

# FlexForum Insights

Actions to make flexible electric vehicle charging an easy and obvious choice for households and businesses

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*This FlexForum Insights is a FlexForum perspective given its objective and purpose and drawing on the expertise and perspectives of FlexForum Members and the parties who participated in the process to develop the workplan to accelerate uptake of flexible electric vehicle charging. Individual FlexForum Members and the parties participating in the process may have their own perspectives and positions.*

Contact [info@flexforum.nz](mailto:info@flexforum.nz) with questions or to find out more.

# A workplan to accelerate uptake of flexible electric vehicle charging

## Action is needed for flexible electric vehicle charging to be the easy and obvious choice for households and businesses

FlexForum is an incorporated society with Members<sup>1</sup> from across the electricity ecosystem committed to working together to make it easy for households, businesses and communities to maximise the value of flexibility and electrification.

Flexibility<sup>2</sup> – from things like electric vehicles (EV), solar, battery storage, heating and cooling equipment and energy management systems – gives households and businesses greater agency and autonomy over their energy costs and outcomes and provides another tool for ensuring a reliable and affordable electricity system.<sup>3</sup>

Flexibility is our focus because it is central to affordable and reliable electrification and a key enabler of a truly consumer-centric electricity market and system.

## The value of flexibility will be maximised when it is easy and obvious for people to make the relevant investments and choices

The value of flexibility – from EV charging and other sources – will be maximised when it is easy and obvious for households and businesses to make the relevant investments and choices.

Flexible EV charging involves modifying the rate of charging in response to a signal – typically a price or a financial reward – to provide a service and value to the EV owner or the electricity system (or, ideally, both).

Flexible charging depends on the EV owners making a series of choices about things ranging from their charging method, use of their vehicle, fueling options and electricity retail service.

Many EV owners charge flexibly using tools such as timers, in car features or manually flicking the switch to schedule charging in response to the signals and rewards of time-of-use (TOU) retail pricing.<sup>4</sup>

EV owners and the electricity system would realise extra value and benefits from integrating the flexibility of their charging into the system and market.<sup>5</sup> But the investments and choices needed to do this are not an easy and obvious choice.

## A workplan to realise the full value of flexible charging

FlexForum has coordinated a co-design process on behalf of the Energy Efficiency and Conservation Authority (EECA) to produce a workplan setting out actions to realise the full value of flexible charging by making it easy and obvious for people to make the relevant investments and choices.

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<sup>1</sup> FlexForum Members are listed at <https://flexforum.nz/about/>. Members span the electricity ecosystem and include electricity generators, retailers, metering services providers, EV charger manufacturers, energy management software firms, Transpower, distributors, advisory services firms, industry associations, universities, and individuals.

<sup>2</sup> For readers looking for a definition, we think flexibility is the modification of generation injection and consumption patterns, on an individual or aggregated level, often in reaction to an external signal, to provide a service to the owner or within the power system.

<sup>3</sup> The benefits of flexibility are flagged by a range of parties including [Transpower](#), the [Market development advisory group](#), and the [BCG Climate change in New Zealand: the future is electric report](#).

<sup>4</sup> 61% of EV owners surveyed are charging 'off-peak' after 9pm. EECA, Electric Vehicle Charging Research, March 2023, at <https://www.eeca.govt.nz/assets/EECA-Resources/Research-papers-guides/EECA-Public-Charging-Research-March-2023.pdf>.

<sup>5</sup> The full benefits of flexibility will be realised by integrating flexible resources into the electricity system and market. Integration means a flexible resource has functionality to autonomously communicate and respond to requests to provide flexibility to respond to specific market or system conditions.

The workplan actions are detailed in the Appendix. The actions come in five flavours.

- Actions to ensure the full value of flexibility is monetised and converted into rewards to the EV owner. See [Table 1](#)
- Actions to make it easy for people to make the choice to use flexible charging. See [Table 2](#)
- Actions to ensure a minimum functionality for flexible devices. See [Table 3](#)
- Actions to provide the digital architecture to enable and support the use (trading) of flexibility. See [Table 4](#)
- Actions to provide people with a compelling story about the costs, benefits and rewards. See [Table 5](#).

The workplan is a synthesis of the experience and perspectives expressed during 3 workshops held between April 2024 and July 2024. We greatly appreciate the time and the candid and thoughtful contributions from the 50 people from across the electricity ecosystem who participated in developing the workplan. The parties who participated in the workshops are listed in the Appendix.

We also greatly appreciate the opportunity to partner with EECA to quickly and relatively painlessly produce robust, usable expert advice drawing on diverse perspectives from across the electricity ecosystem.

We think the exercise provides a template for accelerating the extensive regulatory and policy work required to deliver flexibility and electrification. The workplan took 4 months from start to finish. EECA contributed \$50,000 to support the exercise – a workshop series and associated documentation does not happen by magic or relying on volunteers – and required participants to commit about 10-12 hours across this period.

We think the approach is faster, cheaper, increases participation particularly from small entities, produces robust and high-quality advice, and is more satisfying and productive for participants. It should be standard practice for all regulatory and policy work that requires understanding and exploring how to get stuff done.

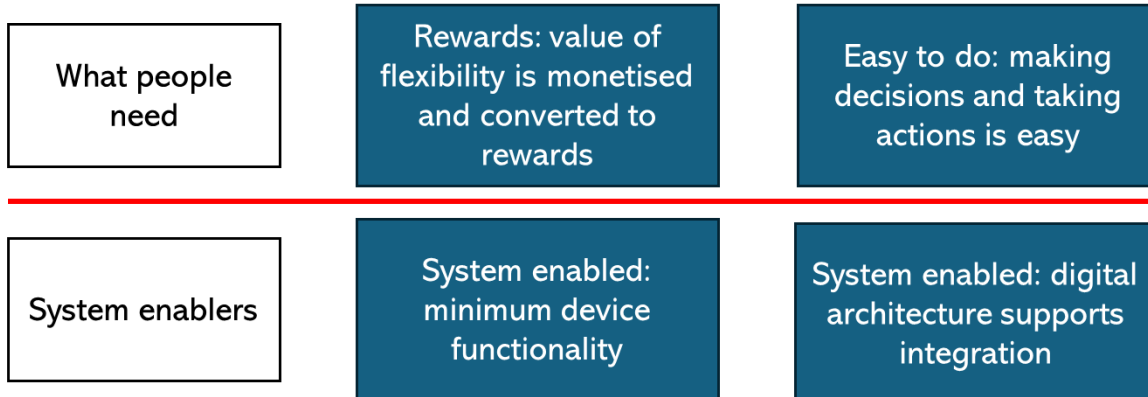
## Delivery and implementation

Delivery and implementation of the workplan actions will rely on all parts of the electricity ecosystem – businesses and regulators – working together because no one party can do it on their own.

FlexForum will support delivery of the actions because they either generally or specifically align with steps in the Flexibility Plan 1.0.

Each workplan action includes suggestions for how it should be delivered and who should be involved in the work. The suggestions reflect the nature of the action, the range of interests involved and the importance of coordination and collaboration.

**People know that flexible charging is an easy and obvious choice and they can confidently make the relevant investments and choices**



# Action is needed to make flexible electric vehicle charging an easy and obvious choice

## Flexible charging will make electrification more reliable and affordable than otherwise

Households and businesses will over the coming years continue to shift to EVs and meeting national emissions reduction targets requires more than 50% of monthly vehicle sales are electric by 2030. This means an increase from about 6000 EVs bought in 2020 to annual sales of 150,000 electric vehicles 2030.<sup>6</sup>

More EVs means people will use more electricity while reducing their use of fossil fuels. EECA and others have assessed the implications of the shift and consider the changing use of the electricity system from EV charging can largely be accommodated if charging is coordinated and occurs during off-peak period when the system is not as 'busy' – that is, charging is 'flexible'.

One study by Concept Consulting estimated that without flexible charging, the average household could be paying \$220 more a year by 2050 with a present value cost of \$1.7 billion to 2050.<sup>7</sup> Other studies have made equivalent conclusions about the value of flexible charging.<sup>8</sup>

The benefits and value of flexible charging mostly come from lower average power prices because we will build less generation and network infrastructure to deliver increased demand for capacity. Electrification becomes more reliable and more affordable than otherwise.

## Flexible charging means adjusting when charging happens

Flexible EV charging involves adjusting the rate of charging in response to a signal – typically a price or a financial reward – to provide a service and value to the EV owner or the electricity system (or, ideally, both).

Flexible charging is also referred to as 'smart' charging. We talk about flexible charging because the Flex in FlexForum stands for flexibility.

Many EV owners charge flexibly using tools such as timers, in car features or manually flicking the switch to schedule charging in response to the signals and rewards of TOU retail pricing. We will call this **scheduled charging**. It involves little more than picking a TOU retail pricing package,<sup>9</sup> plugging the charger cable that came with the vehicle into convenient power point and scheduling when the switch is on or off.

Scheduled charging requires no major costs and a bit of effort from the EV owner, including a basic one-off interaction with an electricity retailer. EECA research<sup>10</sup> tells us **scheduled charging is currently the easy and obvious choice for EV owners** who:

- prefer overnight charging at home with 97% of EV owners charging at home at least some of the time

<sup>6</sup> Refer EECA, <https://www.eeca.govt.nz/insights/eeca-insights/electric-vehicles-and-aotearoa/>.

<sup>7</sup> Concept Consulting and retyna, Shifting gear, October 2021, How New Zealand can accelerate the uptake of low emission vehicles. Report 2: Consumer electricity supply arrangements, at [https://www.concept.co.nz/uploads/1/2/8/3/128396759/ev\\_study\\_rept\\_2\\_v2.0.pdf](https://www.concept.co.nz/uploads/1/2/8/3/128396759/ev_study_rept_2_v2.0.pdf)

<sup>8</sup> For example, check out... Transpower, February 2021, [A roadmap for electrification](#).

<sup>9</sup> Consumer NZ explains TOU electricity plans here - <https://www.powerswitch.org.nz/the-best-power-plans-for-charging-your-ev>

<sup>10</sup> EECA, Electric Vehicle Charging Research, March 2023, at <https://www.eeca.govt.nz/assets/EECA-Resources/Research-papers-guides/EECA-Public-Charging-Research-March-2023.pdf>

- prefer using the standard 3-pin plug charger cable that probably came with the vehicle, with 61% plugging into a standard power point
- generally respond to the TOU signals, with 69% of EV owners using TOU pricing and 96% of these people charging off-peak after 9pm some or most of the time.

Scheduled charging means flexibility is provided to assist in managing predictable market and system conditions based on the typical daily peaks and troughs of power use. However, these typical conditions are frequently disrupted by events such as very cold nights, very hot days, or infrastructure not being in service for repair or due to incidents. Moreover, conditions are expected to become less predictable as we develop a more renewable power system with more intermittent wind and solar generation.




Flexibility can provide value and benefit in non-typical situations by assisting to manage the availability of network capacity or energy shortfalls but relies on the flexible resource being integrated into the market and system. We will call this **integrated or dynamic charging**. It involves responding to unplanned requests from a distributor, retailer or other flexibility user to provide flexibility to respond to specific market or system conditions that emerge at short notice, unpredictable times, or require a commitment the response will happen. Conditions where integrated charging can provide extra value include:

- wholesale events, such as the energy shortfalls experienced on 9-10 May 2024 or 9 August 2021
- network congestion events, and help defer longer term network investment as signalled in network asset management plans.
- ancillary services such as reserves and frequency keeping.

Integration requires a flexible resource to have the functionality to communicate and actively respond to requests to deliver a service. It also requires the EV owner to agree to let someone – a flexibility coordinator – to actively coordinate the use of their flexibility.

EV owners need to invest in a charger or use in-vehicle functionality with connectivity and the ability to receive bespoke requests to modify the rate of charging. A standard charging cable is not sufficient to enable integration and dynamic charging.

**Integrated charging is not an easy and obvious choice for EV owners.** Wall mounted chargers cost roughly \$1500 to \$2500 to buy and install, but currently do not offer many extra benefits relative to scheduled charging. EECA research<sup>11</sup> says EV owners are happy with plugging into the wall because it suits their needs, wall chargers are too expensive, or are expensive and difficult to install.

	Not flexible	Scheduled flexibility	Integrated flexibility
<b>Method</b>	Charger cable plugged into a convenient power point 	Charger cable using a timer or in vehicle functionality to schedule charging 	Wall charger or in vehicle functionality with connectivity 
<b>Rewards</b>	Electricity is cheaper than petrol!	Electricity is cheaper than petrol! Retail TOU pricing – lower prices in designated times, eg, after 9pm	Electricity is cheaper than petrol! Retail TOU pricing – lower prices in designated times, eg, after 9pm

<sup>11</sup> Ibid.

# The workplan was developed collaboratively

The workplan was developed collaboratively drawing on the experience and perspectives of experts from across the electricity ecosystem who attended a series of 3 workshops held between April 2024 and July 2024. The workshop series was designed to:

1. get broad input and a whole-of-system perspective about the current and future state for EV charging
2. identify the specific actions to be taken now, next and later to provide households and businesses with the ability and incentive to prefer flexible charging including how the electricity ecosystem can earn the social license needed for people to confidently allow their EV charging to be coordinated to provide services across the electricity system
3. document the actions and identify the extent of consensus and commitment from the electricity ecosystem to adopt and implement the co-designed industry workplan.

Each workshop took a human first approach to identify why and how people would consider flexible charging an easy and obvious choice. The sessions built on each other with the participants developing a common understanding of the issues and choices people have relating to charging their vehicles.

Workshop 1: 17 April 2024	Workshop 2: 22 May 2024	Workshop 3: 27 June 2024
Set the scene and identify the factors which drive the choices that households and businesses must make about EV charging	Identify the intervention points and interventions which are available for flexible charging to become an easy and obvious choice	Identify the actions required for flexible charging to become an easy and obvious choice

## Workshop 1 – set the scene and understand the choices people have and make

Workshop 1 was about setting the scene and identifying the charging choices which people have and make. The session made clear that flexible charging is an easy and obvious choice for EV owners with well over half of EV owners charging ‘flexibly’ in response to retail TOU pricing, but integrated charging is not because the extra investment is not worth it... ‘when 90% of the benefits are currently available from a timer or my in-car features’ (as someone said at workshop 1).

Integrated charging – requiring devices with connectivity and are integrated into the power system and market – are a relatively more expensive and more complex option for people to capture the value currently on the table. People agreed, however, that extra value is there to put on the table if it were monetised and converted into rewards.<sup>12</sup>

The session identified several process-related issues which need to be resolved for schedule and integrated charging to become an easy and obvious choice for households and businesses:

- people need more information about the value and reasons for preferring flexible charging and information about how it is (or will be) an easy choice to make
- it needs to be practically easier for people to purchase, install and use flexible charging equipment, including people in non-standard situations, eg, apartments, rental accommodation, or where there is no off-street parking
- ensure consistent definitions, standards and functionality, with a particular focus on making it easy to seamlessly integrate flexible EV chargers into the electricity market and system
- build trust to secure public approval and social license, particularly given a big chunk of the reason and potential benefits of flexible chargers relies on the electricity sector having permission to reach in and control the availability of the business or family car.

<sup>12</sup> The issues and opportunities of monetising and converting value to rewards are described in more detail in FlexForum Insights, July 2024, [Maximising the value of flexibility relies on making that value easily and routinely available to households, businesses and communities](#).

## Workshop 2 – consider what good looks like

Workshop 2 was about what good looks like and how to make that happen. The focus was on the choices and decisions that EV owners must make when thinking about charging and how these add up to a significant amount of life admin which most people do not have time for. This highlighted the importance of people getting good advice about the options and benefits of flexible charging which reflects their circumstances, and how this advice will probably come from vehicle retailers or electricians.

The conversation also highlighted the assumption that people will be comfortable with ceding control and independence over the amount of fuel in the tank of their personal vehicle, regardless of whether this is the actual or perceived outcome of flexible charging.

Returning to a key theme from workshop 1, the conversation again highlighted the criticality of the electricity sector fully monetising the value of flexible charging to put actual benefits or money on the table to encourage people to invest in the capability to provide flexibility.

## Workshop 3 – actions to make all forms of flexible charging easy and obvious

Workshop 3 asked participants about the actions required to achieve five outcomes associated with flexible charging being easy and obvious.

- What actions are needed for the value of flexible charging to be monetised and converted into rewards?
- What actions are needed to make it easy for people to get good advice, ... for advisers and influencers to provide good advice, ...for people to install EV charging equipment, ... for people to use EV charging equipment, ...for tenants and body corporates to install and manage shared private charging infrastructure?
- What actions are needed to ensure EV charging equipment is flexibility ready?
- What actions are needed to establish the digital architecture for data to get where it needs to be?
- What actions are needed to produce and share a compelling story about flexible charging?

The perspectives and insights provided through the session are the basis of the list of actions making up the workplan. More detail is provided in the next section.

## Post workshop review process highlighted broad support for the actions

The draft workplan and actions (ie, tables 1-5 in the appendix) were circulated to workshop participants and FlexForum Members on 10 July 2024 and a revised version including feedback on 25 July 2024.

The review process highlighted broad support for the workplan and the actions. This is not surprising as the actions closely align with the steps in the Flexibility Plan 1.0.



# Making it easy and obvious for people to make investments in and choices about flexible charging

The workshops highlighted that flexible charging depends on EV owners making a series of choices about things ranging from their charging method, use of their vehicle, fuelling options and electricity retail service.

Each of these choices involves assessments which reflecting individual circumstances and preferences. These assessments may not occur deliberately or explicitly and could involve someone asking questions of themselves, friends or the internet about ‘how often will I need to fuel my car?’, ‘how long will it take to charge?’, ‘when and where will the vehicle be parked?’, ‘is there a nearby power point?’, ‘is electrical work needed?’, and ‘do I need to change my electricity retailer or power plan?’.

For many people, the easiest EV charging option right now is to plug the charger cable<sup>13</sup> that came when they bought the vehicle into a convenient power point at their home or business. Charging can be an afterthought. Several anecdotes shared through the workshop process described how people do not think about charging options until, or after, purchasing their vehicle.

Making flexible charging a key consideration of the assessment process means giving people obvious reasons to do so, making the choice easy to make and act on, and making sure they hear this information before, during and after they decide to buy an EV.

The workshops identified five sets of actions required if flexible charging is to become an obvious and easy choice for people.

- Two sets of actions are about making sure people have what they need to make choices
  - the full value of flexibility is monetised and converted into rewards to the EV owner
  - it is practically easy for people to make the choice to use flexible charging
- Two sets of actions are about enabling those choices
  - there is a minimum functionality for flexible devices
  - there is a digital architecture to enable and support the use (trading) of flexibility
- Actions to bring it all together and make sure people have information about flexible charging before, during and after they decide to buy an EV.

## Actions to ensure the full value of flexible charging is monetised and converted to rewards for the EV owner

**The full value of flexible charging must be monetised and converted into rewards** which are easily accessible to flexibility owners (ie, EV owners). Doing this will provide the reward and the incentive for EV owners and EV equipment manufacturers to want to invest in the functionality and capability to provide flexibility.

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<sup>13</sup> For the curious, there are 4 charger cable types commonly used across the world. Types 1 and 2 are for AC charging. Type 1 is a single-phase plug, can charge at a speed of up to 7.4 kW and is common for American vehicles. Type 2 is a triple-phase plug and can charge at a level of up to 22kW at home and is common for European and Asian vehicles from 2018 onwards. CCS and CHAdeMO are for DC charging. CCS is a version of type 2 with two additional power contacts which allows faster charging. CHAdeMO can be found in Asian vehicles and allows for high charging capacities as well as bidirectional charging.

This requires filling the holes in the value stack. The FlexForum view is that [Maximising the value of flexibility relies on making that value easily and routinely available](#). This means changing the rules to create durable price signals and rewards to make it easy and worthwhile for people to offer flexibility:

- to help manage short-notice wholesale market events. For example, retail pricing products could be routinely available to EV owners (and owners of other flexibility resources) which signal and reward their responses to short notice energy shortfalls such as experienced on 9 August 2021 or 9-10 May 2024.

**Action 1: Determine whether regulatory intervention is needed to ensure there are retail products routinely available to EV owners which explicitly monetise and reward the value of flexibility for managing short notice wholesale market events.**

A similar action was recommended by the Electricity Authority Market Development Advisory Group in its advice on Price discovery in a renewables-based electricity system.<sup>14</sup> The Electricity Authority has work underway on demand-side flexibility activity monitoring and is [currently](#) considering feedback on a draft retail data request. Accelerating progress with this work would put money on the table faster and make it more likely that EV owners would offer their flexibility in time to avoid energy shortfalls in winter 2025.

- to help manage short-notice distribution and transmission capacity shortfalls. For example, network pricing products could be routinely available to EV owners (and owners of other flexibility resources) which extend on the existing TOU structures to signal and reward their responses to short notice capacity shortfalls, such as caused by the Northland transmission tower collapse on 20 June 2024, and help defer longer term network investment like how Orion Energy is using flexibility in the [Lincoln area](#).

**Action 2: Determine how to fully monetise and reward flexibility provided to manage network capacity events.**

We accept that the next default price path from April 2025 will provide further funding and incentives for distributors to monetise the value of flexibility used to provide targeted capacity management services. However, significant effort is needed to deliver the action including collating experience developed to date and building more experience through learning-by-doing to build a robust and common understanding about the pricing and payment options that network operators can use to signal price and quantity of flexibility demanded and enable offer and acceptance, any implications of packaging these input costs and the underlying capabilities that are needed by distributors, flexibility coordinators and people to enable flexibility to manage network capacity events, eg, data infrastructure.

Two complementary actions are needed to monetise and reward flexibility provided to manage network capacity events.

**Action 3: Determine an initial specification for a common set of network capacity management services to provide a reference for when and how people can provide flexibility in addition to any response to distribution price structures.**

**Action 4: Determine an initial, common and easy to use process to communicate where flexibility will be needed for network capacity management, when and what for (i.e. the service).**

These actions provide a reference point for what flexibility is needed in specific situations, over and above the shifting incentivised by distribution prices, plus when and where. A starting point can be the services defined for FlexTalk 1.0.

- to supply ancillary services. The rules do not necessarily make it easy to harness the flexibility of EVs and EV charging.

**Action 5: Determine how to enable the routine provision of ancillary services using small scale flexible resources.**

This action involves updating the processes set out in the [Procurement Plan](#) that the System Operator uses for procuring ancillary services to accommodate the use of large numbers of small-scale flexible resources. The current rules are designed around a small number of large-scale sources of ancillary services.

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<sup>14</sup> See MDAG, [Price discovery in a renewables-based electricity system](#), final recommendations paper, recommendations 3 and 30.

## Actions to make it easy for people to make the choice to use flexible charging

**Flexible charging must be practically easy to do.** This means making it easy for people to both get and act on answers to all their flexible charging questions. Easy means:

- EV owners can easily get actionable information and personalised advice to make the assessments and choices about the options, costs, benefits and rewards of flexible charging.

**Action 6: Develop and share widely a checklist of key questions and answers that people can ask about the options, benefits and rewards of flexible charging.**

**Action 7: Regulate by amending the Electricity Industry Participation Code to provide EV owners with immediate and automated access to the key pieces of electricity data.**

These two actions are about people having the data and information about the range of EV charging options to assess the business case for flexible charging investments and choices the relative benefits given their circumstances.

Identifying and documenting the practical and tangible questions and answers people can ask about flexible charging will help to disperse the mystery and provide a reference for people before, during and after they buy their EV.

The Code amendment should provide EV owners (and other people) with automated access to their historical electricity consumption data and the full range of retail pricing options offered by retailers to people in their location. The Code amendment is preferred over waiting for passing of the Customer and Product Data Bill because it can deliver the outcome faster.

- people advising EV owners, including electricians and vehicle retailers, can easily and quickly get information to provide on the spot personalised advice about the options, benefits and rewards of flexible charging.

**Action 8: Regulate by amending the Electricity Industry Participation Code to provide advisers to an EV owner with immediate and automated access to the key pieces of electricity data.**

This is a companion to action 7. Most people are busy and will look for personalised advice about flexible charging. The list of advisers extends beyond the electricity sector to include electricians and vehicle retailers (who are likely to be a more called on more often and be more influential than electricity retailers). All advisers need the ability to provide EV owners with personalised advice which in turn relies on the ability to obtain automated access to their historical electricity consumption data and the full range of retail pricing options offered by retailers to people in their location.

If trusted, easy to access and easy to use online tools providing personalised advice about flexible EV charging choices have not emerged within 12 months of regulating, someone needs to work out why.

- people can easily find relevant installation advice and assistance

**Action 9: Develop installation guides for the typical EV charging installation scenarios.**

Installation, or how to, guides which reflect the EV owner journey will provide a reference for EV owners and more particularly, their advisers, about the options, decision points and who to ask about the physical and practical aspects of investing in and installing the equipment needed for flexible charging. These should collate the experience of people who install charging equipment and be used to identify ways to simplify the installation process. The goal is that EV charging installations becomes as straightforward as installing a new oven, hot water cylinder or heat pump. The workshop series highlighted that the level of familiarity of electricians with EV charging hardware options influences the choices people make about flexible charging.

The initial guides should be developed through a collaborative process that focuses on the experience and choices of the EV owner.

- people can easily choose and change their flexibility coordinator (the party managing the flexible operation of their EV charger).

**Action 10: Regulate by amending the Electricity Industry Participation Code and any relevant instruments to formalise the role and responsibilities of flexibility coordinators in the electricity market and system arrangements.**

The term coordinator or flexibility coordinator is used in place of aggregator, intermediary, flexibility supplier and flexibility trader because coordinator best describes what the entity is doing – it is coordinating flexible resources.

This action involves the Electricity Authority making a space in the regulatory architecture by creating a new participant category for flexibility coordinators. This process should start in 2024 to support the learning-by-doing needed to understand and document the roles and responsibilities of flexibility coordinators. The learning by doing undertaken for other actions should identify insights about roles and responsibilities to collate and build this understanding.

- know who to talk to when things go wrong with confidence their concerns and complaints will be heard and resolved.

**Action 11: Determine how to provide people with a clear and effective disputes pathway to use when they have questions and complaints about third party operation of their charging equipment and the use of its flexibility.**

Knowing who to call when things go wrong will help to build confidence in the idea of flexible charging particularly given the more active and dynamic integrated charging involves the electricity ecosystem reaching in to control the rate a vehicle is fueled. Utilities Disputes can provide initial options about good practice management of questions, complaints and disputes relating to third party operation of charging equipment and use of flexibility. Further activity depends on creating a new participant category for flexibility coordinators.

- easily find relevant advice about the provision and use of in situations, e.g., apartments, requiring shared private EV charging infrastructure.

**Action 12: Determine how EV owners can easily access and use flexible charging when living or working in situations with shared, private, infrastructure and how to make it easy for landlords, Body Corporate and facility managers to install and provide shared, private, EV charging infrastructure.**

Lots of people live in apartments and find it difficult to identify practical options to provide and use shared, but private charging infrastructure. The challenges include physical wiring, the communal location of the charging infrastructure and the potential for a mis-match in the interests and willingness to incur costs between the provider and the users.

Residents, tenants, landlords and body corporates need a reference for how they can easily provide, manage and use shared, private charging infrastructure and realise the benefits and rewards of flexible charging.

## Actions to enable flexible charging by defining a minimum functionality for flexible devices

Defining the minimum technical functionality required for devices to be flexible, including EV chargers, EVs on their own, and any other flexible resource will provide a reference for device manufacturers, flexibility owners and flexibility users about the functionality a device requires to be flexibility ready (ie, when deciding device design) and to be able to provide flexibility (ie, when deciding what model or brand to buy).

**Action 13: Determine the minimum functionality relating to communication, interoperability, safety, cyber-security and measurement necessary for devices to provide flexibility across the full range of electricity services (subject to the capabilities of the relevant device).**

Device functionality includes things like communication, safety, cyber-security and measurement and has fundamental and whole-of-system implications for the provision of flexibility and the design and operation of the digital architecture underpinning the electricity market and system.

Functionality should be determined based on how and when the flexibility is practically used and integrated into the electricity system and market. Given this, the minimum functionality must be determined using learning-by-doing about the features and functionality relating to communication, interoperability, safety, cyber-security and measurement necessary for devices to provide flexibility.

Regulating to mandate minimum device standards should occur only after the learning-by-doing.

Once there is experience with using flexibility across the electricity supply chain based on specific services (eg, action 3), device manufacturers and the flexibility users responsible for the rewards and associated signals can collaborate to establish a set of pre-programmed defaults that align with the common options available to people to maximise the value and benefits of flexible charging.

## Actions to create a digital architecture to enable and support the use (trading) of flexibility

The digital architecture for the electricity ecosystem enables the day-to-day operation of the electricity system and market through business-to-business, business-to-market and business-to-human data exchanges.

Using the flexibility obtained from flexible charging requires updates to the digital architecture to integrate the extra data exchanges and specifying the communication protocols, data types, formats, exchange mechanisms and recipients for all the data that will be sloshing about.

**Action 14: Determine the parties (participants) involved in the use (trading) of flexibility and the data exchanges necessary to enable their participation and an implementation roadmap to iteratively develop the data infrastructure over time.**

**Action 15: Determine the communication protocols, data types, formats, and exchange mechanisms necessary to support digitalised data exchanges as the default mechanism, along with an implementation plan.**

Doing this will provide a blueprint for device manufacturers, the flexibility coordinators and parties across the supply chain wanting to use flexibility to provide services, the system and network operators coordinating physical operation of the power system, and the market operation service providers, with clear instructions about what functionality to include in their data systems.

## Actions to provide people with a compelling story about the costs, benefits and rewards

People need obvious reasons to make the investments and choices for flexible charging, and need to be hearing these reasons before, during and after they decide to buy an EV. This means developing consistent information, language and messaging about the options and tangible benefits of flexible EV charging, that promotes consumer confidence.

**Action 15: Create and support the general uptake and use of an EV and flexible charging lexicon with a glossary of key terms and concepts.**

**Action 16: Produce a list for EV owners and their advisers of the flexible charging devices and options and the associated value and benefits of each option.**

**Action 17: Produce clear and specific information about existing practical ways to use flexible charging to maximise value and what good looks like in the future once the actions in this workplan are delivered for vehicle retailers and electricians and for existing and prospective EV owners.**

More people have EVs, but they are not commonplace. Flexibility is a new concept. Much work needs to be done to make flexible charging an obvious and easy choice, particularly to fully monetise the value of flexible charging.

Providing people and their key advisers with practical information about the options, benefits and future opportunities of flexible charging using consistent language will help to build trust and social license.

## Delivery and implementation

Delivery and implementation of the workplan actions will rely on all parts of the electricity ecosystem – businesses and regulators – working together because no one party can do it on their own.

FlexForum will support delivery of the actions because they either generally or specifically align with steps in the Flexibility Plan 1.0.

Each workplan action includes suggestions for how it should be delivered and who should be involved in the work. The suggestions reflect the nature of the action, the range of interests involved and the importance of coordination and collaboration.

Success depends on each action being addressed methodically with broad end-to-end involvement from all interests and transparency of discussions and the state of progress.

Alignment with the Flexibility Plan means progress will be monitored by FlexForum. However, explicit oversight from policy and regulatory bodies is also required, perhaps through the Council of Energy Regulators.

Ultimately giving visibility of progress against the actions in the workplan will provide households, businesses, communities, the electricity sector, regulators, and government with confidence that the process and outcomes reflect the long-term interests of consumers in general, the electricity system and market and Aotearoa New Zealand

# Appendix

## A workplan to accelerate uptake of flexible electric vehicle charging

There are 5 groups of action. Each **action** is listed with the **outcome** it is intended to deliver (or help deliver), **who should lead and be involved** in delivery, and suggestions about the initial activities and timeframes.

Consistent and tangible progress with delivering the actions listing in tables 1 and 2 is particularly critical for the electricity ecosystem to earn the social license to integrate EV charging into the electricity market and system and coordinate it in response to market and system conditions.

Table 1 Actions to ensure the value of flexibility is monetised and converted into rewards for the EV owner

#	Outcome	Action	Who should be involved in delivery
1	There are transparent and durable price signals and rewards for people providing flexibility to manage to <u>short-notice wholesale market events</u> .	<b>Determine whether and what regulatory intervention is needed (if any) to ensure there are retail products routinely available to EV owners which explicitly monetise and reward the value of flexibility for managing short notice wholesale market events.</b>	<p>A similar action was recommended by the Electricity Authority Market Development Advisory Group in its advice on Price discovery in a renewables-based electricity system.</p> <p>The work should be led by the Electricity Authority, with input from electricity retailers, System Operator, flexibility coordinators and flexibility owners.</p> <p>Accelerating progress with this work could make it more likely that EV owners would offer their flexibility in time to avoid energy shortfalls in winter 2025.</p>
2	There are transparent and durable price signals and rewards for people providing flexibility to manage <u>network capacity events</u> .	<p><b>Determine how to fully monetise and reward flexibility provided to manage network capacity events.</b> The action should include activities which build understanding about:</p> <ul style="list-style-type: none"> <li>the pricing and payment options that network operators can use to signal price and quantity of flexibility demanded and enable offer and acceptance</li> <li>any implications coming from packaging input costs like distribution pricing signals into the retail products seen by people</li> <li>the underlying capabilities that are needed by distributors, flexibility coordinators and people to enable flexibility to manage network capacity events, eg, data infrastructure.</li> </ul> <p>Aligns with Flexibility Plan steps #20 and #21</p>	<p>This action initially involves collating experience developed to date and building more experience through learning-by-doing with distributors, Transpower, System Operator, flexibility coordinators and flexibility owners, market enablers such as metering providers, and people.</p> <p>Existing experience should be collated and presented by December 2024 for critique and discussion about implications and opportunities to deliver the outcome.</p> <p>Scoping further learning by doing should start in 2024 and be coordinated by an entity taking a whole-of-system view, eg, FlexForum, with progress regularly reported publicly.</p> <p>The learning should be supported by EECA (eg, via FlexTalk 2.0), Electricity Authority and Commerce Commission.</p>

#	Outcome	Action	Who should be involved in delivery
3		<p><b>Determine an initial specification for a common set of network capacity management services to provide a reference for when and how people can provide flexibility</b> in addition to any response to distribution price structures. The initial specifications should be accompanied by a plan for testing and refining the specifications.</p> <p>Aligns with Flexibility Plan steps #6 and #17</p>	<p>This action involves collating and synthesising experience gained to date through learning-by-doing by various involving distributors, Transpower, System Operator, flexibility coordinators and flexibility owners.</p> <p>The initial specifications should be delivered by December 2024 through a collaborative industry co-design process that involves interested stakeholders from start to end.</p> <p>The process should be supported by EECA, Electricity Authority and Commerce Commission due to implications for activities in their respective regulatory jurisdictions.</p>
4		<p><b>Determine an initial, common and easy to use process to communicate where flexibility will be needed for network capacity management</b>, when and what for (i.e. service).</p> <p>Aligns with Flexibility Plan steps #16, #32, and #33</p>	<p>This action initially involves building experience through learning-by-doing with distributors, Transpower, System Operator, flexibility coordinators and flexibility owners.</p> <p>The learning should be coordinated by an entity taking a whole-of-system view, eg, like FlexForum, with progress regularly reported publicly.</p> <p>The learning should be supported by EECA (eg, via FlexTalk 2.0), Electricity Authority and Commerce Commission.</p>
5	<p>People can routinely offer flexibility in response to the price signals and rewards for providing <u>ancillary services</u>.</p>	<p><b>Determine how to enable the routine provision of ancillary services using small scale flexible resources.</b></p> <p>Aligns with Flexibility Plan step #24</p>	<p>This action involves updating the processes for procuring ancillary services in the <a href="#">Procurement Plan</a> to accommodate the use of large numbers of small-scale flexible resources.</p> <p>The System Operator should suggest an initial process by December 2024, including associated testing and technical qualification requirements, necessary to enable participation of large numbers of small-scale flexible resources.</p> <p>The Electricity Authority should request the System Operator to prioritise this activity.</p>



Table 2 Actions to make it easy for people to make the choice to use flexible charging

#	Outcome	Action	Who should be involved in delivery
6	EV owners can easily get actionable information and personalised advice to make assessments and choices about the options, benefits and rewards of flexible charging.	<b>Develop and share widely a checklist of key questions and answers that people can ask about the options, benefits and rewards of flexible charging.</b> Aligns with Flexibility Plan step #1	This action involves documenting the actionable information people across a range of common scenarios would want to make assess and make tangible and practical choices about flexible charging.  The action should be led by EECA and collate the expertise and experience of people, electricity retailers, electricians, vehicle retailers, charge point manufacturers and suppliers.
7		<b>Regulate by amending the Electricity Industry Participation Code to provide EV owners with immediate and automated access to the key pieces of electricity data</b> necessary to make assessments and choices about flexible charging, specifically: <ul style="list-style-type: none"> <li>• their historical electricity consumption data</li> <li>• the full range of retail pricing options offered by retailers to people in their location.</li> </ul> Aligns with Flexibility Plan steps #2 and #7.	This action should be delivered by the Electricity Authority with urgency to have solutions in place and operating by June 2025 or earlier.
8	People advising EV owners, including electricians and vehicle retailers, can easily and quickly get information to provide on the spot personalised advice about the options, benefits and rewards of flexible charging.	<b>Regulate by amending the Electricity Industry Participation Code to provide advisers to an EV owner with immediate and automated access to the key pieces of electricity data</b> necessary to provide personalised advice about flexible charging, specifically: <ul style="list-style-type: none"> <li>• the EV owner’s historical electricity consumption data</li> <li>• the full range of retail pricing options offered by retailers to people in that location.</li> </ul> Aligns with Flexibility Plan steps #2 and #7.	This action should be delivered by the Electricity Authority with urgency to have solutions in place and operating by June 2025 or earlier.
	Subsequent action	If trusted, easy to access and easy to use online tools providing personalised advice about flexible EV charging choices have not emerged within 12 months of regulating, work out why.	This action is contingent on implementation of actions 7 and 8.
9	People can easily install and use EV charging equipment, including: <ul style="list-style-type: none"> <li>• easily find relevant installation advice and assistance</li> </ul>	<b>Develop installation guides for the typical EV charging installation scenarios.</b> Activities should include: <ul style="list-style-type: none"> <li>• EV owner journey mapping to identify each decision point, activity, and who is responsible or can help, eg, electrician, vehicle retailer etc</li> <li>• collating the experience of people involved in installing EV charging equipment</li> <li>• considering how to simplify the journey to make the installation process easier.</li> </ul> Aligns with Flexibility Plan step #1.	This action involves both journey mapping and collating experience of people involved in the installation process.  The activity should involve collating the expertise and experience of people, electricity retailers and distributors, electricians, vehicle retailers, charge point manufacturers and suppliers.  The initial guides should be delivered by December 2024 through a collaborative process that involves interested stakeholders from start to end. EECA should support the activity.

#	Outcome	Action	Who should be involved in delivery
	Subsequent action	Identify how to build installation capability so installing EV charging equipment becomes as simple as installing a new oven, hot water cylinder or heat pump. Aligns with Flexibility Plan step #1	EECA can lead this action and work with electricians, vehicle and others involved in the installation purchase to assess existing installation capability and scope training and skill development programmes.
10	<ul style="list-style-type: none"> <li>easily choose and change their flexibility coordinator (the party managing the flexible operation of their EV charger).</li> </ul>	<p><b>Regulate by amending the Electricity Industry Participation Code and any relevant instruments to formalise the role and responsibilities of flexibility coordinators</b> in the electricity market and system arrangements.</p> <p>Note: the term coordinator or flexibility coordinator is used in place of aggregator, intermediary, flexibility supplier and flexibility trader because coordinator best describes what the entity is doing – it is coordinating flexible resources.</p> <p>Aligns with Flexibility Plan step #30</p>	<p>This action involves the Electricity Authority making a space in the regulatory architecture by creating a new participant category for flexibility coordinators. This process should start in 2024.</p> <p>This action also involves understanding and documenting the roles and responsibilities of flexibility coordinators. The learning by doing undertaken for other actions should identify insights about roles and responsibilities to collate and build this understanding.</p>
11	<ul style="list-style-type: none"> <li>know who to talk to when things go wrong with confidence their concerns and complaints will be heard and resolved.</li> </ul>	<p><b>Determine how to provide people with a clear and effective disputes pathway</b> to use when they have questions and complaints about third party operation of their charging equipment and the use of its flexibility.</p>	<p>This action involves the Ministry of Business, Innovation and Employment, Utilities Disputes and flexibility coordinators.</p> <p>Utilities Disputes can provide initial options about good practice management of questions, complaints and disputes relating to third party operation of charging equipment and use of flexibility. Further activity depends on creating a new participant category for flexibility coordinators.</p>
12	<ul style="list-style-type: none"> <li>easily find relevant advice about the provision and use of in situations, eg, apartments, requiring shared private EV charging infrastructure.</li> </ul>	<p><b>Determine how:</b></p> <ul style="list-style-type: none"> <li><b>EV owners can easily access and use flexible charging when living or working in situations with shared, private, infrastructure,</b> eg, apartments.</li> <li><b>to make it easy for landlords, Body Corporate and facility managers to install and provide shared, private, EV charging infrastructure.</b></li> </ul> <p>Aligns with Flexibility Plan step #1</p>	<p>This action involves initially collating the experience and expertise of EV owners, body corporates and landlords about the currently available options for shared, private EV charging infrastructure.</p> <p>The action can be led by EECA as part of the action to Develop installation guides for the typical EV charging installation scenarios.</p>

Table 3 Actions to ensure a minimum functionality for flexible devices

#	Outcome	Action	Who should be involved in delivery
13	There is an agreed, common, minimum technical functionality for integrating devices enabling flexible charging into the electricity market and system.	<p><b>Determine the minimum functionality relating to communication, interoperability, safety, cyber-security and measurement necessary for devices to provide flexibility across the full range of electricity services</b> (subject to the capabilities of the relevant device).</p> <p>Aligns with Flexibility Plan steps #31, #35 and #36.</p>	<p>This action has fundamental and whole-of-system implications for the provision of flexibility and the design and operation of the digital architecture underpinning the electricity market and system.</p> <p>This action initially involves building experience about through learning-by-doing about the features and functionality relating to communication, interoperability, safety, cyber-security and measurement necessary for devices to provide flexibility.</p> <p>The learning should be coordinated by an entity taking a whole-of-system view, eg, like FlexForum, with progress regularly reported publicly.</p> <p>The learning should be supported by EECA (eg, via FlexTalk 2.0), Electricity Authority and Commerce Commission.</p>
	Subsequent action	<p>Regulate to require EV charging equipment manufactured locally and imported conform to the minimum technical functionality.</p> <p>Contingent on action 14 .</p> <p>Aligns with Flexibility Plan steps #25</p>	<p>This action involves changes to legislation. We understand the change process is underway and is being led by MBIE and EECA.</p>
	Subsequent action	<p>Determine a set of defaults/presets to be pre-programmed into devices that align with common options available to maximise the value and benefits of flexible charging.</p> <p>Contingent on action 14.</p>	<p>This action involves collaboration using industry co-design processes between equipment manufacturers and suppliers and electricity retailers and flexibility coordinators to share information and agree default/preset programming options.</p>

Table 4 Actions to provide the digital architecture to enable and support the use (trading) of flexibility

#	Outcome	Action	Who should be involved in delivery
14	The digital architecture for the electricity ecosystem enables digitalised business-to-business, business-to-market and business-to-human data exchanges necessary to integrate flexible EV charging (and other flexible resources) into the system and market and maximise the value of flexible resources for the owner and system-wide.	<p><b>Determine the parties (participants) involved in the use (trading) of flexibility and the data exchanges necessary to enable their participation and develop an implementation roadmap to iteratively develop the data infrastructure over time.</b></p> <p>Aligns with Flexibility Plan steps #31, #35 and #36</p>	<p>This action complements actions 1-9 by providing the digital architecture necessary to deliver the associated outcomes.</p> <p>The action involves collating experience obtained to information about current and future state B2B, B2M and B2H data exchanges to identify the data exchanges and relationships underpinning a digital architecture which enables and supports the use of flexibility.</p> <p>When considering the iterative steps this action initially involves building experience through learning-by-doing about the features and functionality relating to offer and acceptance and clearing and settlement (e.g payment).</p> <p>Existing experience should be collated and presented by December 2024 for critique and discussion about implications and opportunities to deliver the outcome. Scoping further learning by doing should occur in parallel.</p> <p>The activities should be collaborative using industry co-design processes and coordinated by an entity taking a whole-of-system view, eg, FlexForum, with progress regularly reported publicly.</p> <p>The activity should be supported by the Electricity Authority, EECA (eg, via FlexTalk 2.0) and Commerce Commission.</p>
	Subsequent action	<p>Determine the communication protocols, data types, formats, and exchange mechanisms necessary to support digitalised data exchanges as the default mechanism, along with an implementation plan.</p> <p>Aligns with Flexibility Plan steps #31, #35 and #36.</p>	<p>The action involves identifying the features, details and requirements of a digitalised data exchange architecture.</p> <p>Initial proposals and an implementation plan should be presented by June 2025 drawing on existing learning by doing. The activities should be collaborative using industry co-design processes and jointly coordinated by the Electricity Authority and EECA to ensure a whole-of-system perspective.</p> <p>The activity should be supported by the Electricity Authority, EECA (eg, via FlexTalk 2.0) and Commerce Commission.</p>

Table 5 Actions to provide people with a compelling story about the costs, benefits and rewards

#	Outcome	Action	Who should be involved in delivery
15	<p>EV owners and prospective EV owners....</p> <ul style="list-style-type: none"> <li>• know what the practical and tangible costs, benefits and rewards available from flexible charging are</li> <li>• feel confident that flexible charging is a good, easy and obvious choice</li> <li>• decide to adopt flexible charging.</li> </ul>	<p><b>Create and support the general uptake and use of an EV and flexible charging lexicon</b> with a glossary of key terms and, eg, integrated, flexible, fast, slow.</p>	<p>This action involves developing an agreed EV and flexible charging language to be used by parties across the ecosystem including charge point manufacturers, EECA, electricians, vehicle retailers, flexibility coordinators and electricity retailers.</p> <p>The initial lexicon and dictionary should be presented by June 2024.</p> <p>The activity should be occur collaboratively using industry co-design processes and be supported by EECA.</p>
16		<p><b>Produce a list for EV owners and their advisers of the flexible charging devices and options and the associated value and benefits of each option.</b></p> <p>For example, a wall charger can do [x] and provide [y] benefits, the native vehicle functionality can do [a] and provide [b] benefits.</p>	<p>This action involves developing a list of flexible charging options and devices provide an initial reference point for EV owners and advisers while knowledge and understanding of flexible charging develops.</p> <p>Charge point and charging manufacturers and suppliers should develop the list, supported by EECA, by December 2025. The list should be maintained until EECA is satisfied that advisers have robust knowledge and understanding of the costs, benefits and rewards of flexible charging.</p>
17		<p><b>Produce and maintain specific information about <u>existing</u> practical ways to use flexible charging to maximise value and what good looks like in the future once the actions in this workplan are delivered:</b></p> <ul style="list-style-type: none"> <li>• for vehicle retailers and electricians</li> <li>• for existing and prospective EV owners.</li> </ul>	<p>This action is about sharing information about the current state costs, benefits and rewards of flexible charging and the expected future state. EECA can lead this action, with input and support of the electricity ecosystem.</p>

## Parties who participated in developing the workplan

The 3 workshops combined were attended by 50 people from 34 organisations or interest groups

Participant
Australian National University Battery storage and grid integration program
Basis
Bluecurrent
Body Corporate Chairs Groups Inc
Commerce Commission
Contact
Counties Power
decarb
Drive Electric
ECA-UK
Electra
Electricity Authority
EECA
Energy Smart
evergen
Evisi
EV Power
evnex
FlexForum
Hikotron
Individual
inFact
Ministry of Business, Innovation and Employment
Mercury
Orion
Overlay
Powernet
Simply Energy
Thundergrid
Trust Horizon
Vector
We.EV
wmac
Z Energy

Thanks for participating and sharing your experience and perspectives!