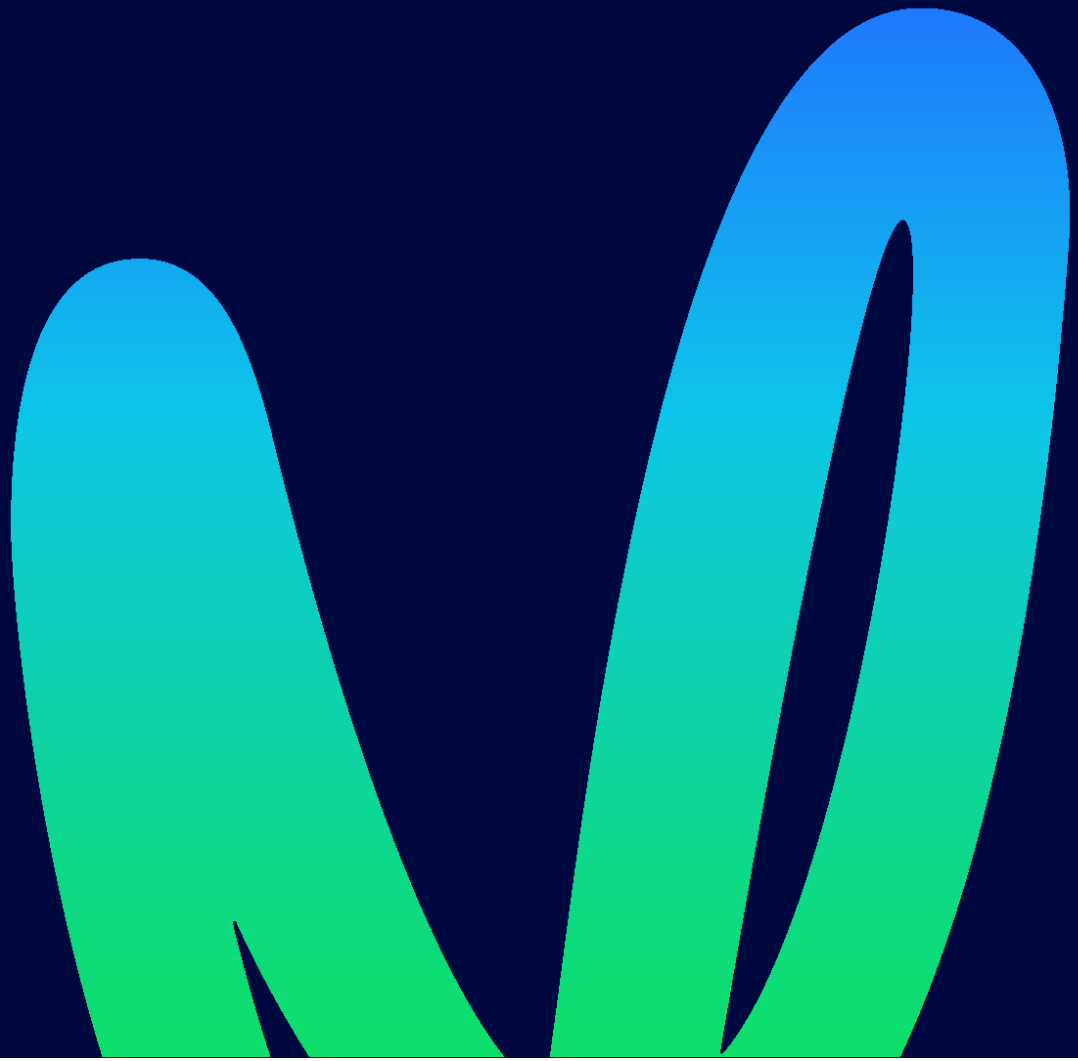
December 2019

Vector submission -

Ministry of Transport, Green Freight Project



vector

We support the efforts of the Ministry of Transport to reduce emissions from transport, including the Green Freight project. This project seeks answers to a number of questions associated with affordable electrification more broadly, and we want to work in partnership with Government to enable these solutions.

We are submitting to help respond to the question of *How could New Zealand best use alternative fuels to reduce GHG emissions from road freight?* and to support the Ministry of Transport's (MOT's) wider body of work to reduce greenhouse gas emissions from transport.

We note the work undertaken by the Interim Climate Change Commission (ICCC) which recommended that the electrification of transport and process heat be prioritised to reduce emissions from the energy sector. The scenario favoured in the ICCC's report *Accelerated Electrification* included replacing around 2 million fossil fuelled vehicles with EVs by 2035. We support the MOT's efforts to reduce greenhouse gas emissions from transport – a quarter of which comes from road freight (despite road freight making up only 7 percent of total vehicle kilometres driven).

Smart EV charging and wider demand management technology will have a key role to play to enable the electrification of New Zealand's heavy vehicle fleet.

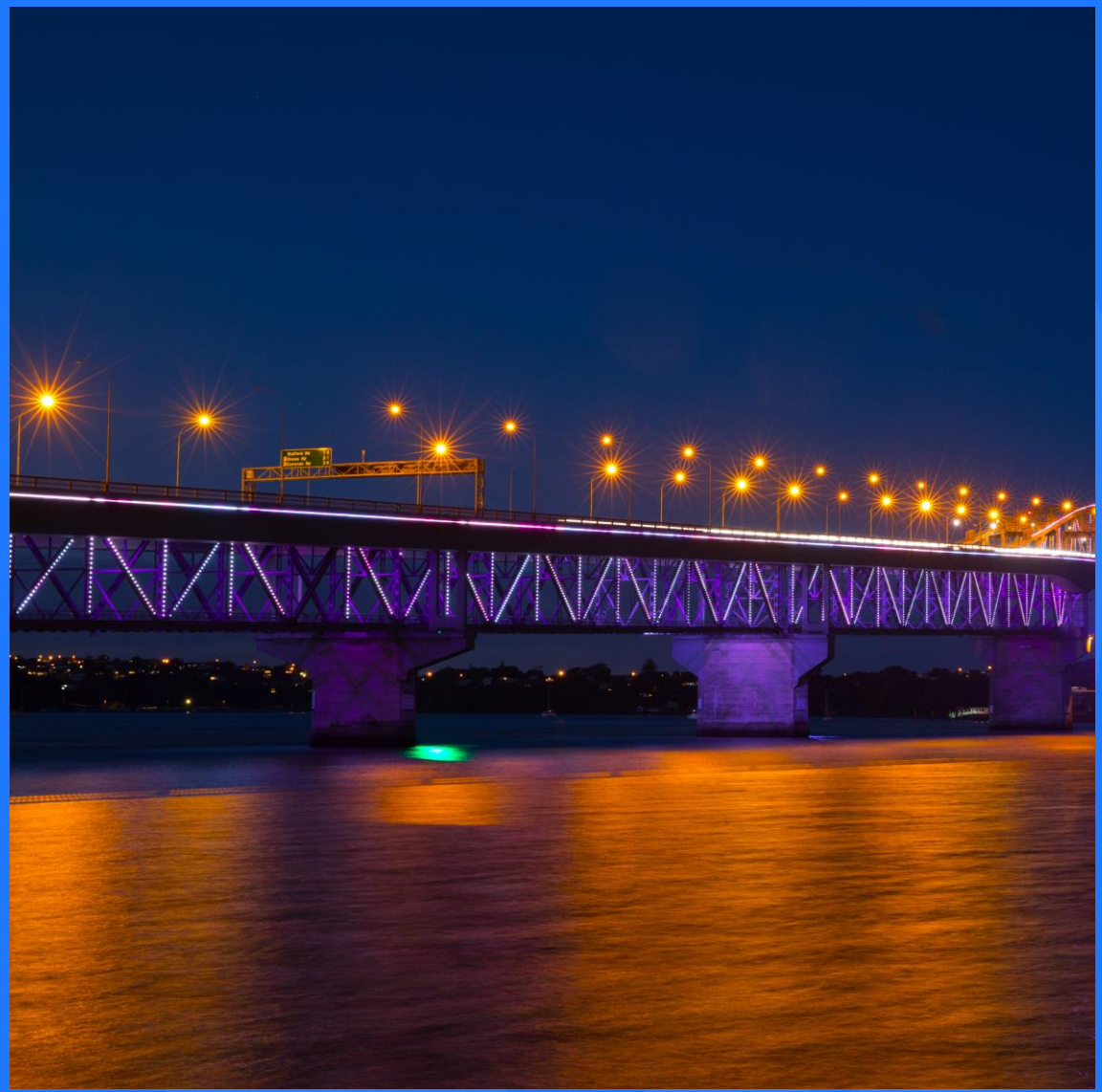
As highlighted by Energy Efficiency and Conservation Authority's (EECA's) recent report *Electric Vehicle Charging Technology,* smart EV charging, along with wider demand response technology, will be critical to the affordable electrification of transport. This is because of the potential impact of EV charging on the network. Just a 7kW EV charger has the potential to more than double a household's load on the network, and our modelling has found that if customers started using unmanaged 7kW home chargers, the load will surpass network capacity during evening peak at just 20 percent EV penetration. This impact will likely increase with faster charging – a 22kW fast charger adds the equivalent load of around 8.8 households to the network on average. Clustered uptake and charging would concentrate this impact. The way that our urban design and charging infrastructure is shaped to facilitate low emissions transport will therefore have significant cost implications – for example, having charging hubs along a highway to electrify the heavy vehicle fleet will concentrate load on the network – unless this demand is managed effectively.

vector

New Zealand is well placed to help lead the integration of smart demand management technology; and network businesses have a clear incentive to drive uptake.

There is an opportunity to support a proactive approach to smart demand management, and, New Zealand's energy sector makes us well placed to help lead this future. As reflected in the work of the ICCC, our unique energy emissions profile in which a relatively low percentage of our emissions are attributable to generation, increases our imperative to electrify transport to reduce emissions from the energy sector.

Network businesses have a clear incentive to enable efficient demand management. Investing in the network to meet peak demand is already a key driver of cost for electricity distribution businesses accounting for up to 50 percent of networks' costs – which is passed on to customers. As highlighted by the ICCC, "*Accelerated Electrification* will not happen if electricity is too expensive". Deferring network costs by flattening demand peaks (as well as by reducing demand through energy efficiency) will play a key role in the affordable electrification of transport. This requires the integration of smart demand management technology, and distributed energy resources (DER) – such as household solar panels and batteries – which can reduce demand peaks on the networks, as well as enable greater renewable generation.

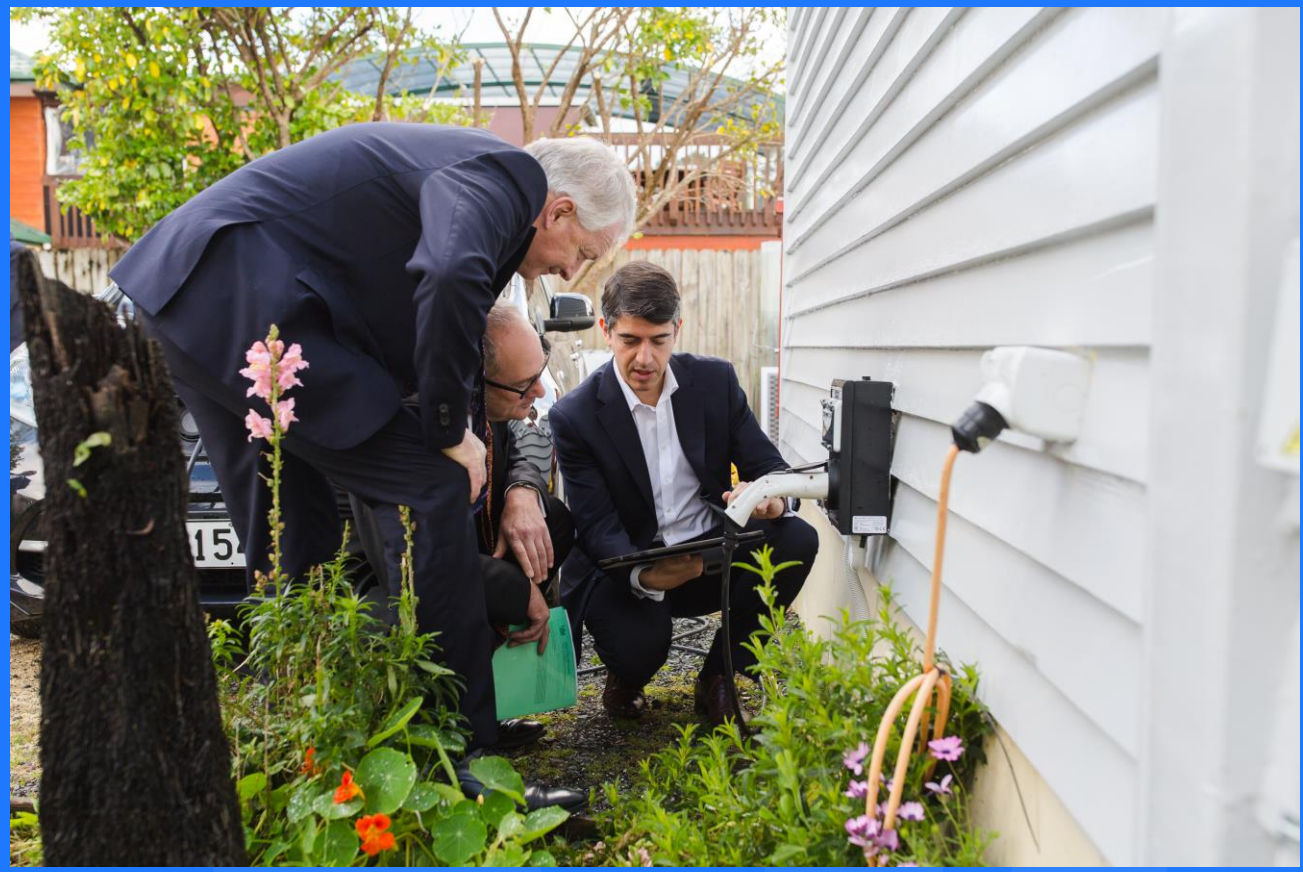


vector

Vector is creating an enabling platform for the affordable electrification of transport

Vector is majority owned by customer shareholders and is working to create a New Energy Future which puts the interests of our customers at the centre.

To understand how managed charging can be used to meet customer needs whilst optimising the network, Vector has begun a trial of 120 EV smart chargers in the homes of Auckland customers, as well as a trial of 80 smart EV chargers on Waiheke Island. As noted by *Electric Vehicle Charging Technology*, a fully managed EV charging ecosystem relies on a digital platform to integrate and coordinate smart EV chargers and DER. Vector has co-developed the Distributed Energy Resource Management System (DERMS) with international software firm, mPrest, which fulfils this role, enabling the secure integration and coordination of smart demand management technology and DER – creating a platform for a distributed energy future and for the electrification of transport.



Vector General Manager of Product, Technology and Innovation, Cristiano Marantes, shows Mayor of Auckland, Phil Goff, and Minister for Transport and Urban Development, Hon Phil Twyford, a smart EV charger at the launch of Vector's trial of 120 EV smart chargers in October 2019

vector

Vector is exploring ways to electrify our heavy transport fleet – however, enabling this transition will require significant infrastructure funding beyond demonstration projects

As well as creating an enabling platform for the sustainable integration of EVs, Vector is also the owner of a fleet of around 80 trucks which are used for Vector OnGas deliveries. As part of the Vector Group's target to have net zero emissions by 2030 we have a key interest in electrifying road freight to reduce our operational carbon footprint and contribute to New Zealand's wider decarbonisation objectives.

Vector is currently exploring the electrification of heavy vehicles. This trial will be a first step in understanding the infrastructure costs and changes associated with the electrification of our heavy vehicle fleet and will lend insight into the deployment of electric heavy vehicles in the logistics and public transport sectors. This project could also gain the attention of the overseas manufacturer to release new EVs to the NZ market. Vector is also actively working with Auckland Transport and various bus companies to investigate potential financial requirements for the operation of a battery and electric bus fleet in Auckland, and will be undertaking an assessment of the high voltage network with Auckland Transport.

For electrification of the heavy vehicle fleet to be viable, charging needs to be a cost effective and operationally feasible option for industry, accounting for investment in charging infrastructure up front; and the implications of both the time it takes to charge, and time of charging; as well as the price of electricity (including the cost of distribution charges). As mentioned above, smart demand management technology can be used to stagger charging times when a fleet is plugged in and charged overnight to help reduce the load on the network – however there are significant cost implications for a fleet owner who cannot use the vehicles for that period of time.

Vector has received EECA funding for a number of demonstration projects – including for the trial of smart chargers on Waiheke, mentioned above. However, the costs associated with transitioning the heavy vehicle fleet will go beyond the costs of trialling new technology, requiring significant infrastructure investment for distribution and transmission.

The uptake of demand management technology requires the right regulation

New energy technology such as DER and smart EV chargers – increasingly straddles the divide between different segments of the market, having benefits for both networks and customers. This is because innovation is based on new customer needs, not traditional business models which have been built around old regulatory silos. This gives network businesses a clear and unique incentive to support the uptake of this technology. It is critical that businesses with this incentive also have the regulatory ability to invest in demand management technology like smart EV charging. As with all technology and innovation, regulatory certainty is critical to support investment, and needs to be weighted appropriately with any need for regulatory flexibility. This certainty requires robust regulatory checks and balances which ensure the transparent and consistent development and implementation of rules. Industry needs the ability and incentive to invest in new technology and innovation which can allow this transition. Because Vector is subject to price quality regulation, regulatory settings determine Vector's allowable revenue and whether or not Vector has the cashflow to make required investment in the context of growth and change – including the convergence of the electricity and transport sectors.

Regulatory decisions and settings can therefore impact on wider policy goals – including the electrification of transport and New Zealand's heavy vehicle fleet. This is why Vector has called for a Ministry for Energy to help strengthen the alignment between policy and regulatory settings and to strengthen a coordinated approach between interdependent challenges facing the energy sector - including energy affordability and decarbonisation.

Vector Group CEO, Simon Mackenzie; participants in Vector's trial of 120 EV smart chargers and Te Atatu locals, Loren and Kim and their family; Mayor of Auckland, Phil Goff; and Minister for Urban Development and Transport, Hon Phil Twyford at the launch of the 120 EV smart charger trial in Te Atatu in October 2019

vector

Reducing emissions from road freight will require a whole of systems approach which considers a range of alternative fuel options, accounting for emissions produced across the fuel supply chain. We support the discussion documents' exploration of the three-fuel mix, as well as fuel efficiency, to reduce emissions from road freight.

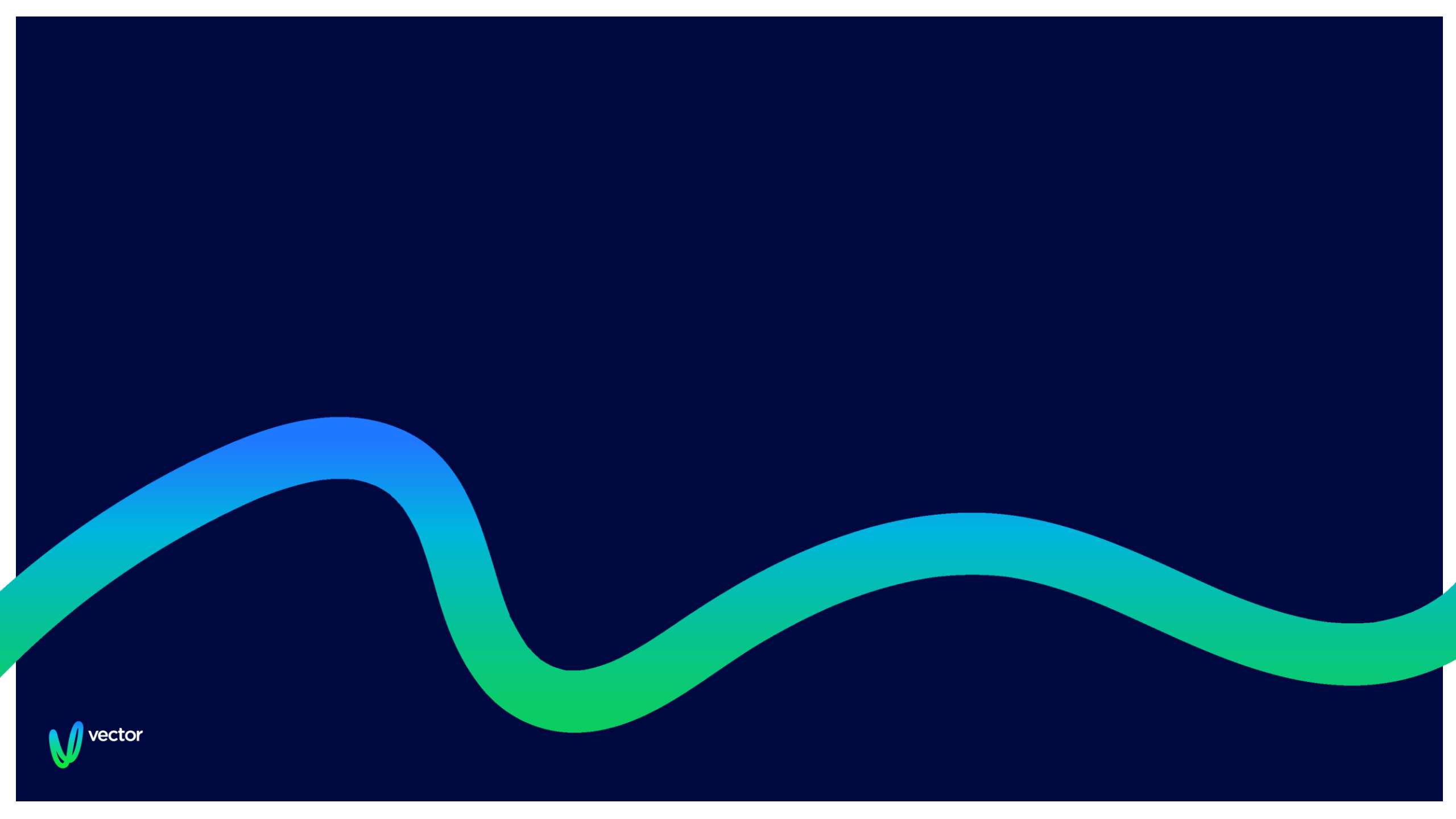
The Green Freight Project discussion document focuses on three alternative fuel options to reduce greenhouse gas emissions from road transport – electricity, bio fuels, and hydrogen. Decarbonising our economy will likely require a mix of fuel alternatives. As referred by the discussion document, every alternative fuel option will come with its own infrastructure challenges. We believe that electrification has strong potential in reducing emissions from the majority of New Zealand's road freight – however for long haul journeys, other alternatives, such as hydrogen, may have a role to play.

As mentioned above we are exploring the electrification of trucks and buses currently. As noted in the discussion document, the electrification of residential vehicles is already advanced – however the electrification of road freight will come with its own unique infrastructure challenges. A key challenge is understanding what these infrastructure needs are and Vector's exploration of this matter will act as a test case for this.

vector

Supporting the uptake of any green fuel alternative requires a whole of systems approach to ensure that uptake produces the sustainable outcome intended, and also requires collaboration across the sector and energy supply chain. For example, the electrification of transport will only produce the intended emissions reductions if our electricity generation is also low carbon. The interdependency of these different aspects of our energy system in contributing to a low carbon future is reflected in the work of the IPCC – pathways to reduce global warming to 1.5 degrees show both 'an increasing share of electricity accompanied by a rapid decline in the carbon intensity of electricity'. We appreciate the work undertaken by the ICCC into the impact of a transition to 100 percent renewable generation on emissions reductions, electricity capacity requirements, and the cost of emissions reductions. This transition, along with increasing demand for electricity associated with the electrification of transport and process heat, could increase the cost of electricity. Ensuring that any fuel alternative is cost competitive will be key to its success.

As noted in the discussion document, life cycle analysis has not been undertaken for heavy electric vehicles in New Zealand. Vector has released a New Energy Futures paper on batteries and the circular economy which outlines key issues and considerations to support the sustainable procurement, use, re-use and disposal of batteries. This analysis sits alongside the Battery Industry Group (BIG) which was convened by Vector to support responsible end of life management of large batteries. We support a holistic, circular economy approach which accounts for the social and environmental impacts of alternative fuels across the supply chain.


vector