

Special feature: How can New Zealand's electricity system keep pace with electrification?

A diverse generation mix could lower the cost of meeting future demand

Even under lower-growth scenarios, electricity demand is expected to rise by about 40 percent, meaning the system will need to adapt as the scale, pace and location of growth vary. Transpower's Te Kanapu insights paper examines six illustrative ways to meet additional electricity demand. Its modelling suggests that a geographically dispersed mix of wind, solar, geothermal, hydro, batteries and thermal peakers could deliver the lowest-cost outcome. Estimated generation and storage costs decline from around \$554–1,044/MWh under locally supplied solar and battery configurations (Case 1) to about \$96–171/MWh under the nationally diversified generation mix (Case 6). Reliable, affordable clean energy could therefore support electrification and strengthen New Zealand's export competitiveness.

New Zealand's geography makes a strong transmission network essential

Realising these benefits depends on more than building additional generation. New Zealand's topography is long and narrow, while its best hydro, geothermal, wind and solar resources are often located some distance from major demand centres. Transmission therefore lets regions share renewable resources, reduces the need to overbuild local generation and storage, and supports a more affordable, secure, and sustainable electricity system. The diversified generation mix case is projected to see (on average) less than 1 hour of non-supply per year, compared with around 26 hours under the most locally supplied case. However, these estimates may not capture outages within the transmission and distribution networks.

Investment decisions involve important trade-offs

The principal trade-off is that the generation mix with the lowest system-wide cost may require greater upfront investment in transmission and regional connections. The lower system-wide generation costs from this mix therefore need to be weighed against the additional network investment required, consenting timeframes, environmental and community impacts, and the seven to ten years that major transmission projects can take to deliver. Early, coordinated investment could bolster the grid's capacity and resilience and reduce bottlenecks in remote or more network-constrained regions. This would help ensure vulnerable communities are not disproportionately exposed to supply disruptions and that the benefits of electrification are shared across New Zealand.

Electrification will place substantially greater demands on the system

EECA's TIMES-NZ 3.0 model¹ broadens the picture by examining how changes across the whole energy system, from transport and industrial fuel switching to electricity generation and consumption, could interact over the coming decades. Its *Steady* and *Shift* scenarios indicate that greater electrification will increase the importance of managing when electricity is used, with demand flexibility and batteries helping to reduce peak requirements and overall system costs. This

¹ <https://eeca-nz.shinyapps.io/times-nz-v3/>



reinforces Transpower’s finding that the transition will depend on building more renewable generation and network capacity and on using the electricity system more efficiently.

Uneven regional resilience will complicate the electricity transition

NZIER’s work on the Downer Infrastructure Resilience Index² (IRI) adds a regional perspective by assessing electricity infrastructure resilience across New Zealand. The results show considerable variation: Waikato records the highest electricity resilience score, followed by Southland and Taranaki, while Northland and Auckland record lower scores. This indicates that resilience challenges associated with future electricity demand will vary across the country, particularly in areas where networks are more exposed to disruption or dependent on critical transmission links. Together with the Transpower and EECA findings, the IRI suggests that supporting the transition will require sufficient generation and national grid capacity, alongside continued investment in regional electricity infrastructure to strengthen resilience as demand grows.

Figure 1: The per-unit cost of generation and storage in each case

Figure 2: The reliability in each case

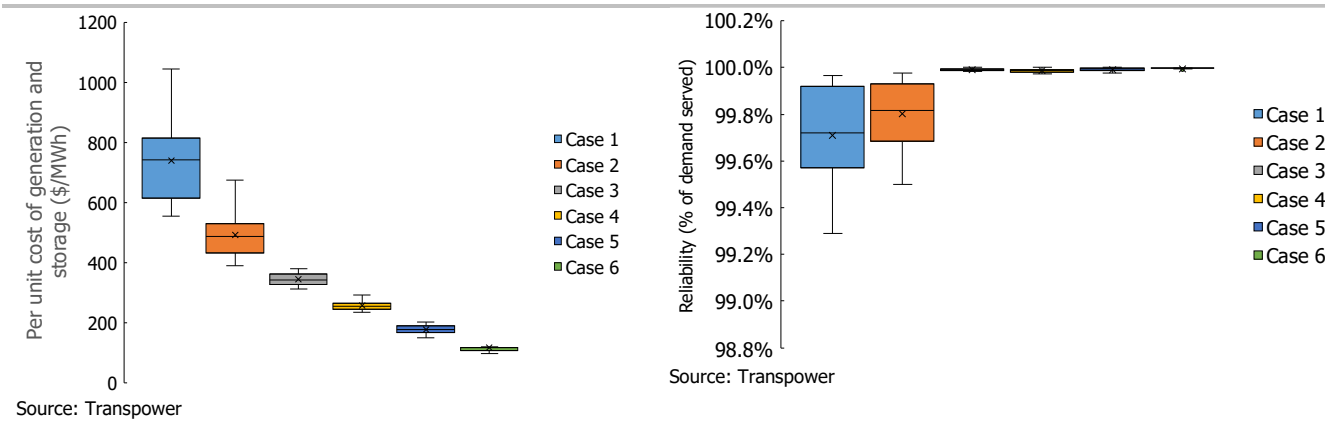
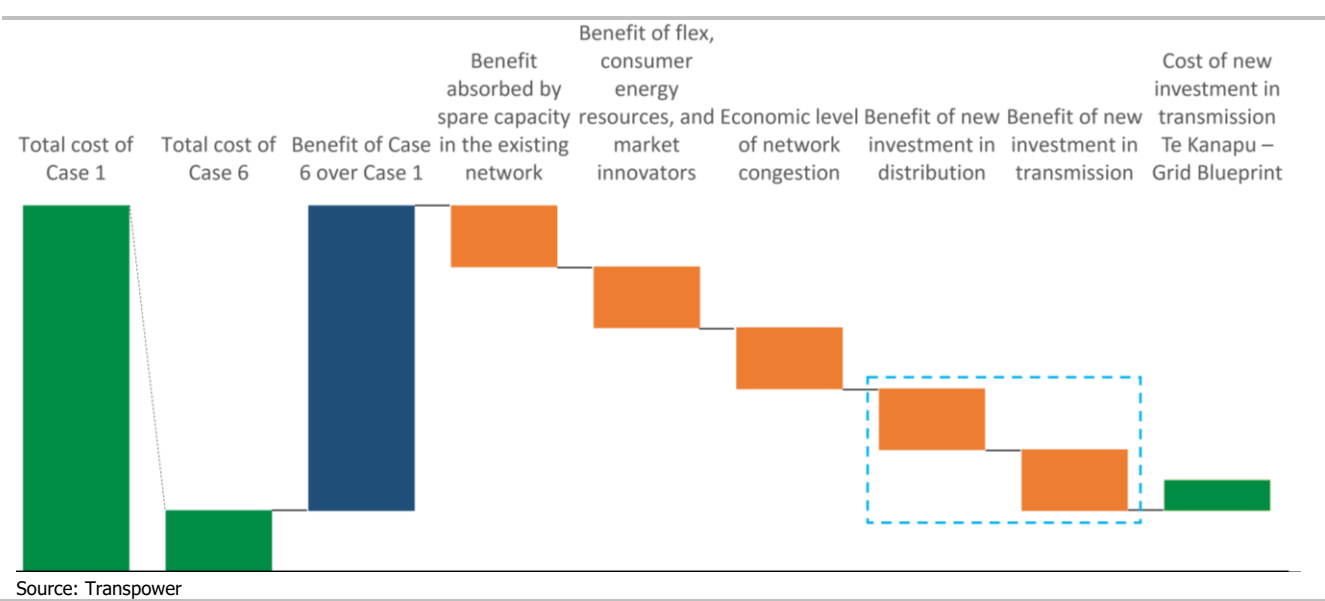


Figure 3: Schematic illustration of costs and benefits



² <https://downergroup.com/whitepapers/the-new-zealand-infrastructure-resilience-index/>

Figure 4: 'Steady' total electricity demand

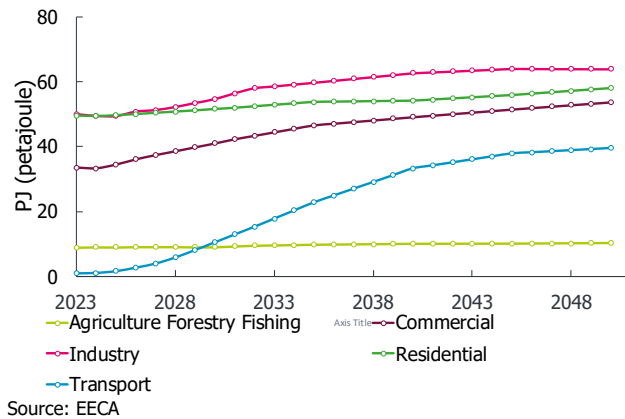
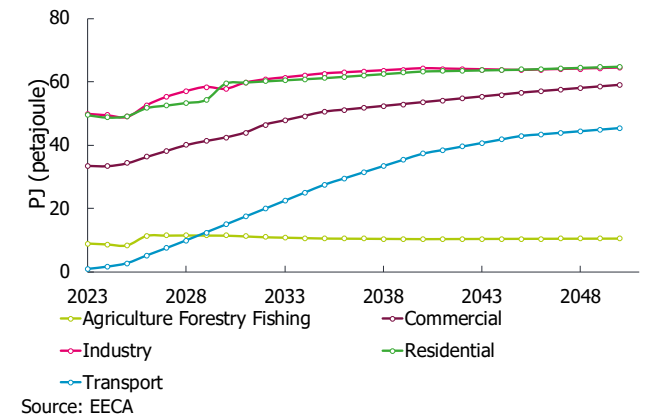


Figure 5: 'Shift' total electricity demand



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This Special Feature on Transpower's Te Kanapu future grid programme was originally published in the September 2026 edition of NZIER's *Quarterly Predictions*, one of the key publications available exclusively to NZIER members.

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