Rewiring Aotearoa submission on proposals to support the uptake of smart electric vehicle charging

About Rewiring Aotearoa

Rewiring Aotearoa is an independent non-partisan non-profit funded by New Zealand philanthropy. It is a registered charity working on energy, climate, and electrification research, advocacy, and supporting communities through the energy transition. The team consists of New Zealand energy, policy, and community outreach experts who have demonstrated experience both locally and internationally. We're always fighting for the New Zealanders who use the energy system, and our goal is to help build a low cost, low emissions, high resilience electrified economy for Aotearoa NZ.

Key messages

Unmanaged EV charging that occurs at network and system peaks could add unnecessary electricity infrastructure investment, increasing bills for all customers. Investment in our networks is scaled to meet peak demands and has the potential to significantly increase electricity bills over the coming decades. It is important we take action to shift demand, where it makes sense, to avoid peak demand increases. Rewiring Aotearoa is very supportive of the efforts the Ministry of Business Innovation and Employment is taking to consider options to deliver a more flexible electricity system that will lower system costs for all consumers.

Uptake of smart EV chargers is one way to manage peak EV demand and support a lower system cost. However we do not think there is a strong enough case to mandate that all fixed EV charging units sold in New Zealand must be smart because:

- Mandating the uptake of smart EV charging adds a cost to customers who wish to install a fixed charger unit without offering certainty over future benefit from this investment to these customers.
- It forces customers to pick a technology that may not be the best long term option to provide smart EV charging.
- Improved electricity retail pricing plans including managed EV charging plans and improved distribution price signals could increase incentives for customers to support smart EV charging and provide a better technology neutral pathway than mandating smart EV chargers.
- Customers can be incentivised to charge in off-peak periods through time of use price plans that can provide much of the distributed flexibility value obtained through smart EV charging without investing in a smart EV charger (eg: using basic automated settings on charger or in the EV so charge times correspond to off-peak price periods).

Instead of mandating EV smart chargers, **Rewiring supports Option 3 - Mandatory labelling, along with further education with all EV's sold via registered car sales yard.**

Why we don't support mandatory smart EV chargers

Investing in smart EV chargers (smart fixed charging units) will keep options open for customers to access controlled EV charging rates, and have the ability to respond to dynamic price signals that can be different from day to day, in possible future retail tariffs. This could provide potential future benefits for customers who invest in smart EV chargers. Currently there are limited options that reward customers for having the capability of a smart EV charger.[1] Currently customers can automate access to the benefits from off-peak electricity retail tariffs via simply setting a charging timer on their EV to start charging when off-peak electricity tariffs are lower. (This is available in most EVs including basic second hand imported EVs such as the Nissan Leaf).

We have seen a similar policy implemented in the UK in 2022, where smart EV charging was mandated via the Electric Vehicles (Smart Charge Points) Regulations 2021. However, now in the UK the majority of all EVs on the market are sold with onboard smart EV charging capability. Therefore, requiring a smart charger in addition to this is unnecessary. Retailers such as Octopus Energy in the UK offer managed EV charging tariffs[2] and for a large number of EV vehicle types, communication via the onboard smart EV charger in the vehicle. Communicating with an onboard smart EV charger to manage charging has the added benefit of providing more information about the battery state of change (SOC) which helps the retailer better manage the charging without making assumptions about the battery SOC. Many smart EV chargers do not communicate with the car and cannot provide information about the battery SOC to third parties.

Electricity sector participants may prefer mandated smart EV charger roll out, as it provides a simple pathway for third parties to solve the challenge of increased demand on the grid. However, Rewiring believes there is a better and fairer way of providing the same benefit to the energy system.

Electricity sector should pass on costs and benefits of time of use charging: Rather than a mandated solution that may not provide the best technical solution, we think that the electricity sector should be encouraged to do more to incentivise consumers by providing innovative tariffs including managed EV tariffs for those with appropriate smart EV chargers or vehicles and improved time of use tariffs. Distributors could also implement more cost-reflective network pricing[3] that incentivises retailers to pass through these costs and offer tariffs that effectively incentivise EV charging to occur outside network peaks. This approach could encourage customers to charge off-peak and utilise electricity when the cost is low, by providing greater rewards through lower bills.

Managed EV tariff offerings could also provide a technology neutral pathway to incentivise smart EV charge uptake either via fixed smart chargers or other means. Electricity prices

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[1] https://octopusenergy.nz/intelligent-octopus
[2] https://octopus.energy/smart/intelligent-octopus-go/
[3] For example "sharper" distribution pricing could be implemented where much more of the cost is allocated to usage in a smaller number of hours when network peaks occur.

have been at all time highs in the UK, due to geopolitical instability pushing up the cost of natural gas. We have heard anecdotal evidence that customers purchasing EVs are checking if the EV they are buying has on board smart chargers with communication protocols that make them eligible for managed EV charging tariffs. This indicates that retail offers that reward customers work. It also demonstrates the risk of mandating a specific technology (smart fixed EV chargers) when another technology (onboard smart EV chargers) ends up being the preferred future technology that is utilised.

Who controls the demand flexibility: Contracted agreements associated with the sale and installation of smart EV chargers can result in the company that supplies the smart EV charger and provides the platform to communicate between the smart EV charger and the electricity participant (eg: the retailer), effectively owning the access to the customers demand flexibility. This means the smart EV charger providers can choose if and how much it wants to charge electricity participants to access the customers demand flexibility associated with the EV charger. We have heard anecdotally of cases where the cost charged to retailers to access a customer's smart EV charging is higher than the value of the customer's distributed flexibility from smart EV charging. In this case this is a barrier to the customer accessing a managed EV charging plan.

We strongly support technical interoperability through common open communication protocols. However, it is also important that contractual arrangements do not limit a customer's ability to access a wide range of future EV charging tariffs.

Similarly, **MBIE should ensure that contractual arrangements allow the smart functionality of smart EV chargers to be disabled** if the customer wants to use an alternative way to provide access to their distributed flexibility from their EV charging, for example via a smart onboard EV charger.

Locking in technology: We disagree with this point "EV chargers can last up to 15 years (depending on a number of factors including type, size, and usage), so each EV charger installed now that is not smart will lock in non-dynamic EV charging for some time." This assumes that other innovative and lower cost options are not going to be made available to customers to smart charge EVs. Onboard smart EV chargers is one option which is emerging in New Zealand and we cannot presume that other options will not develop over coming years.

Rewiring supports Option 3 - Mandatory labelling, along with further education

Education is key to supporting consumers to make choices that benefit them most. We strongly support the option to mandate that EV charger suppliers apply standardised labels that include information about efficiency and key information about any smart functionality.

Information about efficiency could be made more accessible and relevant to customers by explaining what it means in terms of the annual cost of EV charging. This could then be compared to the most efficient and least efficient options. We agree that the star rating that

is used for whiteware could be developed and used to help customers assess the efficiency of different charging options.

Compatibility with smart-charging tariffs: Information about smart functionality should be explained in terms of the benefits it will provide customers, such as the option to access more dynamic pricing or managed EV plans, and the potential cost savings from these types of tariffs that are currently available. It should also specify which vehicles and fixed chargers are compatible with these plans. It would be helpful if there was a website available where customers could access up to date information about this. At present, only Tesla EVs and Wallbox, and My Energi Zappi fixed smart EV chargers appear to be compatible with the Intelligent Octopus Managed EV charging tariff in New Zealand.[4]

Along with labelling, information sheets (eg: provided by EECA with EECAs logo on it) should be provided with all EVs that are sold via registered car sales yards providing information on the different options for EV charging including smart charging and how customers can access savings via choosing time of use plans. As better price comparison tools are developed these could also be referenced on this sheet to help customers choose the price plan and charging method that best meets their needs. Online training (eg: recorded videos from EECA) could be provided to car sales people to help them understand the different charging options and answer customer questions.

Information provided at point of sale should not just cover fixed smart EV charging as the only options. It should explain how to ensure safe trickle charging[5], how to use onboard timers to set charging to take advantage of off-peak price plans and whether the vehicle comes with a genuinely smart and interoperable onboard charger.

Incentivising off-peak trickle charging is important and can also benefit from education

It is likely that many households will choose to use trickle charging to meet their EV charging needs to avoid the upfront cost of a fixed EV charger. Trickle charging occurs at lower voltages than fixed charging and provides longer charge times. However despite larger batteries and increased driving range being offered in new EVs, driving patterns for many households do not require them to invest in a faster fixed charger. Plugging in and turning on EVs to trickle charge overnight a few times per week will likely suit many households driving needs regardless of EV battery size, and public fast chargers can be used when a quick full charge is needed (for example before heading off on a road trip). We predict trickle

[4] https://octopusenergy.nz/intelligent-octopus

[5] Trickle charging introduces a new appliance to the home that is operated for a long period of time. The safety risks are no different to running a 2.4kW heater all night. However, for all prolonged electric appliance operation there are some small risks. Helping customers understand these risks could result in them being dramatically reduced and at low cost. For example prolonged use of a very old wall socket that does not have a good connection with the three point plug can increase resistance and produce heat. Simple solutions implemented by electricians such as replacing old wall sockets can reduce risks. Having an electrician check the circuit that is used to charge the EV, if there are any other loads connected to it and that there is sufficient Amps can help avoid overloading. However the risk of fire due to overloading a circuit would only occur if the fuse controlling this circuit is faulty and does not trip.

charging to continue to be a significant part of meeting New Zealand's private EV charging needs.

Whilst trickle charging occurs at lower voltages (1.6 - 2.4kW) compared to fixed EV chargers (up to 7.4kW), even a small increase in peak demand, when it occurs across a large proportion of households, can add to investment costs for some networks. For example as widespread EV uptake occurs increasing peak by around 2kW from trickle charging EVs in winter evenings, when households are also utilising space heating and cooking could require upgrades to some networks that have not built their low voltage networks to handle even modest increases in peak demand.

Households using trickle chargers can access the benefits of off-peak EV charging through automated steps - setting the charging timer to charge during off-peak periods. As we noted above, ensuring appropriate pricing plans are available to incentivise EV charging off-peak will be increasingly important. Education at point of sale and through improved price comparison tools can also help customers who choose to trickle charge to consider tariffs that benefit them and encourage off-peak charging.

Low cost technology could also be explored to facilitate trickle charging that automatically responds to dynamic time of use pricing signals or enables third parties to send signals to turn down EV charging to manage network constraints. This would avoid the high upfront costs of fixed EV chargers and provide smart EV charging solutions. The key here would be to ensure customer safety is provided for. Education could play a key role here and where needed costs saved from investing in fixed chargers could be used to upgrade home electrical sockets and wiring.

Responses to Questions

Please consider the information provided above as part of our response to the questions set out in the consultation. We have provided specific responses to some of the questions below.

3. Do you agree that smart charging can support network infrastructure needs, and in turn realise benefits for end consumers?

Yes, smart charging can help to move demand away from times of network peaks and reduce network congestion to support network infrastructure needs. However, customers can also provide demand flexibility in response to price signals, which can provide much of the value of smart EV charging. This relies on electricity sector participants providing tariffs that incentivise this.

4. What are your views on whether the supply of chargers in New Zealand would move to predominantly smart charging without regulation?

Managed EV charging tariffs that provide sufficient cost savings could incentivise customers to proactively purchase smart fixed chargers or EVs with onboard smart EV charging capacity that allow them to access these tariffs. This could be wide spread, with appropriate education and managed EV tariff or dynamic price offerings in New Zealand.

8. Do you see a role for cybersecurity to be managed alongside any requirements relating to smart functionality, or should this be managed by another mechanism? Please provide evidence or data where possible to inform our analysis

MBIE should ensure that regulation that provides sufficient and reasonable protection from Cyber security threats are put in place at the same time to any regulatory change related to smart EV charging, and are priorities even if mandated EV smart charging is not a enacted by the Government in New Zealand.

9. Do you agree with the objectives? If you agree or disagree, please explain why.
Broadly although we suggest some additional objectives that emphasise the need to provide consumer choice and consider the most suitable technology options to meet these needs.

10. Are there any additional objectives you think we should also adopt to inform decisions on this proposal?
We think additional points should be added:

- **Least cost technology solutions should be enabled.**
- **Consumers are informed and educated to choose the EV charging solution that provides them with the most benefit**. - Consumers can weigh up time of use pricing and managed EV charging retail plans easily and understand the charging options available to them to make informed decisions about how to meet their charging needs.

11. Which option do you prefer and why? Are there other options you think should be considered?
We support Option 3, along with further education for EV purchasers.

We think the government could easily develop an educational flyer that summarises the financial benefits of off-peak charging, and options to achieve this. It should be a requirement for all EV purchasers to be provided with this information upon purchase of the vehicle. Please see the section above titled "*Rewiring supports Option 3 - Mandatory labelling, along with further education*" for a summary of why we support Option 3 and the additional education measures that we think should be implemented.

Most of the flexibility from EV charging can be accessed via customers responding to time of use tariffs without needing smart EV charging capability. However there may be a number of periods when it is beneficial for networks to have access to reduce EV charging to avoid congestion. We agree that smart EV charging is one option to provide this more dynamic control, however do not agree that it should be mandated that customers must purchase a specific type of smart technology to facilitate this. Our view is that electricity pricing plans should be the primary mechanism to incentivise customers to purchase technology that can provide interoperable smart EV chargers. Please see the section above "*Why we don't support mandatory smart EV chargers*" for more information on this.

12. Do you agree with our assessment of the options against the objectives? If you agree or disagree, please explain why.

We do not think the criteria fully cover the impact of purchase of a smart EV charger on consumers and are too simplistic. For example the criteria do not consider the cost to consumers from mandated smart EV charging and do not consider wider options for smart EV charging that may meet both networks and electricity participant and customers needs (eg: onboard smart chargers). Further explanation is provided in the body of our submission.

14. Do you think there is a case for voluntary or mandatory labelling of EV chargers, and why or why not? a. If you support labelling, what content do you think should be incorporated in the label? Please provide evidence or data where possible to inform our analysis

Please see the section above titled “Rewiring supports Option 3 - Mandatory labelling, along with further education” for a summary of why we support mandatory labelling, what should be included and the additional education measures that we think should be implemented.

18. Do you agree with our assessment of the costs and benefits of each option?

The analysis does not consider the full range of options to provide smart EV charging and may not include analysis of the most beneficial and least cost solution. For example education that supports customers to safely trickle charge and access off peak tariffs could do a lot to address network congestions. Trickle charging does not impose the same high voltage draw that fixed EV chargers do and will be less likely to create secondary peaks at the time an off-peak tariff starts. Options that result in more imported new EVs having onboard smart EV chargers was not considered. Options involving action to improve retail offerings that could provide greater incentives for investment in smart EV charging capability was not considered.

20. Are there any unintended consequences on the market for EV chargers or the wider EV market you think we haven’t considered?

Mandating smart EV chargers could reduce customer demand for smart onboard EV chargers to be included with imported EVs in New Zealand. Onboard smart EV chargers can provide a better solution as they can communicate the state of charge in the battery to retailers and allow them to better manage EV charging on behalf of customers.

21. How do you see the proposal affecting different people and groups (e.g., business users, manufacturers, consumers)?

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