TRANSPOWER

A future grid blueprint for Aotearoa

Consultation 2:

Potential Scenarios Summary of submissions

March 2026

Te Kanapu

Future Grid Blueprint

Executive summary

Transpower, as owner and operator of the national grid and electricity system, has an important role to play in enabling Aotearoa New Zealand to electrify and grow. Through our Te Kanapu initiative, we are building a future grid blueprint for Aotearoa to guide investments in the grid up to and beyond 2050, supporting the country's future economic growth and net-zero aspirations.

When complete, Transpower's future grid blueprint will make the case for what investments are needed to meet future demand and unlock growth; and it will help the industry plan across a longer time frame.

The grid blueprint will contain future scenarios and the 'low regrets' investment options for the 2030s; options that address the features common across the scenarios, identify the lowest overall system cost and will deliver an optimal future grid for everyone.

The approach we are taking is collaborative: we are developing this future grid blueprint by gathering views and information from many others. Since the start of 2025, we've been meeting with communities, businesses, iwi, customers, industry and energy sector groups, and government to hear their thoughts on Aotearoa in 2050 and what it means for Transpower.

We are also seeking feedback through a series of consultations. In October 2025, we published our second consultation **A future grid blueprint for Aotearoa. Consultation 2: Potential Scenarios**. The feedback we received is here in this summary of submissions.

Consultation 2 outlined the five potential scenarios we have developed, to enable a discussion around Aotearoa's different possible futures and resulting energy use. The scenarios were created based on work that was completed by independent consultants, the feedback we received in **Consultation 1: Imagining Aotearoa in 2050**, and by including the themes we have been hearing in our conversations with stakeholders.

Feedback on Consultation 2

Overall, respondents tell us they support our approach and our ambition for the country as outlined in the growth scenarios and that these potential futures are feasible and plausible for use within our modelling but are somewhat ambitious. They were drawn to scenarios that use the nation's strength in renewable energy to drive economic growth with Global Green Rush and Aotearoa Electrified, most popular.

However, respondents believe our growth projections to be overly ambitious especially those relating to local eFuel production and the establishment of data centres. They want to see views of where demand is sitting at 2030 and 2040, and more detail at a regional and sector level.

Respondents also believe we have not adequately addressed the decline of gas, system resilience, the role of distributed generation and how peaking and dry year will be solved in each scenario.

Finally, there remain unanswered questions in the minds of our respondents around growth that we are proposing for our energy system; namely will it be affordable, will it be reliable and is the desired long-term strategic, bipartisan approach, even achievable?

Feedback we have heard repeatedly is that fundamental policy change and a bipartisan approach to planning and delivery is needed if Aotearoa is to realise a future of growth.

What we have changed

Following this feedback, we have revised our potential scenarios, so they are better reflective of what you think is feasible and plausible. We have also included more information on the uptake of consumer energy resources (CER) and solutions in each scenario for peaking and dry year.

These revised scenarios are now available in **Consultation 3: Future Direction - Our Energy Scenarios**, which also contains more detail around the assumptions we have used to guide our modelling and the data that illustrates those assumptions.

Unchanged are our two guiding principles, namely that in 2050, Aotearoa:

1. has a growing and thriving economy; and
2. remains committed to achieving net-zero carbon emissions.

All our scenarios paint a future of growth because this is what impacts the decisions we need to make around investment in the national grid. We want to identify the 'upper limit' of electrification and the broadest possible changes in the system, as ultimately, it is easier for us to scale back, than it is to scale up investment at short notice.

However, the degree of growth is different across each scenario, and this is where our scenarios have changed, based on your feedback.

Broadly, we have:

1. reduced projected electricity demand in 2050 across our scenarios by 13%-22%. See figures 1 and 2.
2. reduced projected electricity demand from data centres across all our scenarios except one. Our forecasts now align with NZTech September 2025 report[1], **Empowering Aotearoa New Zealand's Digital Future**, except for our Aotearoa Intelligence scenario, where we have gone further than they have to capture the upper limit of growth from data centres.
3. reduced the projected electricity demand from local eFuel production across all our scenarios except one and no longer assume significant manufacturing of eFuels in Aotearoa.
4. increased electricity demand from process heat to reflect the deeper decline of the natural gas sector, and
5. assumed a slower uptake of electric vehicles across all scenarios.

1 Report published after work was completed for the content of Consultation 2.

Table 1 summarises what you've told us and our approach to addressing your key concerns.

Table 1: Feedback we received and our response

Key themes of feedback	Our response
We are not competitive with other countries; growth has been low. We are not attractive to large industries, closures will continue.	All our scenarios assume GDP growth; those with higher growth require policy shifts occur as enablers.
Data centres are a bubble. Aotearoa is not attractive to data centre developers. Data centre demand is too optimistic.	Data centre forecasts are now much lower across all scenarios. We have used the recent report by NZ Tech. One large data centre in the 2030s is retained in Aotearoa Intelligence.
Local production of sustainable aviation and eFuels will be too expensive and are unlikely. We will continue to import aviation and marine fuels.	Fundamentally reset our assumptions on manufacturing eFuels. Only significant production occurs in Made in Aotearoa ramping up from 2035.
EV uptake has dropped and has been slow to recover since removal of subsidies. Worldwide EV adoption is faltering.	We now assume a slower uptake of EVs, our 2050 uptake is now close to what we predicted originally in 2040. It includes lower demand due to more mode shift; public transport, walking, etc.
The gas sector decline will happen/is happening much faster than expected. Alternatives are electricity or biofuels for existing industries.	Process heat electricity demand is now up to 25% higher in scenarios with existing industries and industrial growth. Gas sector is more clearly addressed in scenarios.
Dry year and peaking solutions need to be clearer.	These have been added to scenarios.
The Māori economy has been omitted.	Scenarios are currently providing broad, national-level descriptions around growth and investment. We expect growth and investment in the Māori economy to be more evident in regional-level descriptions and detail.

Figures 1 and 2 illustrate our electricity demand projections across all five scenarios, first as presented in the consultation draft and second, as in our revised projections.

Figure 1: Comparison of annual electricity demand by sector and scenario in TWh in 2050

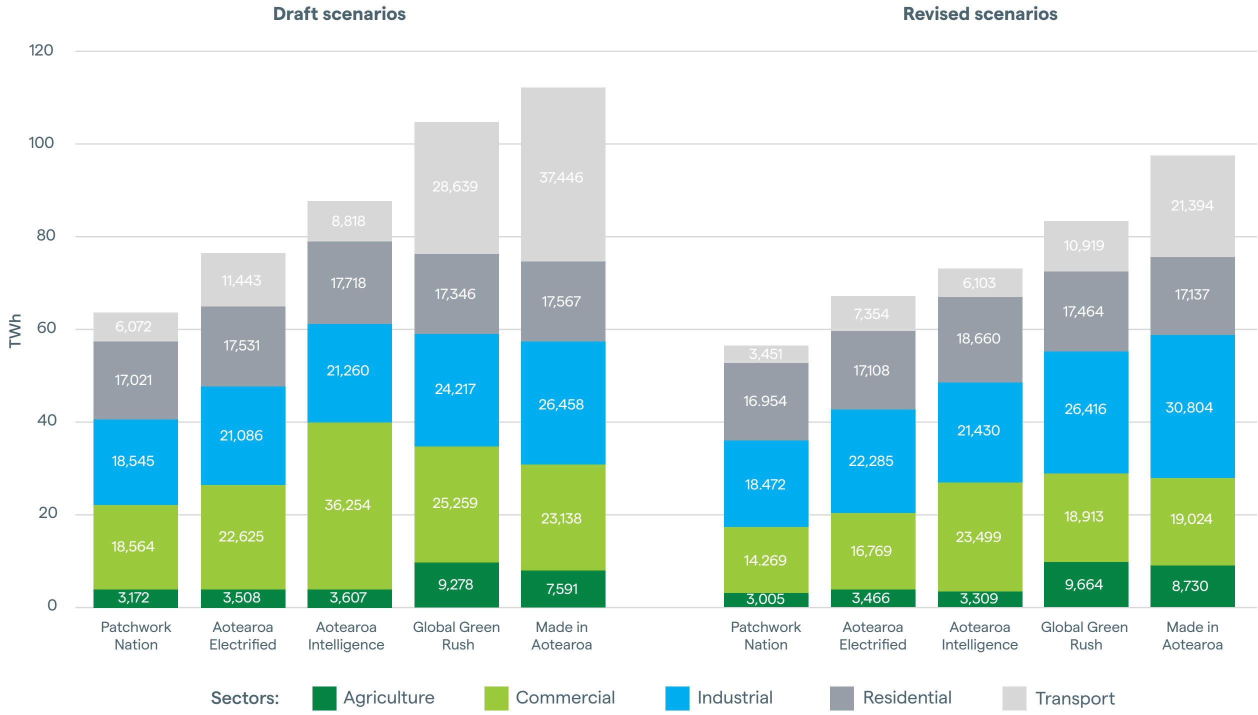
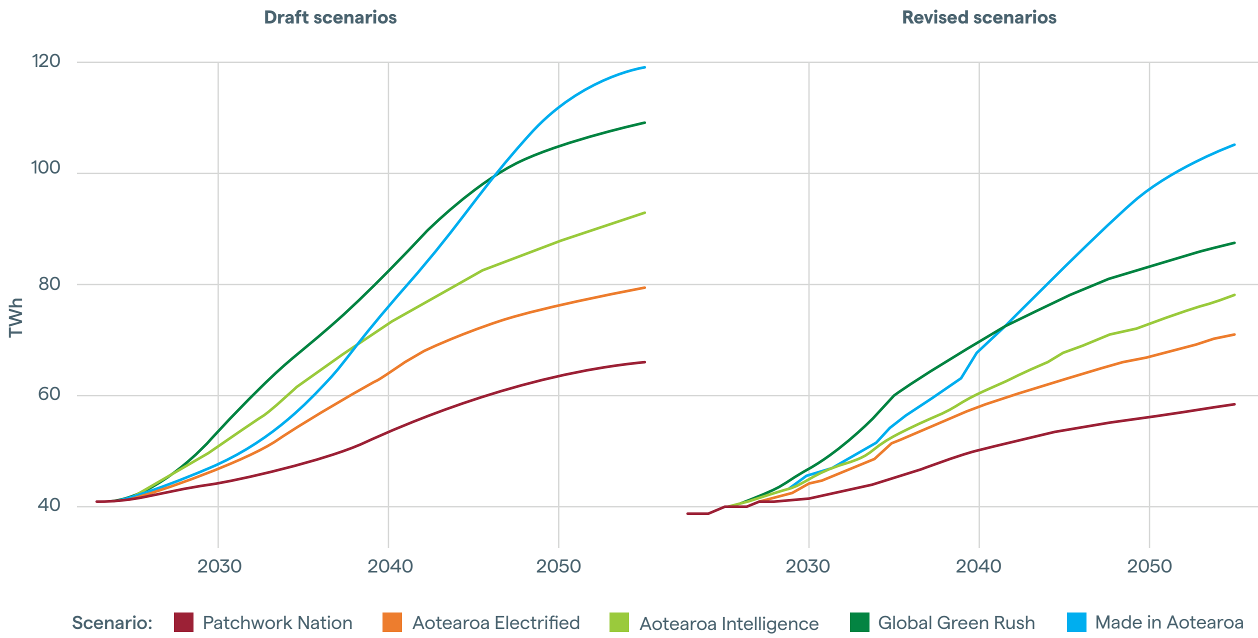


Figure 2: Comparison of electricity demand by scenario in TWh



Comparing Te Kanapu scenarios nationally and internationally

Several respondents asked for greater clarity on how our scenarios compare to others. While our range of forecast demand in 2050 has reduced, our scenarios still reflect a growth ambition, something that stakeholders continue to support.

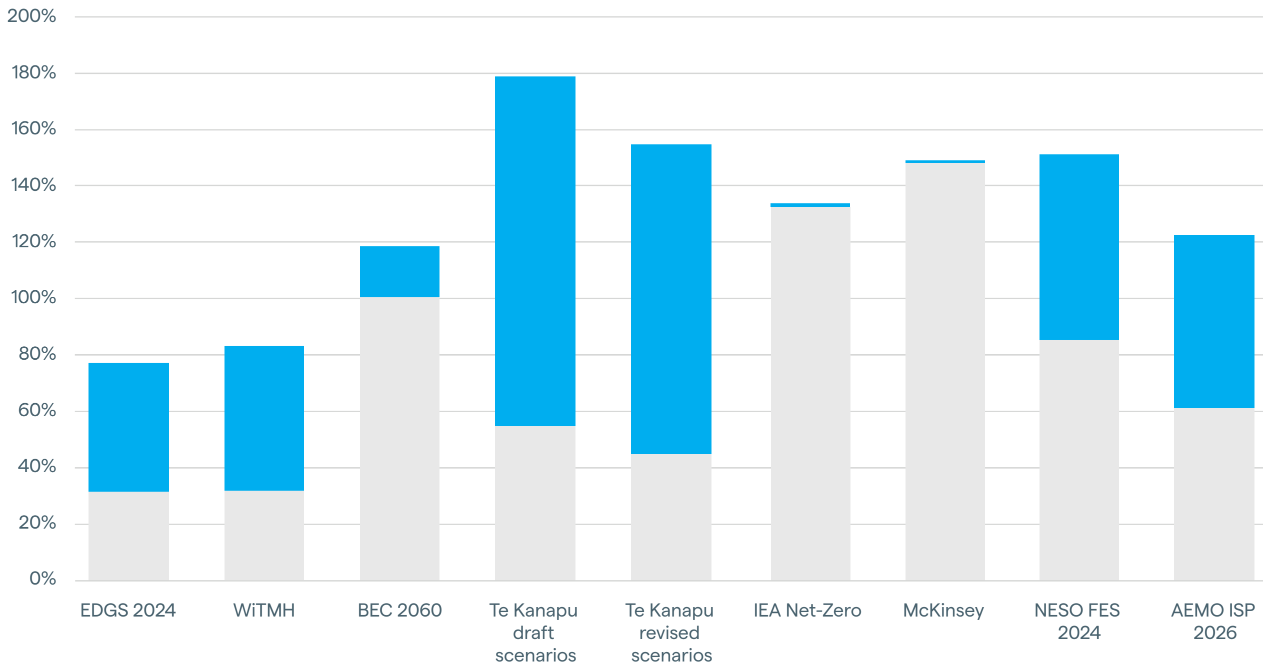
International comparisons with scenarios produced for a similar purpose by the Australian Energy Market Operator (AEMO) and Great Britain's National Energy System Operator (NESO), put our scenarios in-step with these.

Our scenarios continue to span a broad range of possible futures to help ensure the future grid blueprint will capture any low regret outcomes from outliers.

Figure 3 below offers a comparison between the Te Kanapu scenarios with other scenarios from Aotearoa and abroad. We note that the AEMO ISP 2026 (as shown in Figure 3) also reflects reduced demand, when compared to the AEMO 2024 ISP.

Figure 3: Comparing Te Kanapu scenarios nationally and internationally

Modelled increase in electricity demand by 2050 (relative to 2024)



What happens next?

We have taken all the feedback received and used it to revise our potential scenarios. Consultation 3: Future Direction describes our newly revised scenarios plus the generation inputs and costs that enable each scenario. It also outlines several assumptions that we are using in our modelling, and why. **Consultation 3: Future Direction - Our Energy Scenarios**, is available now.

Please get in touch by emailing **feedback@transpower.co.nz**.

You can also sign up to receive email updates on Te Kanapu as our work progresses. As we move into the modelling phase of our work, we will publish regular updates to outline any changes we make to key inputs or our assumptions around demand, generation and options. **www.transpower.co.nz/our-work/te-kanapu**

Introduction: Shaping our energy future together

Transpower is a state-owned enterprise. We build, maintain and run the country's national electricity grid; we also operate the electricity market system, but we don't own, generate or sell electricity.

Through our Te Kanapu initiative, we are building a future grid blueprint for Aotearoa to guide investments in the grid up to and beyond 2050, supporting the country's future economic growth and net-zero aspirations.

We expect that in 2050, the way Aotearoa produces and consumes energy and electricity will be different from today and that change will play out differently in different regions. While the potential for change is vast, no one individual can possibly know, or predict, exactly what 2050 will hold. This is why we need knowledge and insights from others.

The future grid blueprint will guide Transpower in its longer-term, 'low regrets' investments in the grid; investments that identify the lowest overall system cost and ensure the grid is resilient, adaptive and supports the way we need to manage the electricity system. The blueprint will also support industry and those in the energy sector with their long-term planning.

Te Kanapu means both 'lightning' and 'bright', so it speaks to both the electrification and illumination of our country, and Transpower's goals for a bright, energised future.

Developing a future grid blueprint

There are four main parts to developing the future grid blueprint:

1. Finding out as much as we can about the future economy, energy supply and use, technology advances and megatrends, before using that information to develop potential future scenarios.
2. Developing electricity forecasts for each of those scenarios and looking at how the electricity needed might be generated. Forecasts were included in Consultation 2: Potential Scenarios.
3. Analysing and identifying what the grid needs to look like by 2050 across our scenarios.
4. Confirming any near-term grid upgrades needed in the 2030s that are required in most scenarios.

The approach we are taking is collaborative: we are developing this future grid blueprint by gathering input from as many others as possible. Since the start of 2025, we've been meeting with many people to hear their thoughts on Aotearoa in 2050 and how Transpower, and the electricity system, will need to respond to meet the needs of the future. These conversations are ongoing, giving us many new things to consider and fresh insights that we are applying to our work.

We are also seeking feedback through a series of consultations.

- In July 2025, we published **Consultation 1: Imagining Aotearoa in 2050** and sought views on four key areas: what existing industries will be driving our economy in 2050; what new industries will be driving the economy; what the most important factors in achieving economic growth are, and what Transpower and the energy sector need to do to achieve economic growth.
- **Consultation 1: Summary of survey responses** outlines what we heard from stakeholders over the initial consultation period to late August 2025.
- This information was then used to support the development of our potential future scenarios, the subject of **Consultation 2: Potential Scenarios**; a summary of feedback received through this consultation is what's being covered here.
- We have taken all the feedback received and used it to revise our potential scenarios. Consultation 3: Future Direction describes our newly revised scenarios and more detail around the assumptions and data we have used. **This consultation is now open for feedback** closing 30 March 2026.
- We have also released our **Te Kanapu technical approach suite of documents** describing the methodology we are using for building the future grid blueprint.

Completing and publishing the future grid blueprint

Having revised our potential scenarios and defined our technical approach, we are starting to model the draft future grid blueprint. This draft will be published later in the year for your consideration and feedback.

While this work is underway and wherever possible, we want to capture any shifts in the key inputs we are using; we also anticipate our assumptions could change during this process. Our plan is to publish regular updates on how our modelling is progressing and to highlight where changes have occurred.

Your feedback is always welcome.

After consulting on our draft future grid blueprint, we will incorporate the feedback we receive before publishing our first future grid blueprint, outlining our initial tranche of planned investments in the national electricity grid through to 2050 and beyond.

Our first future grid blueprint will not be our last. We will continue to review and revise this work as we gather feedback and will update the blueprint regularly to ensure it remains current.

Potential future scenarios

Scenarios provide a way to examine future trends. They are not forecasts; they are plausible, coherent stories about the future, used to test plans against a wide range of uncertainties.

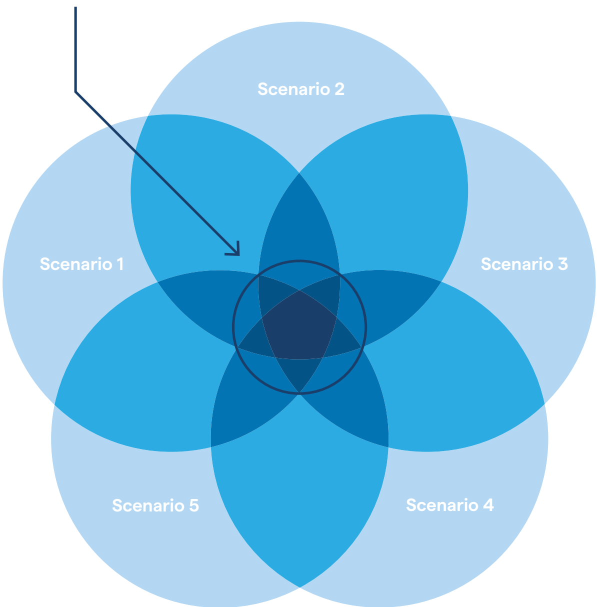
Scenarios seek to enable people to compare different possible versions of the future, and the levers and actions that produce those futures. They are designed to be used to explore what might happen, not what should happen or what we want to happen.

To produce the future grid blueprint, we need to understand the different possible futures that lie ahead out to 2050 and beyond. Will the nation's future be one of a large expansion of goods production, or growth in the high-tech sectors? Will it be regional or urban growth? Rapid or stalled electrification?

By developing a suite of potential future scenarios, we can explore the electricity generation and demand assumptions that come with them. Then we can use extensive power system and market modelling (our Te Kanapu technical approach) to understand what we need to do, to enable these scenarios.

We need to identify the common features that exist across our potential futures, to help guide our investments and ensure the national grid and electricity system can meet the needs of Aotearoa into the future, regardless of the uncertainty that exists around what may or will, eventuate.

The common features across all our potential futures will help guide the 'least regrets' investment in the grid.



While some Aotearoa-specific scenarios exist already, they do not provide enough detail, nor are they ambitious enough for our purpose. Additionally, they don't reflect some of the key factors that we are exploring such as the potential for new industries to be driving our economy and growth in electricity demand.

In **Consultation 2: Potential scenarios** we outlined five potential future scenarios. All are grounded in two main assumptions, which are that in 2050, Aotearoa:

1. remains committed to achieving net-zero carbon emissions, and
2. has a growing and thriving economy.

Our scenarios are deliberately based on growth and ambition because of the decisions we must make around investment in the national grid. We want to identify the 'upper limit' of our potential as it is easier for us to scale back our ambition, than it is to scale up grid investment at short notice.

> It is important we explore the full potential of Aotearoa's energy future and ensure we are ready to enable all opportunities.

While some scenarios have similar growth trajectories, the key factor to consider is how and where this growth occurs across Aotearoa. This is critical to the decisions we will need to make around our grid investments.

Feedback to date: What we've heard and what it means

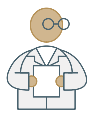
Update to Consultation 1: Summary of survey responses

We first published our **Consultation 1: Summary of survey responses**, in September 2025.

Since then, our survey has remained open and we have received an additional 26 submissions; 25 survey responses from individuals, and a written submission from the Electricity Authority.

This brings our figures to:

129
survey responses



97
survey responses from individuals

32
survey responses from organisations

The additional responses have largely reinforced the previous results with only minimal change.

When asked 'what three factors will be most important for shaping the country's economy by 2050?', 'affordability and the cost of living' is now ranked first (up from second) with 'accelerating economic growth' ranked third instead of first. 'Having quality core services' is now second (up from third).

When asked, 'what are the key factors that will help Aotearoa achieve economic growth by 2050?', 'energy' remains the top ranked factor, while 'the economy and productivity' has swapped rankings with 'investment', now ranked second and third respectively.

When asked, 'what technologies and fuels do you expect will play the greatest roles in the energy future of Aotearoa?', 'geothermal' remains ranked number one, while 'grid scale battery energy storage systems (BESS)' and 'utility-scale solar' have swapped positions, now ranking second and third respectively.

Responses to open ended questions continue to emphasise the same factors as being most critical to success: energy affordability and security; the need to embrace new technologies; a stable and streamlined policy environment, and the adoption of a long-term, wholistic view.

The Electricity Authority have also reinforced the need for Transpower to remain flexible in its planning, given the high levels of uncertainty.

Wider stakeholder feedback

Alongside formal consultation, we have also sat down with key stakeholders across the energy sector to gather more specific information around growth, resilience and energy security, barriers and Transpower's role in enabling the country's energy future.

What appears certain to stakeholders is that Aotearoa will experience a future of renewable-dominant generation supported by diverse technologies. However, the shift to renewables brings investment and operational challenges, not only for industry but also for communities that need to accept new infrastructure.

When it comes to the question of what makes for the 'optimal' energy pathway for Aotearoa, views diverge. However, views are consistent around the need for bipartisan policy to ensure stability, and for Transpower to act either as a neutral coordinator, or in a leadership role, to support this to happen.

There is consensus that the industry needs shared priorities for a resilient energy future.

Key opportunities stakeholders identify are to build ahead of need; support strategic industries and investment through government intervention; enable CER and to develop a coordinated national energy strategy for growth.

Consultation 2: Potential scenarios

In October 2025, we published our second Te Kanapu consultation, Potential Scenarios. We posted this on our website, shared it directly with people who had already joined the conversation, and promoted it through all our channels.

For more detail from survey responses, see pages 16 – 22.

We received 161 responses

- 88% individuals
- 12% industry

Survey responses by business or organisation

Advancing Manufacturing Aotearoa

Aurora Energy

Beca Ltd

BusinessNZ

Christchurch International Airport

Datagrid

Development West Coast - Regional Economic Development Agency

Energy Resources Aotearoa

Geoff Hunt Consulting

Helios Energy Limited

IEGA

JERA Nex bp

Lodestone Energy

Major Electricity Users' Group

Maxim Institute

Mercury

NZ Offshore Wind Ltd

Orion

Powerco

Unison Networks Limited

Venture Taranaki

Key themes

Use the nation's strength in renewable energy to drive economic growth

Respondents strongly favour scenarios emphasising a green energy transition and the need to leverage the nation's competitive advantage from green energy, while growing the economy and manufacturing base.

Respondents said that scenarios Global Green Rush and Aotearoa Electrified best reflected their ambition[2] for Aotearoa.

Flexibility is key along with technically credible implementation pathways

When considering the challenges ahead, respondents indicate a preference for flexible strategies that combine the best elements from different scenarios.

Great to see the ambition but growth projections don't ring true

There is support for Transpower's ambition and the plausibility of the scenarios, however, many respondents consider demand growth projections to be overly optimistic especially those relating to the local production of eFuels and presence of data centres. Some reasons for this include low historical growth; anticipated industrial closure; international competition; slow EV uptake, and the need for policy changes before such growth could be considered reasonable.

More data-driven evidence and more detail is requested

Respondents want to see clear views of demand in 2030 and 2040, regional granularity, and sector breakdowns.

Some respondents sought confirmation that, given the ambitious growth projections outlined, that the scenarios were not driving investment decisions. More detail is requested[3].

The decline of gas, system resilience, peaking and the impact of the Māori economy have not been adequately addressed

Some respondents believe that the gas sector will decline faster than expected which will drive rapid change. They urge realistic treatment of gas availability (including LNG procurement) and investment 'ahead of the curve' to prevent constraints from throttling growth. Views diverge on long-term gas, but the near-term role in reliability is widely acknowledged.

Distributed generation and storage will be pivotal, but need the right price signals

Contributors expect solar and Battery Energy Storage Systems (BESS) (including behind-the-meter) to be rapid, low-cost options in the future. They stress stable time-of-use frameworks and Transmission Pricing Methodology settings are needed to make investments bankable; and they caution against over-estimating short-term demand response. Hybrid plants and retail innovation (virtual net-metering) are also flagged.

Technology mix assumptions should be updated

This is considered especially important for offshore wind and pumped hydro; be cautious on hydrogen, eFuels and demand-side flexibility. Respondents lean toward a balanced system that is neither fully centralised nor fully decentralised.

Questions and concerns remain regarding the country's energy future

Will it be affordable?

Affordability is the number one issue raised, followed by equity. Submissions highlight concerns about high prices, energy poverty risks, and the need for pricing frameworks (e.g., time-of-use signals, buy-back rates, gentailer reforms) that promote fairness and cost efficiency. Many call for long-term strategies to avoid price shocks and ensure low-cost energy as a foundation for competitiveness and equity.

Will it be reliable?

The intermittency of renewables raises concerns around how a reliable supply will be achieved across potential scenarios.

2 Weighted voting method was used, i.e. three points for 1st choice, two points for 2nd, one point for 3rd. Some responses mentioned only one scenario, other responses noted up to three.

3 More detail is available in **Consultation 3: Future Direction - Our Energy Scenarios**

Will the necessary long-term planning and coordination actually happen?

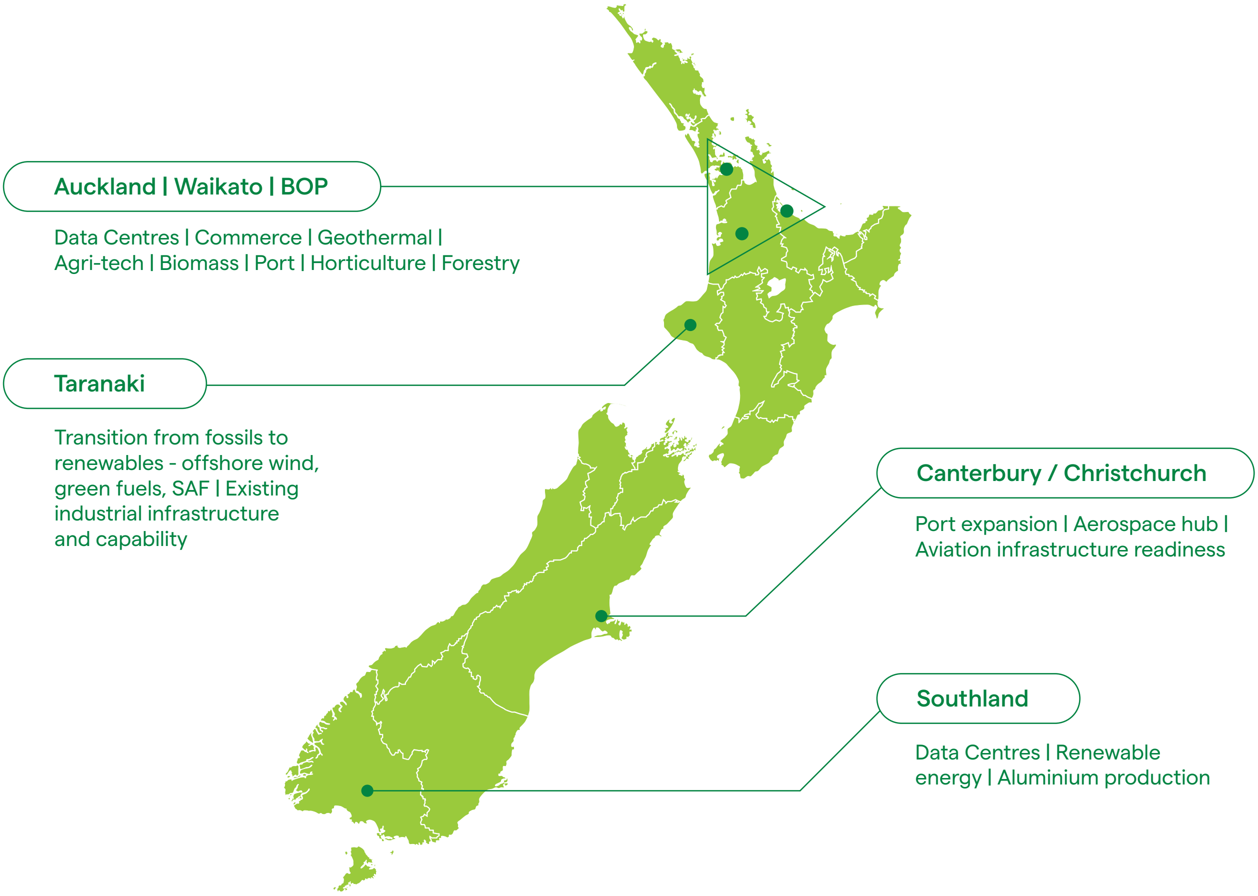
Stakeholders emphasise that strong government leadership - demonstrated through funding, clear policy direction, and regulatory frameworks - is essential to enable high-growth future scenarios and affordable, reliable, and future-ready electricity infrastructure. This includes setting national strategy, ensuring investment certainty, aligning pricing and market rules, and coordinating across agencies to support the energy transition.

Respondents believe that electoral cycles will disrupt long-term planning. There is scepticism around whether cross-party consensus can be achieved and sustained.

Regional drivers of growth

We presented key drivers of current economic activity at a regional level and sought respondents feedback on their region in 2050.

Respondents identified six key regions expected to drive economic growth in Aotearoa, by 2050. Each region's unique competitive advantages and economic strengths are highlighted.



Auckland

- Population hub
- Strengths in trade, manufacturing, commerce especially eCommerce, residential, entertainment and technology
- Geographic advantage located in Golden Triangle
- *But* an infrastructure challenge remains

Waikato

- Strong population growth
- Strengths in farming, manufacturing, and tourism with a focus on innovation
- Logistics
- Geographic advantage located in Golden Triangle
- Potential for data centres, transport hubs and biomass

Taranaki

- Home of the energy transition and green products and services
- Strengths in agriculture and food production
- Potential for SAF, eFuels and green hydrogen production

Bay of Plenty and Tauranga

- Strong population growth and the country's largest port
- Strengths in horticulture, forestry, geothermal and port-based logistics
- Geographic advantage located in Golden Triangle

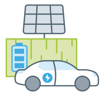
Canterbury and Christchurch

- A hub for the South Island enjoying strong urban growth
- Diverse economy that spans agriculture, horticulture and aquaculture, manufacturing, bioprocessing and high-tech industries, tertiary education and tourism

Southland

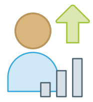
- A potential hub for data centres
- Strengths are in its natural advantages: a cool climate, hydroelectricity and sustainable food production
- Growth will come from farming and computing-related technologies
- Opportunity for growth in aluminium production

The following cross-regional growth drivers were also identified:

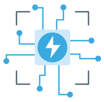


Electrification of transport

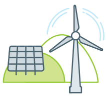
Process heat transition



Population growth



Data centres



Green energy production

Detailed responses

Potential scenarios

Which scenario best reflects your ambition for Aotearoa?

Votes were weighted by preference to generate the result. Three points for first choice, two for second, one for third.

Global Green Rush

- Noted as a preference 52 times
- Score = 152

Made in Aotearoa

- Noted as a preference 53 times
- Score = 133

Aotearoa Electrified

- Noted as a preference 27 times
- Score = 80

Aotearoa Intelligence

- Noted as a preference 24 times
- Score = 51

Patchwork Nation

- Noted as a preference 5 times
- Score = 13

Patchwork Nation

Are these the drivers and industries you would expect to see in this scenario?	Does the generation mix seem logical?
Yes – 53	Yes – 51
No – 13	No – 20
Other – 5	Other – 7

Are there other actions or factors we have missed?

- Hydro is viewed as essential but missing.
- Stakeholders see structural blind spots which undermine the realism and credibility of scenarios; for example, the failure to address dry-year security.
- The scenario is missing Māori and iwi-led energy pathways, both a cultural and economic omission which may affect regional generation and community resilience.

Additional thoughts

- Sudden deindustrialisation due to the gas scarcity could cause sharp, regional demand shocks.
- When faced with the cost of increasingly impactful weather events, resilience and security will be prioritised for investment. This will incentivise the adoption of decentralised technologies.
- BESS adoption will rise independently of policy ambition; it's market-driven and already underway.
- Internal inconsistencies (like process heat rising in deindustrialisation) need addressing to maintain the credibility of the scenario.
- The generation mix must fix price volatility or Aotearoa risks permanent economic decline.

Aotearoa Electrified

Are these the drivers and industries you would expect to see in this scenario?	Does the generation mix seem logical?
Yes – 56	Yes – 61
No – 6	No – 14
Other – 20	Other – 4

Are there other actions or factors we have missed?

- Widening equity and affordability gaps, as wealthier households and regions can afford to invest in decentralised energy while vulnerable communities face energy hardship and rising costs.
- The scenario is missing references to iwi partnerships and Māori perspectives which are increasingly central to regional development and renewable energy projects.

Additional thoughts

- Stakeholders signalled that the scenario underestimates how slowly key sectors like heavy transport will transition and that the generation mix may need to account for transitional, waste-to-energy type fuels, not just renewables if it's to remain plausible.

Global Green Rush

Are these the drivers and industries you would expect to see in this scenario?	Does the generation mix seem logical?
Yes – 51	Yes – 55
No – 9	No – 19
Other – 13	Other – 3

Are there other actions or factors we have missed?

- The cost of green technology and electrification is uncertain, and rising prices for renewables could make Aotearoa less competitive globally.
- Māori/iwi involvement in geothermal and renewable projects should be considered along with concerns about selling forests for carbon sinks. The scenario should highlight the need for inclusive and responsible resource management.

Additional thoughts

- While the scenario aligns with climate goals, assumptions about falling CAPEX and global cooperation may be unrealistic, creating risk for the country's energy strategy.
- There needs to be a focus on resilience over reliance; the country cannot depend on global supply chains or foreign partners for critical energy infrastructure; local innovation and resource sovereignty are essential.

Made in Aotearoa

Are these the drivers and industries you would expect to see in this scenario?	Does the generation mix seem logical?
Yes – 52	Yes – 53
No – 10	No – 18
Other – 16	Other – 4

Are there other actions or factors we have missed?

- There is scepticism about the viability of green fuels. Multiple respondents question the realistic production economically and at sufficient scale.
- The economic case for green exports depends on timing and credibility. Responses suggest that *"…the economic benefit of the 'green premium' may erode by the continued presence of carbon-emitting generation."*.
- Success depends on sufficient competitive advantage arising from the country's green manufacturing, being captured in the global market to offset labour costs.

Additional thoughts

- Distributed generation may be the pragmatic path forward.
- Location planning needs to align generation sources with industrial demand, not just existing infrastructure.
- Respondents generally favour the concept of renewable energy zones but emphasise these require coordinated planning, generation mix, diverse firming solutions (not just pumped hydro), and public-private investment partnerships.
- Regional development requires an honest assessment of the limitations that exist.
- Export eFuel manufacture will happen at the point of generation to minimise the cost of new transmission for competitiveness.

Aotearoa Intelligence

Are these the drivers and industries you would expect to see in this scenario?	Does the generation mix seem logical?
Yes – 50	Yes – 48
No – 13	No – 22
Other – 10	Other – 5

Are there other actions or factors we have missed?

- Resource and environmental impacts from the increase in data centres, and the question of social licence need to be considered.
- The conflict between climate policy and economic growth, with this scenario sidelining climate policy.
- The country's very high seismic risks and dependence on only two or three intercontinental fibre-optic cable links have been overlooked and is a constraint on this scenario.

Additional thoughts

- There are fundamental feasibility concerns surrounding data centres, with the problem considered to be one of network bandwidth and latency, not electricity.

Drivers of growth

Aviation

1. What do you think about the opportunities for and extent of growth we outlined?
   a. Agree / likely – 23 responses
   b. Disagree / unlikely – 14 responses
   c. Neutral / other – 12 responses

2. What challenges and other things have we missed?
   a. Availability / cost of infrastructure / cost of implementation – 7 responses
   b. Demand for aviation may be overestimated and may decrease in response to external factors (e.g. finite fossil fuels, climate change, cost to consumers) – 5 responses
   c. Aviation is essential for Aotearoa but difficult / impossible to decarbonise – 5 responses
   d. Government leadership / regulation – 5 responses
   e. Climate crisis – 4 responses
   f. There are technical and viability issues specific to fuel types (e.g. weight, short lifespans of batteries, range limits, fire risks) – 4 responses
   g. Nuclear generation – 2 responses
   h. Distance / location – 2 responses

Additional thoughts

"SAF seems extremely unlikely to materialise at the demand level you anticipate due to high cost. Fossils fuels are likely to remain the dominate fuel for aviation through to 2050."

"From a West Coast perspective, aviation demand growth will be modest. The region is well suited to early adoption of electric short-haul flights, which will increase electricity needs at airports. For the Coast, the main opportunity is electrifying regional aviation rather than producing new fuels. Future low-emission aviation aligns with tourism and freight opportunities. Could help build confidence in sustainable transport innovation."

Shipping

1. What do you think about the opportunities for and extent of growth we outlined?
   a. Agree / likely – 15 responses
   b. Disagree / unlikely – 5 responses
   c. Neutral / other – 30 responses
2. What challenges and other things have we missed?
   a. Climate crisis – 6 responses
   b. Biofuels – 5 responses
   c. Data centres – 3 responses
   d. Limitations specific to alternatives fuels – 2 responses
   e. NZ geography / location / distance – 2 responses
   f. The assumption that NZ will grow its exports / imports is unlikely – 2 responses
   g. Regulation / policy – 2 responses

Additional thoughts

"As for aviation, fossil fuels will remain dominant for long distance with localised transport - e.g. Auckland ferries switching to battery electric."

"Yes, the opportunities seem realistic. Electrification of ferries and docked ships is a good start, and eMethanol production from green hydrogen has strong potential, especially if we shift away from fossil-based methanol. Growth will depend on how fast we invest in port infrastructure and clean fuel production. Taranaki and Marsden Point make sense as hubs."

"Shipping is essential to NZs long term prosperity as we rely on it for most of our exports. Low carbon shipping is essential to NZs long term prosperity unless we exit from international climate agreements and obligations and other countries let us (which seems unlikely). While international shipping is excluded from national carbon accounting, this is a blind spot in the global system which other countries will eventually require to be fixed in the agreements, like aviation. It will then disproportionately impact NZ's ability to meet our targets. So, we should prioritise this as a sector for emissions reduction in advance of the almost inevitable."

Data centres

1. What do you think about the opportunities for and extent of growth we outlined?
   a. Agree / likely – 23 responses
   b. Disagree / unlikely – 19 responses
   c. Neutral / other – 5 responses
2. What challenges and other things have we missed?
   a. Data centres are resource intensive / environmental impact – 12 responses
   b. Need to be mindful of the global demand for data centres / concerns for how demand is calculated / demand decrease – 7 responses
   c. Social licence - resources needed to run data centres may be at the expense of communities – 3 responses
   d. AI technologies – 3 responses
   e. Ensuring value requires strategic thinking / they may provide little value relative to scale of investment required – 2 responses
   f. New energy technologies for residential (solar, LED lighting, EV charging) – 2 responses
   g. Strain on the grid – 2 responses
   h. Cyber security issues / hackers / attacks from foreign adversaries – 1 response

Additional thoughts

"Data centres have the potential to bring economic growth to NZ if the "right players" – those that bring long-term job creation and R&D – are connected to the grid. If the "wrong players" are connected, then NZ effectively loses cheap, renewable power that it could have used to fire up developing industries such as SAFs, hydrogen, etc."

"Data centres need to supply their own power and not pull off the grid, so they need their own solar panels on top of their building and BESS to keep them totally independent."

"Datacentres also require water and other resources. Social licence may also be a consideration, as, based on some international commentary, the energy usage of datacentres can sometimes be at the cost of energy availability for local residents in some locations."

Primary industries

1. What do you think about the opportunities for and extent of growth we outlined?
   a. Agree / likely – 16 responses
   b. Disagree / unlikely – 4 responses
   c. Neutral / other – 9 responses
2. What challenges and other things have we missed?
   a. Climate impacts on suitable land and associated knock-on impacts – 9 responses
   b. Government leadership / regulation / policy – 5 responses
   c. Challenges specific to rural NZ - Affordability and transport – 3 responses
   d. Increasing uptake of off-grid, local power supplies creates new energy opportunities – 2 responses
   e. Poor planning / lack of strategic thinking – 2 responses
   f. Balancing energy demand with infrastructure capacity – 2 responses

Additional thoughts

"Mining, agriculture and forestry remain central to our regional economy with significant minerals projects progressing. Electrification and cleaner processing are key to strengthening these industries, supporting Te Whanaketanga's mission to realise our natural resources responsibly while creating local value and long-term employment."

"I believe more localised supply at the point of need is required. Too many rural areas can be impacted by weather events, bringing down supply power lines. Localised generation reduces this risk, use a range of options like wind, solar, turbine."

"It is likely that primary industry growth will occur in all regional locations, particularly where land is at a lower cost, on farm solar will play a major role, both to enhance resiliency and lower on farm costs."

Commercial, industrial and residential electricity

1. What do you think about the opportunities for and extent of growth we outlined?
   a. Agree / likely – 15 responses
   b. Disagree / unlikely – 7 responses
   c. Neutral / other – 13 responses
2. What challenges and other things have we missed?
   a. The need to improve energy efficiency to support grid performance – 7 responses
   b. The potential of geothermal / natural gas energy sources – 4 responses
   c. Transport and access to energy, especially in regional NZ – 4 responses
   d. Batteries / storage as a means of managing capacity / peak demand – 4 responses
   e. Impact of population growth and land-use planning in urban centres – 4 responses
   f. Climate crisis / resilience – 4 responses
   g. Affordable energy / high costs – 2 responses

Additional thoughts

"Residential electricity usage is set to increase as gas becomes too expensive and homes become more electrified. Rooftop solar and batteries can facilitate this, but incentives will be needed to overcome the capital cost."

"Energy affordability, grid capacity and land-use planning will be ongoing challenges as industrial activity and population increases. Supporting efficient energy use, exploring storage and local generation options, and ensuring consenting frameworks can adapt to new demand will be key to sustaining growth and competitiveness."

Land transport

1. What do you think about the opportunities for and extent of growth we outlined?
   a. Agree / likely – 10 responses
   b. Disagree / unlikely – 2 responses
   c. Neutral / other – 0 responses

2. What challenges and other things have we missed?
   a. Addressing climate crisis / transition to alternatives – 8 responses
   b. Location and type of infrastructure to support uptake – 7 responses
   c. Lack of government investment / incentives – 5 responses
   d. Increasing uptake of sustainable transport options (public transport, rail, walking, cycling) – 4 responses
   e. Cost of infrastructure / cost to consumers – 3 responses

Additional thoughts

"Government's not moving fast enough (not enough incentives for EV adoption, lack of Carbon taxes on fossil fuels)."

"Missed the large increase in cycling, public transport and walkable cities reducing private car usage leading to more efficient trips. This will depend hugely on local government leading cities to be greener and more pleasant places for people to live and whether the central govt will support this by providing money to councils to spend on projects like urban greenways and cycleways."

"A substantial move of long-distance road freight to electrified rail, along with a substantial increase in regional passenger rail travel."

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