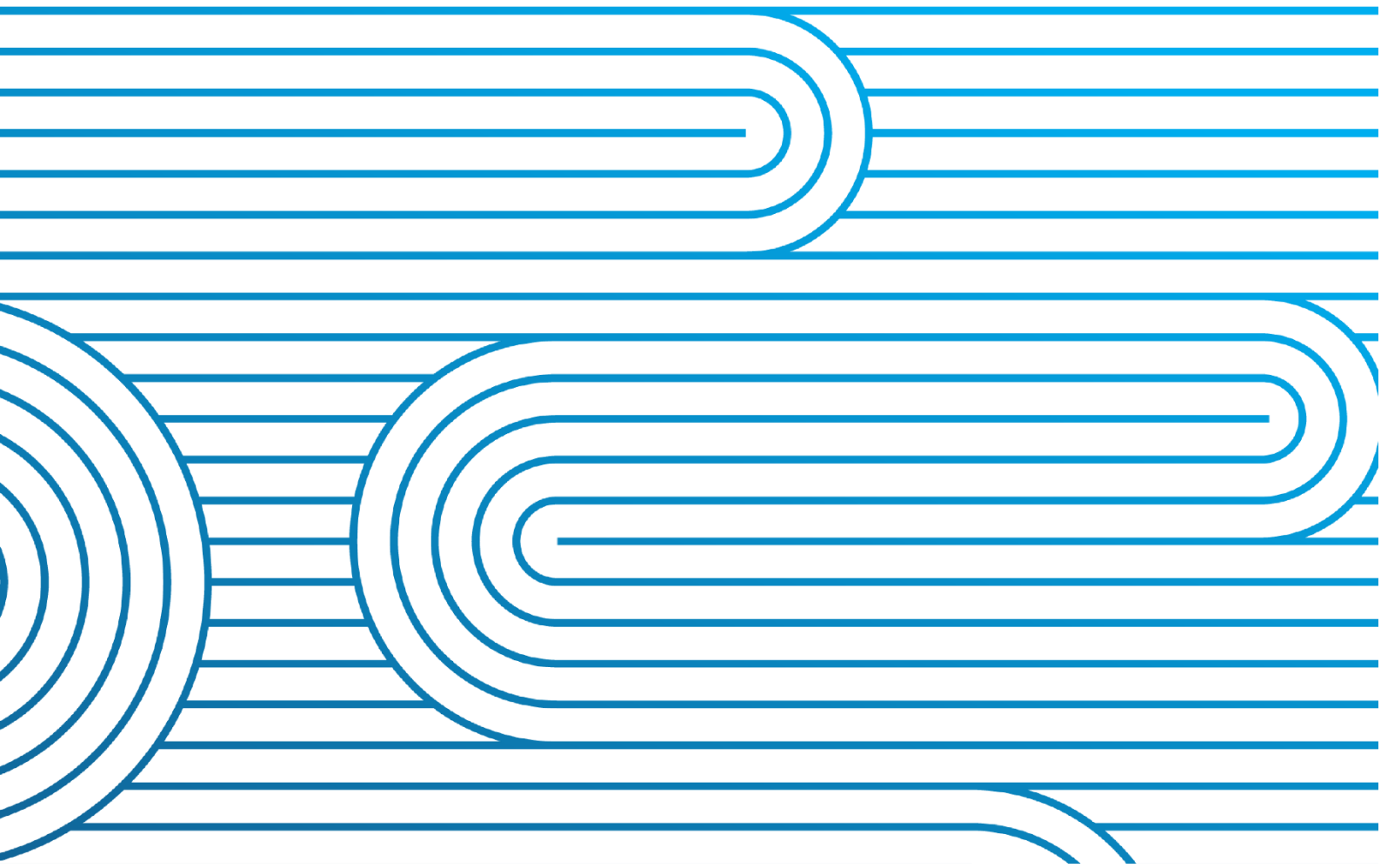


# Submission to the Ministry for the Environment

On the Ministry's *Te hau mārohi ki anamata* | *Transitioning to a low-emissions and climate-resilient future: Have your say and shape the emissions reduction plan*

24 November 2021



# Contents

## **Executive summary ..... 2**

Transpower broadly agrees with the Ministry for the Environment's and the Climate Change Commission's recommendations .....	2
Decarbonising the energy sector will play a key role and there are opportunities we can target immediately .....	2
A major expansion of the electricity system is required, more so than in recent history .....	5
For Transpower and others to deliver at pace, we need an Energy Strategy, and supporting legislative and policy changes.....	6
The Resource Management system reform also needs to recognise the importance of, and enable faster delivery of, electricity infrastructure .....	8
Transpower is committed to play its part in decarbonising Aotearoa and welcomes the opportunity to engage further.....	10

## **Response to consultation questions..... 11**

### **Meeting the net-zero challenge ..... 11**

Transition pathway .....	11
Helping sectors adapt.....	14
Working with our Tiriti partners.....	15
Equitable Transitions Strategy.....	15

### **Aligning systems and tools..... 17**

Government accountability and coordination .....	17
Funding and financing .....	18
Emissions pricing .....	20
Planning.....	20
Research, science and innovation .....	22
Behaviour change .....	23
Moving Aotearoa to a circular economy.....	24

### **Transitioning key sectors ..... 25**

Transport .....	25
Energy and industry.....	31
Building and construction.....	37
Agriculture .....	39
Waste.....	40
F-gases .....	41
Forestry.....	42



# Executive summary

## Transpower broadly agrees with the Ministry for the Environment's and the Climate Change Commission's recommendations

Aotearoa is at a pivotal point in decarbonising its economy.

The level of reform and policy change required to decarbonise at pace is unprecedented in Aotearoa's recent history. The changes required will set direction for our people and our businesses for at least the next decade, and many changes will change the country's trajectory and will be difficult to undo. It is critical that we make these changes in line with a sustainable, net zero carbon future.

We concur with the Ministry that a significant number of initiatives are already underway to decarbonise the electricity industry and wider energy sector. However, further work is required, especially as part of the resource management system reform, to ensure the sector can effectively and efficiently enable Aotearoa's decarbonisation to meet the first carbon budget.

Through our submission, we highlight key opportunities for the Emissions Reduction Plan and the importance of strengthening the alignment of the entire legislative and policy framework and ensuring they remain aligned, so Transpower, and other infrastructure providers, can help Aotearoa decarbonise.

Transpower believes a well-thought, evidence-based and coordinated approach to decarbonisation, that includes input from our community and businesses is required for New Zealand to be successful. This consultation is an important step that follows those principles.

## Decarbonising the energy sector will play a key role and there are opportunities we can target immediately

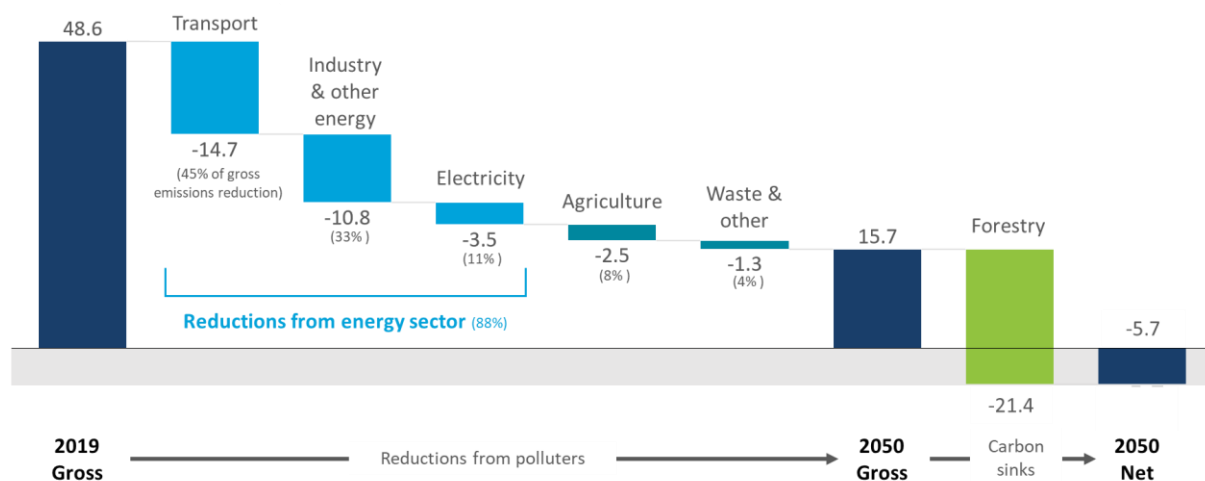
Transpower is a key enabler for realising Aotearoa's emissions reduction ambitions in the transport, energy and industry, and building and construction sectors. With support from the right policy and regulatory settings, we can continue playing this enabling role into the future.

Through our Whakamana i Te Mauri Hiko programme of work, we have identified increased electrification across the economy as a viable and necessary way to reduce Aotearoa's carbon emissions. This conclusion is echoed in the Climate Change Commission's final advice.

As shown in Figure 1, in the Climate Change Commission’s final advice, emissions reductions from the energy sector (including transport, process heat and electricity generation) represents almost 90% of the gross emissions reductions required to get to net zero in 2050.

**Figure 1: Contributions to reducing long-lived gas emissions in the Climate Change Commission’s Demonstration Path**

(million tonnes of carbon dioxide equivalent, mtCO<sub>2</sub>e)



Source: Climate Change Commission.

Reducing emissions across all segments within these sectors will be challenging, especially in hard-to-abate segments where technology is still emerging (e.g. aviation, steel production, hydrogen). Targeted emissions reductions in particular segments through energy efficiency and electrification are doable, already underway, and can deliver substantial, lower cost emissions reductions over the next decade. However, efforts in these areas need to be significantly scaled up to meet emissions budgets. The significant opportunities that we have identified that can deliver cost-effective, immediate and substantial emissions reductions in the first two emissions budget periods are:

- Energy efficiency
- Light vehicle electrification
- Electrification of public transport and associated mode shift
- Electrification of low temperature process heat
- Electrification and biomass for medium temperature process heat
- Increasing share of renewables in the electricity generation mix from 80-85% to 95-98%

Our analysis in the [Electrification Roadmap](#) outlines that the electrification of transport and process heat, as well as increased renewable electricity, can deliver ~5mt CO<sub>2</sub>-e of emissions reductions per annum while delivering annual net benefits of \$0.5 billion to the economy by 2030. By 2035 the analysis forecasts ~10mt CO<sub>2</sub>-e reductions per annum while delivering annual net benefits of ~\$1.5

billion to the economy<sup>1</sup>. We are already seeing successful examples of sectors displacing fossil-fuel technology to renewable, low-emissions electricity:

- In the **Transport** sector, electric vehicles are becoming mainstream
- In the **Energy and Industry** sector:
  - Transpower and the market are seeing high interest in developing renewable generation that could increase the share of renewables in the electricity generation mix
  - High temperature heat pumps are displacing coal and gas-fired process heat in low-medium heat applications
- In the **Building and Construction** sector, heat pumps, again, are displacing fossil fuels to keep buildings and homes warm and healthy.

These opportunities do not rely heavily on the development of new technology or behavioural change that can take decades to eventuate in Aotearoa. These opportunities are the smartest and most elegant way to meet our first emissions budgets, and therefore we need to leverage these opportunities **now**.

Policy plays a role in realising these decarbonisation opportunities. Since the Climate Change Commission published its final advice, we have witnessed how targeted policy intervention can drive technology uptake and behavioural changes to enable individuals, businesses and organisations to deliver significant carbon reductions quickly.

For example, the Government's Investment in Decarbonising Industry fund has funded 39 projects that will reduce 6.6 million tonnes of CO<sub>2</sub>-e across their lifetimes. With \$57m of government funding required to achieve this, it represents a marginal abatement cost of just ~\$9/tCO<sub>2</sub>-e. This well-targeted contestable fund could be scaled up to deliver significantly greater abatement.

Similarly, the recently introduced Clean Car Discount is showing potential to support the decarbonisation of transport. In its first few months, the mechanism has demonstrated immediate and significant uplifts in electric vehicle numbers in New Zealand, enabling individuals to decarbonise their travel. The Low Emissions Transport Fund is also providing important proof of deployment for heavy transport decarbonisation options. Interventions such as these have the potential to accelerate the decarbonisation of energy use, in time to meet our carbon budgets.

Aotearoa is at the stage where we can be bolder by scaling up and accelerating our efforts. The continuation and expansion of targeted funding will encourage quick wins and can be wound back when growth is self-sustaining.

<sup>1</sup> Source: Transpower analysis based on [Whakamana i Te Mauri Hiko](#) emissions reductions and [Ministry for the Environment 2030 marginal abatement cost curves](#)

## A major expansion of the electricity system is required, more so than in recent history

We, as Transpower, are ready to support the targeted electrification of the economy as part of New Zealand's decarbonisation transition. As Grid Owner and Grid Operator, Transpower owns and operates the infrastructure that forms the national electricity grid. We enable electricity to flow from where it is generated to where it is consumed, from the hydroelectric stations in Te Waipounamu to users in Auckland and the Far North. As the System Operator, we also operate the electricity market on behalf of the Electricity Authority.

An essential part of our role is to look ahead into the future to understand how the grid may need to change to accommodate the growing demand for renewable electricity. In 2020 we released [Whakamana i Te Mauri Hiko](#) which explores how demand for electricity and the makeup of generation might change as New Zealand decarbonises. We found that Aotearoa could expect a 55-70% increase in demand for electricity by 2050 due to base demand growth and the electrification of transport, process heat and building heating. This growth in electricity demand will require an expansion of the electricity system, which was also identified by the Climate Change Commission.

To give a sense of the scale of the expansion required, in [our submission](#) on the Ministry of Business, Innovation and Employment's Accelerating Renewable Energy and Energy Efficiency (MBIE AREEE) discussion document we estimated that the New Zealand electricity sector will need to build and deliver as much new electricity generation in the next 15 years as we have in the last 40 years, or 30 years in the event of the potential closure of the Tiwai Point aluminium smelter.

This new generation places demands on the infrastructure downstream. We estimate that 60 to 70 new grid scale connections, each requiring new lines and potentially new substations, will be required between now and 2035 (to accommodate both new generation and increased demand), which will need to be supported by several large core grid upgrades before 2035. This is a significant scaling up of our infrastructure build compared to recent years.

It is important to note that the major increase in electricity delivered across the transmission grid and distribution networks does not have to imply a similar scaling up of expensive network build. Peak demand, not total energy volume drives network build. The more that electrification of new sectors of the economy like transport and process heat can be done in a way that means the new energy volume doesn't drive up the peak to the same degree, the more that can be done with the existing network. Examples of these would include electric vehicles being charged overnight or electrified dairy factories operating outside of peak winter months based on milking seasons.

However, even with better utilisation of existing electricity networks outside the peak, investments in the transmission and distribution networks will be required. Delivering new transmission assets can be a complicated and lengthy process, with regulatory investment approvals, resource consenting, and land rights acquisition sometimes stretching our lead times towards ten years. For grid upgrades, we propose our expenditure plans to the Commerce Commission seven years in advance, who then scrutinise our plans to ensure they are suitably efficient and are in the best interests of consumers. For core grid upgrades that cost over \$20 million, we also need to submit a Major Capital Proposal for approval by the Commerce Commission, via the Grid Investment Test, which adds more time to the process.

To deliver on New Zealand's net zero carbon ambitions, we need to increase our pace of delivery. The nature of our customers is changing. Solar plants and batteries are faster to build than traditional thermal plants and therefore our current connection build timeframes need to be shortened. Transpower recognises that we need to be nimbler and somewhat reactive in the way we plan, build and commission our infrastructure. We also will need to make investment decisions despite having imperfect information, with an eye on where the grid needs to be in the future and in line with the path that Aotearoa takes to decarbonise.

In this submission, we highlight areas that the Emissions Reduction Plan can target to assist us with ensuring we play our role in Aotearoa's transition to a net zero carbon future at the pace that is required. While we cannot speak on behalf of other businesses within the industry, such as distribution businesses or generation developers, we anticipate that they might face similar challenges.

Aotearoa's decarbonisation relies significantly on the ability for the electricity industry to expand the electricity system and accommodate new renewable generation and electricity demand at pace.

## **For Transpower and others to deliver at pace, we need an Energy Strategy, and supporting legislative and policy changes**

To ensure long-term, enduring and sustainable emissions reductions, the government needs to give clear signals to Aotearoa's energy users and the energy supply chain by providing clear direction through an Energy Strategy and enabling policy and legislation.

**Aotearoa's Energy Strategy needs to be developed with a sense urgency.** Many organisations and industry groups have already started working on roadmaps (e.g. Aotearoa Circle) for decarbonising energy and are ready to deliver at pace. The uncertainty of the future energy direction for the country, however, is inhibiting action. The development of a clear Energy Strategy will give organisations the certainty they need to press forward with their decarbonisation plans.

From an infrastructure provider perspective, we are particularly interested in identifying, as soon as practicably possible, what measures will be market-driven as opposed to policy-driven, and when they will take effect. We also recommend that the transition of fossil energy out of the energy system is clearly mapped out in the Energy Strategy because the level and nature of fossil fired generation connected to the grid will have an impact on how we operate the electricity system. Having clarity on the phase out will help us to ensure reliability and security of supply.

While the Energy Strategy can provide overarching direction to businesses in Aotearoa, there are other legislative and policy changes we can enact now.

**We can deliver quick wins by legislating recent learnings.** We suggest that some of the provisions in the Climate Change Response Act are widened so that government and other Crown entities

have a greater mandate to use climate change in their frameworks and drive decision making that is consistent with our net zero carbon ambitions.

In particular, section 5ZN of the Climate Change Response Act (CCRA), provides certain decision-makers with the discretion to take into account the 2050 target, the emissions budget or an emissions reduction plan. For the electricity sector, this provision could apply to decision-making by the Commerce Commission, Electricity Authority, and local authorities when making policy or consenting decisions on our projects. We recommend that this provision is used more broadly where appropriate to enable electrification. This will allow consistent decision-making and create alignment across key industry regulators.

We also recommend the following changes, which will be instrumental in enabling the delivery of electricity infrastructure at the pace required to decarbonise:

- **Improving how the Grid Investment Test recognises the benefits to Aotearoa of emissions reduction.** At present, the Grid Investment Test considers the costs and benefits of the project “arising in the electricity market” and benefits of the project that fall outside of the electricity market are not considered. We understand that because of this, the Commerce Commission is not able to fully consider the benefits of emissions reductions arising from a project. For Transpower, this limits the ability for the Commission to approve major transmission investments that could assist New Zealand’s transition to a low carbon economy where the climate change benefits fall outside the electricity market.

For example, where an investment would result in consumers switching from fossil fuels, and in so doing, save money that would have been spent on fossil fuels while also reducing emissions, the Commerce Commission is not permitted to consider these benefits when deciding whether to approve the investment or not.

Other areas of the test could also be adapted to better reflect Government direction on climate change, such as applying a social cost of carbon or a social discount rate for carbon costs which are considered in the Test.

We note that the Commerce Commission has recently engaged with the electricity sector on how it can better enable decarbonisation. We commend the Commerce Commission for this engagement with the sector.

- **Incorporating forecasts into investment decision-making in the electricity sector that are consistent with New Zealand achieving our decarbonisation targets.** Currently, the Climate Change Commission is using carbon price, electricity demand and other forecasts to set national targets and budgets that are different to the forecasts used by the regulators to make investment and pricing decisions in the electricity sector. To decarbonise effectively, we need to ensure that the forecasts used across both instances are consistent and aligned with New Zealand’s decarbonisation targets.

Similarly, the Grid Investment Test and others rely on the Electricity Demand and Generation Scenarios (EDGS) that MBIE produce to test whether an investment is in the best interest of consumers. The current EDGS were produced in 2019, prior to the update of the Climate Change Response Act and the setting of the carbon budgets, and therefore



may not fully reflect a decarbonised future. For investments to be aligned with a future where New Zealand achieves its decarbonisation objectives, the EDGS need to be made consistent with that future.

By having decision making frameworks that better incorporate New Zealand's decarbonisation ambitions, Transpower and other providers are better empowered to invest in the right infrastructure at the right time to support decarbonisation.

- **Linking the Climate Change Response Act, Emissions Reduction Plan, and Emissions Budgets to the proposed Natural and Built Environments Act (NBA), proposed Strategic Planning Act, and proposed Climate Adaptation Act.** The Select Committee report into the [\*Inquiry on the Natural and Built Environments Bill: Parliamentary Paper\*](#) recommended stronger linkages to the CCRA when resolving conflicts between NBA outcomes. Our submission sought a strengthened role for the CCRA, the emissions reduction plan and the targets – including in the climate change outcome, and when limits are set by the Minister.

In the absence of a climate change target in the NBA and SPA (as currently occurs), it is crucial that decision-makers under the NBA and SPA implement the CCRA, the emissions reduction plan, and emissions budgets. A requirement of this kind is important for enabling the maintenance, upgrade and build of the Grid infrastructure necessary to meet our climate change commitments.

Together, these measures will give more certainty about the changes we will need to make to ensure our grid is ready at the right time, in the right place, and with the right capacity. It will also increase businesses readiness to change. This means having the right people, capability and skills, but also mobilise the entire supply chain required to deliver on our energy future.

An Energy Strategy will be essential to rally and coordinate Aotearoa's effort to decarbonise. Its scope needs to be wide enough to encompass all facets of the energy sector: supply, demand, technology, and pace.

## The Resource Management system reform also needs to recognise the importance of, and enable faster delivery of, electricity infrastructure

The discussion document recognises the role of the resource management system reform in decarbonising the economy. However, the discussion under "Planning" is relatively silent about the need for enabling provisions for electricity infrastructure. It has no reference to electricity transmission assets. It is critical that electricity infrastructure, including transmission, is able to be consented and built on time.

While large scale electricity infrastructure has national benefits, it is often unwanted by communities and creates local adverse effects. A focus on the end use of the electricity – such as an increased use of electric vehicles – will provide little, if any, support for building the necessary Grid and renewable infrastructure.

By way of example, the Report of the Environment Committee Report [Inquiry on the Natural and Built Environments Bill: Parliamentary Paper](#) significantly weakened the Outcomes in relation to infrastructure (clause 13A). The infrastructure outcome has been removed, as has any explicit reference to transmission. Instead, the focus is now on “well-functioning urban and rural areas, including by ongoing and timely provision of infrastructure” – a significant change of focus from providing resilient and secure electricity supply, to the functioning of those areas.

Transpower will need strong enabling provisions in the NBA and SPA:

- A strong infrastructure outcome, with explicit reference to transmission activities
- A strong climate change outcome, with explicit reference to mitigating our greenhouse gases in a way that is consistent with emissions budgets and emissions reduction plans under the CCRA
- Strong linkages to the CCRA, ERP and emissions targets and budgets, including when:
  - Environmental limits are set
  - The National Planning Framework is developed, and tensions between competing matters reconciled
  - Decisions are made on consents and designations
  - Regional spatial plans under the SPA are developed
- Strong recognition that we have technical, operational and locational requirements – we cannot avoid all effects – but that the route and site selection process is the best opportunity to reduce those effects
- Strong recognition that the national and international benefits of transmission infrastructure outweighs local effects
- Strong National Planning Framework, which retains the benefits of, and improves on existing policy and rules in the NPSET and NESETA.
- Certain consenting pathways – risks of obtaining consents need to be known from the outset of a project
- Efficient consenting processes, with appropriate public input

The ERP, as a key document to ensuring our emissions budgets are met, needs to provide direct guidance as to what is needed in the reform to enable necessary electricity infrastructure. We welcome the publication of [Te hau mārohi ki anamata, Transitioning to a low-emissions and climate-resilient future](#) which will form part 1 of the ERP and we are looking forward to see in the final ERP how the details of the Resource Management Act reform are considered.

The reform is also critical to enable the timely construction of our infrastructure. Electrification is accelerating and well-designed legislation will be necessary to deliver infrastructure projects at the required pace.

The Resource Management system reform must feature as a key enabler of electrification in the Emissions Reduction Plan. The ERP must provide direction and guidance about what needs to be included in the new legislation.

## Transpower is committed to play its part in decarbonising Aotearoa and welcomes the opportunity to engage further

We are already experiencing a significant increase in enquiries from potential developers of new generation. And we are committed to changing our business to meet the challenge of delivering the electricity that New Zealand needs in 2035 and 2050.

While Transpower is working to ensure it can enable this electrified future, we reiterate what we said in our [Climate Change Commission submission](#) – the challenge for the electricity industry is significant but with sufficient planning, adaptability, and commitment, it is achievable. We believe the Emissions Reduction Plan can play a significant role in helping to navigate these imminent challenges and ensuring Aotearoa can meet its emissions reductions targets.

If you have any questions about our submission, please contact Nicolas Vessiot ([nicolas.vessiot@transpower.co.nz](mailto:nicolas.vessiot@transpower.co.nz)) in the first instance.

Yours sincerely,

**Richard Hobbs, General Manager Strategy and Customer**

# Response to consultation questions

## Meeting the net-zero challenge

### Transition pathway

#### Question 1: Guiding principles

We agree that the emissions reduction plan should be guided by the set of principles proposed by the Ministry.

In particular, the “clear, ambitious and affordable path” principle will be an important feature of the plan for regulated infrastructure providers such as Transpower. Increasing certainty will enable us to better plan our physical assets and use our expenditure efficiently.

In addition to their current scope, we would like the principles to recognise:

- **The need to act at pace to meet our climate commitments.** The Ministry and the Climate Change Commission have made it clear that the time for action is now and that there is no time to waste. As an infrastructure provider that builds and operates long-life assets, Transpower’s decisions today will impact how the electricity grid will be built for the next 50 to 60 years. Any delay in policy decisions will lock us in for a long-time.

Also, the construction of new assets takes time and planning requirements can further delay construction. The resource management system reform needs to enable construction of electricity infrastructure, rather than create barriers to its construction. Any enabling provisions, including in the proposed National Planning Framework must be available from day one. If the reform is delayed, interim measures, including a strengthening for the National Policy Statement on Electricity Transmission and the Resource Management (National Environmental Standards for Electricity Transmission Activities) Regulations 2009 must occur.

- **The essential role of the infrastructure sector to enable decarbonisation.** Decarbonisation will come from the electrification of the transport and industry sectors, and the decarbonisation of electricity generation. It will require the construction of new electricity industry assets. This includes:
  - More electricity generation. Transpower estimates that we will need to have at least ~4GW of new generation to be built between now and 2030 <sup>2</sup>.
  - More assets and associated substations to transport electricity. The increase in electricity demand will require upgrades to existing lines and substations as well as

<sup>2</sup> Source: [Whakamana i Te Mauri Hiko](#), Accelerated electrification scenario

new lines and substations to move electricity from where it is generated, to where it is needed. With the increase in variable, intermittent renewable generation, having the ability to move electricity from one part of the country to another to meet demand together with measures to manage security of supply.

## Question 2: Enabling private sector action

It is imperative for the energy sector that the Emissions Reduction Plan removes barriers to building infrastructure and enables the uptake of low emissions technology. We believe this can be achieved through:

**Clearer alignment between the Climate Change Response Act and other legislation**, including the full suite of environmental legislation, the Civil Defence Emergency Management Act, the Commerce Commission's input methodologies, and the Electricity Authority's activities. As discussed in the summary of our submission, it is essential that these are aligned and incorporate our learnings to date.

In relation to the clearer alignment between the proposed Natural and Built Environments Act (NBA) the Select Committee has recommended that the linkages to the CCRA are clearer. This linkage is critical to enabling electricity infrastructure – as there is no limit or target in the exposure draft of the NBA for climate change or for electricity infrastructure to meet in order to electrify the economy on time. Without a clear linkage to the CCRA, and the ERP in particular, there will be nothing specific to meet. (This is in contrast to other parts of the natural environment, which will be the subject of limits under the NBA).

**A consenting pathway through protectionist policies in existing RMA National Policy Statements, and in the proposed NBA purpose and principles in relation to the natural environment to allow the construction of electricity infrastructure.** In recent times there has been a proliferation of National Policy Statements that have strong protectionist policies, which create barriers to work on existing infrastructure and construction of new infrastructure. Without this work and new infrastructure, the electricity industry will not be able to build the infrastructure necessary to electrify the economy. A consenting pathway through these policies must be provided through resource management system reform (and in the interim, if the reform is delayed). The benefits of decarbonisation must be considered in unison with protecting the environment at a local level. There are instances where despite our best endeavours, the functional, technological and locational constraints of our assets will require us to make a trade-off between the benefits of preserving local environmental conditions, and the benefits of decarbonisation.

**Solutions to the first mover disadvantage on the electricity networks.** The first mover disadvantage arises in a situation where the first customer incurs the full costs of a larger asset and bears the risk of subsequent customers not eventuating or not being able to recover costs from subsequent customers. This dynamic disincentivises investment in some new renewable generation or electrification loads which have the potential to support New Zealand's decarbonisation.



For example, consider a case where a dairy company wants to electrify its plant (with capacity X) in 2022 and a local meat works wants to electrify its site (with capacity Y) in 2026. The optimal size for the transmission line would therefore be X+Y and the cost would be shared between the two companies. However, for us to build a line with X+Y capacity all parties are presented with two key challenges:

- Who pays the meat works' share of the costs before they connect and how does that party recover the costs from the meat works to avoid a free-rider situation?
- Who carries the risk that the meat works changes its mind and opts to not connect in 2026 meaning the incremental cost of the increased connection capacity is not recovered?

Another example would be building a long transmission line to an area with high quality wind resource which may not be affordable for one wind farm developer to pay the full connection cost. However, a consortium of wind farms may be able to economically share the connection costs of a larger connection, but this requires coordination between parties competing for the same resources.

Renewable Energy Zones (REZ) are a potential solution to address the first mover disadvantage. They are proposed in the [New Zealand Draft Infrastructure Strategy](#), and Transpower supports effort to develop this concept.

**Using policy to set incentives that send the right investment signals.** This has already been observed through the strengthening of the Emissions Trading Scheme, the Government Investment in Decarbonising Industry Fund, the Clean Car Discount and the Low Emissions Transport Fund. The government should seek to further strengthen and scale up these effective policies to continue to mobilise private sector investment in low carbon technologies.

### Question 3: Further measures to close the gap

Two additional actions relating to the Resource Management system reform are not specifically addressed in the discussion document, that are needed to ensure we can build necessary infrastructure, and allow us to maintain or upgrade existing assets at a pace that supports electrification:

- A strengthening of the National Policy Statement on Electricity Transmission (NPSET) and National Policy Statement for Renewable Energy Generation (NPSREG) and associated rules.
- The assurance that the enabling provisions for building national infrastructure projects in the National Planning Framework (NPF) are available from day one of the Natural and Built Environment Act being available. If the reform or the development of the NPF is delayed for any reason, the NPSET and NESETA must be strengthened in the interim. Our suggestions on how this can be achieved by changing [Te hau mārohi ki anamata, Transitioning to a low-emissions and climate-resilient future](#) before it becomes Part 1 of the ERP, can be found in question 35.

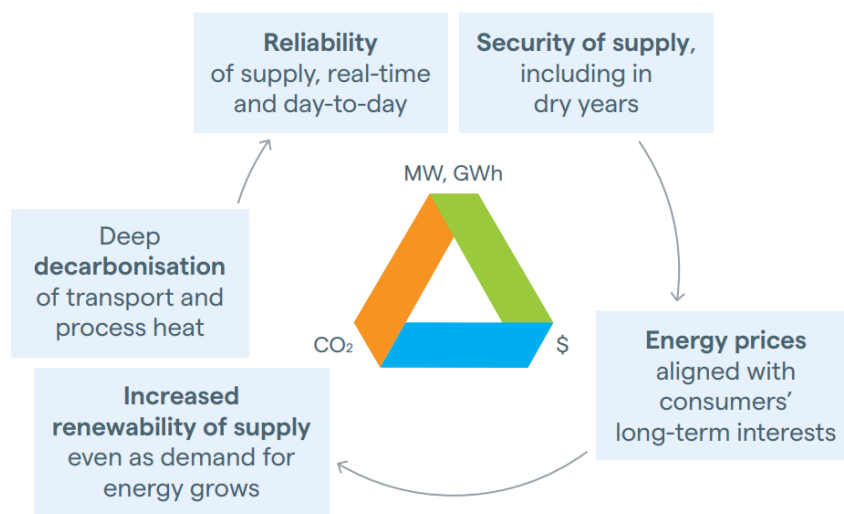
#### Question 4: Nature-based solutions for climate and biodiversity

No comment

#### Question 5: Other views relating to the Transition Pathway

In relation to energy, it is important that we anchor our decarbonisation efforts in the energy trilemma. The energy trilemma is a concept that considers reliability and affordability, alongside decarbonisation, as the three key dimensions that need to be balanced in a successful energy system. This concept is illustrated below.

Figure 2: Energy trilemma



Source: Whakamana i Te Mauri Hiko

In September 2021, we highlighted in our latest [Whakamana i Te Mauri Hiko Monitoring Report](#) that 2021 has been a challenging year for the industry. A prolonged dry period and increasing peak demand on the system saw challenges arise for both the electricity sector and energy consumers with high sustained energy prices and with security of supply and reliability. These are challenges are a reminder of the importance of the energy trilemma and the role affordable, reliable and secure supplies of low carbon energy has in Aotearoa's transition to a low carbon economy.

#### Helping sectors adapt

#### Question 6: Actions to best improve our ability to adapt to climate change

No comment

**Question 7: Actions that could increase risks and impacts of climate change**

No comment

[Working with our Tiriti partners](#)

**Question 8: Priority strategies for whānau, hapū or iwi**

No comment

**Question 9: Priority actions for Māori-led transition strategy**

No comment

**Question 10: Whānau, community, Māori collective or business participation in strategy development**

No comment

**Question 11: Whānau, community, Māori collective or business information in emissions profile**

No comment

**Question 12: Models of partnership for good outcomes for Māori**

No comment

[Equitable Transitions Strategy](#)

**Question 13: Objectives for an Equitable Transitions Strategy**

We support the objectives set out by the Climate Change Commission.

In particular, we support the Commission's recommendation to develop policies for creating a workforce with the skills needed for accelerating the low emissions transition, however we believe this needs to be a time-critical action. The Government needs to be thinking about the scale of the workforce requirements of key sectors such as electricity now because of the lag time in the education system and likewise, this needs to be a consideration in the immigration settings.





In [Whakamana i Te Mauri Hiko](#), we found that for the electricity sector alone, New Zealand would need thousands more highly skilled people by 2035 solely to meet the demand ramp for new generation, transmission and distribution investments required for electrification<sup>3</sup>. This labour requirement is on top of ensuring the industry can secure resources to manage material levels of retirement over the next 15 years as the workforce ages. Turnover rates for the industry are relatively low, meaning current workforce development processes have been designed to replace small numbers – a practice that will not be sufficient to meet the demand ramp driven by electrification and increased renewability.

But ramping up workforce demand is not the only challenge. Meeting workforce supply has become more difficult due to the decline of vocational training, the relative weakness of the electricity industry's employment brand relative to other industries, stricter immigration laws and growing international competition for New Zealand trained workers.

On top of additional workforce capacity, new capabilities will be required to deliver new types of infrastructure, such as digital and technology innovation, automation, robotics, artificial intelligence and data science.

It is unlikely that the electricity sector is alone in the workforce challenges it faces to enable decarbonisation, therefore, we support the Commission's recommendation to focus on:

- Assessing how the education system sets all New Zealanders up for the low emissions jobs of the future, with skillsets that enable workers to adapt and lifelong learning
- Upskilling and redeploying workers transitioning from high emissions sectors
- Developing skills and training into low emissions industries by Māori, for Māori

#### **Question 14: Additional objectives and measures included in Equitable Transitions Strategy**

No comment

#### **Question 15: Models and approaches to incorporate and respond to different perspectives**

We support the need for central and local government to work together to develop and deliver the transitions required.

We also support the need for wide consultation with New Zealanders but balanced with the need for timely decision making as action on climate change is urgently required if we are to meet our Paris Agreement commitments.

<sup>3</sup> Section 9 of [Whakamana i Te Mauri Hiko](#) – "Access to skilled workforce" pp 79 - 80



#### **Question 16: Government support for households to reduce emissions**

Electrification remains an important lever to allow households to lower their emissions footprint.

In this context, it is important that electricity remains affordable. Residential customers rely on retailers to manage the volatility of energy prices and competition to ensure they are competitive. As the system transitions away from fossil fuels, and more infrastructure is built, mechanisms to ensure the prices paid by households remain stable and predictable will be important for the transition.

#### **Question 17: Government support for minimising disruption to workers**

No comment

#### **Question 18: Additional resources, tools and information for community transition planning**

No comment

#### **Question 19: Encouraging low-emissions business models**

A functioning Emission Trading Scheme with clear signals of long-term carbon price evolution will encourage the uptake. The Infrastructure Commission Draft Strategy gives the example of the United Kingdom where infrastructure businesses use the future value of carbon in their business cases.

#### **Question 20: Other comments on an equitable transition**

An equitable transition relies on government, communities and businesses working together with the same goal. The more alignment and coordination, engagement and transparency across the organisations the better.

### **Aligning systems and tools**

#### **Government accountability and coordination**

#### **Question 21: Holding government accountable**

No comment



## **Question 22: New ways of working**

We agree that partnerships are required to innovate.

## **Question 23: Other comments on government accountability and coordination**

We support the need for coordinated efforts to address climate change across Government. The levers available to mitigate climate change sit across a number of agencies e.g. Electric vehicles under Ministry of Transport, Energy under MBIE, RMA (and RM system reform), water allocation and climate change under Ministry for the Environment. There are interdependencies between each that means no agency or department can work in isolation.

Leadership to coordinate across agencies, supported by policy, strategy and assigned accountability will provide both policy makers and industry with clarity and consistency. Over the next decade we expect there to be an increasing convergence of energy vectors and the integration of transport with urban infrastructure.

Transpower and other infrastructure providers, either publicly or privately owned, are key enablers to decarbonisation and have formed groups (like the Aotearoa Circle, or the Sustainable Business Council's Clean Car Reference Group) to provide business leadership in this space. Our view is that government officials and policy makers should be highly engaged in these groups (at least in an observer capacity) if not directly engaging with organisations. This will create the right environment to align policy frameworks and business decisions, particularly given the rapid speed that many businesses are moving to drive sustainability and climate change in their organisations.

Additionally, government should draw on the operational expertise of infrastructure operators, including Transpower, to ensure that the policy and regulatory settings are right for their particular sector. This is particularly true for electricity infrastructure, which is different from other government owned infrastructure that would be representing on working groups and reference groups by government officials.

## **Funding and financing**

## **Question 24: Barriers and gaps for private capital**

No comment

## **Question 25: Māori and Māori collectives' access to finance**

No comment

## Question 26: Government priorities for directing finance

No comment

## Question 27: Others relating to funding and financing

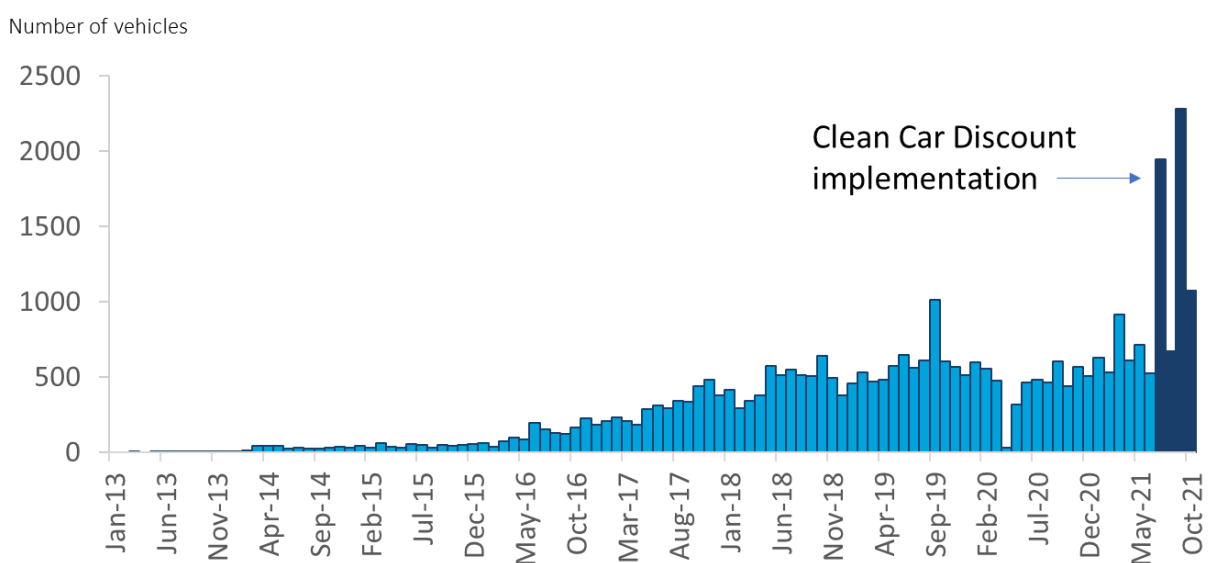
While we do not have a specific view on other funding mechanisms, the \$70 million Government Investment in Decarbonising Industry (GIDI) Fund is precisely the type of intervention required to enable rapid decarbonisation at scale. The contestable aspect of the fund ensures support is first targeted to the areas that can make the lowest cost, most material and immediate emissions reductions.

The GIDI Fund has been effective in overcoming capital cost barriers. So far, it has driven an annual abatement of 6.6 million tonnes of CO<sub>2</sub>-e over the lifetime of the 39 projects funded. With a total investment of ~\$142m (including ~\$57m of government funding) to date, this represents a marginal abatement cost of ~\$9/tCO<sub>2</sub>-e. It could be scaled-up significantly (perhaps via hypothecation of Emissions Trading Scheme funds) to provide more support in accessing the significant sums of capital that will be required to enable businesses to transition away from fossil fuels.

The Government's \$200 million State Sector Decarbonisation Fund is also providing important and timely support for conversion of public sector coal boilers.

Lastly, we would like to highlight that the early signs show that the Clean Car Discount has created a step change in registrations of light electric vehicles in the fleet as shown in Figure 3 below.

**Figure 3: Monthly electric vehicle registrations in New Zealand**



Source: Ministry of Transport.

## Emissions pricing

### **Question 28: Information on future emissions price paths**

Transpower does not have sufficient information on future emissions price paths to inform our investment decisions. However, Transpower is increasingly using a future emissions price based on current ETS and international carbon price trends to guide Transpower investment decision-making, particularly for more carbon-intensive investments or activities.

### **Question 29: Emissions price for investment decisions**

Our investment decisions are driven by current government regulatory and funding criteria. A realignment of key decision-making framework, like the Grid Investment Test is required to drive investment that will enable decarbonisation.

### **Question 30: Treatment of forestry in New Zealand Emissions Trading Scheme**

We support the intent of the discussion document to reduce reliance on exotic forestry to improve opportunities and incentivise indigenous afforestation. This will ensure longer-term carbon and biodiversity benefits can be achieved.

### **Question 31: Options to constrain forestry in New Zealand Emissions Trading Scheme**

No comment

### **Question 32: Other views on emissions pricing**

No comment

## Planning

### **Question 33: Changes in addition to resource management reform**

While Transpower supports the opportunity for enabling a wide range of emissions reduction opportunities, we consider that any consideration of emissions reductions in planning decisions needs to be carefully worked through, to avoid creating uncertainty of consent outcomes.

### Question 34: Urban intensification, low-emissions lane use, public transport and walkable neighbourhoods

No comment

### Question 35: Other views on planning

The ERP needs to recognise not only the resource management system reform which is underway, but give direction of the transition to the NBA – particularly as that transition could take a decade or more. We consider that the ERP should direct:

- retention and strengthening of the existing national direction applying to the electricity industry – barriers created by other competing national direction must be resolved in the short-term
- the preparation of the NPF should be highly prioritised now. Ideally it would be operative shortly after the NBA comes into force
- projects furthering our climate change objectives should be enabled through the transitional period

Planning via the RMA, and its replacement legislation will either enable, or hinder the infrastructure necessary to electrify the economy. The Emissions Reduction Plan needs to recognise this risk – and identify what is needed to ensure existing Grid assets can be operated, maintained, upgraded and new asset built.

We suggest that the Emissions Reduction Plan has a dedicated section on the role of the electricity infrastructure including the Grid, in being key to enabling the electrification of the economy and meeting the Government's climate change commitments. Directive comments need to be made in other relevant sections of the ERP. The following comments are intended to strengthen what is set to become Part 1 of the ERP ([\*Te hau mārohi ki anamata, Transitioning to a low-emissions and climate resilient future\*](#)):

- Page 21 refers to the CCRA as an “Enabler” – reference should also be made to the need for the NBA and SPA to be complementary legislation that will, or should, enable infrastructure necessary to electrify the economy. Reliance on the CCRA alone will not enable our necessary works or projects.
- Pages 36-37 address “Planning and Infrastructure” – this section is focussed on housing and urban development and reducing industrial emissions. It must be broadened to address other infrastructure, including electricity infrastructure in its own right (rather than as supporting infrastructure for urban or rural development). If the discussion about planning and infrastructure is narrow in focus, so too will be the focus of the reform. As discussed earlier, the outcomes for infrastructure were weakened, rather than strengthened, through the recent Parliamentary Inquiry, due to their links to rural and urban communities.

- Pages 48-49 refer to the “Energy and Industry” sector plan. Again, this section must be strengthened. Reference is made to “*accelerating renewable electricity by ... reviewing planning instruments to speed development of renewable electricity.*” By contrast, reference is made to “developing” national direction to phase out coal boilers.

A “review” will not be enough – it needs to be completed, and stronger national direction gazetted. That national direction must include both transmission and generation and reconcile tensions with other national direction (including the NPSs for Freshwater, Indigenous Biodiversity, Urban Development and the New Zealand Coastal Policy Statement). If this strengthening and reconciliation does not occur, barriers will remain in place for electricity infrastructure.

## Research, science and innovation

### Question 36: Mission-based approach

No comment

### Question 37: Supporting energy, waste or hard-to-abate industries

No comment

### Question 38: Aotearoa’s unique global advantage

No comment

### Question 39: Growing frontier firms

No comment

### Question 40: Opportunities for innovation

No comment

### Question 41: Other views on research, science and innovation

No comment



## Behaviour change

### Question 42: Information, tools or forums to encourage greater action

No comment

### Question 43: Trusted messages and/or sources of information

No comment

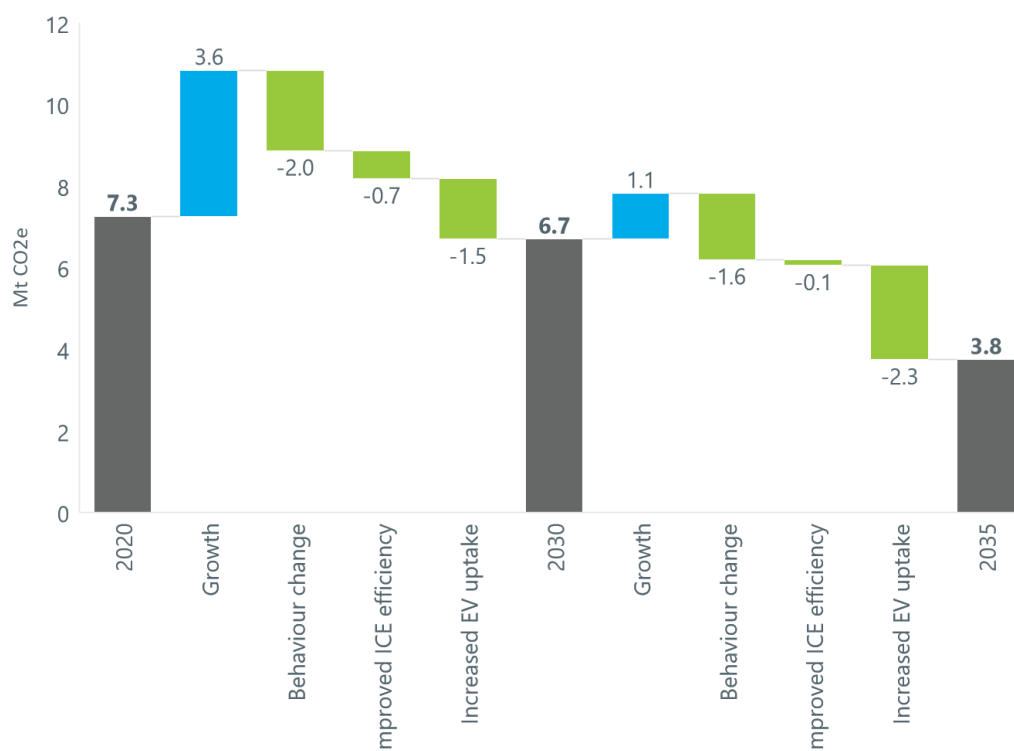
### Question 44: Other views on behaviour change

Nudging consumers to change their preferences should be an essential component of New Zealand's decarbonisation strategy. Increasing uptake of public transport makes the job of converting the private fleet easier. Even beyond this kind of behaviour change, consumer purchasing decisions have to change for us to be effective. In transport particularly, the vast majority of our emissions come from the vehicles that New Zealanders drive every day. We will need to ensure that New Zealanders are supported and encouraged, both financially and through behavioural nudges to accelerate the transition away from high emissions vehicles where they are able to.

We acknowledge that reducing the need to travel and shifting to alternative modes of transport will also play a role in a decarbonised transport sector. However even with material behaviour change, decarbonising New Zealand's vehicle fleet will make significant progress to reducing our emissions. Our analysis of the Commission's 'Demonstration Path' scenario, as shown in Figure 4, finds that EVs can provide significant emissions reductions in light vehicles, equivalent to 3.8 Mt CO<sub>2</sub>-e by 2035, or 46% of the abated emissions. This is slightly more than behaviour change, like switching to public transport or travelling less, which can achieve 3.6 Mt CO<sub>2</sub>-e or 44% reduction by 2035.



**Figure 4: Composition of light passenger transport emissions reductions based on the Commission's 'Demonstration Path' scenario**



Source: Transpower analysis of Commission data.

## Moving Aotearoa to a circular economy

### Question 45: Circular economy in 2030, 2040 and 2050

No comment

### Question 46: Bioeconomy

No comment

### Question 47: Circular economy strategy for Aotearoa

There are many opportunities for reuse, repurposing and recycling of older equipment in the electricity sector. Many of these items of equipment are highly carbon intensive in construction and there are some good opportunities here. For example, glass and porcelain recycling from insulators, alternative uses for back-up UPS batteries, electricity poles and towers, conductor wire etc.

We recommend that initiatives that allow for sector-leadership like the Battery Industry Group (B.I.G.) are considered in the Emissions Reduction Plan.

#### **Question 48: Proposals for circular economy and/or bioeconomy**

We support the industry partnerships and government funding through the Industry Transformation Plans.

#### **Question 49: Main barriers to circular approach and expanding bioeconomy**

The absence of recycling facilities for complex equipment is the main barrier.

#### **Question 50: Cross-sector regulations and investments**

No comment

#### **Question 51: Other views on circular economy and/or bioeconomy**

No comment

## **Transitioning key sectors**

### **Transport**

#### **Question 52: Reduce light vehicle kilometres travelled by 20 per cent by 2035**

We support the ambition to achieve a significant reduction in vehicle kilometres travelled by cars and light vehicles by 2035. As discussed in our response to Question 44, while we support the ambition in achieving significant mode shift or travel reduction, we emphasise the importance in ensuring New Zealand's efforts are in both mode shift and transport electrification or decarbonisation via other fuels, rather than putting more effort into one or the other.

#### **Question 53: Increase share of light zero-emissions vehicles to 30 per cent**

We support the ambition to significantly increase the share of zero-emission vehicles in light fleet by 2035. However, we believe that the proposed target of 30% by 2035 is not ambitious enough. In its final advice, the Climate Change Commission's Demonstration Path sees electric vehicles making up 36% of the light vehicle fleet by 2035. Our own Whakamana i Te Mauri Hiko modelling forecasts that electric vehicles will make up 43% of the light vehicle fleet by 2035.

Light vehicles, including cars, vans and light duty trucks, make up close to 80% of our transport emissions. Electric alternatives for these types of vehicles are becoming more widespread and economic to run, making light vehicles the largest emissions reductions opportunity for New Zealand, especially leading up to 2025 and 2030.

Currently, EVs are only on par or more economical than their ICE equivalents on a 'total cost of ownership' basis. The upfront purchase prices of EVs are rapidly falling but it is likely that EVs will only become cheaper upfront compared to ICE equivalent towards the end of this decade. This will be too late for our carbon budgets and emission reduction targets. In the Emissions Reduction Plan, we need to keep building on the momentum to kickstart EV uptake.

In the [Electrification Roadmap](#), we identified 'access' as one of the key barriers to EV uptake.

- New Zealand's access to global EV supply
- New Zealanders' access to EVs
- New Zealanders' access to EV charging

There are several actions that help to address these barriers which should be considered in the Emissions Reduction Plan. We commend the Government for beginning to implement several of the actions outlined below.

### **Ensuring New Zealand can access global EV supply**

New Zealand is a small player in the global vehicle market. We currently have around 3.5 million passenger cars on our roads, less than 1% of the 1.4 billion cars worldwide. For this reason, there is real potential for constrained supply of EVs into New Zealand, both new and second-hand, as other countries also move to electrify their transport systems.

Globally, New Zealand needs to be a destination of choice for electric vehicle suppliers by providing the right incentives and market signals to only attract increasingly clean vehicles into the country. There are three key actions that could help New Zealand achieve this:

- Continue with the implementation of the Clean Car Standard
- Place a time limit on light vehicles with internal combustion engines (ICE) entering, being manufactured, or assembled in New Zealand:
  - On the supply side, setting a ban date would signal to global car suppliers (both new and second hand) that New Zealand's demand for imported ICE vehicles will decline significantly while the demand for EVs is growing. In response, suppliers are then likely to begin shifting their business models and processes to ensure sufficient EV supply into the country by the ICE ban date, otherwise they risk losing a part of their business.
  - On the demand side, a ban date signals to consumers that policy and infrastructure are transitioning to support EVs and are reducing support for ICE vehicles. This



gives consumers the confidence to buy EVs ahead of the ban date, and also makes buying new ICE vehicles closer to the ban date more unattractive. A ban date will also deliver clear signals to developers of long-term infrastructure, like EV charger providers and network companies to invest in infrastructure that will enable EV uptake. [Concept Consulting and Retyna's Shifting Gear](#) study concludes that New Zealand could ban new entry of light ICE vehicles as early as 2032.

- Explore the potential to 'pool' or bulk purchase EVs, especially for government and commercial fleets, to enable purchasing savings. A bulk purchase would strengthen New Zealand's negotiating position and signal that there is a strong demand for electric vehicles.

### **Ensuring New Zealanders can access EVs**

Supply focused interventions will not be enough. New Zealanders also need to be encouraged to transition to EVs (where public or active modes are unattractive) to build local demand. Currently, even as the total cost of ownership of EVs are falling and are on track to save New Zealanders' money, the largest barrier to adoption is the high up-front cost of electric vehicles. Therefore, to build local demand for EVs and help New Zealanders overcome the capital cost barrier, we recommend the following capital cost mechanisms:

- Continue with the implementation of the Clean Car Discount
- Continue with transitioning Government fleet to feed into second-hand market
- Continue to explore potential new or extension of co-funding and grants such as EECA's Low Emissions Transport Fund, and low-cost loans such as via New Zealand Green Investment Finance that enable buyers to more easily spread out the payment of up-front capital costs
- Also, as New Zealand's banks increasingly commit to sustainable finance and shifting away from fossil fuel exposure there are opportunities to develop new lending options for EV purchasers, thus improving access to capital and the upfront economics
- Remove or reduce the Fringe Benefit Tax on commercial electric vehicles, as this currently penalises businesses for buying a cleaner vehicle. Commercial fleets will be critical for feeding into the second-hand car market

It will also be important to focus on how to stimulate the availability of affordable second-hand EVs for different uses (e.g. SUVs, wagons, utes, vans) and at different price points (e.g. three-year, five year, ten-year-old EVs) to ensure that different customers' needs and preferences can be met.

### **Ensuring New Zealanders can access charging**

Accessible charging infrastructure will be a critical enabler for rapid uptake of EVs. We support the work currently underway to develop a charging infrastructure plan for the rapid uptake of EVs and commend the Government for announcing the plan to have fast EV chargers every 75km along most state highways.



Two of the top three concerns for EV adoption, charging and range anxiety are addressed by an effective network of public and private charging options, with [direct correlation shown internationally](#) between EV adoption uptake increases and the number of chargers available per 100,000 people. We must invest in a sustained way in the charging infrastructure to be ready to enable what needs to be a wave of new EVs in New Zealand.

The plan should consider the differing roles of government, the private sector and individual EV owners. The government may not necessarily need to be responsible for the whole delivery of a nationwide charging infrastructure network, but rather could play an enabling role, or leverage partnerships with the private sector.

Key to a fast and smooth installation of charging will be the building and sharing of planning knowledge and technical capability. Industry and government coordination across charger installers, suppliers, network operators, local government and landowners will be required.

The development of a national charging network will need to be in close co-ordination with the electricity sector. A critical element of the charging network will be the electricity network's capability to support vehicle charging. Smart charging of EVs provides an opportunity for energy consumption to be shifted away from peaks and, in doing so, offers an opportunity to decarbonise our economy most affordably. If not managed carefully, non-smart EV charging has the potential to materially increase demand peaks in distribution networks and the grid, resulting in avoidable expense in the network infrastructure, the cost of which then falls on the end user.

#### **Question 54: Reduce emissions from freight by 25 per cent**

We broadly support the target to reduce emissions from freight. Because zero carbon 'heavier' transport (i.e. non-light transport) is still developing in technology, is more costly to abate and accounts for only 20% of New Zealand's transport emissions, light vehicles should remain the top priority for electrification in the immediate future leading up to 2025.

We expect that policies system to the Clean Car Programme for light vehicles could be adopted to support and accelerate low carbon heavy transport.

#### **Question 55: Reduce emissions intensity of transport fuel by 15 per cent**

We broadly support the need to reduce the emissions intensity of transport fuel to help reduce emissions from vehicles already in use.

#### **Question 56: Limit on light vehicles with internal combustion engines**

We support the Climate Change Commission's recommendation on setting a time limit on light vehicles with internal combustion engines (ICE) entering, being manufactured, or assembled in New Zealand.



[Concept Consulting and Retyna's \*Shifting Gear\*](#) study concludes that New Zealand could ban new entry of light ICE vehicles as early as 2032.

### **Question 57: Other views on transport**

We welcome the work that is beginning on the development of a national EV infrastructure plan to ensure New Zealanders have access to charging. The electricity sector will play a critical role in enabling the successful rollout of charging infrastructure; therefore, it is important that the sector is involved appropriately.

We are entering a period where, for the first time at a large, widespread scale, the transport sector and the electricity sector will converge to jointly deliver transport outcomes for New Zealanders, as a growing number of EV owners plug their car into the electricity system to charge. For both sectors, there is a need to develop an understanding of how the other operates, where the two interface and where value can be maximised from a co-ordinated approach.

The Climate Change Commission in their advice stated that the electrification of energy use, as needs to happen in the transport sector, will require a major expansion of the electricity system.

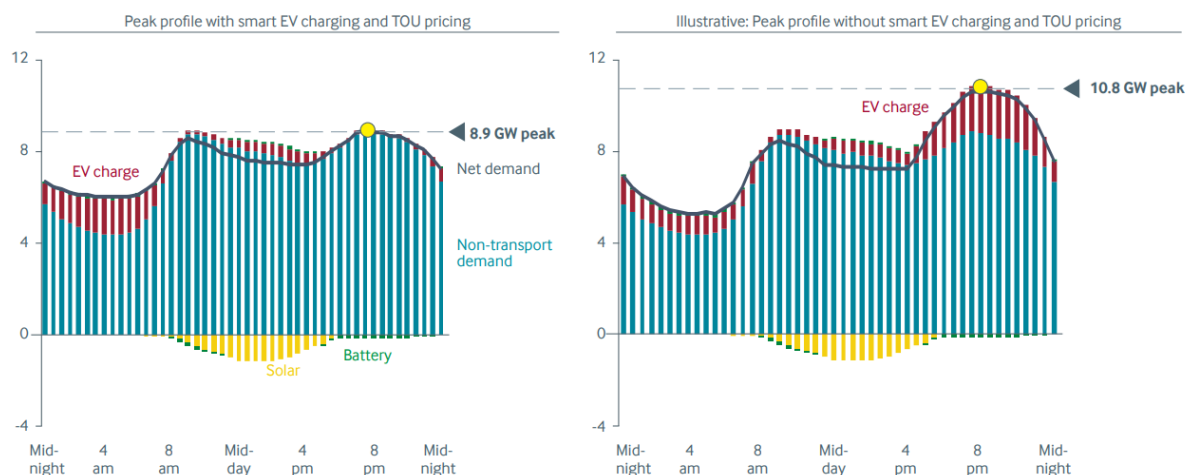
The transport sector is an area where this expansion in the electricity system can be more nuanced than building a lot more infrastructure at increasing cost. The uptake of EVs will drive demand for significant increases in the volume of electricity to be delivered around New Zealand. However, it also has the potential to help flatten the peak demand on the network, by empowering consumers to shift demand to off peak periods and access significant off-peak electricity price savings.

There is also a significant opportunity to reduce electricity costs for all electricity consumers across New Zealand. An important concept to understand is that both transmission and distribution networks are built to meet peak demand capacity. Network costs are driven by the capacity (MW) of the infrastructure, but consumers are often charged by their retailer on a usage (\$/MWh) basis. Therefore, if peak demand is maintained but energy consumption grows (i.e. more electricity is used to charge EVs during the off-peak period), then charges to all electricity consumers, not just EV users, can be reduced on a per unit basis.

This major opportunity to reduce electricity costs for all New Zealanders can be realised by encouraging widespread adoption of solutions such as time of use pricing and smart charging. Smart chargers enable consumers to physically plug in their car when they get home in the evening but control actual charging such that it occurs through the night outside of peak periods. Smart chargers' 'peak smoothing' effect, which is shown in the first chart in Figure 5, increases the utilisation of the electricity network and has the potential to save consumers approximately \$1.5 billion for every gigawatt of avoided peak electricity demand growth.

**Figure 5: Peak profile loads with and without smart EV charging**

(2035, GW)



In 2019, the UK EV charging project ‘[Electric Nation](#)’, which at the time was claimed to be the “largest smart charging project in the world”, concluded that with there is sufficient flexibility in charging requirements such that with the right incentives and tools (such as time of use pricing and smart charging) the impact of charging on peak demand can be managed. The next phase of the project is focussing on ‘vehicle to grid’ (V2G) capabilities, which has the potential to be more beneficial than smart charging due to the ability to put significant levels back into the network at peaks times, reducing the need for additional peaking generation. This not only benefits the electricity network but can also benefit the customers who generally will be paid to inject electricity into the network.

These are the types of benefits that we need to ensure New Zealanders can access through the accelerated uptake of EVs. Unlocking this potential requires coordinating the availability of EVs, smart charging infrastructure, peak/off peak pricing tariffs and innovative electricity retail offerings. We are already seeing this thinking come through as some electricity retailers are offering off-peak tariffs of around 15c/kWh (down from the standard residential price of 28-30c/kWh), equivalent to refuelling a petrol vehicle at approximately \$0.40/litre or 80% less than the cost of petrol today.

This is an important first step that needs to be built on through strong cross sector-collaboration between the energy and transport sectors.

## Energy and industry

### Energy strategy

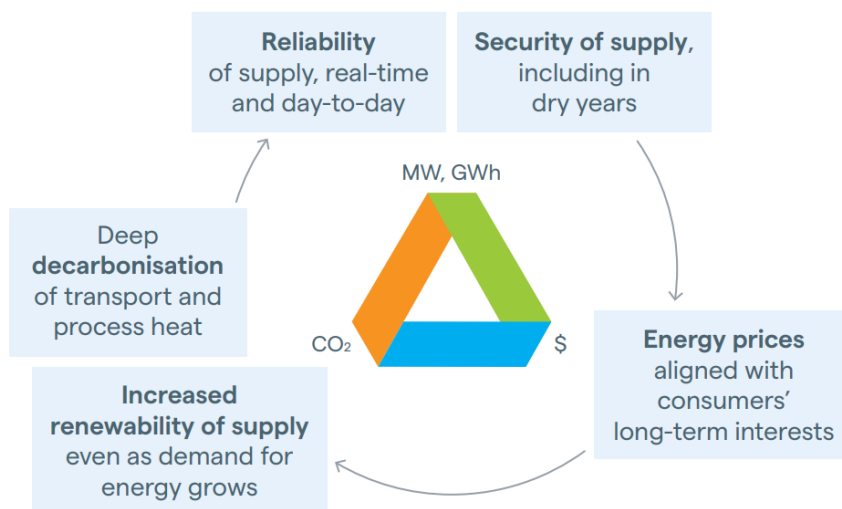
#### Question 58: Key priorities, challenges and opportunities of an energy strategy

As identified by the Climate Change Commission, a national energy strategy can be the driving platform for articulating how New Zealand's energy system, and more specifically, how the electricity system can enable decarbonisation while continuing to deliver reliable, affordable, low emissions electricity.

The integrated national energy strategy should focus across vectors (electricity, gas, hydrogen, biomass, biofuels etc) and across sectors of the economy (e.g. industry, transport etc).

It is important that the Energy Strategy considers and carefully balances all three dimensions of the energy trilemma, as shown in Figure 6 below. Aotearoa's decarbonisation efforts need to be supported by affordable and reliable sources of low emissions energy to be successful.

Figure 6: Energy trilemma



Source: Whakamana i Te Mauri Hiko

#### Question 59: Clear signalling to set a pathway for transition

We have identified three areas that require a clear signal to set a pathway for transition:

- **An agreed renewable energy and electricity target.** Targets for renewable energy and renewable electricity (even if aspirational for the latter) will be important for sending signals for investment in low emissions energy sources (e.g. renewable electricity, biofuels, green hydrogen).



For Transpower, the electricity target will be particularly important as it will have implications on how we manage resilience and security of the electricity system. A higher share of renewable electricity implies more intermittent generation such as wind and solar on the system and potentially other technologies such as batteries. Transpower needs to ensure we have the capabilities to manage this change in generation mix. The Electricity Authority's Market Development Advisory Group (MDAG) is currently studying the characteristics of a 100% renewable electricity market and findings suggest that there are significant differences in how the system and market operates between 95% and 100% renewable electricity.

- **A dry year solution.** The New Zealand Battery Project has been set up to investigate options for a dry year solution and its results will dictate the direction for the rest of the market. At the same time, other organisations are exploring the potential for their projects to provide dry year support (e.g. Southern Green Hydrogen project).
- **The role of gas in the transition.** Gas currently plays an important role in the electricity system as it provides flexible, synchronous electricity supply, which is important for ensuring peak and energy demand is met and supporting the stability and security of the electricity system. In 2021, we saw the effect that uncertain gas supply has on the electricity market: electricity prices were high and unaffordable to some businesses, and coal fired electricity generation rose to its highest levels since 2013 to meet the country's electricity demand. These events provide some insight into what might happen if gas were to transition out of the electricity system in a disorderly and sudden manner.

To ensure consumers are able to access affordable, reliable and low carbon electricity, we must ensure that gas is transitioned out of the system in a co-ordinated and orderly way that allows the industry to ensure it has the right mechanisms and/or technologies in place to ensure peak and energy demand can be met affordably, and that the reliability and security of the system can be maintained without gas (and coal). Setting a clear signal in the Energy Strategy on the transition out of gas can play a role in helping the industry adapt.

### *Setting targets for the energy system*

#### **Question 60: Government ambition in adopting a renewable energy target**

As a key player in the electricity system, Transpower is more focused on the impact a renewable electricity will have on our business, as opposed to the proposed wider energy target. We note in that the government has an aspirational target of 100% renewable electricity by 2030 and that the consultation document recommend that the target is revised in 2025.

We think that at this point in time, having 100% renewable as an *aspirational* target, rather than a firm target, is appropriate. This is because the difference between how we operate a highly renewable (e.g. 95%) and 100% renewable electricity system is significant. The difference in cost and therefore affordability to the consumer of both systems is also potentially significant.

















Part of the challenge of operating a 100% renewable electricity system has to do with the ability of the system to meet both daily peak demand and annual energy demand when there is a lack of firm electricity generation (e.g. gas peakers) and an abundance of variable and intermittent renewable generation (e.g. solar and wind).













Daily peak demand is a capacity issue – we need to have generation capacity available to meet the peaks, particularly during a dry year. The dry year challenge is an energy issue – there is a shortage of energy (namely water) with which to convert into electricity to meet energy demand. Table 1 below shows a simple assessment of some of the technology options that have been considered to meet both peak and dry year risk.

In a 95% renewable world, flexible resources that can be dispatched quickly, like gas peakers, battery energy storage systems or demand response are necessary. Gas peakers also have the ability to contribute resource adequacy in a dry year.

In a 100% renewable world, we may rely on demand response, batteries, or green peaker technology that can provide intra-day peaking support and resource adequacy in a dry year. Alternatively, some have suggested significant renewable generation overbuild to be able to meet peak and energy demand. Some of these solutions are described in Table 1 below. Any of these solutions will require a significant investment, the costs of which will ultimately be borne by the New Zealand consumers. This is why the shift to 100% renewables must be considered with caution, keeping the affordability dimension of the energy trilemma in mind.

**Table 1: Technologies and their ability to contribute to peak demand and dry year** (continues next page)

Technology	Ability to contribute to peak demand	Ability to contribute to dry year	Comments
<b>Gas (Combined cycle)</b>			Lower flexibility challenges economics, emits carbon
<b>Gas (Open cycle/Peaker)</b>			High flexibility, emits carbon
<b>Hydrogen demand response</b>			May have restrictions on flexibility due to offtake contracts for hydrogen
<b>Hydrogen Peaker</b>			Currently very expensive
<b>Biomass</b>			More expensive than gas, needs net zero fuel source
<b>Short duration pumped hydro energy storage</b>			Dry year contribution limited by size, sites need to be identified
<b>Long duration pumped hydro energy storage</b>			Environmental consenting may be difficult

Technology	Ability to contribute to peak demand	Ability to contribute to dry year	Comments
Renewable overbuild			Could be expensive
Batteries			May need multiple value streams to be economic
Renewable overbuild and batteries			Could be expensive
Additional HVDC capacity			Allows SI hydro to contribute more to NI peaks
Demand response			Allows peaks to be managed, potentially at least cost
Large scale load interruption			Prolonged shutdown of major loads, likely to be expensive

*Phasing out fossil gas while maintaining consumer wellbeing and security of supply*

### Question 61: Managing phase out of fossil gas

Gas currently plays an important role to provide dry-year cover and peaking capacity. The retirement of fossil gas in New Zealand's energy mix needs to be carefully studied. Recent times have shown that in the absence of a reliable gas supply, coal is used to generate electricity.

*Decarbonising the industry sector*

### Question 62: Current work to decarbonise industrial sector

Transpower is working closely with our customers and EECA to identify process heat load that can be decarbonised. The regional heat demand database is a result of this work. It identifies the location and size of process heat generation plants in Canterbury and Southland and will allow better planning.

This data can be extended to the rest of the country. This work is currently funded by Transpower, EECA and the local EDBs, and relies on voluntary disclosure from businesses.

### Question 63: Issues, challenges and opportunities for decarbonising the industrial sector

Decarbonisation through electrification requires the electricity industry to be able to build electricity lines and substations at the right time, at the right place with the right capacity.

As discussed before, there are several risks to this being done, including if the proposed NBA creates barriers, or areas where electricity infrastructure cannot be located, and changes to investment decision-making criteria.

*Addressing current data gaps on New Zealand's energy use and associated emissions through an Energy and Emissions Reporting scheme*

#### **Question 64: Large energy users and proposed Energy and Emissions Reporting scheme**

No comment

#### **Question 65: Large stationary energy user threshold**

No comment

#### **Question 66: Other large energy user thresholds**

No comment

#### **Question 67: Other issues, challenges or opportunities around large energy users**

No comment

*Supporting development and use of low-emissions fuels*

#### **Question 68: Government support for low-emissions fuel development**

We support the expansion of targeted policy and contestable funding interventions to encourage technology uptake like the Government Investment in Decarbonising Industry fund or the Low Emissions Transport Fund.

#### **Question 69: Other views on energy**

We also recommend the following changes to policy and legislating relating to energy, which will be instrumental in enabling the delivery of electricity infrastructure at the pace required to decarbonise:

- **Improving how the Grid Investment Test recognises the benefits to Aotearoa of emissions reduction.** At present, the Grid Investment Test considers the costs and benefits of the project “arising in the electricity market” and benefits of the project that fall outside

of the electricity market are not considered. We understand that because of this, the Commerce Commission is not able to fully consider the benefits of emissions reductions arising from a project. For Transpower, this limits the ability for the Commission to approve major transmission investments that could assist New Zealand's transition to a low carbon economy where the climate change benefits fall outside the electricity market.

For example, where an investment would result in consumers switching from fossil fuels, and in so doing, save money that would have been spent on fossil fuels while also reducing emissions, the Commerce Commission is not permitted to consider these benefits when deciding whether to approve the investment or not.

Other areas of the test could also be adapted to better reflect Government direction on climate change, such as applying a social cost of carbon or a social discount rate for carbon costs which are considered in the Test.

We note that the Commerce Commission has recently engaged with the electricity sector on how it can better enable decarbonisation. We commend the Commerce Commission for this engagement with the sector.

- **Incorporating forecasts into investment decision-making in the electricity sector that are consistent with New Zealand achieving our decarbonisation targets.** Currently, the Climate Change Commission is using carbon price, electricity demand and other forecasts to set national targets and budgets that are different to the forecasts used by the regulators to make investment and pricing decisions in the electricity sector. To decarbonise effectively, we need to ensure that the forecasts used across both instances are consistent and aligned with New Zealand's decarbonisation targets.

Similarly, the Grid Investment Test and others rely on the Electricity Demand and generation Scenarios (EDGS) that MBIE produce to test whether an investment is in the best interest of consumers. The current EDGS were produced in 2019, prior to the update of the Climate Change Response Act and the setting of the carbon budgets, and therefore may not fully reflect a decarbonised future. For investments to be aligned with a future where New Zealand achieves its decarbonisation objectives, the EDGS need to be made consistent with that future.

By having decision making frameworks that better incorporate New Zealand's decarbonisation ambitions, Transpower and other providers are better empowered to invest in the right infrastructure at the right time to support decarbonisation.

- **Linking the Climate Change Response Act, Emissions Reduction Plan, and Emissions Budgets to the proposed Natural and Built Environments Act (NBA), proposed Strategic Planning Act, and proposed Climate Adaptation Act.** The Select Committee report into the [\*Inquiry on the Natural and Built Environments Bill: Parliamentary Paper\*](#) recommended stronger linkages to the CCRA when resolving conflicts between NBA outcomes. Our submission sought a strengthened role for the CCRA, the emissions reduction plan and the targets – including in the climate change outcome, and when limits are set by the Minister.

In the absence of a climate change target in the NBA and SPA (as currently occurs), it is crucial that decision-makers under the NBA and SPA implement the CCRA, the emissions reduction plan, and emissions budgets. A requirement of this kind is important for enabling the maintenance, upgrade and build of the Grid infrastructure necessary to meet our climate change commitments.

## Building and construction

### **Question 70: Energy performance programmes for existing commercial and public buildings**

We support the Commission's recommendation that the Government improve the energy efficiency of buildings by introducing mandatory participation in energy performance for existing commercial and public building. However, this should be done on the basis that there is a cost-benefit analysis undertaken on a per-building approach. The approach should be flexible enough to recognise that some commercial and public buildings may derive no value from such a programme – for example, large warehouses, infrastructure sites and other commercial sites that are otherwise unoccupied.

### **Question 71: Building and construction sector emissions reductions from energy, industry, transport and waste**

There are several options that the government could consider to help the building and construction sector reduce emissions from other sectors (e.g. energy, industry, transport and waste), such as:

- Provide or support the deployment of tools and clear guidance to better understand embodied carbon and other activities that generate emissions in building and construction.
- Set minimum standards and requirements for measurable or quantifiable components of the building and construction sector for emissions reduction – e.g. energy efficiency measures, encouraging rooftop photo-voltaic panels on commercial buildings, electric vehicle charging capability.

### **Question 72: Supporting people, communities and businesses to reduce fossil fuel use in buildings**

No comment

### **Question 73: Space and water heating in commercial buildings**

No comment



**Question 74: Potential adverse effects on particular people or groups**

No comment

**Question 75: Māori and iwi in the Building for Climate Change programme**

No comment

**Question 76: Raising awareness of low-emissions buildings**

No comment

**Question 77: Contestable funding for low-emissions building and construction sector**

No comment

**Question 78: Initiatives and incentives to reduce construction waste**

There are many opportunities for reuse, repurposing and recycling of older equipment in the electricity sector – and initiatives that allow for sector-leadership that should be investigated. Transpower is currently participating in a pilot programme with others in the sector to exchange surplus unused electricity equipment rather than reduce equipment disposals. Many of these items of equipment are highly carbon intensive in construction and there are some good opportunities here. For example, glass and porcelain recycling from insulators, alternative uses for back-up UPS batteries, electricity poles and towers, conductor wire etc.

**Question 79: Encouraging low-emissions buildings and retrofits**

There are several options that the government could consider to encourage low-emissions buildings and retrofits:

- Optimising NZ-sourced materials and building solutions – for example, cross-laminated timber as a replacement for concrete or imported timber (and embodied emissions reductions)
- Re-assessing existing technical and building standards to prioritise or incentivise lower carbon materials – e.g. fire rating requirements etc.
- Rebates or tax incentives on investment in low emissions design components. This could include subsidising purchases of some building elements

- Potentially financially offsetting (or rebate) of carbon reductions achieved in buildings from base-case design – or ETS linkages to offset carbon saved in construction design. Alternatively, offset emissions from Emissions Intensive Trade Exposed (IETS) businesses with industrial allocation of carbon units

#### **Question 80: Coordinating and supporting workforce transformation**

No comment

#### **Question 81: Improved thermal performance standards**

No comment

#### **Question 82: Other views on the building and construction sector**

No comment

### **Agriculture**

#### **Question 83: Support and target farm advisory and extension services**

No comment

#### **Question 84: Encouraging on-farm mitigation practices**

No comment

#### **Question 85: Research and development on mitigations**

No comment

#### **Question 86: Environmental credentials for low-emissions food and fibre products**

No comment

#### **Question 87: Reducing barriers to changing land use**

No comment





**Question 88: Other views on agriculture**

No comment

**Waste**

**Question 89: Reduce waste biogenic methane emissions by 40 per cent**

We support the target as it is in line with the broader greenhouse gas emissions targets.

**Question 90: Education and behaviour change initiatives to reduce organic waste**

No comment

**Question 91: Policies to manage the impacts of higher waste disposal costs**

We support mandatory waste reporting for New Zealand businesses where it helps to create an understanding of baseline waste generation activities and identified opportunities to incentivise or reduce waste generation.

**Question 92: Ban disposal of food, green and paper waste at landfills**

No comment

**Question 93: Ban disposal of organic materials going at landfills**

No comment

**Question 94: Landfill gas capture systems**

No comment

**Question 95: Standardised approach to collection systems**

No comment



**Question 96: Transfer stations separating and recycling materials**

No comment

**Question 97: Proposals extended to farm dumps**

No comment

**Question 98: Alternative ideas for farm dumps and waste production on farms**

No comment

**Question 99: Other options to reduce landfill waste emissions**

No comment

**F-gases**

**Question 100: Phase down bulk import of hydrofluorocarbons**

No comment

**Question 101: Impact of phase down on business**

No comment

**Question 102: Restricting import or sale of finished products with high-global warming potential HFCs**

No comment

**Question 103: Utilising lower GWP refrigerants in servicing existing equipment**

We support the use of lower global warming potential refrigerants in servicing existing equipment if it can be demonstrated that they are safe and meet the manufacturers recommendations for existing equipment.



**Question 104: Alternatives to HFC refrigerants**

No comment

**Question 105: Reducing refrigerant emissions in design and energy efficiency**

No comment

**Forestry**

**Question 106: Forestry as a buffer**

No comment

**Question 107: Employment transition for those affected by land-use change**

No comment

**Question 108: Native forest economic viability**

No comment

**Question 109: Types of forests and forestry systems**

No comment

**Question 110: Afforestation**

No comment

**Question 111: Roles of central and local governments, and the private sector**

No comment

**Questions 112: Pest control/management**

No comment



**Questions 113: Priorities from iwi/Māori perspective**

No comment

**Question 114: Other views on forestry**

No comment



