

Ministry of Transport
PO Box 3175
Wellington 6140
New Zealand

Sent via email: evchargingstrategy@transport.govt.nz

11 May 2023

Draft strategy: Charging our future

We appreciate the opportunity to respond to the New Zealand Government's draft national strategy *Charging Our Future*, published by the Ministry of Transport in March 2023.

Transport emissions are the fastest growing source of greenhouse gas emissions in New Zealand and account for 20% of NZ emissions. Decarbonisation of the light vehicle fleet through uptake of electric vehicles (EVs) will play a key role in decarbonisation with nearly 70% of all transport emissions coming from light vehicles such as cars and vans.¹

Our focus in this consultation response is to:

- Reinforce the need to manage the impacts on the electricity system and assets through use of smart charging²
- Improve the availability and access of EV charging infrastructure that enables an equitable transition for all New Zealanders
- Support co-ordination of transportation strategies with the electricity sector

We have included our responses to specific consultation questions in the appendix.

¹ [Ministry of Transport website](#) (accessed 3 May 2023)

² We define 'smart' charging where the charging mechanism has built-in communication capability and is able to vary charging based on external signals. Sourced from 'Electric vehicle (EV) chargers for residential use', Standards NZ PAS 6011:2021

Managing the impact of charging on the electricity grid is important

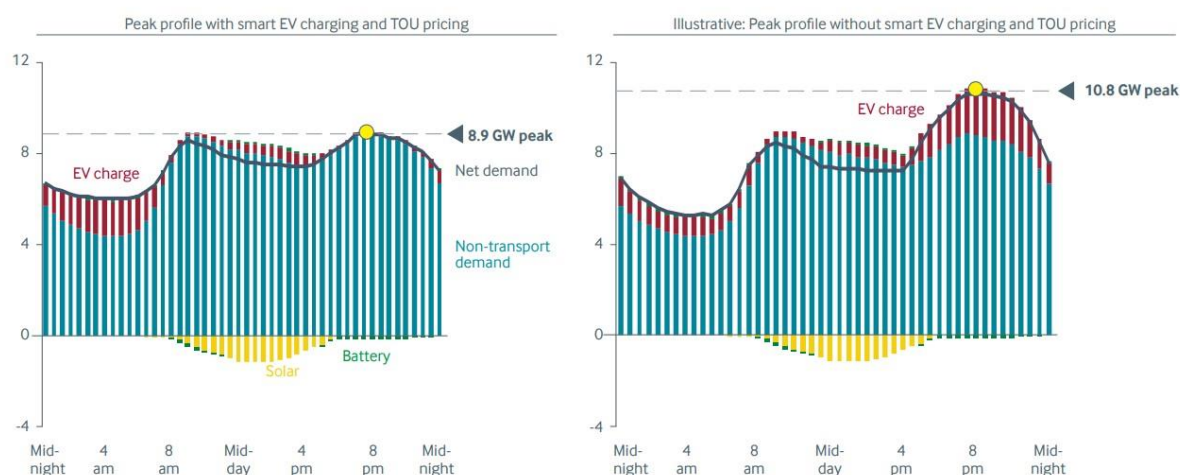
We agree that different charging requirements from EV owners will require a range of charging services – home, workplace, destination, and journey charging. However, in all cases there will be a need to manage impacts on the electricity system and network assets.

One area that will require particular focus for policy makers and the energy sector is around peak energy demand management. Increases in peak demand will require significant investment in transmission, distribution, and generation.

Transpower's *Whakamana i Te Mauri Hiko* estimated that smart EV charging and responding to time-of-use pricing, has the potential to materially reduce peak demand, in 2035, by about 2 GW.³ This has the potential for consumers to save approximately \$1.5 billion for every gigawatt of avoided peak electricity demand growth.⁴

Figure 1: Peak profile loads with and without smart EV charging and time of use pricing

(2035, GW)



This major opportunity to reduce electricity costs for all New Zealanders can be realised with mandatory smart EV charging for private (slow) charging and other forms of faster charging where they can provide services back to the grid. Mandatory smart EV charging for private charging of light vehicles will be critical because it will enable consumers to respond to signals such as energy prices, system capacity or network congestion that can help minimise the impact on peak demand periods. This would trigger network investment, potentially drive higher peak energy costs and compromise security of supply – the costs of which are spread across all consumers.

For public charging, the development of a charging hub model will be a significant step change in the way in which public EV charging infrastructure is rolled out in New Zealand. Setting ratio targets per number of EVs and planning locations in advance will help inform where the load will be located and what electricity infrastructure upgrades are required to

³ Transpower, '[Whakamana i Te Mauri Hiko](#)' 2020

⁴ Transpower, '[Electrification Roadmap](#)' 2021

service them. Depending on the size of the hubs, they may require an increase in network capacity.

We understand the single largest public EV charger installation in NZ is currently 300 kW. In the future we expect the development of high power ultra-fast charging technology and demand for charging from both cars and trucks to drive the need for megawatt charging hubs for long distance journey charging. Europe's most powerful EV charging hub is 10 MW and research from Europe indicates that 3.75 MW heavy vehicle chargers⁵ will be available in 2024.⁶ Incentivising charging hub providers to invest in ways to reduce their impact on peak demand can reduce the need for large investment in electricity network infrastructure. (e.g., through a battery energy storage system, or BESS).

Transpower's recent *Whakamana i Te Mauri Hiko* Monitoring report for March 2023 observed an increase in the number of registered petrol hybrid vehicles, showing that other barriers to EV uptake, including access to charging infrastructure, continue to exist.⁷

If the electrification of the light fleet is substituted by an increased uptake of hybrid vehicles, other levers will need to be pulled to achieve our emissions budgets.

A charging strategy should support an equitable transition to an electrified fleet and enable access for all New Zealanders'

Accessible and affordable charging infrastructure is a critical enabler for rapid uptake of electric vehicles. In Transpower's *Electrification Roadmap*, we identified access to EV charging as one of the key barriers to EV uptake. Decarbonisation of the road transport fleet is a multi-dimensional opportunity that needs to be addressed holistically. According to the Energy Efficiency and Conservation Authority (EECA), there are several key barriers that exist for prospective EV owners when it comes to both private and public charging infrastructure. These include the high upfront purchase price of 'smart' EV chargers, perception of 'charging anxiety' and the lack of public fast chargers.⁸ In New Zealand, 82% of charging is done at home⁹ which will require a focus on an equitable transition for all New Zealanders to have access to low-cost smart charging. We note that some EVs have functionality for smart charging, and that the technology of onboard charging is evolving in this area. EECA has identified the increased usage of public EV chargers up from 49% in 2021 to 76% in 2023 – mostly for longer trips.

We support the Government taking steps to ensure more is done to increase the availability and visibility of public fast chargers, access to charging for households who require dedicated on-street charging facilities (that do not have private off-street charging access)

⁵ ICCT, '[Charging solutions for battery-electric trucks](#)', 2022

⁶ EE Power, [News Article](#), 2022. This charging hub includes, ten Fastned 300 kW chargers, twenty Wenea 7-22 kw chargers and twelve 250 kW Tesla Superchargers.

⁷ Transpower, '[Whakamana i Te Mauri Hiko monitoring report](#)', 17 April 2023

⁸ KPMG, '[Electric Vehicle Charging Technology](#)' 2019 and EECA '[Consumer Monitor](#)', Edition 3 April-June 2022

⁹ Climate Change Commission, '[Advice on Governments Second Emission Reduction Plan](#)', April 2023

and prioritise work to ensure the cost of private smart EV charging can be kept affordable for existing and prospective EV owners.

To be successful, decarbonisation of transport requires strong co-ordination between energy and transport strategies

Transpower supports the development of a national EV charging strategy, underpinned by alignment with long-term outcomes and electricity sector strategies and plans. The development of a national charging network will need to be in close co-ordination with the transport and electricity sector. As discussed earlier in this submission, a critical element of the charging network will be the electricity network's capability to support vehicle charging.

We agree that a new cross-cutting entity that has dedicated funding and resourcing to provide alignment and focus, not only collaboration. This entity could establish and monitor targets, mandate standards, provide funding, create partnerships with the private sector and provide a single point of contact for consumers, industry, infrastructure providers and road corridor owners, including councils.

Managing co-ordination with the electricity grid is a critical success criterion for the EV charging strategy. The electricity distribution and transmission system will play a key role as an enabler for both new load and generation to connect to the grid. Ensuring, where appropriate, that there is an appropriate degree of alignment across and integration between this strategy and the wider electricity sector strategies and plans.

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.

We welcome further discussion

We consider EV charging as a critical enabler of EV uptake and decarbonisation of the transport sector. We believe our expertise in electricity system operations and transmission infrastructure can assist the Government in the next phases of this work.

We answer the specific consultation questions in the appendix.

If you would like to discuss our submission in more detail, please contact Nicolas Vessiot (nicolas.vessiot@transpower.co.nz) in the first instance.

Appendix – answers to consultation questions

Answers to consultation questions

Question	Transpower's position
Do you have any comments about the institutional arrangements for implementation set out in Annex 2, or on the way central government should work with the private sector when implementing the final version?	<p>We agree that a new cross-cutting entity will be required to ensure alignment and focus, not only collaboration, however we do not have a preferred option.</p> <p>This entity should play a central coordination role, and/or leverage partnerships with the private sector.</p>

Question	Transpower's position
If there are drivers missing, what are they and what impact do you think they would have on the content of the final strategy?	A missing driver for the strategy is that the lack of convenient charging facilities is a barrier to uptake.

Question	Transpower's position
Do you agree with this description of the status quo? Is anything missing from this description of the status quo?	<p>We agree, however we note that the definition of depot charging can be extended to all types of fleets, as opposed to "public" sector.</p> <p>We also note the different levels of criticality and needs from different type of users, for example bus depots require high level of reliability to deliver their services. If the electricity infrastructure can help deliver the reliability required, consideration on the</p>

	role private investment to increase reliability (e.g., flexible storage behind the meter) should have.
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Question	Transpower's position
Do you think this draft vision serves as a useful guide for the EV Charging Strategy? If not, what is missing from the vision?	We agree.

Questions	Transpower's position
Do you agree with the proposed outcomes? If not, please explain why.	We agree, noting the need for equity.
Should the final strategy focus on more or different outcomes? If so, please identify what these outcomes should be.	The current outcomes are adequate.
Do you consider any of these outcomes more important than the others? If so, which one(s) and why?	Outcomes one and two are critical in removing barriers to adoption.

Questions	Transpower's position
Do you agree with the focus area under outcome 1? If not, please explain why.	<p>We understand that the point suggesting that that emerging technology can prevent the need for additional power generation relates to the use of demand response to avoid an overbuild of generation. We agree with the intent but would like to remind that the increase in electricity required to electrify the fleet will still require the building of additional generation to meet increased demand.</p>
Which further actions under Focus area 1a would you prioritise? Please explain your answer.	
Please provide any comments on the timing of completing these actions	

We agree with the focus area, and suggest that the following actions are addressed as a matter of priority:

- Mandate smart charging capability on charging of light vehicles (e.g., onboard or offboard private EV chargers), and other forms of faster charging for destination and journey charging where services can be provided back to the electricity network.
- Work with electricity distribution and transmission to identify opportunities, mitigate risks and clarify responsibilities in developing EV charging infrastructure.
- Suggest the EV charging providers should be incentivised to procure long-term electricity supply contract underpinned by renewable energy (e.g., renewable energy certification scheme). This would ensure enough generation capacity is built to match the increase in demand, incentivise shaped (firming or demand response) load contracts, and give consumers certainty about the costs of charging.
- Develop a nation-wide charging location infrastructure plan identifying the need for charging, the location, size and investment and type of charging service to meet consumer needs. This will be very important for all types of charging, but especially for large ultra-fast charging hubs for journey charging that will require significant upgrades to electricity networks.

Managing co-ordination with the electricity grid is a critical success criterion for the EV charging strategy. The electricity system will play a key role as an enabler for both new load and generation to connect to the grid. Ensuring, where appropriate, that there is

	an appropriate degree of alignment across and integration between this strategy and the wider electricity sector strategies and plans.
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Questions	Transpower's position
Do you agree with the focus areas under outcome 2? If not, please explain why.	We agree.
Which further actions under Focus areas 2a and 2b would you prioritise? Please explain your answer.	We suggest that access to EV charging is defined through specific location or regional targets (e.g., street, town, inter-regional). to help with infrastructure planning. National direction should set a minimum target, and local councils could increase the target based on local feedback and consultation
Please provide any comments on the timing of completing these actions	Targets should be in place as soon as possible.
Are there any actions needed to reflect the particular EV charging needs of disabled communities, Māori, or other groups? Please explain your answer	No comment.
Please provide any comments relating to targets for EV charging infrastructure.	The targets need to be specific for each type of charging considered, and they need to be linked to local considerations.

Questions	Transpower's position
Do you agree with the focus areas under outcome 3? If not, please explain why	We agree to progress this to support the market development, but suggest standards are mandated rather than voluntary guidelines. A well-functioning market requires a competitive, open and non-discriminatory approach to infrastructure, systems and information.
Which further actions under Focus areas 3a, 3b, and 3c would you prioritise? Please explain your answer	By implementing EV charging targets (see Outcome 2), local authorities and electricity networks can work better together in the planning stage. Mandating EV charging for new builds is a good idea given the small incremental cost, providing smart charging is enabled.
Please provide any comments on the timing of completing these actions	No comment.

Questions	Transpower's position
Do you agree with the focus areas under outcome 4? If not, please explain why.	We agree.
Which further actions under Focus areas 4a and 4b would you prioritise? Please explain your answer.	In the current context, the responsibility to address the first mover disadvantage sits with the Electricity Authority (EA). The entity in charge of implementing the strategy would need to consider how to work with the EA so this can be addressed with urgency.

	<p>Ensuring commercial public EV charger infrastructure and service providers have adequate electricity provision contracts that are backed up by renewable generation is important for public confidence.</p> <p>Support that government continues to work with the private market, especially to understand where public funds are required to invest.</p>
Please provide any comments on the timing of completing these actions	No comment.

Questions	Transpower's position
Do you agree with the focus areas under outcome 5? If not, please explain why	We agree.
Which further actions under Focus area 5a or 5b would you prioritise? Please explain your answer.	The review of cost recovery arrangements for capacity expansion of the network needs to be addressed as a priority. As most local electricity distribution networks need to be upgraded for either capacity reasons or age reasons, the current regulatory framework does not provide for anticipatory investment. In the current regime, the cost to provide extra capacity is borne by existing customers of the network until the capacity is used, incentivising networks not to invest in additional capacity ahead of time.
Please provide any comments on the timing of completing these actions.	No comment.