme (rather than addressing specific, more localised needs through discrete MCP projects).

When we started this work, our focus was to enable the renewable energy used by New Zealand"s Aluminium Smelter at Tiwai Point to be transmitted northwards - at the time, the smelter was tipped for closure in mid-2021. In March 2021, we expanded our focus to include addressing how we would enable new renewables and electrification across all of Aotearoa out to 2035 through developments in the grid backbone.

From 2030, electricity demand is forecast to ramp up as decarbonisation happens at scale and at pace. In Phase One we are looking at upgrades to the existing grid. By Phase Two, in many places we"ll be out of options to upgrade existing grid infrastructure and new lines will be needed to accommodate large-scale generation development and demand growth.

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We began our Phase Two work in early 2023 to demonstrate and build a wider understanding that new grid build, including new transmission lines that form a resilient grid backbone, are a key part of New Zealand"s energy transition. We don"t have any predetermined ideas about where or what form these new transmission corridors might take, what we do know is how long it takes to consult well and secure consents. We also know we need to meet the resilience and service expectations of a highly electrified economy in a country with a range of natural hazards.

We take a "least regrets" approach to identifying the range of upgrade projects needed on the grid. To do this we need industry and customer input throughout the programme. Transpower is only one link in the electricity delivery chain and the most efficient pathway will only be achieved if we can assist in creating a "joined up" view of grid needs with our industry partners.

As our NZGP work progresses, we will continue to consult with industry and our customers about the specific needs, details and timings of projects. These consultations will be signalled through Transpower"s usual channels, including our monthly industry newsletter (sign up here).

Meeting increasing demand will require new electricity generation infrastructure. And by being smart about how and when we use electricity, we can do more with our renewable electricity capacity, and keep costs down.

We can all help our renewable electricity resources go further by being smart about how we use electricity. Using energy efficient lighting, heating and appliances in our homes and businesses helps reduce the amount of electricity we need overall. Shifting electricity use to off-peak times where possible helps to reduce the peaks and our reliance on fossil-fuel generation.