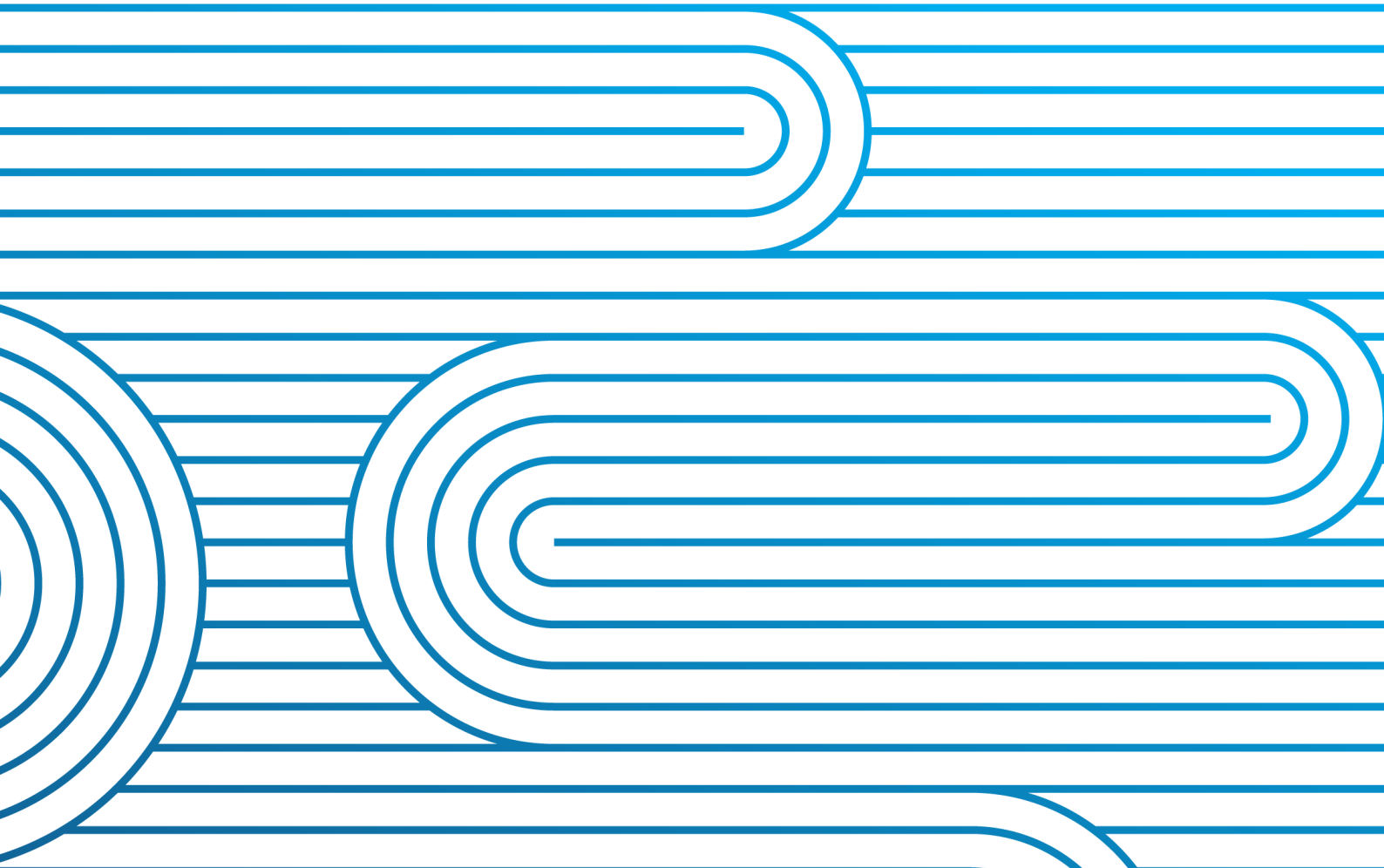
TRANSPOWER

Submission to the Infrastructure Commission

On the Commission's strategy consultation document - Infrastructure for a Better Future

02 July 2021



Contents

Section 1: Overview

Transpower's context: Decarbonising New Zealand's energy sector

As the owner and operator of New Zealand's electricity transmission grid, an essential part of Transpower's 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.

The Climate Change Commission's recently released carbon budgets and advice to government recommends that New Zealand "maximise the use of electricity as a low emissions fuel."

As New Zealand decarbonises its energy sector, we expect to see significant demand growth in urban centres driven by transport electrification. Similarly, we expect to see significant growth across the nation as New Zealand's manufacturers, hospitals, schools, universities, and commercial and public buildings increasingly look to electricity for their heating needs.

We expect that we will have to build new connections to supply these new consumers and upgrade our existing connections as our existing customers increase their uptake of electricity. To supply this power, we will need to connect vast amounts of new generation, both from existing players and new entrants employing existing and new generation and storage technologies.

To ensure that the power from these new generators can make its way to consumers across the country, we will need to make upgrades to the core interconnected grid. This may involve upgrades to existing lines and substations or in some cases may involve building entirely new assets.

To determine how the grid must change, Transpower needs to answer three key questions:

- What investments will we need to make in the grid to connect and transport the amount of electricity required to support New Zealand's decarbonisation?
- How do we ensure that the grid remains operable, and we are able to support security and reliability of supply? And
- What changes will need to be made to the processes, regulations, and the workforce that enable Transpower and the broader industry to go about our work?

To answer these questions, in 2020 Transpower released Whakamana i Te Mauri Hiko which explores how demand for electricity and the makeup of generation might change as New Zealand decarbonises. It considers the implications for the planning of the grid and the sector's ability to deliver a 55-70% increase in demand for electricity over the next 30 years.

Accommodating such a significant increase poses a significant challenge to the industry, but one that with sufficient planning, coordination, and adaptability we will be able to overcome.

Delivering new transmission assets can be a complicated and lengthy process, with regulatory investment approvals, environmental approvals, and land rights acquisition sometimes stretching

our lead times towards ten years. As demand for electricity ramps up through the mid-2020s, and as the pace of technological change accelerates, we will need to plan under considerable uncertainty to have a long-term view of the types of investments that might be required. We will need regulatory investment approvals, environmental approval, and land rights acquisition processes which allow us to quickly move on transmission investments as demand for electricity builds and the triggers for our investments are hit - and we will need to continue improving our internal processes, and develop the workforce to deliver them.

While Transpower is responsible for delivering these investments, it is not a task that we can do alone.

To clarify the concepts from Whakamana i Te Mauri Hiko into a more concrete forward plan of works, Transpower has started our Net Zero Grid Pathways project which seeks input from industry to help determine what specific grid investments may be required, and by when. We are also approaching the Resource Management system reform from the perspective of enabling this forward work plan (including new build and work to the existing Grid).

This engagement with industry is vitally important in an investment environment that is challenged by high levels of uncertainty. As we investigate and decide on long lived investments that will serve transmission consumers for decades to come, it is essential that our decisions reflect the advice that consumers provide on their forecast future demands on the grid.

While existing electricity consumers and generators are able to provide us advice on their future plans, we expect that as New Zealand decarbonises, we will increasingly see demand for electricity coming from the transport and process heat sectors. Because they will be new customers, and because of their importance to New Zealand's decarbonisation objectives Transpower has taken a deep dive into these areas with the 2021 release of our Electrification Roadmap.

The roadmap helps to clarify the magnitude of electrification that we should plan for the grid to support, and the role of other fuels in decarbonising these key sectors. It also identifies a number of key opportunities for policy and business model changes that could help to motivate and enable the transition to low emissions fuels.

The Grid is a platform for decarbonisation

In their recently released carbon budgets and advice to Government, the Climate Change Commission (CCC) identify the electrification of energy use as essential to New Zealand's transition to a low carbon economy. When considering electrification of energy use, they identify that there are clear priorities for the short term, where significant gains can be made. These are:

- transport, and in particular light transport;
- process heat, and in particular lower temperature activities; and
- increasing the proportion of renewable electricity, and in particular the shift to 95-98% renewables.

These priorities identified by the CCC are well aligned with the previous analytical and modelling work by the Productivity Commission, Transpower, and the Interim Climate Change Commission as well as with the findings of our Electrification Roadmap.

As well as being achievable, the decarbonisation of transport and process heat are two of the most cost effective and sizeable abatement choices available to New Zealand.

Collectively, they make up 54% of New Zealand's emissions covered in the 2050 Net Zero Carbon target, so electrifying these activities could materially improve our emissions reductions.

The move to 95% renewable electricity is a third area of significant, cost effective gains available in the short term which is likely to occur rapidly as a result of natural market forces.

A more renewable electricity system will magnify the benefits of electrifying transport and process heat. It is possible for New Zealand to have an electricity system with at least 95% renewable generation by 2030 through natural market developments.

To achieve this, we need to prioritise displacing the use of fossil fuels for baseload generation with low cost renewable generation.

To enable a thriving renewable energy infrastructure sector, our analysis has identified the following priorities in the next five years:

- Reform the Resource Management system to recognise the importance of electricity infrastructure in meeting our climate change commitments, and ensure that there is strong enabling national direction and consenting pathways for this infrastructure. Efficient and certain policy, plan making and consent processes are required;
- Improve our property rights acquisition regime to allow more rapid project delivery;
- Development of a deep Power Purchase Agreement (PPA) market in order to help drive down electricity prices and provide longer-term price certainty to purchasers;
- Further evolve markets to realise the value of distributed energy resources and demand-side participation;
- Empower regulators like the Electricity Authority and the Commerce Commission to support decarbonisation;
- Further incorporate the long-term benefits of climate change mitigation and connecting new renewable generation into the Grid Investment Test (our regulated cost benefit analysis framework); and
- Improve Grid Investment Test processes and inputs to further enable transmission development that provides additional capacity for electrification and/or new renewable generation.

Importantly, these changes in the transport and process heat sectors, and to the composition of our electricity generation, are achievable. That is not to say they won't require effort, and they won't require change from a lot of people, because they will. But they can be done and done within the timeframe required by New Zealand's climate change targets. The technology is available, the commercial and practical problems are solvable, the industry co-ordination is possible, the right policy and regulatory mechanisms can be developed, and changes can be made.

A major expansion of the electricity system is required

The CCC's electrification and decarbonisation priorities will require a major expansion of the electricity system, and this needs to start now.

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. Even in the event of a potential closure of the Tiwai Point aluminium smelter, we would still need to build and deliver as much new generation in the next 15 years as we have in the last 30 years.

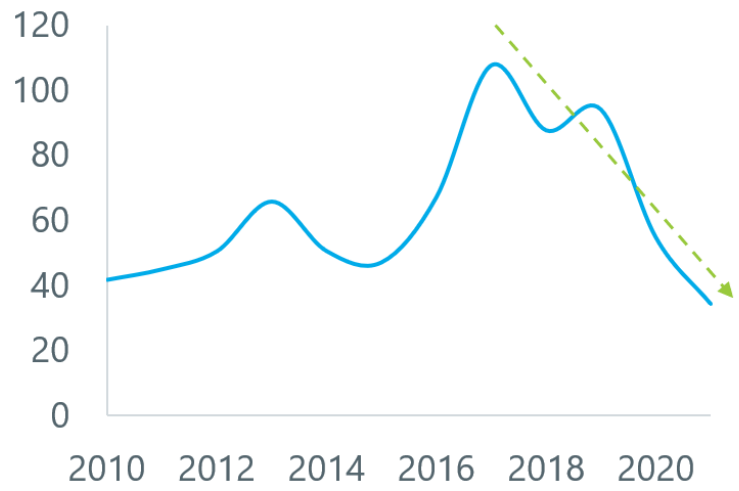
This new generation places demands on the infrastructure downstream. We estimate that 60 to 70 new grid scale connections, each requiring new lines and potentially new substations, will be required between now and 2035 (30 to 40 new generation connections and 30 new connections to accommodate the increased demand).

These new connections will get more electricity on and off the grid. We will also need to strengthen the grid to reliably and safely transport these volumes of energy across the country. Our modelling identifies an increase in large grid upgrade projects that need to be done before 2035. This is only 15 years from now, and each one is a major infrastructure project. Again, this is a significant scaling up of our infrastructure build compared to recent years.

In short, under any scenario a major expansion is required, starting now. However, it is important to be clear about what this major expansion of the electricity system implies and does not imply.

It does not imply a commensurate major expansion in electricity costs, nor a one for one increase in transmission build. The cost of new renewable generation is declining rapidly. New Zealand needs to build a lot more of it, but it is getting cheaper to do so. New renewable generation is already more cost effective than today's baseload thermal generation, and technology will continue to improve. By way of example, in Australia the wholesale electricity price has declined significantly in the last three years as close to 20 GW of new renewables have been built:

Figure 1: Falling wholesale price of electricity in Australia (2020 real, AU$/MWh)



In addition, 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. Energy volume is often how consumers' bills are charged. As a general rule of thumb, if energy volume grows at a faster rate than peak demand, network charges for consumers will decline as the cost of the network is spread over a larger number of units of electricity.

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. More generally, there will be greater variation in where and when energy is available to the grid, and greater flexibility from users in how they take energy from the grid, that will mean the grid is much better utilised outside the peak. We forecast that peak demand could grow at half the rate of energy volume growth to 2050 which could lead to reduced network charges for all consumers in time.

In short, we are talking about a major expansion in the volume of delivered electricity and that will require more network investment, but how much more depends on the path New Zealand takes to decarbonise. Our estimates above of increased large grid upgrade projects before 2035 assume the sector co-ordination and policy work is done to enable distributed energy resources and demand response to smooth the growth in peak demand as the volume of electricity delivered to the economy grows.

What the major expansion of the electricity system *does* imply is making some changes to the way we go about:

- investment decision-making; and
- project environmental approvals and land access.

Investment decision-making

When it comes to network investment decision-making, the next 15 years, and the 15 after that, are going to be very different from New Zealand's recent experience. Or, to be more accurate, they will need to be if New Zealand is to hit its climate change targets.

Our existing system – our ways of framing an investment choice, of articulating a business case for internal approval, of consulting with stakeholders, of regulatory oversight – has evolved to support least regrets investment decisions in a world that is evolving incrementally. In this system, the task for the project manager, internal governance, and external scrutiny is to be confident that the right increment of investment is being built as late as prudently possible. There is time to wait for more information and more certainty should it be needed, and it is seen to be in consumers' long-term interests to do so.

This framework has worked well during our recent period of relatively flat demand growth with a comparatively high degree of certainty. As the pace of electricity demand growth increases, we believe that the time is right for a conversation about how we could evolve this system to reflect the role that the grid must play in New Zealand's decarbonisation. This conversation must involve both our regulators, consumers, and the broader industry to ensure that we strike the balance between the needs for consultation, scrutiny, flexibility, and pace. There is no single policy that will achieve this shift in the network investment system, but to begin the conversation, we suggest that areas of focus should include:

- Making investment decisions in the face of uncertainty;
- Considering integrated investment proposals; and
- Allowing our investment decision-making framework to better consider climate change.

To be clear, we are not proposing that the investments Transpower makes on behalf of electricity consumers should be subject to less scrutiny or that the need for consultation has decreased. If anything, the coming years will require more consultation to allow us to make decisions under increased uncertainty. Investments made by Transpower in major capital projects need to be approved by the Commerce Commission, via the Grid Investment Test, to ensure that they provide net benefits to electricity consumers. This assures industry participants and consumers that there is independent scrutiny of any decision to invest. This process is critical for ensuring efficient transmission investment in the long-term interests of consumers.

We are also not proposing transformational reform of the sector's regulatory framework. The sector's regulatory framework has largely worked to date. But as the context shifts from just in time, incremental investment to integrated investment that enables the transition to net zero carbon there are a number of relatively simple, practical changes that could be made to the current framework to better align it with the Government's direction on emissions reductions.

Making decisions in the face of uncertainty

To increase our pace of delivery, we will need to make decisions and commit to investments in circumstances where, in the last two decades, we might have waited for better information. We

will need to make investment decisions despite having imperfect information, with an eye on where the grid and the country needs to be in 2030 and 2050. This implies shifting the framework to:

- investing in network capability;
- creating options for further electrification and renewable generation; and
- having frameworks in place to proactively make decisions where inaction due to uncertainty is an unacceptable outcome.

To give a regulator confidence to make this shift, this should be expressly recognised and codified in the legal framework. This could be achieved through specific changes to regulators' mandates, or it could be implemented through targeted Government Policy Statements which articulate the Government's intention that regulators consider a broader range of factors when setting policy and approving investment decisions. As an example of this concept in practice, in the early months of the COVID-19 crisis the Government provided the Commerce Commission with a Government Policy Statement which under section 26 of the Commerce Act 1986 required the Commerce Commission to have regard to the economic policies of the Government as transmitted in writing.

We also suggest that the industry and government assess the relative merits of introducing a fast track approval process for major capital investments, as the Australian Energy Market Commission recently did in Australia. This process doesn't have to be used every time, but where we have investment proposals that are consistent with keeping New Zealand on track to achieve the major expansion in the electricity system required, we should have the tool available to make these decisions quickly. This variation to the Australian framework allows the regulator to undertake steps of their approval process in parallel, increasing the pace of the approval process. It follows a rigorous industry and consumer consultation process. Alternative potential processes could take inspiration from the Fast Track consenting process, which accelerated RMA approvals for specific infrastructure projects and allowed non-specified projects to be approved via Orders in Council.

Consultation, scrutiny and regulatory approvals will continue to have an important part to play in the years ahead. Possibly more so – the next 30 years will demand more judgment not less, and we need to draw upon all expertise. The key will be in the shift that everyone involved has to make, to a mindset that is reframed to keeping the sector on track to reach its 2030 and 2050 climate change targets.

Considering integrated investment proposals

A related shift is enabling decision-makers to consider investment proposals together. The transmission grid is a system, and often a series or package of investments in the grid will have a much larger impact than any individual or isolated investments.

When considering the potential benefits of network investment proposals, in a context where the CCC has identified a requirement for a major expansion in the electricity system over a challengingly short period of time, we need to be sure we are identifying the systemic and magnified benefits that can come from an integrated package of investments. We face a future where we have to make a number of significant changes to the grid – it doesn't make sense to weigh them all in isolation.

Allow our investment decision-making framework to better consider climate change

A third area of focus should be a health check of whether the framework we use for making investment decisions, and other regulatory decisions in the electricity sector, is fit for purpose in the context of the increasing importance of climate change. As outlined, we are not proposing transformational reform of the sector's regulatory framework as it has largely worked to date. This provides a strong foundation from which a number of relatively simple, practical changes can be made to better align it with the Government's direction on emissions reductions.

As the Climate Change Commission has signalled, meeting the challenge of climate change will be the overarching objective of the electricity system for the foreseeable future. We need to be sure the regulatory investment framework we have inherited from a period where climate change was not a primary focus is fit for purpose.

Specifically, this could include:

- strengthening the mandate for the Commerce Commission and the Electricity Authority to consider climate change in their decision making. The decisions made by the electricity sector regulators on issues like investment approvals and pricing will either help or hinder New Zealand's progress toward its climate change objectives. We recommend that the Commerce Commission and the Electricity Authority both be charged with making decisions consistent with the electricity sector enabling New Zealand to reach its 2030 and 2050 climate change targets. Given the role the electricity sector must play in decarbonising the economy, and the scale of that challenge, this needs to be made explicit;

- improving how the Grid Investment Test recognises the benefits to New Zealand of emissions reduction. At present the Grid Investment Test considers the costs and benefits of the project "arising in the electricity market". Benefits of the project that fall outside of the electricity market are not considered. This limits the ability of the Commerce Commission to approve major transmission investments that would assist New Zealand's transition to a low carbon economy where the climate change benefits fall outside the electricity market. So, for example, where an investment would result in consumers switching from fossil fuels, and in so doing, saving 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. Transpower is required to us a discount equal to our Weighted Average Cost of Capital by default under our current framework which may undervalue benefits accruing to future generations from avoided environmental harm; and

- incorporating forecasts into investment decision-making in the electricity sector that are consistent with New Zealand achieving our decarbonisation targets. We should avoid a situation where the Climate Change Commission is using forecasts of carbon prices, demand, etc, to set national targets and budgets, and the regulators in the electricity sector are using different forecasts when deciding on investments and pricing in the sector. Additionally, if the Electricity Demand and Generation Scenarios (EDGS) that MBIE produce do not reflect a future in which New Zealand achieves its decarbonisation objectives, then the Grid Investment Test would suggest that we should invest in the grid accordingly.

These are examples to illustrate the broader point – we should check now that our regulators are both empowered and required to make decisions that are consistent with the electricity sector playing the role required of it to decarbonise the New Zealand economy.

Environmental approvals and land access

Currently, environmental approvals and land access timeframes for large projects can be in the order of 2-5 years, before the 1-4 years of build can be commenced. These timeframes are often even longer when Resource Management Act appeals, and compulsory acquisition processes are exerted. This lengthy time frame is a luxury that New Zealand can no longer afford. It impacts on our ability to commission the amount of network infrastructure that New Zealand needs by 2035 and 2050.

Environmental approvals

It has been accepted that the RMA is no longer working. Wholesale system reform is underway. It is crucial that these reforms allow us to rapidly address New Zealand's climate change mitigation needs, and provide for essential infrastructure, **alongside** the intended increased protection of the natural environment using biophysical limits and targets.

At the time of writing this submission, the exposure draft of the Natural and Built Environments Act (**NBA**) was not available. As a result, our comments are based on the content of the Randerson Panel Report, *New Directions For Resource Management in New Zealand* and the February cabinet papers on the reform (ie. proactively released versions).

We are concerned that the proposed mechanism for protecting the natural environment (using biophysical limits) will substantially constrain climate change mitigation initiatives such as renewable energy, transmission and distribution projects, as well as other essential infrastructure. Resource management processes will become a key barrier to achieving New Zealand's net-zero target by 2050. It is crucial that the reform:

- resolves tensions between conflicting infrastructure and natural environment priorities;
- speeds up and makes more certain resource management processes to enable rapid delivery of essential works;
- aligns with the Climate Change Response Act (CCRA) framework, purpose and targets and other related legislation to ensure a cohesive, system-wide approach.

The task ahead to rapidly electrify New Zealand's economy will require fast reform, substantial collaboration across government agencies and stakeholders and speedy and agile processes.

Setting comprehensive national direction and standardisation at a very early stage will be essential to ensure a fast and orderly transition.

Biophysical limits cannot be so absolute as to prevent necessary climate change mitigation and other essential infrastructure activities. National direction and other high-level planning tools will be needed to help resolve conflicting tensions.

While necessary, the new legislation will create uncertainty and litigation. It is important that 'easy wins' (such as retention and improvements to current national direction) are progressed alongside broader statutory reform.

The NBA, Strategic Planning Act (SPA) and Managed Retreat and Climate Change Adaptation Act (CAA) are key elements of the transformation needed. It is critical that the NBA, SPA and CAA recognise and support the nature and pace of the electrification challenge set by the CCRA targets, consistent with the Climate Change Commission's advice and the Minister's Emissions Reduction Plan.[1]

The legislation must:

- Avoid statutory frameworks that threaten, constrain or delay both existing or new renewable electrification, transmission and distribution projects; and

- Provide processes and consenting pathways that actively enable the prompt and flexible consenting of electrification projects, as well as the continued operation, maintenance and upgrading of existing infrastructure (including to respond to technology and other changes).

To achieve those outcomes, public participation in some processes will need to be moderated and amenity considerations deprioritised (reflecting national versus local benefits and costs, and priorities).

Land access and other regulatory regimes

The new resource management system will not be enough given the significant 'lag' between providing a regulatory solution and on-the-ground outcomes. Related legislation, including the Public Works Act 1981, Heritage New Zealand Pohere Taonga Act 2014 and Conservation Act 1987 all provide land access and/or property rights regimes. These will also need to be reviewed. It is important to note that any efficiencies gained through the resource management system reform could be stymied if changes are also not made to land access regimes. Longer term reform will therefore need to be prioritised.

The objective: speed

The overall objective of these changes in how we make investment decisions, and how we make decisions on project consenting and land access, is speed. We need to commit to investment decisions and build the infrastructure faster than we have to date. A standard timeline of 1-3 years for investment approval and 2-5 years for consenting and land access can lead to years of planning before a project build even commences. This will no longer be workable if the required electrification and renewable generation is to be achieved.

[1] The Emissions Reduction Plan will be gazetted by the end of 2021. CCRA, section 5ZI.

At Transpower, we are implementing an improved end-to-end delivery process that is improving our efficiency and enabling us to deliver projects more quickly. By way of example, the Clutha Upper Waitaki Lines project has had its original three-year construction timeline shortened to two years through realising efficiencies in delivery (we note that the acceleration of this line upgrade was largely reliant on the NES for Electricity Transmission and Transpower's existing good relationships with landowners which are unlikely to be available to us for new-build lines). These changes are important, and we will continue to challenge ourselves to be more efficient in our delivery. But even with these efficiencies, we will still need the changes in how we make investment decisions, and how we make decisions on project consenting and land access.

The future is already knocking on our door

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.

We are updating our network planning to ensure that our future grid plans remain consistent with delivering a net zero carbon future and engaging with industry through our Net Zero Grid Pathways project to ensure our future investment plans are well informed. We are collaborating with customers to help them plan for the decarbonisation of their business. We are improving our processes to accommodate the new volume of connections to our grid and refreshing the information we give to new customers on the grid connection process to make this more streamlined. We are also planning ahead for a major scaling up in our workforce which is an industry-wide challenge.

While Transpower is working to ensure it can enable this electrified future, we reiterate what we said in our MBIE AREEE submission – the challenge for the electricity industry is significant but with sufficient planning, adaptability, and commitment, it is achievable.

Where appropriate we have continued these discussions in our submission.

Section 2: Response to the Infrastructure Commission's questions

Question 1: What are your views on the proposed 2050 infrastructure vision for New Zealand?

The Commission's proposed vision for infrastructure is that:

> *"Infrastructure lays the foundation for the people, places, and businesses of Aotearoa New Zealand to thrive for generations"*

Transpower supports this vision. Framing infrastructure as a foundational component correctly identifies that infrastructure is necessary but not sufficient for wellbeing, identifies key stakeholders in people, places, and businesses and demonstrates that investments made today will have long-lasting, intergenerational impacts.

Question 2: What are your views on the decision-making principles we've chosen? Are there others that should be included?

We support the outcomes and decision-making principles that are proposed, and encourage the Commission to expand on their interpretations of these outcomes and principles to develop a shared understanding across infrastructure providers.

We would also encourage the Commission to consider providing a framework through the Infrastructure Strategy which articulates how efficiency, equity, and affordability should be traded off in situations where they may oppose each other.

We also note that the Commission states that "*All decision-making about infrastructure must be guided by Te Tiriti o Waitangi (the Treaty of Waitangi) and its principles, but specifically the obligation to partner with Māori.*" While this obligation applies to all infrastructure provided by the Crown, not all infrastructure providers are governed by the Crown's Treaty obligations. In these cases, these infrastructure providers should develop their own approaches to engaging with Maori to ensure appropriate outcomes.

Question 3: Are there any other infrastructure issues, challenges or opportunities that we should consider?

The Commission highlights "*the unique features of infrastructure*" on page 33 of the consultation document. We consider that two key features of infrastructure are omitted from the list:

> Firstly, the adverse effects of infrastructure (particularly nationally significant infrastructure) are often local but the benefits gained are at a much broader level. These benefits can be felt in a different district or region (eg. transporting electricity from the source of generation to the demand which may be some distance away). From a climate change mitigation perspective, the adverse effects of climate mitigating infrastructure (e.g. local visual amenity) will be local, but the benefits will be national, or even international – relating to the climate more generally.
>
> Secondly, infrastructure often has a functional, technical or locational need to be in a place, or at a scale or form. This need, or constraint, can result in infrastructure having no choice but to be located in a sensitive environment (e.g. in the coast marine area or other water, in an outstanding natural landscape or habitat of indigenous flora or fauna). Put simply, infrastructure cannot always avoid sensitive environments.

These features can result in infrastructure being unwanted by some, resulting in opposition to infrastructure projects by local communities or environmental protection groups.

We consider that these features should be elevated in the strategy. They flow through into Issues and Challenges facing networked infrastructure (discussed on page 34-35 of the Consultation Document) and the significant changes that are underway (discussed at page 36). As discussed in *Section 1: Overview* the resource management system reform must enable the infrastructure needed to meet our climate change commitments. The new regime will need to recognise the unique features of networked infrastructure, including the inability to always avoid sensitive environments, and benefits being enjoyed by communities far removed from where the adverse effects are felt.

As we discuss below, networked infrastructure, including electricity infrastructure, will be impacted by the RM system reform. The ability to meet our climate change commitments is dependent on infrastructure that can mitigate the effects of climate change being enabled. This infrastructure is often overlooked, with a focus on housing and urban infrastructure that services housing and urban development. Large scale infrastructure is more akin to Lead Infrastructure.

At page 37 of the Consultation Document, reference is made to various reforms, including the "Resource management reform" and "Responding to climate change adaptation and mitigation". Further reference is made to the reforms also being considered in the Infrastructure Strategy if they have been "sufficiently advanced by that stage." We consider that, as a bare minimum, the needs of infrastructure must be articulated in the Infrastructure Strategy. These needs include:

- NBA outcomes providing strong enabling direction for electrification of the economy – putting important infrastructure on the same footing as other nationally important matters, and ensuring that environmental limits do not undermine this direction;
- Mandatory national direction (national policy statement and national environmental standards equivalent) which reconciles tensions with competing outcomes and environmental limits;
- Certain consenting pathways provided through the reform;
- Ensuring an efficient process for obtaining environmental approvals. Public input should be proportionate and not allow for re-litigation of matters;
- Retaining existing national direction during the transition period, until a consolidated and comprehensive national planning framework (NPF) is developed;
- Protecting infrastructure from the direct and indirect adverse effects of other parties' activities;
- The rapid change required for climate change mitigation, as well as long term national infrastructure being embedded in the SPA and RSSs.
- The SPA and RSSs providing a mechanism to resolve tensions between biophysical limits under the NBA/areas to be protected and infrastructure needs.

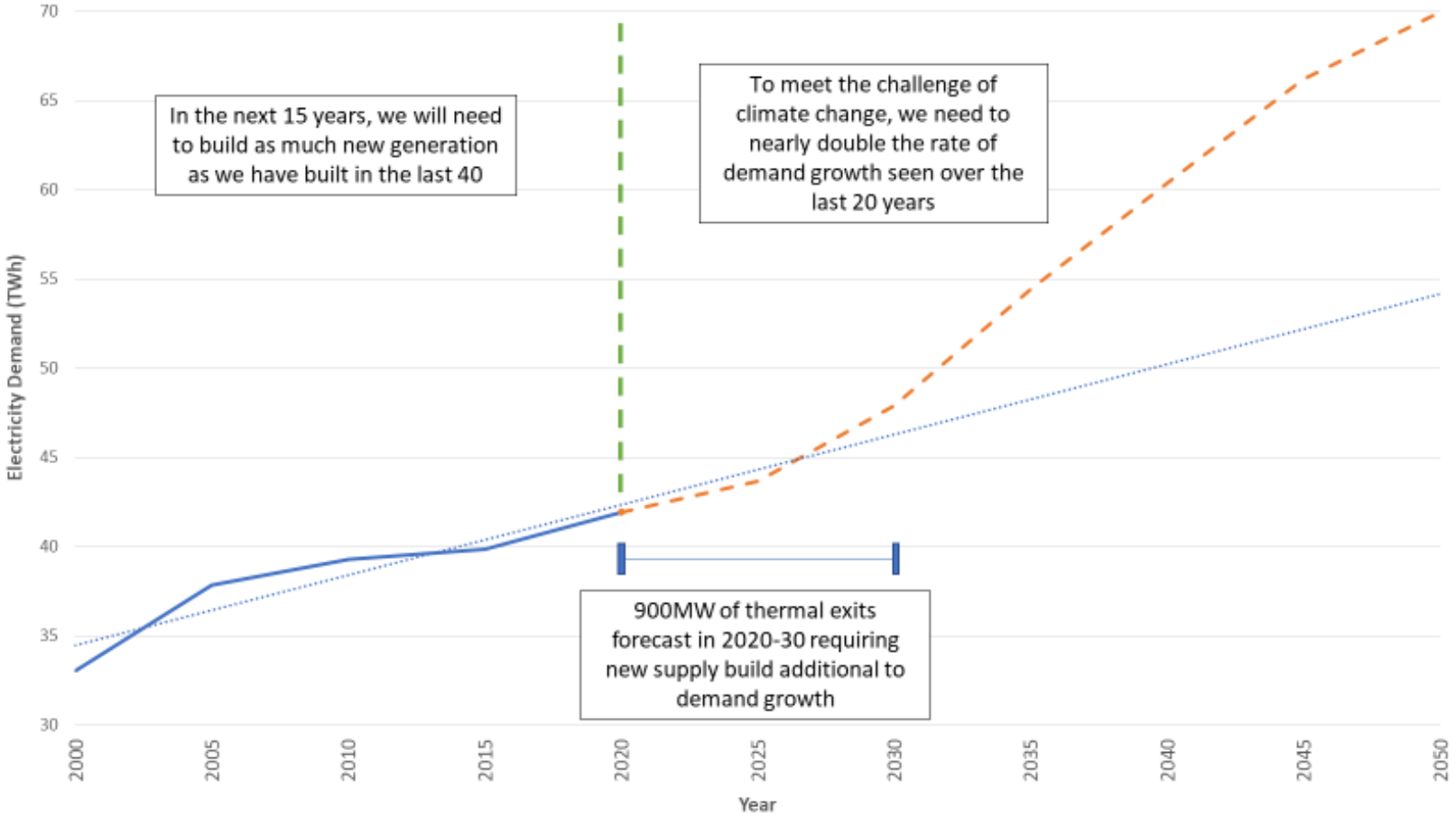
Question 4: For the 'Building a Better Future' Action Area and the Needs: What do you agree with? What do you disagree with? Are there any gaps?

This section states two needs that relate to climate change:

- Prepare infrastructure for climate change
- Transition energy infrastructure for a zero-carbon 2050.

We consider that the way these needs are currently expressed downplays the quantum of development required. Climate change may require retreat from areas (and potentially captured by the proposed Managed Retreat and Climate Change Adaptation Act) – in particular demolition/removal of existing infrastructure and construction of replacement infrastructure. A transition to a low-carbon economy will require a significant build of electricity infrastructure, as discussed earlier in this submission – at a scale that New Zealand has not undertaken since before the establishment of the RMA as demonstrated in figure 2 below.

Figure 2: Decarbonising will require the electricity system to expand significantly faster than at any other point since the introduction of the RMA



F1. Prepare infrastructure for climate change

Action	*Description*	*Response*	*Comment*
F1.1	Adapt business case guidelines to ensure full consideration of mitigation and adaption	Support	Transpower supports business case guidelines that ensure full consideration of mitigation and adaption of climate change. However, we note that our regulated investment test allows us to only consider the economic interests of electricity consumers. As such, broader economic, social, cultural, and environmental benefits are not able to be considered when we make investment decisions which might better allow us to enable the Infrastructure Commission's wellbeing objectives.
F1.2	Recognise climate uncertainty in decision-making processes	Support	Climate uncertainty (e.g. levels of climate mitigation) is one of the key variables in the forecast demand for electricity, and as such is a key uncertainty in our decision making. Due to electricity's role in New Zealand's decarbonisation, it is essential that we are able to manage this uncertainty and enable sufficient grid capacity to enable our customers' transition. In addition to this forecasting uncertainty, the uncertainty surrounding the extend of climate adaption and managed retreat that may be required must also be addressed. In sectors such as the electricity sector which is comprised largely of sophisticated infrastructure providers we believe that these providers are best placed to address these uncertainties.
F1.3	Require bright line (pass/fail) infrastructure resilience test	-	No comment

F1.4	Ensure non-built transport solutions are considered first	-	No comment
F1.5	Enable active modes of travel	Support	Transpower supports enabling active modes of transport. Vehicle electrification and mode shift are complementary measures that will enable the decarbonisation of New Zealand's transport needs. While we plan for changes to our urban form, and active transport infrastructure we have the opportunity to lock in early emissions abatement by substituting high emissions vehicles for low emissions ones. This has the benefit of employing existing roading infrastructure which enables us to make quick progress towards our emissions targets while longer term mode shift infrastructure makes its way through the planning, consenting, and development pipeline. This is particularly important where some mode shift infrastructure may take more than a decade to build and we have less than a decade to meet our 2030 Paris climate change commitment.
F1.6	Require local government to consider information from insurance markets to inform climate-risk-related planning policy	-	No comment
F1.7	Drive a culture of waste minimisation	-	No comment
F1.8	Efficient pricing of waste	-	No comment

F2. Transition energy infrastructure for a zero-carbon 2050

In action F2.2 the Commission proposes that in order to minimise the effects of the First Mover Disadvantage, Transpower might temporarily defer charging customers for the costs of spare transmission capacity. The intention is to allow us to build spare capacity in anticipation of need.

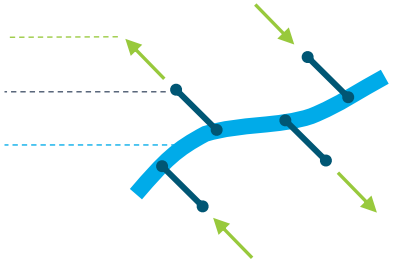
Building in anticipation of demand has always been a feature of electricity network planning - when assets may last for 50 to 100 years these assets are built to service the forecast consumer demand over that period.

Our regulatory framework has served the electricity sector well for a number of years in enabling investment in the interconnected (core) grid. We believe that it will continue to enable investment in the interconnected grid. The framework also enables bilateral connection agreements for connections to the grid in areas where there is available capacity.

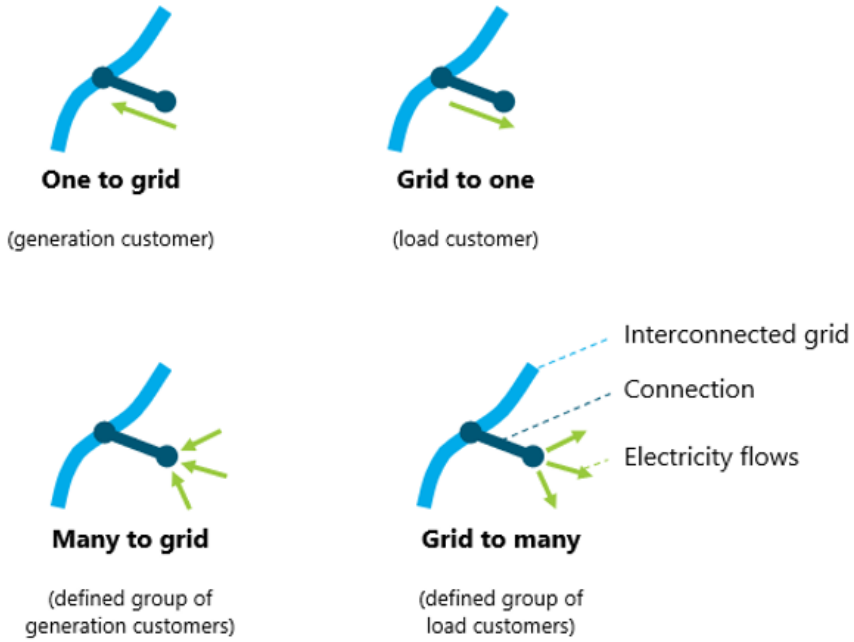
In order to assess the relative merits of alternative investment models, it is first important to understand the different types of electricity transmission investments and their respective cost recovery methods. This can also help to outline where the First Mover Disadvantage could be an issue in future.

Transpower uses three main types of transmission cost recovery models for its investments:

1. **Interconnections:** These are transmission assets on the core grid that supply power from many generators to many load centres (many to many). Costs are recovered through regulated revenue via the Transmission Pricing Methodology (TPM). Maximum allowable revenue is determined by the Commerce Commission for base capex and listed projects. Projects over $20m require Major Capital Proposal (MCP) approval from the Commerce Commission. For these, Transpower applies the Investment Test (IT), as prescribed under the Capex Input Methodology (Capex IM), which is a cost-benefit analysis that identifies the option with the highest long-term net benefit to electricity consumers. Once approved and built, the asset is placed on Transpower's Regulated Asset Base with costs recovered via the TPM.



2. **New connection projects:** Connection assets tend to exclusively serve one customer (one to grid or grid to one) or a group of customers (many to grid or grid to many). The vast majority of Transpower's connections are one to grid or grid to one. The upfront capital cost for a connection investment is negotiated and recovered directly from the connection customer(s) and is not recovered via the TPM. As a result, Transpower bears the commercial risk on the recovery of the upfront connection investment. We do not need to undertake the Investment Test or seek Commerce Commission approval for new connection projects. As the vast majority of connections are one-to-grid or grid-to-one the negotiation and recovery of costs is via a bilateral agreement with the connecting party. Transpower has very few many-to-grid or grid-to-many connections, these can be negotiated and recovered either via a multilateral agreement or through multiple bilateral agreements.



3. **Existing connection projects:** Once completed, connection projects are added to the Regulated Asset Base (RAB) at zero value as the upfront capital cost is recovered directly from the connecting customer(s). From this point, maintenance and asset replacement costs for connection assets are recovered via the TPM.

Interconnection investments

Where we need to make investments in the interconnected grid (type 1 above) to support growth in electricity demand or supply across the country, we administer the Investment Test – a form of Cost Benefit Analysis which ensures we make the investment that will maximise consumer benefit under the future that is forecast in the Electricity Demand and Generation Scenarios (EDGS) which are produced by MBIE.

As we detailed in our submission to MBIE on their Accelerating Renewable Electricity and Energy Efficiency discussion document, as long as the EDGS provide scenarios which are consistent with New Zealand achieving our decarbonisation objectives, the Investment Test will facilitate investment in the interconnected (core) grid to support that future. It may be a feature of New Zealand's proposed National Energy Strategy to ensure that the EDGS be made consistent with the Government's decarbonisation strategy. This would ensure that the investments that we make in grid capacity will enable decarbonisation in line with Government objectives.

The design of Transpower's regulatory model makes a strategic decision to ensure that we are able to recover the costs of interconnection investments with low risk. This is predicated on the concept that as a low risk business, Transpower will have access to low cost financing and be able to employ higher leverage than we would otherwise. This in turn ensures that we are able to pass on lower costs to consumers. This low risk cost recovery model also enables us to invest in capacity in anticipation of demand in the confidence that we will be able to recover the costs of this investment.

The proposal under Action F2.2 to 'defer charging customers for the costs of spare transmission capacity' would increase the risk of these investments to Transpower. This would in turn increase our cost of capital, which would be passed on to all consumers through increased electricity prices in time. It would also make Transpower more reticent to invest in capacity in anticipation of need, as we would have reduced confidence in our ability to recover the full costs of the investment.

Our strong preference is that the established regulatory cost recovery model for interconnection investments is maintained, and that the EDGS scenarios that are used in the Investment Test are aligned with a net zero carbon future.

New connection investments

For new connections to a single connecting party (one-to-grid or grid-to-one) a bilateral connection agreement for cost recovery works well today, and we expect it will continue to work well into the future.

In scenarios where multiple parties might want to connect to a single connection point (many-to-grid or grid-to-many), some parties may be disadvantaged by an issue known as the First Mover Disadvantage.

If all parties are able to coordinate to invest at the same time, then a consortium arrangement can be used to agree terms for the connection. However, if parties are unable to coordinate then the First Mover Disadvantage becomes a deterrent. 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. The incremental cost to add Y capacity is very low when the line is initially being built. However if the line is established at X capacity, the incremental cost to add Y later is high. Therefore, there is an opportunity for both parties to access connection capacity at lower cost if they can coordinate their investment. 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 economic 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.

In some instances, the First Mover Disadvantage can lead to a project still commencing but in a sub-optimal way. For example, the dairy company in the example above may still connect for its needs, but it would be at a higher cost per MW and it may crowd out the opportunity for the meat works to connect in future. In some instances, however, the First Mover Disadvantage might lead to neither party progressing their connection resulting in a missed opportunity.

The vast majority of transmission investment falls into interconnection and bilateral connection agreements. While the First Mover Disadvantage is an issue, it only relates to grid-to-many and many-to-grid connections which make up a small proportion of overall transmission investment.

There are a number of options available to remedy the First Mover Disadvantage. One option, which we proposed in our MBIE AREEE submission is to socialise the costs of the spare connection capacity to all consumers through the Transmission Pricing Methodology as is used in the Texas ERCOT model. This option would only be available where a cost benefit analysis can demonstrate that consumers will be better off (e.g. if the benefit to consumers of newly enabled generation would exceed the additional costs of the spare connection capacity).

Another option, which was proposed by MBIE in their AREEE discussion document, is for Government to directly fund the spare connection capacity via a third-party contribution.

Even where a sound cost recovery model exists to remedy the First Mover Disadvantage, coordinating a multilateral commercial agreement can be challenging. In some instances, the establishment of a Renewable Energy Zone (see our answer to Question 8) with an appropriate commercial framework can assist with coordinating the connection of multiple parties.

Either of the TPM or Government third party funded models would ensure that Transpower continues to retain a low risk profile which preserves our low cost of capital, which benefits consumers through lower costs. As a result either of these models would be acceptable to Transpower for remedying the First Mover Disadvantage.

We also note that investments which are proposed in anticipation of need can be further de-risked by staging our approach and undertaking time consuming but low-cost work such as consenting and land rights acquisition before fully committing to asset build. This is similar to the lead infrastructure proposal raised in the document which would allow us to obtain environmental approvals early and have them "on the shelf" ready to draw on. To enable this, the proposed NBA (and potentially SPA) would have to be set up to facilitate projects where:

- The need for a project was not imminent, and could occur at a future, unspecified date;
- The necessary environmental approvals would have a long lapse period (potentially 30 years).

Response to proposed actions

Action	*Description*	*Response*	*Comment*
F2.1	Enable electricity distribution networks to minimise barriers to the connection and use of large numbers of local generation, storage and demand response facilities (distributed energy resources or DERs)	Support	Electricity distribution businesses are an essential enabler of New Zealand's decarbonisation. They continue to evolve their businesses to adapt to New Zealand's changing energy environment. They will play a vital role in enabling New Zealanders and businesses to transition to renewable electricity and it is essential that they offer an affordable, responsive network connection service to all who wish to make the transition.

Through embracing and efficiently dispatching distributed energy resources, the forecast 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. Energy volume is often how consumers' bills are charged. As a general rule of thumb, if energy volume grows at a faster rate than peak demand, network charges for consumers will decline as the cost of the network is spread over a larger number of units of electricity.

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. More generally, there will be greater variation in where and when energy is available to the grid, and greater flexibility from users in how they take energy from the grid, that will mean the grid is much better utilised outside the peak. We forecast that peak demand could grow at half the rate of energy volume growth to 2050 which could lead to reduced network charges for all consumers in time.

New Zealand's distributors, via the Electricity Networks Association, articulate what the sector needs to achieve in their Network Transformation Roadmap.

For Transpower's most recent thinking on Distributed Energy Resources and flexibility markets please see our response to Question 9.

F2.2	Reduce barriers to building spare transmission capacity where that would reduce inefficient barriers to large-scale renewable generation and the electrification of large process heating units	Propose alternative solution	See discussion under F2 above
F2.3	Investigate the need for a specific regulatory framework for offshore energy generation	Support	While there is a large number of low-cost, onshore generation opportunities which we expect would be deployed prior to offshore opportunities, an established framework for offshore investment would provide certainty to any potential investors who wished to investigate offshore opportunities in New Zealand. Any framework would need to include the resource management system reform. In particular, offshore wind would need to be enabled through national direction, and reconciled with the New Zealand Coastal Policy Statement (which could prevent or create barriers to the establishment of offshore infrastructure).

F3. Adapt to technological and digital change

Action	*Description*	*Response*	*Comment*
F3.1	Move towards open data for the infrastructure sector	-	No comment
F3.2	Accelerate common infrastructure metadata standards	-	No comment

F3.3	Accelerate investigations on the use of digital twins and prepare for a nation-wide digital twin	-	No comment
F3.4	Design and launch artificial intelligence use-cases	-	No comment
F3.5	Deliver and retain digital information	-	No comment

F4. Respond to demographic change

Action	*Description*	*Response*	*Comment*
F4.1	Improve analysis of upside and downside risks in infrastructure provision	-	No comment

F5. Partner with Maori: Mahi Ngatahi

No actions proposed – see responses to Questions 15-17.

F6. Ensure the security and resilience of critical infrastructure

Action	*Description*	*Response*	*Comment*
F6.1	Define critical national infrastructure	Support	No comment

F6.2	Identify critical national infrastructure	Support	No comment

Question 5: How could we better encourage low-carbon transport journeys, such as public transport, walking, cycling, and the use of electric vehicles including electric bikes and micro-mobility devices?

In our response to the Climate Change Commission (CCC) and in our Electrification Roadmap, we supported the prioritisation of the light vehicle electrification as there are large gains to be made and the technology is already available. The policies reflected here support those presented by the Ministry.

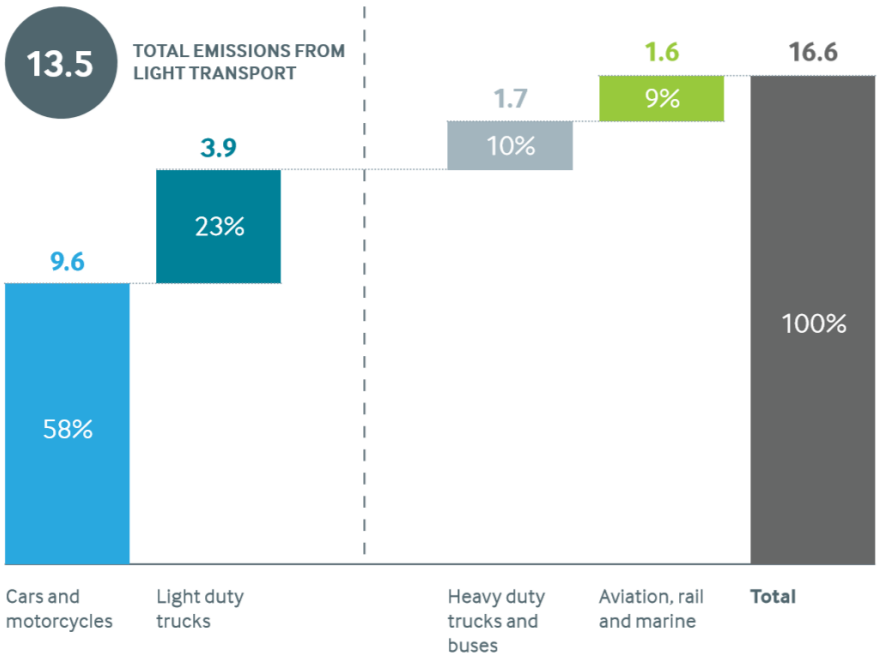
In our view, the key observations in this area are:

- We need to prioritise the electrification of light vehicles in the immediate term. There are large gains to be made and the technology is available;
- This is a project to bring forward a social change – the mass adoption of electric vehicles – that is already set to happen in New Zealand, but will happen too late without policy intervention;
- Bringing this social change forward can be done. The policy and technology tools are available, and other countries have already begun to stimulate mass adoption; and
- Once the adoption of electric vehicles has critical mass, with the supporting systems and feedback loops that come with mass adoption, the policy measures can be wound back.
- Key policy interventions need to address the "access" issues: New Zealand's access to the global supply market and New Zealander's access to EVs and charging

We need to prioritise the electrification of light vehicles in the immediate term

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.

Figure 3: Breakdown of New Zealand transport emissions, 2018



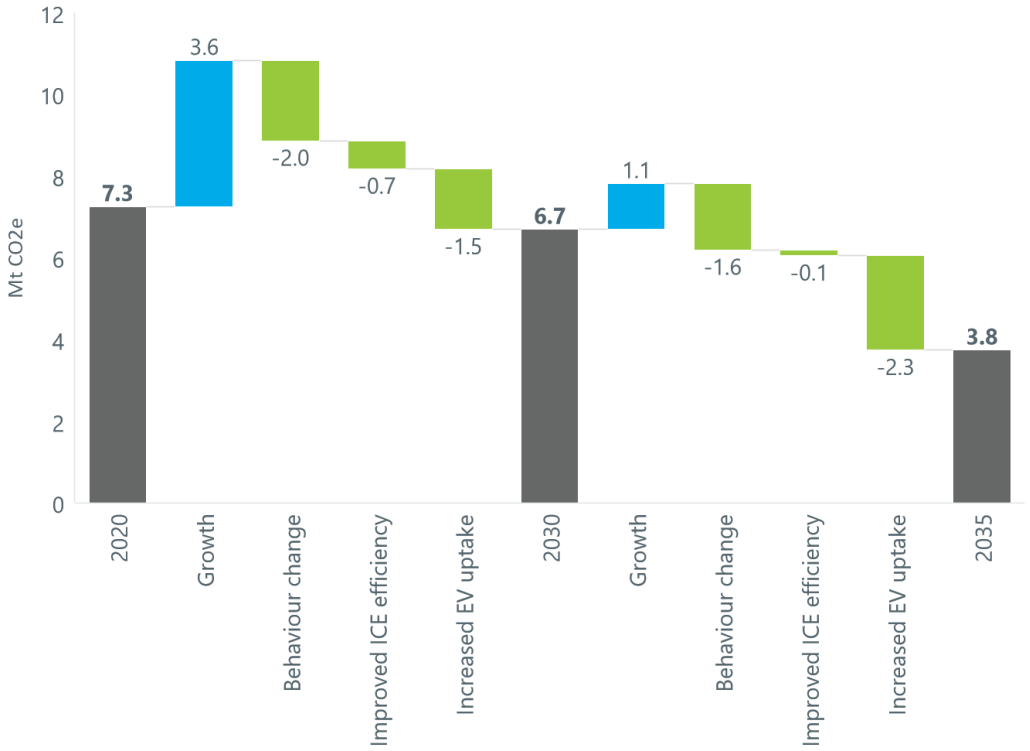
Source: Ministry for the Environment

Our remaining transport emissions from heavy duty trucks, buses, rail, aviation and marine will also need to be decarbonised in time, likely through alternative fuels such as biofuels and/or hydrogen. But because the technology is still emerging, focus within these areas should be on ensuring the settings are in place for rapid uptake once the technology is more readily available.

As a bonus, electrifying our fleet can bring economic benefits to New Zealand. Based on the Ministry for the Environment's marginal abatement cost curves and our Whakamana i Te Mauri Hiko analysis, we estimate that by accelerating the uptake of light EVs and continuing to progress the decarbonisation of heavy transport, we can reduce annual emissions by 2.1 Mt CO_2-e and generate net benefits to the economy of $0.6 billion in 2030. By 2035, annual emissions reductions increase to 6.1 Mt CO_2-e and net benefits to $1.6 billion.

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 our fleet will make significant progress to reducing our emissions. Our analysis of the CCC'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 CO2-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 CO2-e or 44% reduction by 2035.

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



Source: Transpower analysis of CCC data.

This is a project to bring forward a social change

Left to current market and policy settings, purchase price economics will likely favour EVs towards the end of this decade and mass EV adoption will follow. But this will be too late to meet our 2030 Paris Agreement commitments.

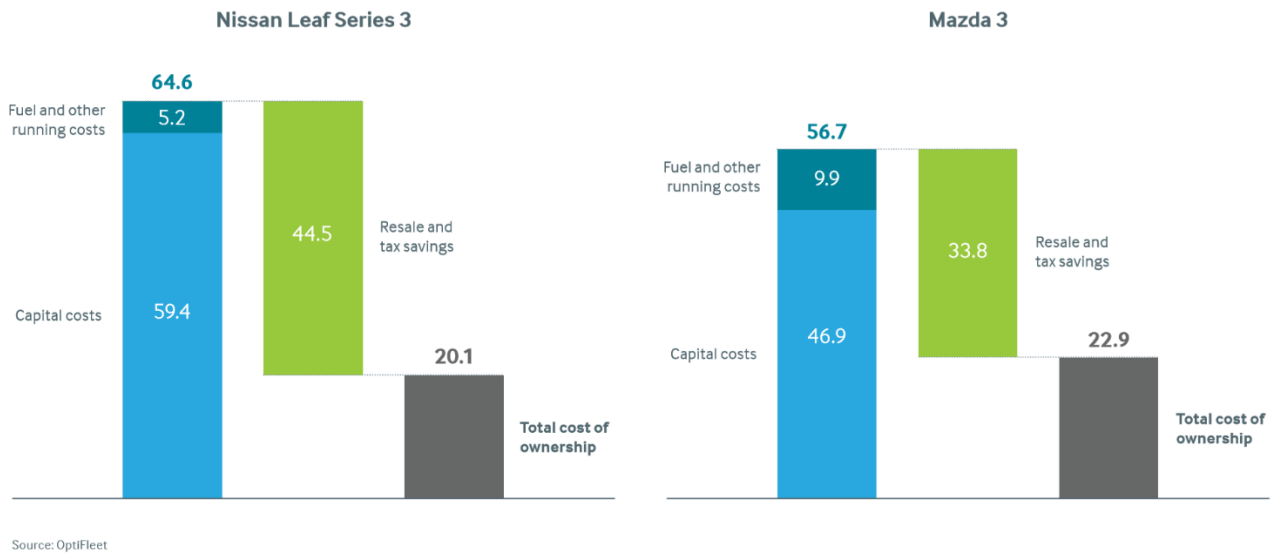
Light passenger EVs are now readily available, with nearly 50 battery EV and plug in hybrid EV models already on our roads, with more expected as vehicle manufacturers are already shifting their businesses to meet the higher EV demand.

In the Electrification Roadmap, we found that under a business-as-usual scenario, EV uptake is likely to begin to accelerate around 2023 as TCO parity is reached for most EVs, driving state sector and large business fleets to begin to electrify. Uptake will then further accelerate markedly around 2028 when sticker price parity is reached for most EVs, driving the small businesses and households who prefer new cars to electrify.

However, as most private car sales in New Zealand are second-hand, under a business-as-usual scenario, EV uptake will only become significant when the average second-hand car sticker price is affordable to the average household, which could take up to ten years. Cars bought new by fleets today will only become affordable for the average household between 2025 and 2030.

The key for light electric vehicles is that on a total cost of ownership (TCO) basis, the economics are such that EVs will become cheaper to own within the next five years, driven by cheaper running costs which offset the high EV sticker price – the cost to charge an EV is equivalent to an average of $0.40 per litre, compared to an average of $2.00 per litre of petrol. For fleet owners that have the ability to buy in bulk and have access to low cost capital, EVs can already have lower TCOs than similar petrol vehicles.

Figure 5: Example of total cost of ownership comparison ($ 000s)



Note: Corporate buyer, three-year ownership term, no fringe benefit taxes

But even when TCO parity is reached, consumers will not immediately move to buying EVs due to their high up-front capital costs, which today can range anywhere between 30-50% higher than their petrol/diesel equivalents. For some, the rationale will be not having access to the capital required to cover the sticker price. For others, 'hyperbolic discounting' will be an issue, which is the tendency for people to put disproportionate weighting on nearer term costs/benefits even if the lifetime benefits significantly outweigh the costs.

Until purchase price parity is reached, the higher up-front capital cost of EVs will be the greatest barrier for adoption, even when the total cost to own an EV will be significantly lower for most of the 2020s. This is the single most important policy question for accelerating EV adoption in the transport sector in the 2020s: where EVs offer total savings for consumers, businesses, the economy and our climate, but the up-front purchasing cost is a barrier, how can policy overcome this? Other barriers to EV adoption include 'range anxiety' which is quickly being overcome by improvements in battery technology and increasing availability of public chargers.

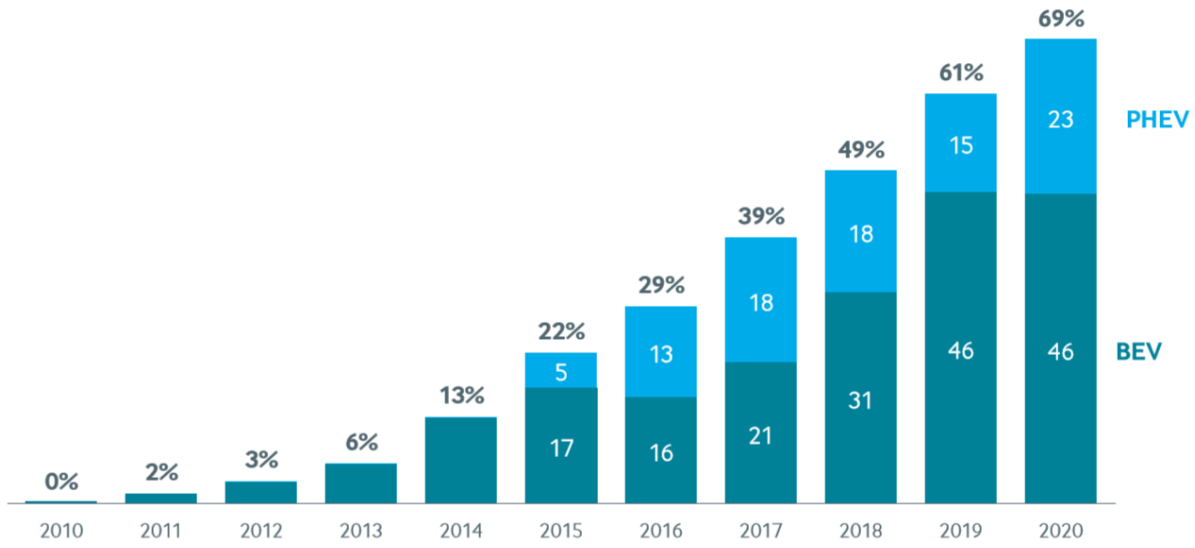
These barriers are likely to be overcome in time through technological developments and natural economics, however not at a pace we need if New Zealand is to meet its carbon targets.

Bringing this social change forward can be done

The good thing is that jurisdictions overseas have proven that a rapid uptake of EVs is possible with the support of a framework of policy, regulation and incentives.

Norway leads the world in the scale and speed of EV uptake. In 2020, EVs made up almost 70% of new car sales, up from less than one per cent in 2010. This rapid growth has been enabled by a suite of interventions.

Figure 6: Percentage of new Norwegian cars that are EVs



Source: Inside EVs, World Economic Forum, European Alternative Fuels Observatory

For a country fuelled mostly by hydroelectricity (much like New Zealand) it has made environmental sense for Norway's transport fleet to rapidly electrify, and the Government has had incentives in place since the 1990s. Back then, the Norwegian Government introduced a temporary, and later permanent, exemption from Norway's vehicle purchase tax, making the price of EVs fall below that of petrol- and diesel-powered vehicles. Since then, EVs have been given the right to park for free in some municipal car parks, drive in bus lanes, take ferries without a ticket and drive toll-free. Norwegian EV users are not required to pay VAT on their cars, or road tax, and company EVs are taxed at a lower rate than petrol or diesel-powered vehicles.

It is worth noting that if New Zealand were to adopt similar EV policies to Norway, we could improve on these policies by having a stronger focus on distributional equity impacts. Because Norway has an exemption for EVs for its vehicle purchase tax this provides increasing cost relief as the car becomes more expensive. This is economically regressive and disproportionately impacts less well-off consumers. The feebate proposed by the Productivity Commission and recently announced by Government is a good example of a policy that would achieve the same outcomes as Norway's policy but with a much fairer outcome in terms of distributional impacts. As the rebate for EVs would be flat, it would ensure that the lower the cost of the car, the greater the percentage of upfront cost relief for the EV.

Other countries are also ramping up their efforts with the formation of the Zero Emissions Vehicles Transition Council by the UK COP26 in November 2020, which aims to strengthen cooperation between governments and large automotive markets. The council is made up of Ministers and representatives from California, Canada, Denmark, European Commission, France, India, Italy, Japan, Mexico, Netherlands, Norway, Spain, South Korea and Sweden, the United Kingdom.

Similarly, in February 2021, the World Economic Forum launched the Zero Emissions Urban Fleets network, a forum for public and private actors to sync and synergize related global initiatives. The group's focus for 2021 is to place European city actors on a path to achieve 50% and 100% electrification by 2025 and 2030 respectively.

What is encouraging is that investment in EV enabling interventions, which comes at an initial cost to the economy, does not need to be sustained out to 2035. Norway has already begun winding back their support as natural economics has taken over, and we can expect other countries who are well on their way to electrifying their fleet to do the same.

Left to its own devices, rapidly improving economics will eventually deliver the switch from fossil fuels to clean energy in transport. Under current conditions, mass adoption of EVs in New Zealand is likely to occur around the end of this decade. That will be too late, however, for New Zealand to realise the economic benefits of decarbonisation and meet our Paris commitments.

Each year of delay in electrifying transport will increase New Zealand's cumulative emissions and transport costs by 1% and $1 billion respectively to 2050.

What is needed now is a kick start to accelerate electrification of transport. With clear, transitional policy and market settings in place in 2021 that specifically target the high upfront capital cost of EVs and getting supply of EVs into New Zealand, we can bring forward mass adoption of EVs by five years to around 2025 and begin wholesale transformation of our transport sector around the end of the decade.

This is an opportunity we cannot afford to miss. But we need to act now. In our Electrification Roadmap, we set out seven areas that need to be addressed together to enable the transport electrification we need to meet our emissions reductions targets. The first two areas are of particular importance:

- Improve immediate access and availability of EVs;
- Reduce up-front capital cost barriers and improve access to capital;
- Reduce operating cost barriers;
- Create behavioural incentives;
- Enable access to EV charging;
- Ensure uptake is supported by electricity infrastructure; and
- Support alternative fuels for heavy vehicle decarbonisation.

These recommendations align with those made by the CCC and are summarised in the table below:

Figure 7: Options for transport decarbonisation

Focus area	Options to accelerate transport electrification
 **Improve immediate access and availability of EVs**	• Implement the Government's proposed Clean Car Standard with long-term signals and regular reviews for progressively tightening standards • Automotive industry and Government work together with vehicle manufacturers and suppliers to increase EV supply into New Zealand Government and local government fleets as soon as possible • Strengthen economic incentives for commercial fleets to electrify • Set an import ban deadline on petrol and diesel-powered light vehicles to enable vehicle manufacturers, importers and dealers time to transition
 **Reduce up-front capital cost barriers, improve access to capital**	Implement solutions to overcome upfront capital cost barriers, for example: • The Ministry of Transport's Clean Car Discount (feebate scheme) • Low cost finance to spread out upfront capital cost of EVs. For example, through scaling up New Zealand Green Investment Finance funding • Business model innovation for alternative ownership models that address upfront capital costs. For example, fleet-as-a-service for corporates, car subscription services, car share pools, and transport-as-a-service for consumers • Developing corporate purchasing pools or car buyer clubs to drive purchasing scale to access discounts and to cut out intermediaries • Banks and traditional lenders to incentivise EV uptake through sustainability-linked lending, particularly to assist commercial fleets to electrify • EECA grants for heavy vehicle (hydrogen, biofuel and electric) proof of deployment
 **Reduce operating cost barriers**	Implement solutions to reduce operating costs, for example: • Extension of Road User Charge exemption • Fringe Benefit Tax exemption or reduction for corporate purchasers of EVs • Electricity market regulation to promote increased offering of peak/off-peak electricity pricing and targeted EV electricity offerings
 **Create behavioural incentives**	Implement behavioural incentives: • Use of transit lanes • Free or discounted parking • Preferential car parks in public and private carpark buildings • Free or discounted access to ferries
 **Enable access to electric vehicle charging**	Improve the availability and speed of public charging infrastructure: • Implement and incentivise widespread fast charging network expansion with government co-investment where required • Support rollout of on-street charging infrastructure for locations without off-street parking
 **Ensure uptake is supported by electricity infrastructure**	Ensure the electricity sector can enable electrified transport: • Implement standards for EV chargers to ensure that they are 'smart' and can provide services back to the electricity grid • Increase uptake by electricity networks of demand response in order to use EV batteries to effectively defer network investment • Drive collaboration between network owners and charging infrastructure owners • Upgrades to distribution and transmission networks to increase capacity when required • RMA reform to ensure that new renewable power plants and their transmission lines can built in step with increasing electricity demand
 **Support alternative fuels for heavy vehicle decarbonisation**	Ensure the heavy vehicle sector can decarbonise through: • Ensuring the development of fast charging heavy EV infrastructure • Clarify settings around Road User Charges for heavy vehicles • Support the development of green hydrogen supply chains, including refuelling infrastructure

Key policy interventions need to address the 'access' issue

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

Below, we detail how different measures can address these barriers.

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 road, 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. New Zealand must ensure that it is well positioned now to import enough EVs to meet what needs to be rapidly growing demand.

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 interventions that could help New Zealand achieve this:

- Implement the announced Clean Car Standard, which would require vehicle importers to bring in progressively more fuel efficient and electric vehicles. Without a form of regulation or policy intervention, by 2025 New Zealand's cars will produce twice the emissions levels of EU vehicles and the incentives on vehicle importers will remain inconsistent with our climate goals. The Clean Car Standard could outline a long-term pathway with targets becoming more stringent over time.

- 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.

Such interventions are not a world first and what's reassuring is that vehicle manufacturers are already shifting their businesses to meet the higher EV demand:

- Tesla intends to ramp up output from 499,550 in 2020 to 20 million annually by 2030
- General Motors plans to exclusively offer electric vehicles by 2035
- Ford intends to sell only electric vehicles in the European market by 2030
- Volvo will only make electric vehicles by 2030
- BYD, a Chinese EV manufacturer looking to enter the Australian and New Zealand markets, is targeting sales of 400,000 BEV/PHEVs in 2021

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. Consumers either do not have access to the capital or exhibit 'hyperbolic discounting' which is the tendency to disproportionately weight decisions towards near term costs/benefits even if the lifetime benefits significantly outweigh the costs.

Therefore, to build local demand for EVs and help New Zealanders overcome the capital cost barrier, we recommend the following capital cost mechanisms:

- Implement the announced Clean Car Discount (feebate) scheme to bring down the upfront cost of an EV. US studies have shown that for every US$1,000 provided as an EV rebate there is a correlated 7.7% increase in EV sales. Point of sale schemes like the feebate scheme were shown to have the most effective impact on lifting sales. The feebate also has the additional benefit of disincentivising the purchase of ICE vehicles;
- 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.

EV uptake rates would benefit from these interventions being in place immediately to encourage uptake while EVs still cost more than ICE equivalents. Once sticker price parity is met, then

interventions can start to be wound back. We expect sticker price parity for most light vehicles to occur between 2025 and 2030. Consistent support through to the time of sticker price parity appears to be critical for fleet transformation. For example, the Chinese government cut EV incentives in July 2019, because it believed the costs of EVs had decreased sufficiently. However, this caused sales of hybrid and EVs to decline by 34% in September 2019 and 46% in October 2019.

An important consideration for creating access to EVs is the fact that most private passenger vehicle purchases in New Zealand are second hand. Therefore, much of the focus of the interventions described is to enable those who usually purchase newly imported vehicles (e.g. commercial fleet operators) to buy electric so that they feed into the second-hand market. This is how the second-hand ICE market already operates, so it is a matter of ensuring the new vehicles cycling through are EVs.

The government should target the electrification of government and commercial fleets to build demand for EVs in New Zealand. These fleet owners also tend to have lower up-front cost barriers due to the access to lower cost capital, the ability to access mechanisms that spread out upfront capital costs like competitive leasing arrangements and the ability to procure in bulk. Business and government fleets can also help raise public awareness and trust in EV technology by giving their drivers the experience of driving EVs. Brand association also boosts public perception of reliability.

Experience in Denmark has shown that if corporates are excluded from an initial incentive regime, fleet transition stagnates. Fringe Benefit Tax (FBT) reductions or exemptions could be particularly valuable in incentivising the uptake of electric vehicles by commercial fleets. As commercial fleets typically turn over their fleets every three to four years, this would be effective at seeding the second-hand EV market, improving EV access to consumers. While the FBT is technically an operating cost, a reduction in FBT can have similar economic effects to a reduction in the upfront capital costs for corporates who access vehicle leasing.

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 supported the Climate Change Commission's recommendation 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.

For a successful nationwide charging network, it is important that the different charging demand profiles and behaviours are understood, as these will have implications on the location of chargers, the different capacities required and the impact on the electricity system.

For example, everyday EV drivers are likely to plug in their vehicles when they get home in the evening and let them slow charge overnight, which may not require any new technology to the user but may have implications for the local distribution network. Other EV drivers may not have access to charging at home and will therefore require charging infrastructure close to home. Every now and then, an EV driver may go on a long trip such as from Auckland to Wellington and will require fast charging during a driving break.

Buses and heavy trucks have different charging behaviours. These vehicles usually have high utilisation and require fast charging at high capacities, which will have significant infrastructure needs and may require local electricity network upgrades. Smaller commercial vehicles may have lower utilisation and are able to charge at the workplace. Small numbers of vehicles at the workplace may not require a site upgrade for electrical capacity, but larger fleet operators may need to upgrade their electrical capacity.

Charging infrastructure for different charging needs is already emerging in New Zealand. For example, ChargeNet's charging network, hyper chargers, Tranzit's 450 kW, Wellington City Council's charging for those with no off-street parking. These are the types of infrastructure that will need to be ramped up to meet growing EV uptake.

Because a lot of EV charging happens at home or on site at a workplace, there also needs to be a component of the charging infrastructure plan that focuses on better enabling EV owners (both residential and commercial) to install and manage their own charging, especially as many have limited experience of interfacing with the electricity system.

Our interviews with commercial fleet owners revealed that there are still a number of information gaps across the installation process that result in sub-optimal solutions, unexpected additional costs and prolonged timelines. For example, during its heavy EV freighter trial, ALSCO discovered that a second charger needed to be installed to speed up truck charging. As this required a second charging station at each of the four locations, the sites unexpectedly needed to be upgraded to accommodate charging infrastructure. New Zealand Post underwent a similar exercise and shared their experience in the form of an EV charging installation guide. The recently released EV charging standards for commercial applications begins to address this information need.

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. As discussed in the introduction of this report, 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.

Other policy incentives to drive uptake

There are other policies available that can further make the switch to EVs attractive for consumers. These are interventions that could lower the operating costs for EV owners, and in turn make the total cost of ownership more attractive (e.g. the existing road user charge exemption), or act as a behavioural incentive (e.g. free public parking). As discussed earlier, because of the nature of consumer decision making, up front capital costs will still be the largest barrier, therefore mechanisms to target capital cost barriers should be prioritised over operating cost barriers.

Norway is a good example of how such mechanisms have resulted in an increased uptake of electric vehicles. Since the 1990s, the Norwegian Government first introduced an exemption from Norway's vehicle purchase tax, making the price of EVs fall below that of petrol- and diesel-powered vehicles. They later introduced the right for EV owners to park for free in some municipal carparks, drive in bus lanes, take ferries without a ticket and drive toll-free. Norwegians are not required to pay VAT on their cars, or road tax, and company EVs are taxed at a lower rate than ICE equivalents. The suite of interventions has enabled an increase in share that EVs make of new vehicle purchases – from 2% in 2011 to 70% in 2020.

What is also evident in the Norway example, is that pricing mechanisms do not necessarily need to be permanent but can be rolled back over time once the costs of EVs come down. Norway has been incrementally phasing out interventions such as reduced company tax, free public parking and road toll exemptions without reversing any of the EV growth.

In New Zealand, one of the transformative operating cost opportunities is in the Fringe Benefit Tax on businesses. For businesses, reaching TCO parity is heavily dependent on the fringe benefit tax (FBT) regime. The FBT is currently a disincentive for commercial fleet conversions to EVs as the value of the FBT is proportionate to the capital cost of the vehicle. As the up-front capital cost of EVs is currently substantially more than for a petrol equivalent, the FBT perversely penalises an organisation for buying a cleaner vehicle. For many organisations, this FBT voids the economic case for EVs.

Similar issues exist overseas and have been addressed – for example, the United Kingdom introduced company tax incentives for EVs in 2020 that have improved the economic case for conversion to electric fleets. As the up-front capital cost of EVs continues to fall the UK intends to wind back the level of tax incentive.

Certainty around policy settings for FBT is now important in supporting the electrification of the light vehicle fleet as businesses account for a material proportion of New Zealand's annual new car registrations. Increased uptake of new EVs by businesses now will feed into the second-hand car market in time to provide greater variety and opportunities for household consumers to purchase used EVs.

Question 6: How else can we use infrastructure to reduce waste to landfill?

No comment

Question 7: What infrastructure issues could be included in the scope of a national energy strategy?

We fully support the CCC's recommendation that Aotearoa New Zealand needs an overarching energy strategy. This would provide greater clarity and coordination on priority initiatives to deliver decarbonisation across the entire economy. We would value the opportunity to work collaboratively across all stakeholders in the sector on such an important document. We support the CCCs suggestions that the strategy could consider:

- Emissions reductions and removals,
- System reliability and affordability
- Future energy developments,
- Infrastructure,
- Equitable industry transitions,
- Regional and national economic development planning,
- Supply chains, and
- Workforce and skill needs.

In a joint letter to the CCC, Transpower joined other electricity sector leaders to express our support, and articulated that the strategy could help address key issues such as:

- the role of non-renewable energy resources in managing a just transition to a low carbon economy;
- how a national renewable energy target could complement existing policy objectives;
- policy and regulatory frameworks adapting to enable and promote the low carbon future;
- supportive frameworks for transmission and distribution investment to unlock areas of future renewable investment; and
- how the low carbon transition can support regional economic development, iwi/Māori and ensure vulnerable consumers are best protected.

We support the CCC's proposal that the strategy be underpinned by a renewable energy target and an emphasis on energy efficiency and other low cost methods of decreasing energy emissions.

In order to enable the delivery of any National Energy Strategy, our resource management system must be enabling of the infrastructure that supports the Strategy. The resource management system reform proposes a Strategic Planning Act, which is to provide an integration role between various Acts, including in relation to the Climate Change Response Act. We consider that our climate change commitments need to be implemented in the National Priorities Statement by prioritising electrification/climate change mitigation and setting out necessary nationally and regionally significant infrastructure required to meet these commitments.

An alternative to containing the detail in the National Priorities Statement, would be for that document to reference any National Energy Strategy, and for the latter document to contain the detail.

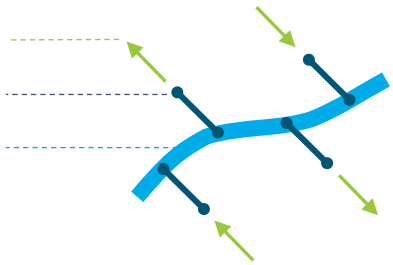
Question 8: Is there a role for renewable energy zones in achieving New Zealand's 2050 net-zero carbon emissions target?

Transpower is currently investigating how the establishment of Renewable Energy Zones (REZs) could aid in coordinating efficient generation investment, access to low cost generation, and enable higher uptake of renewables. We are also investigating how we can enable Renewable Energy Zones where it may make sense to do so.

Our regulatory framework has served the electricity sector well for a number of years in enabling investment in the interconnected (core) grid, and in enabling bilateral connection agreements in areas where there is already capacity available.

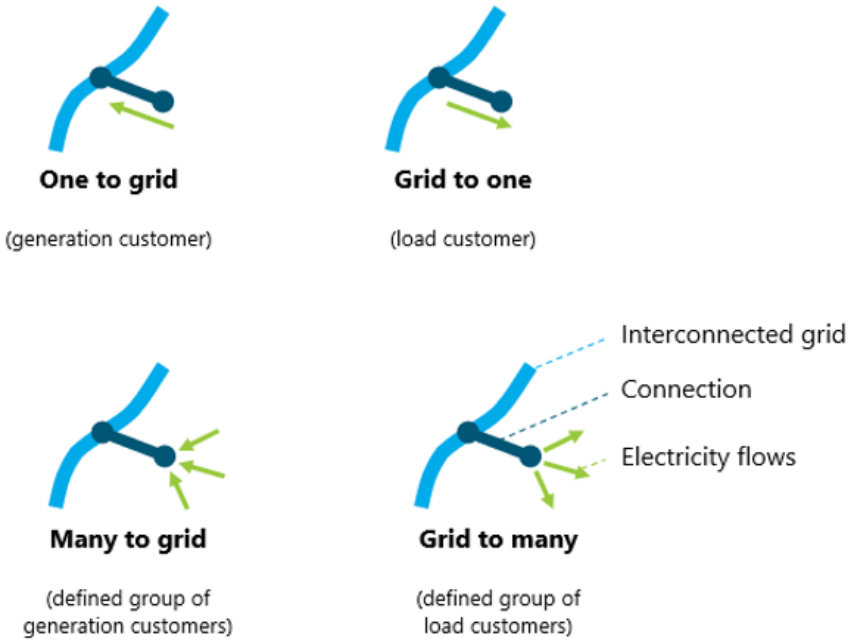
As we have discussed in our response to Action Area F2 under Question 4, Transpower uses three main types of transmission cost recovery models for its investments:

1. **Interconnections:** These are transmission assets that supply power from many generators to many load centres (many to many). Costs are recovered through regulated revenue via the Transmission Pricing Methodology (TPM). Maximum allowable revenue is determined by the Commerce Commission for base capex and listed projects. Projects over $20m require Major Capital Proposal (MCP) approval from the Commerce Commission. For these, Transpower applies the Investment Test (IT), as prescribed under the Capex Input Methodology (Capex IM), which is a cost-benefit analysis that identifies the option with the highest long-term net benefit to electricity consumers. Once approved and built, the asset is placed on our Regulated Asset Base with costs recovered via the TPM.



2. **New connection projects:** Connection assets tend to exclusively serve one customer (one to grid or grid to one) or a group of customers (many to grid or grid to many). The vast majority of Transpower's connections are one to grid or grid to one. The upfront capital cost for a connection investment is negotiated and recovered directly from the connection customer(s)

and is not recovered via the TPM. As a result, Transpower bears the commercial risk on the recovery of the upfront connection investment. We do not need to undertake the Investment Test or seek Commerce Commission approval for new connection projects.



3. **Existing connection projects:** Once completed, connection projects are added to the Regulated Asset Base (RAB) at zero value as the upfront capital cost is recovered directly from the connecting customer(s). From this point, maintenance and asset replacement costs for connection assets are recovered via the TPM.

Renewable Energy Zones facilitate many-to-grid connection (type 2) investments in areas where there is large potential renewable resource and limited transmission capacity, but where challenges in coordinating generation investment make it difficult to justify the enabling transmission investment. It is important to note that the vast majority of new connections are bilateral connections (one-to-grid or grid-to-one) and that the REZ model will only be applicable in certain circumstances.

One method to identify interest in a Renewable Energy Zone is to establish an Expression of Interest process. This can be followed by a tender process once sufficient interest has been confirmed. This process can short circuit the chicken and egg situation to allow transmission to be committed with high confidence of generation development. The establishment of REZs can provide a mechanism to efficiently share connection costs, provide access to good renewable energy resources and remedy the First Mover Disadvantage. Transpower still envisages that the majority of transmission build is still likely to occur via interconnection (core grid) investments and bilateral connection investments. REZs augment this framework to facilitate investment in many-to-grid or grid-to-many connection investments in instances where commercial agreements are difficult to coordinate.

Renewable Energy Zones have been employed in a number of overseas jurisdictions to similarly manage investment coordination and the interaction of large-scale renewable generation with

regulated transmission investment. We are currently assessing the various Renewable Energy Zones models used overseas to understand which aspects would be most suitable in the New Zealand context.

As we raised in our discussion of the First Mover Disadvantage under Question 4, Transpower's low risk profile affords us accordingly low financing costs, which benefit consumers through lower prices. REZs in Australia tend to be state government backed to minimise risk to transmission providers. In the Texas ERCOT model, costs and associated risk of REZs are funded through their equivalent of the Transmission Pricing Methodology. The goal of both of these models is to maintain the low risk nature of the transmission network companies to preserve access to low cost capital, which ultimately benefits consumers.

In addition to the funding and financing considerations described above, we are considering opportunities for Renewable Energy Zones to be included in regional spatial plans under the Spatial Planning Act (as proposed through the resource management system reform).

As our thinking on Renewable Energy Zones continues to evolve, we would welcome ongoing dialogue with the Infrastructure Commission.

Question 9: Of the recommendations and suggestions identified in the Ministry of Business, Innovation and Employment "accelerating electrification" document, which do you favour for inclusion in the Infrastructure Strategy and why?

Transpower provided a comprehensive response to MBIE's Accelerating Renewable Energy and Energy Efficiency discussion document which can be found here.

Of the topics that are discussed in the paper we consider that the following could be included in the Infrastructure Strategy.

Corporate energy transition plans

Corporate energy transition plans, or a similar disclosure on decarbonisation plans would provide infrastructure providers in the energy space with information to better coordinate investment in networks, generation, and biomass stock.

Establishment of PPA market

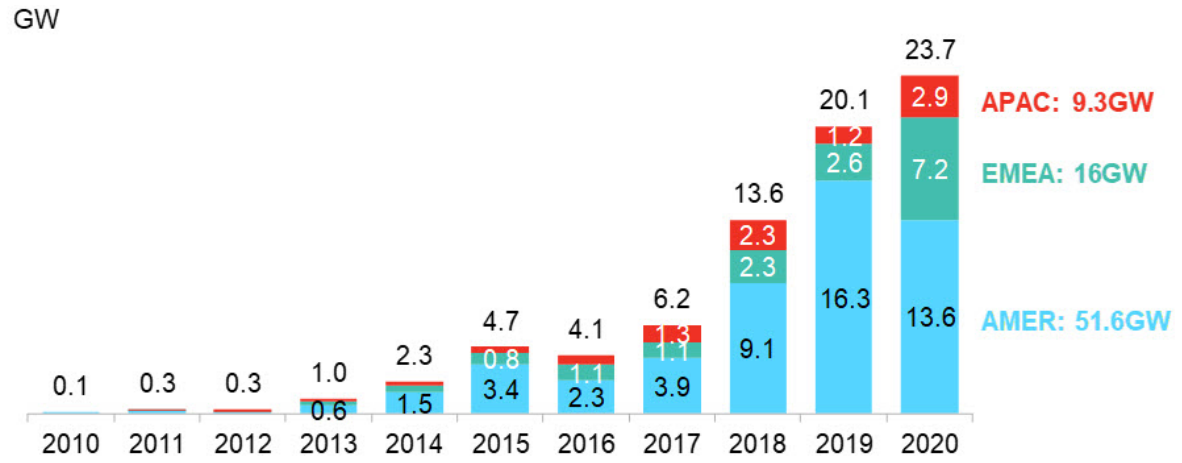
Electricity purchased through the wholesale market can be volatile. Prices swing daily, seasonally, and over multi-year periods in response to supply and demand. Large energy users can hedge, at best, three years in advance via the ASX futures market.

This lack of future price certainty can make investing in capital intensive projects such as new renewable generation, process heat conversion, or development of new industry risky.

Internationally, this volatility is commonly managed through very long term (5-20 year) contracts between a generator and a customer called Power Purchase Agreements (PPAs). The length of the contract gives both parties the ability to avoid the impacts of wholesale market volatility and gives them confidence to invest – often at rates below the wholesale price. PPAs are often used to "underwrite" the financing and development of new renewable energy generation (for developers) and large commitments to electrification (for energy users). Stable, long-term deals tend to lower the cost of capital for projects, in turn reducing the cost of energy.

PPA volumes are increasing globally. The corporate sector is also becoming an increasing source of demand for new PPAs:

Figure 8: Global corporate PPA volumes, 2010-2020



Source: BloombergNEF. Note: Data is through 2020, reported in MW DC capacity. Onsite PPAs not included. Australia sleeved PPAs are not included. Pre-market reform Mexico PPAs are not included. APAC number is an estimate. These figures are subject to change and may be updated as more information is made available.

In New Zealand however, we have tended to struggle with scale. Where Amazon in California can release one PPA tender and back the development of hundreds of megawatts of new generation, in New Zealand there are few organisations who consume sufficient quantities of electricity to do this on their own.

For reasons such as these, the Major Electricity Users Group has recently released the first sizeable tender of this type in the New Zealand market.

The ability to underwrite new investments in electrification and process heat conversion through long-term, low cost renewable electricity is a significant opportunity for New Zealand. If stable counterparties such as the New Zealand Government were to begin tendering their electricity procurement via PPAs then they would potentially stand to secure a discount to their current electricity costs while also forming the foundation of a national PPA market and increasing the proportion of renewable generation in electricity supply.

Demand side participation

Demand side participation and flexibility markets present a significant opportunity to optimise the electricity system to improve reliability, renewability, and affordability.

The forecast 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 use of the network drives network build, not the total energy volume delivered across it. Energy volume is often how consumers' bills are charged. As a general rule of thumb, if energy volume grows at a faster rate than peak demand, network charges for consumers will decline.

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 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.

More generally, there will be greater variation in where and when energy is available to the grid, and greater flexibility from users in how they take energy from the grid, that will mean the grid is much better utilised outside the peak. We forecast that peak demand could grow at half the rate of energy volume growth to 2050 which could lead to reduced network charges for all consumers in time.

Transpower has been investigating demand side participation for a number of years through our Demand Response trial programme. We have been working with the Electricity Authority's Innovation and Participation Advisory Group to share what we have learned through this programme with the broader industry, materials that have supported these discussions can be found here. For further information, see Chapter 5 of our Whakamana i Te Mauri Hiko publication. We continue to work in the space to ensure that demand flexibility is able to play its role in the optimal buildout of the electricity system.

RMA reform

As we detailed in Section 1, we see RMA reform as being vital to our ability to rapidly transform our energy system as the Climate Change Commission has detailed will be necessary for New Zealand to meet its climate obligations.

We note that since our submission on the MBIE AREEE discussion document the Government has initiated reform of the Resource Management system. Throughout this response we detail our thoughts on these reforms.

Net-zero consistent EDGS

Transpower's regulated investment process requires that we use MBIE's ***Electricity Demand and Generation Scenarios (EDGS)*** (or reasonable variations thereof) as forecasts against which we should test our investments. We should avoid a situation where the Climate Change Commission is using forecasts of carbon prices, demand, etc, to set national targets and budgets, and the regulators in the electricity sector are using different forecasts when deciding on investments and pricing in the sector. Additionally, if the EDGS do not reflect a future in which New Zealand achieves its decarbonisation objectives, then the Grid Investment Test would suggest that we should invest in the grid accordingly.

Question 10: What steps could be taken to improve the collection and availability of data on existing infrastructure assets and improve data transparency in the infrastructure sector?

No comment

Question 11: What are the most important regulatory or legislative barriers to technology adoption for infrastructure providers that need to be addressed?

A number of reform packages are underway within the electricity sector which target regulatory barriers to technology adoption including:

- resource management system reform – to remove barriers to renewable generation which is often penalised more heavily for visual amenity impacts than, for example, a gas turbine would be for its carbon emissions;
- Electricity Industry Participation Code updates – to remove barriers to inverter-based technologies from participating in the electricity market;
- Flexibility market development – to unlock markets through which owners of Distributed Energy Resources can be rewarded for using their assets in a way that optimises system outcomes.

While there are a number of specific regulatory barriers to technology adoption, it is also important to consider the pace and responsiveness of regulatory change processes. This is particularly important in industries such as the electricity sector which rely heavily on regulation to define business models and coordinate interactions between parties and use standards to ensure interoperability across a decentralised supply chain. As the pace of technological disruption increases, our regulatory frameworks will need to become increasingly agile and adaptive.

While we can't predict exactly which changes will need to be made over the next 30 years, we can be confident that changes will need to happen throughout. Making our regulatory change processes more responsive is therefore a least-regrets improvement that will be beneficial under a range of potential futures.

Question 12: How can we achieve greater adoption of building information modelling (BIM) by the building industry?

No comment

Question 13: How should communities facing population decline change the way they provide and manage infrastructure services?

No comment

Question 14: Does New Zealand need a Population Strategy that sets out a preferred population growth path, to reduce demand uncertainty and improve infrastructure planning?

No comment

Question 15: What steps can be taken to improve collaboration with Māori through the process of planning, designing and delivering infrastructure?

We endeavour to engage closely with mana whenua on an ongoing basis, as well as throughout the lifecycle of individual projects. We encourage the Commission to engage directly with Maori to understand what we in the infrastructure sector could do to further strengthen those relationships and deliver outcomes for Maori.

Question 16: What steps could be taken to unlock greater infrastructure investment by Māori?

Alberta PowerLine's Fort McMurray 500-kV West Transmission Project provides an example of electricity transmission investment with significant Canadian First Peoples' participation.

Transmission investment in Alberta follows different processes to those in New Zealand, with significant government funding. As part of the PPP process for the Fort McMurray project, Alberta PowerLine provided a commitment to engage with Indigenous communities, and developed an Indigenous contracting strategy which resulted in them awarding $85M CAD worth of contracts to Indigenous communities and their contractors.

Upon completion of the project and livening of the line, Alberta PowerLine was sold by their parent company. As part of the sale process they offered a 40% equity stake to Indigenous communities along the line route which was fully subscribed. The remaining 60% was sold to institutional infrastructure investors.

Co-investment models such as these may offer pathways for iwi and local communities to invest in the infrastructure that their land hosts.

Question 17: What actions should be taken to increase the participation and leadership of Māori across the infrastructure system?

As with our response to question 15, we encourage the Commission to engage directly with Maori to understand how we in the infrastructure sector could better provide opportunities for Maori in the infrastructure system.

Question 18: For the 'Enabling Competitive Cities and Regions' Action Area and the Needs: What do you agree with? What disagree with? Are there any gaps?

This section of the Consultation Document discusses means of enabling infrastructure. A significant gap occurs, as the focus is on housing/urban development and the infrastructure that services urban development. There are many other types of infrastructure that also need to be enabled which are not directly serving urban development, including State highways, electricity generation and transmission, rail and ports. This larger scale infrastructure needs to be addressed in the Infrastructure Strategy.

For the purpose of this submission, we have broadened the focus on the "Enabling Competitive Cities and Regions" Action Area and Needs to capture this larger infrastructure. Alternatively, they could be addressed separately.

C1. Enable a responsive planning system

Action	*Description*	*Response*	*Comment*
C1.1	Continue to review and reform urban planning	Partially support	Transpower acknowledges the need to implement the National Policy Statement on Urban Development (NPS-UD) and for the resource management system reform to be appropriately enabling of urban development. We also agree that the reform needs to clarify the definitions of "environment" and "amenity" to ensure that environmental protections are not applied to subjective amenity issues. However, the NPS-UD is not the only national direction relevant to infrastructure. The National Policy Statements for Electricity

Transmission (NPSET) and Renewable Electricity Generation and the National Environmental Standards for Telecommunications and Electricity Transmission (NESETA) also exist. But, even these documents are not comprehensive and, overall, infrastructure does not benefit from national direction.

One of the greatest failings of the RMA has often been described as not introducing national direction early and then producing it for specific issues on an ad hoc/siloed basis. The National Planning Framework proposed as part of the Natural and Built Environments Act (NBA) provides a huge opportunity to set up the entire NBA framework for success. It will be one of the most important parts of the NBA framework for infrastructure.

The National Planning Framework will need to be suitably comprehensive for infrastructure, and resolve competing tensions between different infrastructure (as well as between environmental protections and infrastructure). Simply put, urban development cannot be at the expense of, or adversely affect, other infrastructure, such as the National Grid.

Transpower considers the National Planning Framework will need to address the following issues in order for New Zealand to transition to a low-emissions economy:

- The NPSET and NESETA have generally been successful. It is *critical* that the NBA requires similar national direction to be carried over. However, several reviews have identified a number of gaps, issues and inefficiencies with those documents that need to be addressed.

- The lack of cohesion between existing national direction results in conflicts, interpretation issues, litigation and the

continued 'watering down' of what was intended to be comprehensive national direction for the National Grid. The NPSET is regularly being "read down" against other national policy statements. The lack of integration between national direction instruments is becoming (and will continue to be) an increasing issue as further instruments come into effect.

- Other nationally important values, such as natural environment values, have been prioritised over nationally important infrastructure.
- In some cases, local interests have inappropriately outweighed national (or climate) benefits. Public participation has become overly repetitive through the planning hierarchy and disproportionate.
- Related to the last point, the significant value of existing infrastructure is not adequately acknowledged. Reverse sensitivity and inappropriate subdivision and development continues to materially compromise existing assets.
- Current national direction does not sufficiently enable other important infrastructure (such as State highways, the rail network and the electricity distribution network), and climate change mitigation activities (eg, due to the weak policies in the NPS for Renewable Energy).
- Transpower considers the NPF can be a forwards-step from the NPSET and NESETA and should focus on achieving outcomes rather than the effects management approach under the RMA. Consolidation into one document should not result in high level, less specific direction. The NPF will

			inevitably need to have sections dealing with different environments/sectors (eg energy, social infrastructure, roading) and rules will need to be tailored to the characteristics of different activities.
C1.2	Standardise planning rulebooks to increase capacity and reduce cost and uncertainty	Partially support	Transpower supports standardised planning rulebooks, but again notes that all infrastructure could benefit from them, not merely housing and infrastructure servicing urban development. We support a reduction in planning documents to 14 combined plans. We also support a comprehensive NPF being developed prior to developing combined plans, with limited local variation. (See further comments in relation to C1.1 above.)
C1.3	Set targets for housing development capacity and triggers for release of additional development capacity	Partially support-	As discussed in relation to C1.1, Transpower supports the development of a NPF. However, we have two concerns about the options articulated at C1.3. Firstly, matters listed are limited to housing development capacity, without reference to the need to protect other infrastructure, such as the National Grid. In this regard, the NPSET contains policies that require a corridor around the National Grid which protects it from inappropriate development, including urban development. It is important that any NPF address infrastructure in a comprehensive manner. Secondly, the matters listed contain a gap in relation to a NPF for other infrastructure. Any NPF will need to clearly identify the

			infrastructure that requires policy support and those that require rules, or both. Given the variety of infrastructure, the development of an enabling rule framework will need to be carefully worked through – a "one size fits all" approach will not be enabling for all infrastructure.
C1.4	Review and realign Crown landholdings	-	No comment

C2. Coordinate the delivery of housing and infrastructure

Action	*Description*	*Response*	*Comment*
C2.1	Ensure the provision of three waters infrastructure to enable growth	-	No comment
C2.2	Volumetric charging to fund proportion of water infrastructure	-	No comment
C2.3	Improve information on infrastructure capacity and costs to service growth	Support	Providing improved information on available capacity and the costs to service growth beyond the existing capacity of networks facilitates improved whole of system decision making where third parties make decisions which impact on network demands. This effect is particularly evident in sectors such as electricity transmission where infrastructure funding takes a beneficiary pays model. It is likely to be less effective in other environments such as roading where funding is socialised and isn't so directly related to a driver or developer's impact on the network

C2.4	Conduct post-implementation reviews of transit-oriented development opportunities	-	No comment
C2.5	Implement regional spatial planning	Partially support	Transpower considers that the Strategic Planning Act (SPA) and any regional spatial plans developed under it provide an opportunity for enabling large scale infrastructure that does not service or enable urban development. We consider that any section of the Infrastructure Strategy that addresses regional spatial plans needs to be broader in focus. At the time of writing this submission, very little information is available publicly about the shape of the SPA. The comments below contain our current thinking, based on the little information available. Spatial planning cannot focus on regional urban growth issues alone, as it has done to date. The rapid change required for climate change mitigation, as well as long term national infrastructure needs must also be embedded in the SPA and in each Regional Spatial Strategy (RSS). The SPA and RSSs provide an important opportunity to reconcile the respective requirements of the Climate Change Response Act (CCRA) and the NBA. The SPA and RSSs could provide a mechanism to resolve the tensions between biophysical limits required under the NBA/areas to be protected and infrastructure needs. For example, RSSs could resolve, and not simply identify, a conflict between an outstanding natural landscape and a required National Grid connection. RSSs will

need to be careful not to prescribe 'no go' areas that prevent new climate change mitigation projects and critical infrastructure.

The limitations of spatial planning need to be acknowledged. It will not be possible to identify all future infrastructure works (especially long-term generation, transmission and large-scale distribution projects) during a spatial planning process. For example, a new renewable generation source or new technologies may require a National Grid connection that was not able to be forecast in a RSS. Other challenges relate to new entrants to the electricity market who could not have been involved in RSS processes and projects (such as solar) that can be brought on very quickly (but may require transmission or distribution connections). The SPA and RSSs need to contain sufficient flexibility to be responsive.

The scope of RSSs and regional combined plans (RCP) need to be very clear in the SPA, so there is not repetition of effort and re-litigation of issues at both RSS and RCP stages.

The National Priorities Statement is an opportunity to provide greater national direction by identifying substantive national priorities relating to climate change mitigation objectives and nationally significant infrastructure. The Statement could also be a useful tool to integrate the Emissions Budgets, Emissions Reduction Plans and Energy Strategy with the NBA outcomes to identify overall national priorities to be reflected in RSSs.

Transpower considers it is important that central government is involved in RSSs to ensure national issues are prioritised (such as security of supply), particularly as central government will not be involved in RCP processes. However, a level of formal collaboration and independence and rigour will be required to ensure RSSs are not

simply a political tool and so that stakeholders feel confident to engage in the process. An independent panel to oversee RSSs may assist.

Approvals for climate change mitigation and critical infrastructure projects identified in RSS should be streamlined through the RCP and/or approvals process following the RSS process. The RSS process could be the 'first stage' of the approvals process, with a subsequent process limited to finalising construction and implementation details (similar to the 2nd stage of a designation process proposed in the Panel Report). It is critical the settings are correct so that projects are subject to appropriate testing at the appropriate stage, and do not require repeated and unnecessary effort to obtain project approvals.

The second point under Action C2.5 is that combined plans are "not inconsistent with regional spatial plans." This is a weak requirement. Transpower is concerned that this direction is weak, ands suggest that matters settled through RSSs will be re-litigated through combined plans. We consider that RSSs must have a stronger influence on combined plans. The RSS process must include appropriate public participation to ensure this stronger influence can occur.

The final point under Action C2.5 relates to central government funding and resourcing to support regional spatial plan development. Transpower supports funding being available, particularly to ensure mana whenua engagement in the process. As discussed above, Transpower considers that RSSs can reconcile tensions and ease pathways for obtaining environmental approvals. Robust processes and meaningful engagement from iwi and Central Government are crucial if RSSs are to have this role.

C2.6	Increase the use of water-sensitive urban design measures to reduce pressure on water networks	-	No comment

C3. Improve access to employment

Action	*Description*	*Response*	*Comment*
C3.1	Implement congestion pricing and/or road tolling to improve urban accessibility	-	No comment
C3.2	Use congestion pricing to plan for new transport infrastructure	-	No comment
C3.3	Plan for congestion pricing schemes in other New Zealand cities	-	No comment

C4. Plan for lead infrastructure

Transpower considers that Action C4 should be amended to refer to nationally significant infrastructure more generally. Nationally significant linear networks have many of the attributes of Lead Infrastructure. It needs the same recognition and many of the protections articulated in Action C4.

In particular, if routes for nationally significant linear networks are not provided for in advance of urban development, it can be difficult if not impossible to protect them at a later date. Further, it may make sense to invest in Grid infrastructure in advance of generation development. The constraints in relation to protecting corridors for future lead infrastructure stated at page 84-85 of the Consultation Document apply equally to nationally significant

linear infrastructure. Further, the legislation and policy reforms needed for corridor protected for lead infrastructure apply equally to nationally significant linear infrastructure.

Action	*Description*	*Response*	*Comment*
C4.1	Develop a lead infrastructure policy, supporting implementation guidance, and a corridor protection evaluation methodology	-	No comment
C4.2	Enable lead infrastructure corridor protection through resource management reform	Partially support	Transpower supports the resource management system reform enabling corridor protection for linear nationally significant infrastructure (as well as lead infrastructure). It is currently not clear how infrastructure projects will be prioritised through the combined plan or approvals process following the RSS process. It is critical that the settings are correct so that projects are subject to the appropriate testing at the appropriate stage, and do not require repeated and unnecessary effort to obtain project approvals. To achieve this outcome, the RSS will need to resolve tensions. This could involve the general testing of routes and corridors for nationally significant linear infrastructure. It should not however involve the testing of project details. For projects recognised in RSSs, the approvals process could then be streamlined to reflect the "buy-in" achieved through the spatial planning process. Gaining approvals at this later stage should be much more certain. The project details and detailed mitigation could be confirmed through a "construction and implementation plan" process under the NBA, prior to construction. The second point under Action 4.2 is to base the statutory test for infrastructure corridor designation on a corridor protection evaluation methodology. See response at C4.1.

C4.3	Establish a corridor reservation fund to protect lead infrastructure corridors	Support	No comment

C5. Improve regional and international connections

Action	*Description*	*Response*	*Comment*
C5.1	Develop a long-term national supply chain strategy	-	Transpower is the sole consumer of many of the parts and materials that we employ. We are therefore likely to experience fewer benefits from a national supply chain strategy than other infrastructure providers might
C5.2	Update the 2006 digital strategy	Support	While the 2006 digital strategy has provided a roadmap for digital enablement over the last 15 years, in a fast paced environment, an update could help to ensure that the strategy continues to provide value

Question 19: What cities or other areas might be appropriate for some form of congestion pricing and/or road tolling?

No comment

Question 20: What is the best way to address potential equity impacts arising from congestion pricing?

No comment

Question 21: Is a 10-year lapse period for infrastructure corridor designations long enough? Is there a case for extending it to 30 years consistent with spatial planning?

Transpower agrees that the 5-year default period for lapse of infrastructure is not long enough. We consider that the default period should be well in excess of 10 years – this timeframe is too short for route protection for actual projects. We consider it appropriate for the lapse period to be as long as 30 years, consistent with the spatial planning process.

A further option is to retain a shorter default lapse period, but change the test of extending a lapse date. Rather than focus on whether substantial progress or effort has been made (as provided in sections 125 and 184 of the RMA), the test could focus on whether there remains a need for the designation or consent to remain in place.

We note that the relationship between any NBA and RSS is not clear – it may be that corridor protection can be in the RSS and not require duplication in the NBA combined plans.

Question 22: Should a multi-modal corridor protection fund be established? If so, what should the fund cover?

No comment

Question 23: What infrastructure actions are required to achieve universal access to digital services?

No comment

Question 24: For the 'Creating a Better System' Action Area and the Needs: What do you agree with? What do disagree with? Are there any gaps?

Transpower considers that there is a gap in the identified Needs. In particular, "Reduced costs and improved consenting" should be expanded to include improved processes for developing, updating and reconciling national direction (plans and rules) and improved processes for plan making. The plan and policy processes are equally as important as the consenting process.

As an example, to ensure the National Planning Framework is robust and integrated, a rolling Board of Inquiry could be established to consider submissions and provide recommendations on the Framework. The Board could also consider integration across the National Planning Framework, and recommend consequential amendments where necessary. The rolling Board of Inquiry could also receive reviews of existing national direction, and be tasked with recommending amendments.

To ensure the National Planning Framework is up-to-date and fit-for-purpose, it should be reviewed and amended every 9 years. However, more regular reviews should also be initiated where required (eg to respond to new challenges, or technologies). A clear process for review is required.

Similar processes need to be provided for in plans, to the extent that infrastructure issues are not addressed at the NPF level.

In relation to consenting, Transpower considers that there is merit in considering establishment of a specialist infrastructure panel, similar to the Freshwater Panel that was established under the 2020 RMA reforms.

S1. Integrate infrastructure institutions

Action	*Description*	*Response*	*Comment*
S1.1	Clarify funding of spatial plans	Support	Transpower understands that regional spatial plans will require collaboration between central and local government, mana whenua and infrastructure providers. It will be important that processes are robust and engagement appropriate. Transpower agrees that clarity

			should be provided through the development of the SPA about how the process is to be funded, including for mana whenua engagement.
S1.2	Review roles and functions of local government and other related infrastructure providers		No comment

S2. Ensure equitable funding and financing

Action	*Description*	*Response*	*Comment*
S2.1	Fund tourism infrastructure	-	No comment
S2.2	Rating Crown land	-	No comment
S2.3	Develop a transition plan for transport funding	-	No comment
S2.4	Use value-capture mechanisms to fund infrastructure for growth	-	No comment
S2.5	Enable land-value change as a basis for a targeted rate	-	No comment

S3. Make better use of existing infrastructure

The ability to maximise the use of existing infrastructure should be considered through the resource management system reform. Transpower currently benefits from the National Environmental Standards for Electricity Transmission Activities (**NESETA**). These standards regulate our activities on lines in existence at January 2010, and provide an enabling framework for maintenance and upgrades of those lines.

The general approach in the NESETA needs to be retained and transferred to the NPF. The NPF could provide a similar regime for other infrastructure beyond the National Grid.

Transpower also benefits from policies under the National Policy Statement on Electricity Transmission which require corridors to be included in plans which protect National Grid lines from inappropriate activities (primarily intensive and large scale buildings). These corridors create a restriction on what can occur on land, rather than such protection being consequential to a designation. These corridors ensure the lines can be maintained and developed (and protect other parties). These protections also need to be retained and transferred to the NPF.

Action	*Description*	*Response*	*Comment*
S3.1	Consider non-built options	Support	As we note in *Section 1: A major expansion of the electricity system is required,* while network investment and some generation investment is driven by peak demand, consumers are generally billed based on the volume of energy that they consume. If non-built solutions are able to encourage consumers to move their demand away from peak periods, then new investment can be avoided while also decreasing household energy bills by spreading existing costs over a larger volume of energy.
S3.2	Investigate New Zealand Government Asset Management Team	-	No comment
S3.3	Improve pricing to optimise use of existing infrastructure	-	No comment

S4. Require informed and transparent decision-making

Action	*Description*	*Response*	*Comment*

S4.1	Undertake a post-implementation review of all major infrastructure projects	Support	Post implementation reviews are an important tool to provide both transparency and to drive continuous improvement in infrastructure decision making and delivery. Transpower provides post implementation reviews of our major works to Treasury which facilitates both assurance, and learning that can be carried forward into future projects
S4.2	Undertake cost benefit analyses of all projects over $150 million	Support	We note that electricity transmission infrastructure requires rigorous cost benefit analysis for all investments and additionally requires regulatory approval by the Commerce Commission for all investment proposals exceeding $20M
S4.3	Review the discount rate	Support	Transpower's Investment Test regulation specifies 7% as the discount rate for use in our analyses. This rate was set in 2012 and financing costs, including views on long term financing, have come down significantly since then. While the Investment Test does allow alternative discount rates to be used, we consider that updating the discount rate and/or linking it to an independent long-term discount rate is appropriate. We also note that our current framework does not allow us to consider wider social, cultural, or environmental benefits. A cash discount rate is therefore appropriate for the current benefits within the Investment Test, however if we were to consider wider benefits then a Social Rate of Time Preference or similar measure may be a more appropriate discount rate to apply when considering those benefits.
S4.4	Develop a cost benefit analysis manual for new water infrastructure	-	No comment

S5. Develop and prioritise pipeline of work

Action	*Description*	*Response*	*Comment*
S5.1	Develop a priority list of projects and initiatives	Support	No comment
S5.2	Improve the use of the pipeline for commercial decision-making	Support	No comment
S5.3	Measure sector utilisation	Support	The major transformation of New Zealand's energy system that will be required to meet our decarbonisation objectives signifies a significant increase in the volume of work that will need to be undertaken on the Grid. We expect that the sector will require a marked uplift in workforce capacity and capability. This demand for energy sector skills is not unique to New Zealand, as a number of our key trading partners see a similar ramp in new renewable generation. This may mean that securing skills from offshore as we have been able to do in recent years may not be as viable a strategy in the future. Measuring sector utilisation can provide valuable information to understand where within the broader energy and infrastructure sectors we may need to begin developing skills to fill these future needs.

S6. Improve project procurement and delivery

Action	*Description*	*Response*	*Comment*
S6.1	Establish a major projects leadership academy	-	We note that there are internationally recognised programmes such as PMI or PRINCE2 which offer well established major project leadership frameworks. We would encourage the use of these internationally

			recognised frameworks to build New Zealand's major project leadership capability
S6.2	Revisit New Zealand's approach to market-led proposals	-	-

S7. Reduce costs and improve consenting

Action	*Description*	*Response*	*Comment*
S7.1	Measure and benchmark infrastructure cost performance	Support	-
S7.2	Standardise design	Partially Support	Standardising designs allows for delivery efficiency improvements but risks that long-term design flaws are introduced to a large number of assets. Standardised designs must also consider the environment into which they are placed. For examples, transmission towers in coastal areas or volcanically active areas will experience high rates of corrosion and will therefore require different designs that might be considered excessive if they were deployed in less corrosive environments.
S7.3	Develop a planning system that is more enabling for infrastructure	Partially support	We have set out detailed comments about the NBA and SPA enabling infrastructure elsewhere in this submission (primarily section 1 and in response to question 18). The comments in this section are limited to the matters set out under S7.3 only and we have referenced the bullet point to which we are responding. *First bullet point:* Transpower is concerned about a hard distinction between the natural and built environment. This distinction can lead to uncertainty of what is captured in either environment, and lead to

policy gaps (and/or litigation risks). As an example, the NPSET refers to urban and rural environments. Parties have argued that these environments do not encompass other environments, such as the coastal marine area or reserve land.

Transpower's infrastructure traverses all environments. There is a risk that the built environment is seen as equating to the urban environment. It is crucial that the reform enables infrastructure in all environments (whether developed or undeveloped).

Second bullet point: Transpower agrees that resource consent decisions should take into account the length of time that infrastructure (not merely the activity) will affect the environment. We have had instances where consents to trim unsafe trees around our lines have been granted for a short timeframe, despite the infrastructure being enduring and the trees continuing to grow once the consent has expired.

Third bullet point: Transpower agrees a consenting pathway for infrastructure is critical. However, this does not start with the NPF, it needs to start with the NBA outcomes. These need to provide strong enabling direction for electrification of the economy (putting important infrastructure on the same footing as other national important matters) and ensure that environmental limits do not undermine this direction.

We also consider that the NPF must provide a policy pathway for addressing the inevitable tensions in competing outcomes that will arise between infrastructure and environmental limits for the natural environment. Both policies and rules will be required, depending on nature and scale of infrastructure. Policies and rules are required for the National Grid – to ensure it is treated consistently and enabled

throughout the country and existing assets are protected and enable to be enhanced.

Fourth bullet point: Transpower agrees that consideration of amenity has been problematic for infrastructure projects under the RMA. However, we query whether it is appropriate to disregard commercial (or regulatory) realities. In particular, cost impacts on the feasibility of options, and must remain relevant to an infrastructure operator's consideration of options.

Fifth bullet point: Reference is made to establishment of a national GIS database for mapping nationally important resources (built and natural). We agree that mapping of resources is important, particularly areas that to be subject to environmental bottom lines. The role and relevance of any national database to RSSs would need to be considered through the resource management system reform. Any database would need to assist in an efficient process, rather than be another layer of process to input into.

Sixth bullet point: Transpower agrees that the RSS process would need to be able to respond to changing national and regional priorities. In addition, it would need to be flexible enough to respond to projects that could not be included at the time the RSS was developed.

Seventh bullet point: Transpower agrees that a pre-notification audit of combined plans to ensure consistency with national direction could be useful. Any audit could be carried out by the rolling board of inquiry or specialist infrastructure panel. However, our preference is for the NPF to reconcile tensions with other national direction, and include provisions that are automatically included in the combined plans.

S8. Activate infrastructure for economic stimulus

Action	*Description*	*Response*	*Comment*
S8.1	Develop ready to build infrastructure	Support	Where infrastructure is funded by Government, accelerating projects to provide economic stimulus is a relatively simple decision for Government to make. In other industries, such as electricity, telecommunications, and in some cases water, infrastructure is funded by users rather than by Government. In these sectors, the opportunities for Government to accelerate investment may be more limited, or may require alternative Government funding mechanisms to fund the costs of acceleration.
S8.2	Evaluate stimulus impacts	Support	-

Question 25: Does New Zealand have the right institutional settings for the provision of infrastructure?

Transpower considers that the infrastructure consenting bodies that have been established for fast track consenting provide a strong blueprint for more permanent similar institutions.

Transpower considers that resource management system reform provides an opportunity to ensure that decision-making institutions are appropriately geared towards enabling infrastructure. Changes could involve:

- A rolling board of inquiry to ensure that the NPF remains up-to-date, with any technological changes and reconciles tensions between competing policies or rules.
- A specialist infrastructure panel, to decide environmental approvals.
- An independent panel to oversee RSSs (see question 26).

As the pace of technological disruption changes and market structures evolve it will be important to continually review institutional settings to ensure that they are providing for an agile and adaptive regulatory environment.

Question 26: How can local and central government better coordinate themselves to manage, plan and implement infrastructure?

As discussed in the context of RSSs, Transpower considers that it is important that central government is involved in RSSs to ensure national issues are prioritised (such as security of supply), particularly as central government will not be involved in the combined plan processes. However, the level of formal collaboration and independence and rigour will be required to ensure that RSSs are not simply a political tool and stakeholders feel confident to engage in the process. An independent panel to oversee RSSs may assist.

Question 27: What principles could be used to guide how infrastructure providers are structured, governed and regulated?

No comment

Question 28: What steps could local and central government take to make better use of existing funding and financing tools to enable the delivery of infrastructure?

Transpower notes that while our investments are generally funded directly from consumers of our services, that our regulatory funding model allows third parties such as the Government to contribute to our regulated investments. Our consumer-funded regulated cost recovery may only be used where it is in the best economic interests of the consumers of our services. This means that we are not permitted to consider broader social, cultural, or environmental benefits to New Zealand in our investment decisions. If the Government wished to use electricity infrastructure as a policy lever to optimise the combined economic, social, cultural, and environmental benefits then they may be able to make a contribution which recognises these benefits and allows us to fund each of those benefits from the appropriate parties.

Question 29: Are existing infrastructure funding and financing arrangements suitable for responding to infrastructure provision challenges? If not, what options could be considered?

Infrastructure funding and financing arrangements in the electricity sector are largely fit for purpose and regulations provide us scope to move into other forms of non-regulated funding in situations where we believe it might lead to better outcomes.

Network investment

While Transpower is confident in our ability to fund our forward plan of works, we note that a number of electricity distribution businesses are facing increasing pressure for investment in their network due to ageing asset bases, and fundamental changes in the way that their networks operate due to increased uptake of new technologies such as electric vehicles, solar panels, and home batteries.

In situations where existing funding arrangements are likely to be insufficient, distribution businesses are able to appeal to the Commerce Commission for customised pricing arrangements to fund their work programmes which has proven to be an effective tool for managing exceptional cases.

Alongside these challenges, a number of distribution businesses have raised concerns about their ability to fund non-built solutions such as demand response from their regulated funding. The Commerce Commission is aware of these concerns and is working with the sector to address them.

As we have discussed in other sections of our response, electricity network companies are only permitted to consider the economic benefits accruing to consumers of our services when assessing

potential investments. If the Government wishes to use electrification as a tool for decarbonisation, or as a tool to achieve social, cultural, or environmental goals, then there is an opportunity for them to make contributions to our investments to allow us to consider those goals in our decision making.

Generation investment

Generation investment in New Zealand is made by private investors, some of whom are partly owned by the Government under mixed-ownership models.

Funding high capex investments such as new renewable generation requires a high degree of certainty that long-term returns will be able to be secured. New Zealand's electricity market holds a number of risks that may lead private investors to question whether those returns will eventuate. Examples include whether the Tiwai Point Aluminium Smelter will continue operating (propping up electricity prices) or whether they will close (depressing electricity prices and eroding returns). Other uncertainties could include the scale and operating characteristics of the proposed Onslow pumped hydro storage project, or the potential for industrial closures more generally.

These uncertainties are well demonstrated by recent tightness in the electricity supply market. To have avoided supply tightness that is currently being experienced, new generation build would have needed to be committed two years ago. This period includes the lead-up to the announcement that the Tiwai Point Aluminium Smelter intended to close, compounded by the emergence of the global pandemic. Following the announcement, nearly all generation intention was postponed in expectation that demand for electricity would drop sharply. Now that Tiwai has confirmed their intention to stay, and the pandemic recovery is underway new generation is being built, however this glut will be too late to remedy the current situation.

This delay in new generation build has coincided with a shortage of gas, and water inflows to the hydro lakes which has in turn led to scarce supplies of electricity.

The resulting price spikes have applied increased pressure on some industrial consumers. In international markets, to manage this risk it is increasingly common for large industrial customers to sign long-term Power Purchase Agreements with new generators to provide both parties with certainty over future electricity prices. While there has been recent interest in Power Purchase agreements (namely from the Major Electricity Users' Group), this is an area that could be further explored to de-risk generation funding.

Question 30: Should local authorities be required to fund depreciation as part of maintaining balanced budgets on a forecast basis?

No comment

Question 31: What options are there to better manage and utilise existing infrastructure assets?

Pricing that signals to customers the costs of their consumption tend to lead to more optimal utilisation, however, it also has distributional impacts that should be considered from an equity standpoint.

In the electricity sector, establishing markets that allow consumers to benefit from flexing their consumption during times of system stress will offer non-built solutions to address network needs – leading to more optimal investment decisions. Transpower has undertaken considerable work in this area, much of which has recently been presented to the Electricity Authority's Innovation and Participation Advisory Group. Ultimately, market design decisions are the Electricity Authority's to make and as such, the specifics of any flexibility market will depend on their views on the optimal market structure.

In addition to markets and pricing, more flexibility should be provided through the resource management system reforms, to ensure we can maximise the use of existing assets (as discussed above). In addition, wider reform is required including in relation to the Public Works Act, Wildlife Act, Conservation Act and Heritage New Zealand Pohere Taonga Act (to name a few). All of these Acts provide different regimes that can create barriers to the maintenance and upgrade of existing assets.

Question 32: Are there benefits in centralising central government asset management functions? If so, which areas and organisations should this apply to?

No comment

Question 33: What could be done taken to improve the procurement and delivery of infrastructure projects?

Transpower is improving our processes to accommodate the increased volume of connections to our grid, and are refreshing the information we give to new customers on the grid connection process to make this more streamlined.

We have reviewed our supply chains and procurement approach in light of the pandemic and are implementing improvements to improve the resilience and efficiency of each.

In the longer term, we are planning for increased demands on our workforce (an industry wide issue) to ensure we are able to deliver the forecast increase in work as New Zealand decarbonises through electrification.

Question 34: Do you see merit in having a central government agency procure and deliver infrastructure projects? If so, which types of projects should it cover?

No comment

Question 35: What could be done to improve the productivity of the construction sector and reduce the cost of delivering infrastructure?

No comment

Question 36: What components of the infrastructure system could have been improved to deliver effective stimulus spending during the Covid-19 pandemic?

Proactive assessment of project business cases and a prioritised pipeline of work which can be accelerated in times of economic stress would provide additional tools to provide economic stimulus during downturns.

TRANSPOWER