# Challenges and regulatory policy solutions integrating public EV charging stations

## International case studies

**NZ MBIE**

October 2023 – Final report

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# Executive summary

## Public EV charging stations

# Different countries are managing the transition towards EVs and supporting public charging infrastructure in different ways. Learning from these approaches can help inform potential regulatory reform in NZ.

## Purpose of this report

The New Zealand Ministry of Business, Innovation and Employment (MBIE) commissioned Baringa Partners (Baringa) to provide advice based on international case studies. This advice sought is in response to concerns and obstacles raised by public electric vehicle (EV) charging operators to the roll out of public EV charging stations in New Zealand. The concerns group into two main categories:

- high and non-transparent connection charges set by NZ distribution lines companies (referred to as 'distributors' in this report), and
- delays in connecting to the distribution network for public EV charging stations.

We have reviewed the regulatory frameworks and industry practices in Australia and the United Kingdom (UK), and analysed how these help or hinder the rollout of public EV charging networks, to draw lessons for New Zealand.

The purpose of this report is not to set out specific recommendations to be implemented in New Zealand. Rather, the purpose is to generate ideas and options that could be considered in New Zealand based on best practice and lessons learned from overseas jurisdictions.

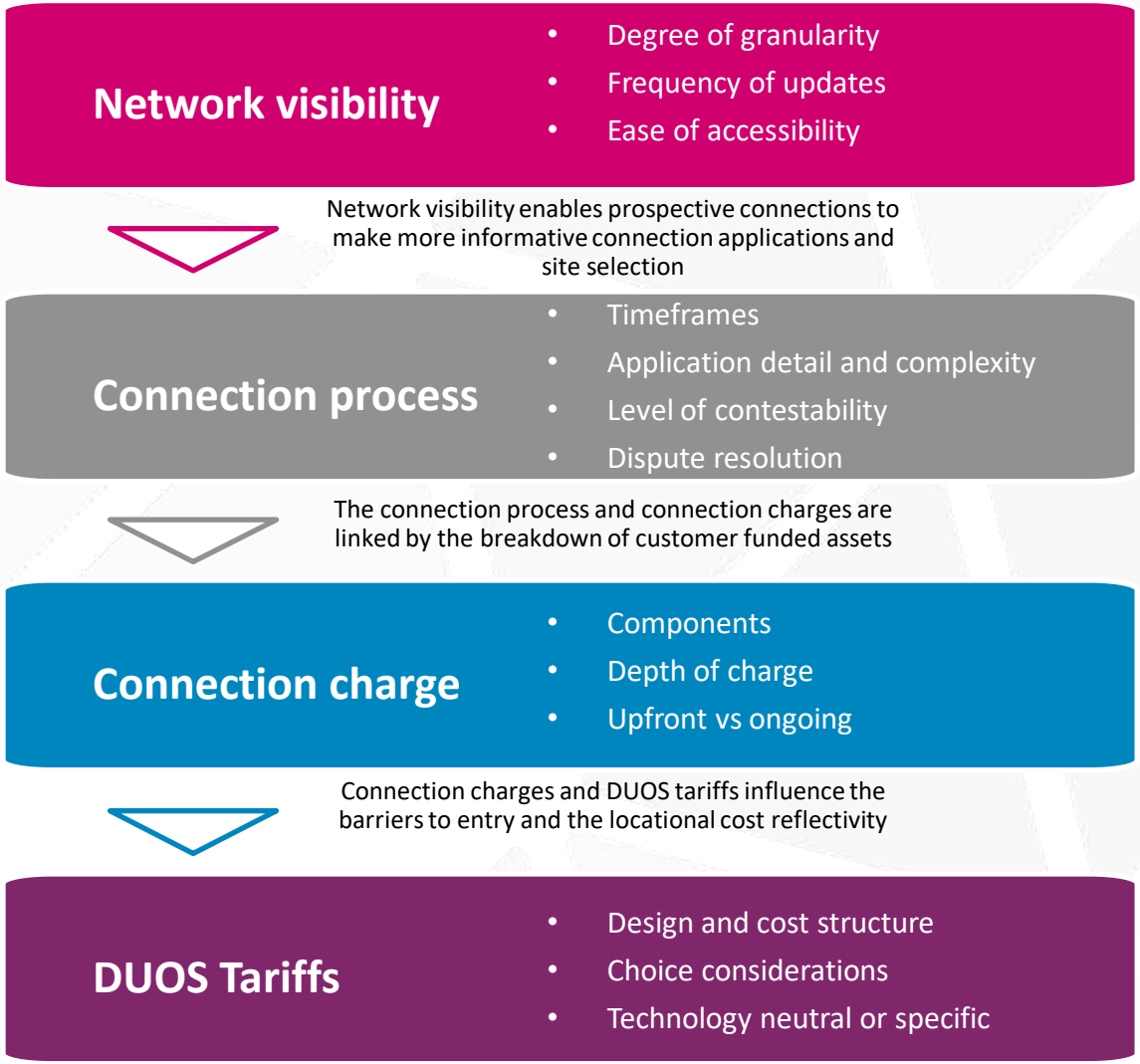
## Focus of this report

Based on our review of the challenges for public EV charging stations in New Zealand, and with agreement with MBIE, this report focuses on 'regulatory policy' levers rather 'government policy' levers.

Regulatory policy is rarely EV specific and tends to apply uniformly across customers of a certain size. For example, the same connection arrangements may across all medium sized commercial and industrial customers, including destination public EV charging stations.

We consider the four key elements of the regulatory framework and industry practice that impact the connection cost and connection timeliness for public EV charging stations are:

- Network visibility
- Connection process
- Connection charges, and
- Distribution use-of-system (DUOS) tariffs.



# Higher levels of regulatory invention and distributor consistency apply in AU and the UK, compared to the light-handed NZ approach leading to significantly more industry differences and less regulatory oversight.

| Topic | New Zealand | Australia | UK |
|---|---|---|---|
| **Network visibility** | • Some asset management information required to be published in standardised form by all distributors, however, limited network visibility information is available and the degree that distributors proactively assist prospective connections to find locations with low congestion differs between distributors. | • Annual planning and reporting requirements require the publication of information on capacity constraints and availability at a locational level, along with the planned upgrades.<br>• This was supplemented by an industry-led initiative to create a user-friendly common web portal covering all distributors. | • Financial incentives (rewards and penalties) apply to all distributors to make network visibility information available.<br>• Additionally, some network utilisation information is required to be published annually. |
| **Connection process** | • A regulated access regime applies to distributed generation but not to demand-side connections, such as public EV charging stations. | • Connection processes are guided through high-level regulatory process requirements, supplemented by detailed best practice industry guidance developed through the industry association. | • A complex combination of regulatory requirements and financial incentives (rewards and penalties) guide the connection process.<br>• Regulatory requirements focus on information provision, maximum timeframes, and dispute resolution mechanisms. Financial incentives are used to improve the quality of the connection process and the customer experience. |
| **Connection charges** | • Distributors are required to publish their capital contribution policies, however, they may amend these at any time and significant differences in approach exist between distributors. | • Distributors are required to submit connection policies for regulatory approval that align with high-level principles established in a guideline published by the regulator. | • A common approach to upfront vs ongoing recovery of connection costs applies to all distributors. Connection charge methodology established through a mixture of regulator-led and industry-led reforms. |
| **DUOS tariffs** | • The regulator publishes best practice principles and assesses distributors' tariffs against these principles, however, distributors are not required to amend their tariffs in response to a negative 'scorecard'. | • Distributors are required to submit tariff structures for regulatory approval that align with high-level principles establishes in the rules by the rule-maker, supplemented by further guidance from the regulator. | • Common tariff structures apply to all distributors, with limited differences between distributors. Tariffs established through a mixture of regulator-led and industry-led reforms. |

**Legend**

More light-handed regulation and differences between distributors — 1 2 3 4 5 — More regulatory invention and consistency between distributors

# New Zealand can learn from both Australia and the UK to enhance the deployment of public EV chargers, particularly around improving network visibility and streamlining the connection process.

New Zealand can draw valuable regulatory insights from both the Australian and UK experiences to accelerate the installation of public EV fast chargers. Several strategies could be considered:

- Outline a standardised regulatory framework that sets clear guidelines for connections, including EV chargers. This framework could streamline distributor connection approvals, technical specifications, safety standards, and connection procedures to simplify the approval process for charging infrastructure projects.
- Collaborate with energy distributors to proactively plan for increased EV charging demand. Learning from Australia's challenges, ensuring adequate grid capacity for fast chargers is crucial. Establishing mechanisms for sharing grid capacity data with charging operators can aid in optimal charger placement.
- Establish consistent and transparent smart tariff structures for commercial and industrial customers, including EV chargers, that encourage demand flexibility – noting that further research (including preferably trials) will be required into the design of those smart tariffs within the NZ market context.

| Regulatory framework element | Opportunities for New Zealand |
|---|---|
| Network visibility | 1. **Improving network location and capacity information**: Learn from Australia's approach to sharing network integration insights. Collaborate with energy distributors to provide information about network constraints and capacity in specific areas. This can guide the strategic placement of charging stations.<br>2. **Evaluate the opportunities for improved data sharing from charging networks** in the UK. Establish partnerships with charging operators to share information about charger availability, status, and charging speeds. |
| Connection process | 1. **Connection regime for demand connections**: Can a mixture of regulatory requirements for new aspects (max connection timeframes, contestability, dispute resolution mechanisms), supplemented with detailed industry best practice guidance developed through the industry association.<br>2. **Learn from the UK's emphasis on financial incentives:** We note financial incentives could only be adopted by ComCom for price controlled distributors, so this is not a complete solution that could apply to all distributors. However, that is not a reason to exclude financial incentives where they can be applied. |
| Connection charge | 1. **Clear capital contribution policies:** The UK's practice of transparently communicating connection costs to charging operators clearly outlines cost components such as network upgrades, infrastructure installation, and any applicable fees. At minimum, provide charging operators with preliminary cost estimates.<br>2. **Standard connection charges**: Both Australia and UK distributors estimate connection charges early in the planning process. Consider establishing predictable cost caps on connection charges. This can provide charging operators with a maximum limit on costs, enhancing predictability and reducing financial uncertainties. The UK has adopted a practical approach that balances competing objectives. |
| Distribution use of system (DUOS) tariffs | 1. **Consider governance reforms to promote reform**: Consider an approach inspired by the UK's mix of regulator-led and industry-led processes, however, ensure reform process timeframes are timely unlike in the UK.<br>2. **Conduct stakeholder consultation**: Engage with charging operators, energy distributors, and regulatory bodies to develop DUOS tariff structures collaboratively. This ensures that the tariffs strike a balance between supporting charging infrastructure growth and ensuring network stability.<br>3. **Avoid customer group specific tariffs**: Smart tariffs that encourage demand flexibility should be available to a wide range of customers, not just public EV charging stations. |

## Australian energy acronyms

| Term | Definition |
|---|---|
| AEMC | Australian Energy Market Commission |
| AEMO | Australian Energy Market Operator |
| AER | Australian Energy Regulator |
| ASP | Accredited Service Provider |
| CER | Consumer energy resources |
| CPD | Critical Peak Demand |
| DAPR | Distribution Annual Planning Report |
| ENA | Energy Networks Association |
| ERA | Economic Regulation Authority |
| EVC | Electric Vehicle Council |
| NEL | National Electricity Law |
| NEM | National Electricity Market |
| NER | National Electricity Rules |
| NOM | Network Opportunity Maps |
| NSW | New South Wales |
| TSS | Tariff Structure Statement |
| WA | Western Australia |
| WEM | Wholesale Energy Market |

## UK energy acronyms

| Term | Definition |
|---|---|
| CDCM | Common Distribution Charging Methodology |
| DCUSA | Distribution Connection and Use of System Agreement |
| DSO | Distribution system operator |
| DUOS | Distribution Use of System |
| FCP | Forward Cost Pricing |
| HCC | High Cost Cap |
| HV | High Voltage |
| LRIC | Long Run Incremental Cost |
| LV | Low Voltage |
| MSA | Motorway Service Area |
| ODI | Output Delivery Incentives |
| Ofgem | Office of Gas and Electricity Markets |
| PCD | Price Control Deliverables |
| RIIO | Regulation = Incentives + Innovation + Outputs |
| RoRE | Return on Regulatory Equity |
| SCR | Significant Code Review |
| TOU | Time-of-use |

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# Introduction

## Public EV charging stations

# This report presents case studies from Australia and the UK to develop insights on how New Zealand can better integrate public EV charging stations.

**Context for this report**

MBIE commissioned Baringa to provide advice in response to concerns raised with the Minister by companies seeking to rollout out public EV charging stations in NZ. The concerns group into two main categories:

- high and non-transparent connection charges set by NZ distributors, and
- delays in connecting to the distribution network for public EV charging stations.

MBIE sought a review of international case studies on what regulatory and policy levers other governments and regulatory authorities have adopted to:

- affect or control connection charges (and if charges are capped, how cross subsidies from other customers were considered and addressed), and
- address process delays – how to speed up connection design, approvals, supply chain for kit, and overall time from enquiry to commencement of charging point operation.

**Overview of approach**

1. Understand EV charger challenges in NZ
2. To provide advice from an international (Australia and UK) perspective, the following areas were assessed:
    1. Overview of the EV market in each country
    2. Outline problem statement
    3. Expert analysis of electricity network regulatory frameworks
3. Apply this analysis to advise on potential levers for regulatory intervention in NZ

Based on our initial review and assessment on the challenges for public EV charging stations in NZ, Baringa and MBIE agreed to focus the assessment on 'regulatory policy' levers rather than 'government policy' levers.

The purpose of this report is not to set out specific recommendations to be implemented in New Zealand. Rather, the purpose is to generate ideas and options that could be considered in New Zealand based on best practice and lessons learned from overseas jurisdictions.

# There are diverse public charging options which cater to different needs of EV drivers, from long-distance travel to everyday convenience.

Public EV charging stations can vary in size to cater to different charging needs and locations. We have outlined the following three categories of different types of public EV chargers:

1. **Slow (e.g. curbside charging):** These are charging stations installed on public streets or curbsides, allowing residents to charge their EVs overnight. This type of charging helps address the challenge of charging accessibility for those living in apartment buildings or areas with limited parking options. They typically require infrastructure and collaboration with local authorities to allocate parking spaces for charging.
2. **Fast (e.g. destination charging)**: Destination charging involves installing EV charging infrastructure at locations where people spend extended periods, such as shopping centres, hotels, restaurants, and entertainment venues. It aims to encourage EV adoption by ensuring that drivers can charge their vehicles while engaging in various day-to-day activities.
3. **Rapid and ultra-rapid (e.g. highway charging):** These are high-power charging stations often located along highways or busy travel routes. They provide rapid charging to EVs, allowing drivers to add a significant amount of range in a short time, usually around 20-30 minutes, with some fully charging in half this time. Highway fast charging is strategically placed to minimise travel interruptions and encourage long-distance EV travel. These are the equivalent of a petrol station replacement for internal combustion engine vehicles.

The size of public EV charging stations significantly influences their role and impact, as connection policies, network tariffs, and government regulations often hinge on size of the charger capacity. Large-scale fast charging stations, like highway refueling points, target long trips and multiple vehicles simultaneously, along with heavy commercial users. These often require longer lead times for connection processes due to the technical requirements, and accordingly may also be subject to different network charging and tariff arrangements. Understanding these capacity based distinctions is important for tailored planning and effective policy making in the EV ecosystem.

**SLOW (level 1)**

AC charging, 3-6 kW

Use cases:

This is the most basic home or destination charging option, where a standard 240V AC socket can be used. Level 1 charging can be useful as a destination charger or as a portable EV charger option, but is not fast enough for longer road trips. It will top up daily use, but will not fully recharge a typical EV overnight.

**FAST (level 2)**

AC charging,7-22 kW

Use cases:

Many level 2 chargers can be found in public places and are typically installed in homes, apartment complexes, workplaces, shopping centres, hotels - anywhere the vehicle will be parked for a while.

These can fully charge EVs within a 4-8 hour range from empty.

**RAPID and ULTRA-RAPID (level 3)**

Rapid: AC or DC charging, 25-99 kW; Ultra-rapid: AC charging, 100kW+

Use cases:

A dedicated DC EV charger at high power levels that is typically used in commercial premises and road-side locations to provide for faster recharging than Level 1 and 2 can achieve.

At the upper end, ultra-rapid chargers can fully recharge some EVs in 10 to 15 minutes.

Source: Baringa analysis, Zapmap database definitions (accessed July 2023), Zapmap (zap-map.com)

# There is overlap between EV charging operators across the three jurisdictions, especially between Australia and NZ, so some operators will already be familiar with the regulatory levers from the case study countries.

**Comparison of EV charging point operators across NZ, Australia and the UK**

| | bp | TESLA | JOLT | Z / AMPOL | ChargeNet | CHARGEFOX | EVIE | NRMA | ubitricity | POD POINT | INSTAVOLT |
|---|---|---|---|---|---|---|---|---|---|---|---|
| NZ | ✓ | ✓ | ✓ | ✓ | ✓ | | | | | | |
| AU | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | | | |
| UK | ✓ | ✓ | | | | | | | ✓ | ✓ | ✓ |

### Global

There are several global EV charging point operators that operate across all three countries such as BP and Tesla

### New Zealand and Australia

In addition to the global players that operate across all three countries, there are some EV charging point operators that operate across NZ and Australia such as Jolt and Z / Ampol.

Additionally, there are several 'home grown' EV charging operators who focus on one market, such as ChargeNet in NZ, and Chargefox, EVIE and NRMA in Australia.

### UK

Of the three countries examined, the UK has by far the largest number of EV charging point operators. A full list of UK operators is set out later in this report.

In addition to the global players operating across all three markets, the UK also has a range of other large and small operators. Large operators in the UK also include Ubitricity, Podpoint and Instravolt.

Source: Baringa analysis, Australia – Electric Vehicle Council (electricvehiclecouncil.com.au), New Zealand – Drive Electric (driveelectric.org.nz), UK – Zapmap (zap-map.com)

# Relevant government policy tends to be EV specific. Whereas relevant regulatory policy and industry practice tends to apply to all electricity customers of a similar size, and is less likely to be EV specific.

The policy and regulatory landscape shape the interactions and dynamics within various industries and sectors. In the context of electricity networks and EVs, these refer to the set of rules, guidelines, and frameworks established by governments and regulatory authorities to govern the deployment, operation, and integration of EVs within the broader energy ecosystem. Policies and regulations are tools that can drive and expedite (or hinder) the transition to EVs.

**What is government policy?**

Policies related to EV charging infrastructure are intentional plans devised by governments to facilitate the adoption of EVs. Policy frameworks that align with national or regional emission reduction targets can also help prioritise EV uptake. These policies can encompass a range of aspects, such as incentivising private investment in vehicle manufacturing, setting minimum technical standards and requirements, promoting renewable energy integration, and encouraging the equitable distribution of charging infrastructure. Policies can include financial assistance such as grants, subsidies, tax breaks or low-interest loans specific for EV adoption.

**What is regulatory policy?**

Electricity networks, like water and rail services, are a natural monopoly. The significant upfront cost of electricity infrastructure (such as poles and wires) means that network services in a particular region can be most efficiently provided by one monopoly supplier. Accordingly, electricity is regulated so that the revenue that distribution network businesses (distributors) can recover from customers is set and consumers can avoid potential risks of monopoly pricing.

EVs present challenges and opportunities for networks such as increased demand during peak times, network tariff (ongoing cost) arrangements, overall system planning, vehicle-to-grid technology and charging infrastructure requirements. Regulation therefore plays a critical role in influencing the growth of EVs and their efficient integration with electricity networks. Regulatory policy is rarely EV specific and tends to apply uniformly across customers of a certain size. For example, the same connection arrangements may across all medium sized commercial and industrial customers, including destination public EV charging stations.

***Based on our review of the challenges for public EV charging stations in NZ, and with agreement with MBIE, this report focuses on regulatory policy levers rather government policy levers.***

For context, we outline some of the key government policy levers in Australia and the UK in this Introduction chapter, with the remainder of this report focused on regulatory policy levers.

**How policies and regulations promote greater EV adoption**

- **Investment and Funding**: Policies can allocate funding to support the development of EVs and EV charging infrastructure. Government grants and private investment can accelerate the deployment of charging stations, particularly in underserved areas.
- **Incentivising adoption**: Well-designed policies can provide incentives to consumers, manufacturers, and charging station operators, making EVs more attractive. These incentives may include tax credits, rebates, grants, and subsidies for EV purchases, as well as general financial support for building and operating charging infrastructure.
- **Research and innovation**: Policies that allocate funding for research and development in EV technology and charging solutions drive innovation. These efforts can lead to advancements in battery technology, charging speeds, infrastructure design and affordability.
- **Consumer education**: Policies can mandate or support public awareness campaigns to educate consumers about the benefits of EVs and how they can effectively improve transportation options.
- **Tariff structures**: Policy and regulatory decisions related to charging tariffs can influence consumer behavior and charging station economics. Fair and transparent tariff structures encourage EV adoption amongst consumers and ensure that charging operators can reasonably cover costs while remaining competitive.
- **Network integration**: Regulations can guide the integration of EVs with the electricity network, ensuring that increased demand due to charging does not strain the grid during peak hours. Thoughtful connection point locations and smart charging solutions can be encouraged or incentivised to manage network load efficiently.

# Australian Governments are providing financial incentives and grants to encourage the installation of EV chargers to shape a supportive environment for the expansion of EV charging infrastructure deployment.

| Policy intervention | Description | Objectives | Status of implementation |
|---|---|---|---|
| **Federal Government: National mapping tool** | • Developing a national mapping tool to support optimal investment in – and deployment of – EV charging infrastructure.<br>• The Federal Government will work with states and territories to develop and deploy this wide-scale national mapping capability. | • To support ease of access to EV charging facilities across the nation, the Australian government will invest, develop and deploy a national mapping tool for EV charging infrastructure.<br>• A national map will facilitate infrastructure, energy and telecommunications planning around EV charging, cross border certainty for EV drivers, and inform and optimise future investment. | Proposed |
| **Federal Government: Highway fast charging investment** | • The Government is expanding the rollout of charging infrastructure through the $500 million Driving the Nation Fund and the National EV Charging Network to install a backbone of 117 chargers located on major highways across the country at an average interval of 150 km. | • The project will raise current and future EV driver confidence by establishing a nation-wide network of chargers. The minimum charging rate for each site will be at least 75kW even when 4 cars are charging simultaneously.<br>• New sites will complement existing and planned EV charging infrastructure. Site selection for new EV chargers will target known blackspots, prioritising regional and remote communities. | Proposed |
| **State (NSW) Government: Rapid charging investment** | • $131M for rapid and ultra-rapid charging infrastructure in areas with limited off-street parking, EV commuter corridors and superhighways. | • The NSW Government will co-invest in more rapid chargers at 100 km intervals across all major highways – creating 'EV Super Highways' across the State. This will help regional residents and businesses improve their access to charging infrastructure and encouraging more city-based EV drivers to travel to regional areas, boosting local tourism.<br>• The NSW Government will also invest in 'EV Commuter Corridors' across Sydney, to make sure drivers have no more than 5km to drive to the next rapid EV charger. | In progress |
| **State (NSW) Government: Regional charging investment** | $20M for destination charging infrastructure at regional locations. | | In progress |

Source: National Electric Vehicle Strategy, Australian Government, 2023; NSW Electric Vehicle Strategy, NSW Government, 2021.

# The UK Government is contributing financial support to co-ordinate and stimulate private investment in a rapid EV charging network across the UK.

| Policy intervention | Description | Objectives | Status of implementation |
|---|---|---|---|
| **Ban on sales of new petrol and diesel cars** | • The UK will ban the sale of new petrol and diesel cars from 2030 | • Key driver in the decarbonization of the transport sector which is now the highest polluting sector in the UK, ahead of the energy sector | In progress |
| **Rapid Charging Fund** | • First announced in 2020, the Rapid Charging Fund (RCF) is a £950 million fund that provides financial support to businesses and local authorities to install fast and rapid charging infrastructure along the strategic road network to prepare for 100% zero emissions vehicles and facilitating long-distance travel for EVs. | • The UK government is aiming that all new vehicles to be required to have significant zero emission capability from 2030 and be 100% zero emission from 2035. The deployment of the RCF will enhance the convenience and accessibility of EV charging for long-distance travel. Specifically, the objective is to have:<br>  • at least 6 high-powered open-access charge points at **each** key motorway service area across England by end of 2023,<br>  • 2500 by 2030, and<br>  • 6000 by 2035.<br>• Encourage and enable competition between chargepoint operators within each site. | In progress |
| **Real-time information on public charge point network** | • New legislation to regulate and ensure public chargepoints are reliable and easy to use. | • Work with industry to open data so that drivers can access real time information about chargepoints across the public network, rely on the public charging network, compare prices and can pay for their charging easily, regardless of chargepoint provider. | In progress |

Source: Rapid Charging Fund, UK Government, 2021

# We consider there are four regulatory policy levers that are particularly relevant to the connection cost and connection timeframes for public EV charging stations.

Regulatory policy levers tend to be uniform and apply to all customers of a similar size – based on either voltage level of connection, annual electricity consumption and/or maximum capacity. Occasionally, these regulatory levers may be EV specific, but this is less common.

We consider the following four regulatory levers are particular relevant to the connection cost and connection timeframes for public EV charging stations. Where regulatory policy is non-binding or not fully specified, these areas are also complemented by industry practice.

**Network visibility**

- Network visibility provides prospective connections, such public EV charging stations, with information on those areas of the network with current spare capacity and those facing constraints. It may also provide information on the connection queue and planned future upgrades.

**Connection process**

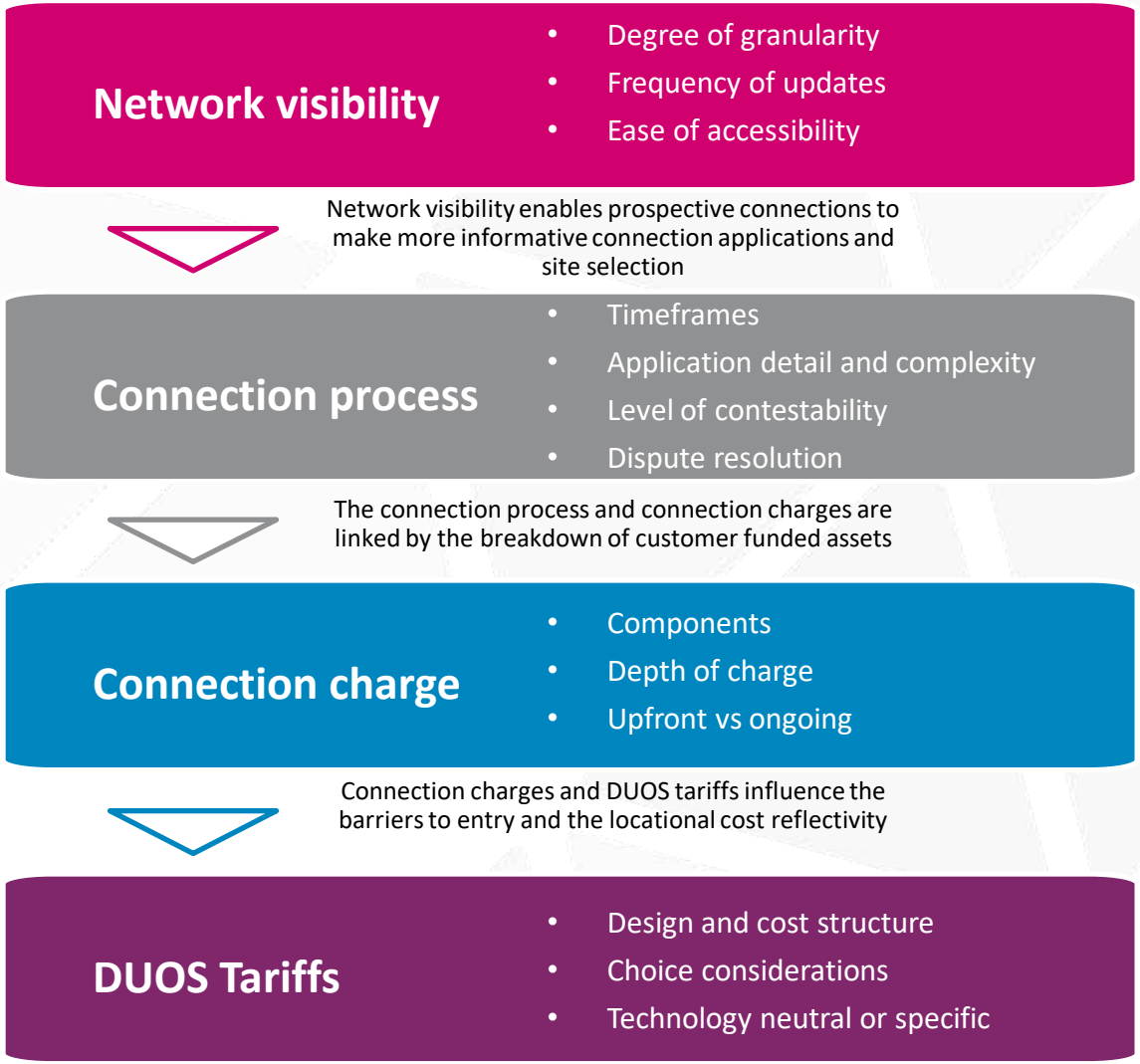
- The connections process establishes elements such as the steps for making a connection inquiry and receiving a connection offer, including any prescribed timeframes and information requirements. It may also establish which, if any, elements of the connection are open to contestable provision by providers other than the distributor, along with dispute resolution procedures.

**Connection charges**

- The connection charging framework establishes when an upfront connection charge (often referred to as a capital contribution) is required and how this is calculated. Among other matters, this calculation with depend on the 'depth' of the connection charge which means whether connection charges only cover the dedicated connection assets for the connection or also contribute the cost of any 'upstream' works on the shared distribution network needed to accommodate the connection.

**Distribution Use of System (DUOS) tariffs**

- The DUOS charging regime establishes the structure and rate of the ongoing network tariffs paid by the network user after they connect. This includes the balance between fixed and variable charges, and the structure of those variable charges (e.g. flat k/Wh energy charges, kW or KVA demand or capacity charges, critical peak charges, etc). It also establishes whether the network user, such as a public EV charging station, has a choice over which network tariff applies to them.



# UK case study

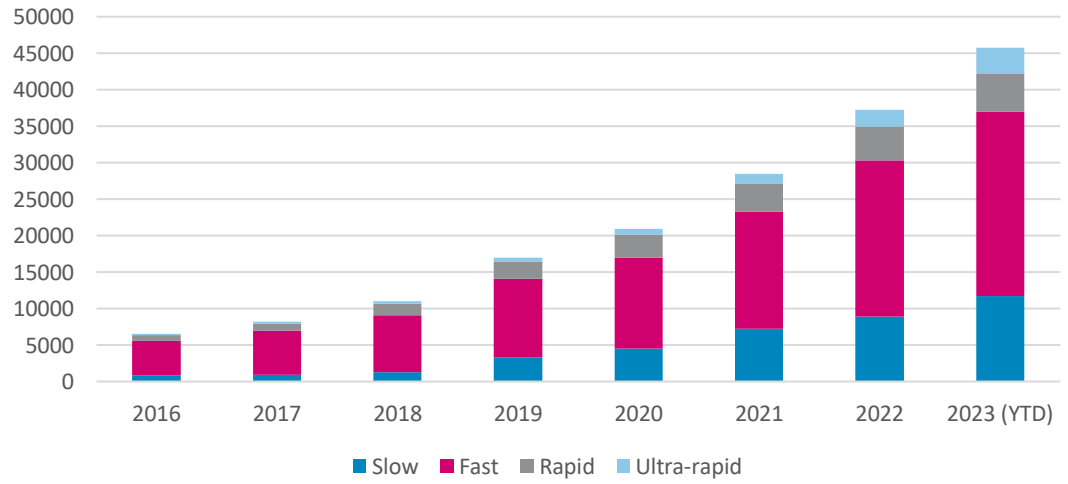
## Public EV charging stations

# There are over ~45,000 public EV charging points in the UK. These are provided by a wide range of public charging infrastructure operators, with ubitricity having the largest network.

- The number of public EV charging points in the UK is growing strongly and has increased from ~5000 in 2016 to over ~45,000 charging points currently. 'Fast' charging points (7-22kW) are the largest category of public charging infrastructure with ~25,000 current charging points. In the last couple of years, 'Ultra-rapid' charging points (100kW+) have also started to appear with ~3500 points now in place. Given the much higher capacity of Rapid and Ultra-rapid chargers, they make up 60% of total public charging infrastructure capacity, even though they only account for around 25% of the total number of chargers.
- There's a very wide range of public EV charging operators in the UK, with ubitricity (lamppost chargers), Pod Point (destination chargers, e.g. supermarkets) and bp pulse (rapid and destination chargers) having the largest networks. Around 50% of chargers are owned by operators who operate less than 5% of all public chargers. The market for Rapid and Ultra-rapid chargers is lightly more concentrated, with InstraVolt, bp pulse and Tesla each having over 10% of the total number of chargers.

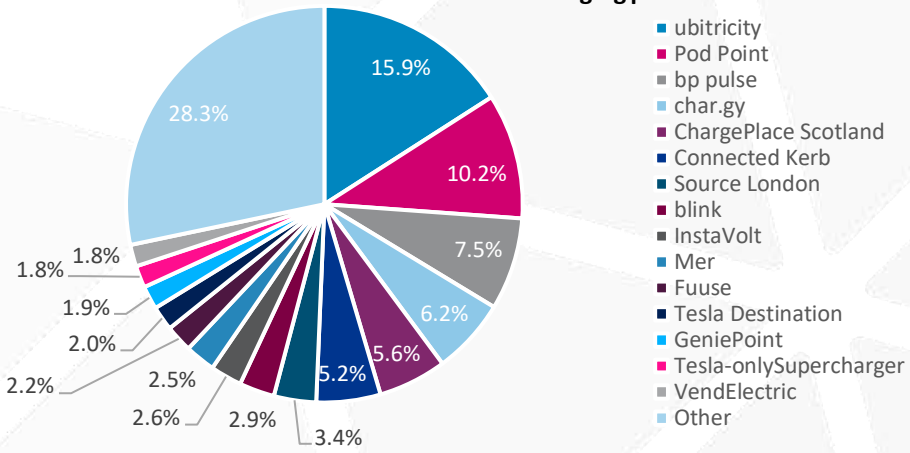
**Number of public UK charging points by speed (2016 to date)**



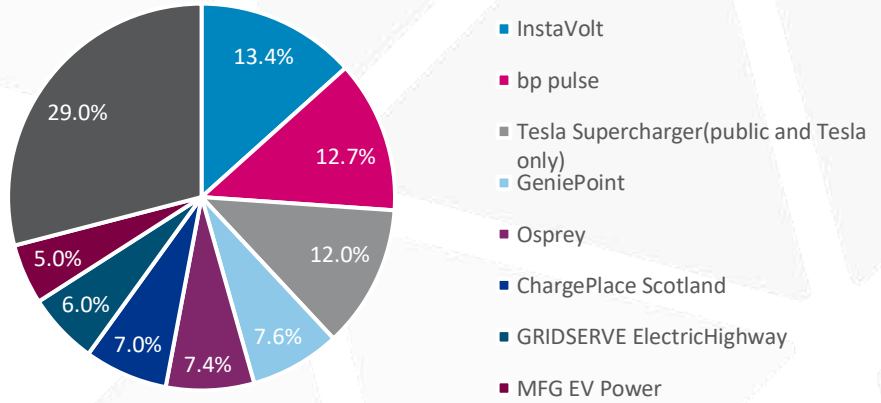

Source: Zapmap database (accessed July 2023), How many EV charging points are there in the UK - Zapmap (zap-map.com)

**Major public EV charging operators in the UK**

**Network market share UK – all electric vehicle charging points**




**Network market share rapid and ultra rapid devices**



# The Government wants to achieve net zero targets and create green jobs; the regulator wants the transition to EVs at least cost to consumers; and the industry wants to overcome grid and lead time constraints.

**Government policymaker perspective**

- In November 2020, the UK published the Prime Minister's 'Ten-point plan for a green industrial revolution', in which the UK committed to ending the sale of new petrol and diesel cars and vans by 2030. The overall purpose of the plan is 'Building back better, supporting green jobs, and accelerating [the UK's] path to net zero'. The plan seeks to invest GBP 12 billion of government investment (GBP 2.8 billion towards accelerating the shift to zero emission vehicles), and through that mobilise up to 3x that much of private investment, to create and support 250,000 green jobs (40,000 jobs associated with zero emission vehicles).
- Enabling thousands more charge points in homes, workplaces, on residential streets and along major roadways is a key goal of the plan to enable this shift. As a result, the UK's Rapid Charging Fund was created to subsidise grid connections for rapid public EV charging stations to:
  - enable a network of rapid charging stations along major roadways, and
  - address range anxiety of EV motorists

**Regulator perspective**

- Ofgem goal is to ensure the energy sector regulation supports the rapid transition to EVs, and does so at least cost to consumers. It has accelerated investment in the energy networks to ensure they are prepared for the increased demand for electricity, and also established its proposed approach to reduce the costs of installing new chargepoints. Ofgem wants to build a smart and flexible energy system that can utilise the huge number of EV batteries that are going to be plugged into the UK system to keep costs down for everyone. It wants to encourage products and services to be available which enable drivers to charge their cars where it is most convenient from them, for example 'on the go' and at workplaces; when it's cheapest to do so; and which allow the sale of electricity back to the grid when it's most needed.
- Ofgem's stated priority is ensuring all consumers benefit from the transition to EVs by: (1) ensuring the network is prepared for EV adoption; (2) reducing barriers to network connections by ensuring efficient and timely process and proposals to reduce EV connection charges; (3) enable rapid development and uptake of smart charging and V2X technology; and (4) support consumer participation.

**EV industry perspective**

- Baringa's commercial modelling and interviews with key industry players in the UK indicate that there are some key factors that are making the deployment of public EV charging particularly commercially challenging: (1) utilisation and price; (2) grid constraints and upgrades; and (3) lead times associated with upgrades.
- **Utilisation and price** – The commercial viability of public EV charging infrastructure requires greater adoption of EVs, though the severity of this problem is reducing with greater EV uptake.
- **Grid constraints and upgrades** – The installation of public EV charging infrastructure may require significant upfront investment, particularly to facilitate the installation of the underground network connection infrastructure. This is particularly prevalent within inner-city areas, in which demand for electric vehicles is likely to be the highest. The cost required to upgrade the grid infrastructure to facilitate the installation of public EV charging points could render the project financially challenging.
- **Lead times** – The lead times associated with grid connections and permit lead times have also been seen to have negative implications on the speed of deployment of public EV charging infrastructure.

# Ofgem is at the core of the regulatory framework in the UK, though the role of Ofgem and industry differs depending on which regulatory instrument an element of the regulatory framework sit in.

Ofgem is the economic regulator and code-maker in the UK. The regulatory framework sits in several different regulatory instruments, and the process, timing and role of Ofgem and industry differ depending on the regulatory instrument. Three of those key regulatory instruments are:

- Electricity distribution price control decisions
- Electricity distribution licences; and
- Industry codes

**RIIO price control decisions**

- Ofgem sets price control decisions through a framework called Regulation = Incentives + Innovation + Outputs (RIIO). The second iteration of this framework, RIIO2, applies to electricity distributors for the 2023-28 period. The RIIO price control decisions consistent of a Core Methodology applying to all distributors, complemented with distributor-specific decisions on aspects such as cost allowances.
- A core outcome of the RIIO framework are the expectations and financial incentives it places on distributors, such as the Price Control Deliverables (PCDs) and Output Delivery Incentives (ODIs).

**Licences**

- Electricity distributors are required to hold and comply with their licence conditions in order to distribute electricity to enable supply.
- Many of the aspects of the regulatory framework developed through other regulatory instruments (e.g. connection regulations and network charging methodologies) are given force by Ofgem making compliance with these regulations a licence condition on the distributor.

**Industry codes**

One of the key industry codes is the Distribution Connection and Use of System Agreement (DCUSA). This is a multi-party contract between licensed distributors, retailers and generators in Great Britain who use the electricity distribution system. The standard day-to-day administration of the code framework is built around concepts of industry led governance:

- Parties to the code may propose code modifications and undergo industry led processes of analysing and consulting on the proposed code modification and alternatives
- A code administrator drawn from industry administers the code including running the code modification process. Code signatories vote on the proposed code modification and the alternative options identified. Several rounds of voting may occur to shortlist a preferred option.
- If the code modification is uncontroversial, the industry panel may self-approve the preferred option. Otherwise, the preferred code modification proposal must be submitted to Ofgem for assessment.
- Ofgem may only approve or reject the code modification proposal, it may not amend the proposal. However, in rejecting a proposal, Ofgem may outline the changes it would require in order to accept an amended proposal in the future.

To address shortcoming of this process (vested interests; disconnect with Ofgem priorities; and lack of ability for Ofgem to consider other options), an alternative approach was introduced which allows Ofgem greater ability to "take charge" of the code reform process. Ofgem is able to launch a Significant Code Review (SCR). Ofgem make choose between one of three approaches to implement its recommendations from the SCR: (1) Ofgem may direct a code signatory to raise a code modification proposal; (2) Ofgem may raise the code modification proposal itself, and it would then undergo the standard code modification process outlined above; or (3) Ofgem may lead an "end-to-end" process to develop the code modification proposal which bypasses the standard code modification process.

Source: Ofgem – RIIO (Network price controls 2021-2028 (RIIO-2)) and licences (Licences and licence conditions | Ofgem); DCUSA (Home - DCUSA)

# A common regulated framework guides the connection process, connection charges and DUOS tariffs, whereas innovation and differences in network visibility is encouraged primarily through incentives.

| Regulatory framework | Element | Description |
|---|---|---|
| Network visibility | Degree of granularity | Information is provided on each individual substation with potential connections able to delve down several layers of detail on every substation. This information includes the current 'headroom' available, size of connection queue and future planned upgrades. |
| | Frequency of updates | Information appears to be upgraded annually, though may differ by distributor. Some information (e.g. utilisation) is required to be published by the regulatory regime on a regular basis. |
| | Ease of access | Available free of charge via the distributor's website. As distributors host the information on their own website, there is not a common single platform for potential connections to access. |
| Connection process | Timeframes and application requirements | Financial incentives are placed on distributors to encourage good connection outcomes with rewards/penalties placed on the time taken between 'inquiry to offer' and 'application to connection'. Connection customer surveys also apply with further financial incentives applying based on survey outcomes. |
| | Contestability | Contestability is available for a wide range of connection activities such as design and construction of connection assets. Price competition from alternative providers is encouraged by requiring distributors to add a surcharge to their connection offers. |
| | Dispute resolution | Licence conditions stipulate the information that distributors must provide in a connection offer. Disputes on the connection offer can be referred to the ombudsman or Ofgem for resolution. |
| Connection charge | Components | Connection charges focus on the user's required connection assets rather than wider network reinforcement costs. |
| | Depth of charge | Depth of charge has moved from a 'shallow-ish' to 'shallow' connection with the contribution to wider network reinforcement removed from the connection charge. Previously, connections contributed to network upgrade costs at the voltage connection level and one up. |
| | Degree of upfront cost recovery | As a result of the move to a shallow connection charge, the upfront cost recovery is lower and more costs are recovered through ongoing DUOS charges. |
| Distribution use of system (DUOS) tariffs | Tariff structure | A common tariff structure and methodology applies across all distributors, with distributor specific differences reflected mainly in the timing of peak, shoulder and off-peak periods for time-of-use (TOU) based tariffs. |
| | Degree of customer choice | There is little customer choice in the selection of their network tariff structure. Choice applies in the structure of the retail offerings and demand management solutions that sit on top of the underlying network tariff structure. |
| | Technology neutral or specific | Network tariffs are technology neutral but their design is mindful of the need to send appropriate price signals to customers with low carbon technologies such as electric vehicles and onsite generation. |

# Network visibility is primarily encouraged in the UK through financial incentives placed on distributors. This incentive forms part of a broader package of DSO reform orientated incentives.

- Some information is required to be published by distributors (in particular, utilisation data), however, network visibility is primarily encouraged by placing financial incentives on distributors to release data on network visibility.
- The promotion of network visibility is part of a broader reform goal, incentivising distributors to make distribution system operator (DSO) transition reforms.
- Ofgem's DSO Incentive was created in RIIO-2 and provides an financial incentive on distributors through adjusting their Return on Regulatory Equity (RoRE). After an initial transition year, the value of this incentive can increase (reward) or decrease (penalty) the distributor's RoRE by +/- 0.2%. The incentive comprises three components: (1) stakeholder survey (40%); (2) performance panel assessment (40%) and outturn performance metrics (20%).
- Network visibility falls under the performance panel assessment limb. Each year, distributors are required to submit a 30-page report outlining the distributor's progress towards DSO reforms. The panel assesses the report using the criteria in the table below. Progress on data and information provision is afforded a 20% weighting.
- Many of the distributors have improved the network visibility data they provide. Distributors host this data on free-to-access portals available on their website. An example of such a portal is shown on the next slide.

| DSO performance panel assessment criteria | Weighting |
|---|---|
| Delivery of DSO benefits | 30% |
| **Data and information provision** | **20%** |
| Flexibility market development | 20% |
| Options assessment and conflict of interest mitigation | 20% |
| Distributed Energy Resource dispatch decision making | 10% |

**Type of regulatory intervention**

- Network visibility is encouraged through a combination of regulatory reporting requirements and financial incentives, with financial incentives the key driver.
- Distributors can receive financial rewards or penalties depending on a panel's assessment of the quality of their data and information provision.
- This financial incentive on network visibility forms part of a package of financial incentives called the DSO Incentive.

**Impact on EV public charging infrastructure**

**Impact on connection timeliness**

- Public EV charging operators are able to identify areas of lower levels of congestion which may reduce connection times.
- That said, the connection offer process is bespoke and can reveal local constraints not identified through these portals.

**Impact on connection cost**

- Indirect impact on reducing connection costs, by enabling charging operator to identify and avoid high congestion parts of the network.

**Baringa assessment**

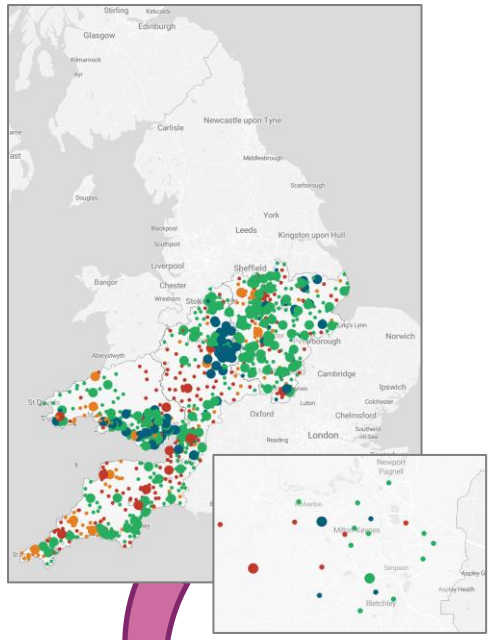
- Distributors in the UK have improved the quality and format of network visibility they provide to potential network access seekers over time, starting from simple static 'heat maps' to the more sophisticated online portals.
- Ofgem's DSO Incentive provides a continuous incentive for distributors to continue to improve their network visibility data over time.
- However, this also leads to distributor-specific approaches with the quality, format and portal to access the information differing between distributors. This may increase the complexity for access seekers looking to connect to multiple distribution networks, such as public EV charging operators.

Source: RIIO ED2 Final Determinations - Core Methodology, Ofgem, November 2022, pp. 79-91.

# The screenshots below provide an example of the layers of information distributors make available publicly through an online portal. This example is from National Grid Electricity Distribution.

**Layer one**




**Layer two**

**Substation(s)**

| | |
|---|---|
| Substation name | Bletchley 33kv S Stn |
| Substation type | BSP |
| Substation number | 940013 |
| Substation name | Bletchley 11kv S Stn |
| Substation type | Primary |
| Substation number | 940042 |

**Layer three**

Return to Map

| | |
|---|---|
| Substation name | Bletchley 33kv S Stn |
| Substation type | BSP |
| Substation number | 940013 |
| Substation Demand Headroom | 73.19 MVA |
| Substation Reverse Power Headroom | 64.76 MVA |
| Upstream Demand Headroom | - |
| Upstream Generation Headroom | - |
| Substation Fault Level Headroom | - |
| Associated Statement of Works | No |

Show supply area | More Info

*Information on current 'headroom' at the substation provided so prospective connections understand how much additional capacity can be readily connected*

**Layer four**

**Demand**

| | |
|---|---|
| Substation Firm Capacity | 201.00 MVA |
| Substation Peak Demand | 127.81 MVA |
| Substation Demand Headroom | 73.19 MVA |
| Upstream Demand Headroom | - |

**Generation**

| | |
|---|---|
| Substation Reverse Power Capability | 100.50 MVA |
| Connected Generation | 65.13 MVA |
| Accepted not yet connected | 8.45 MVA |
| Offered not yet accepted | 4.32 MVA |
| Substation Reverse Power Headroom | 64.76 MVA |

Source: network-capacity-map-application, National Grid Distribution

# Ofgem uses a complex, though sophisticated and innovative, mix of regulatory requirements and financial incentives to improve the connection experience and timeliness for connecting parties.

- The connection process operates through a combination of regulatory requirements, financial incentives and a dispute resolution mechanism.

**Regulatory requirements**

- Distributors are required to offer a connection to access seeker who asks. There's no charge for requesting an offer of connection. Distributors must not discriminate when carrying out works related to connections. In practice this means a network operator cannot unduly discriminate between one type of customer and another.
- The distributor's licence contains conditions that set out the processes that apply to requests for connection, including the information and maximum time limits. Distributors must make a connection offer within three months of receiving the necessary information from the customer.
- The ombudsman or Ofgem can resolve connection disputes.

**Financial incentives**

- For LV connections, the Time to Connect Incentive places financial incentives on distributors to better the maximum timeframes specified in regulatory requirements. Specifically, there are two separate incentives placed on different stages of the connection process: (1) Time to Quote – to time from the distributor receiving an initial application to the time it issues a quotation; and (2) Time to Connect – the time from the customer accepting the quotation to the time the connection is completed. The value of this incentive is +/- 0.15% of the distributor's RoRE.
- For large connections, a separate Major Connections Incentive applies. This is a 'penalty only' incentive with a value of up to -0.35% of the distributor's RoRE. This incentive targets the customers' overall satisfaction of the connection process and is measured via a customer survey.
- The design and construction of connection assets is also contestable, with distributors competing against independent connection providers for these services. In order to promote market development, distributor's must add a 4% surcharge onto their connection offer quotes.

| | | |
|---|---|---|
| **Type of regulatory intervention**  | • The connection process operates through a complex combination of regulatory requirements and financial incentives.<br>• Regulatory requirements focus on the information that must be provided by the connecting party and distributor through the connection process, maximum timeframes, and dispute resolution mechanisms.<br>• Financial incentives are used to improve the quality of the connection process and the customer experience, with differing incentives tailored towards minor and major connections. | |
| **Impact on EV public charging infrastructure**  | **Impact on connection timeliness**<br>• The combination of regulated maximum ('safety net') timeframes, combined with financial incentives to improve these lead-times for both small and major connections, which would cover small curb-side charging stations up to major highway stations. | **Impact on connection cost**<br>• Congestion provision of connection asset design and construction promotes competition and thereby lower costs.<br>• The 4% surcharge imposed on distributor-led connections potentially increases costs in the short run, but exemptions apply in locations where contestable provision is not feasible. |
| **Baringa assessment**  | • Ofgem's framework for connections, while complex, is a sophisticated set of regulatory requirements and financial incentives.<br>• Its use of financial incentives to improve the connection process is particularly innovative. The design of these incentives is also well tailored to the different connection type – with minor connections focused on improving connection timesframes (which can be readily measured across many connections) and major connections focused on the overall connection process (through the use of customer surveys). | |

Source: RIIO ED2 Final Determinations - Core Methodology, Ofgem, November 2022, pp. 140-154.

# High connection charges were seen as a barrier to connection for the many new low carbon technologies needed to achieve net zero. In response, Ofgem has shifted cost recovery to DUOS tariffs.

- In the UK, the 'depth' of the connection charge – i.e. how much of the cost of network upgrades triggered by new connections is recovered upfront from the connection vs recovered from the wider customer base via ongoing DUOS tariffs – has become shallower over time.
- Initially, customers were required to pay for any reinforcement their connection triggered ('deep' charges). In 2005, this was reformed into what Ofgem called 'shallow-ish' connection charges, where new connections would be required to contribute towards the cost of network upgrades at their volage level of connection plus one voltage level up (e.g. LV connections contribute towards LV and HV network upgrades). This is in addition to paying 100% of the cost for any sole use connection assets to extend the network to the customer.
- In 2022, Ofgem further reformed the connection boundary to the new approach of:
  - Remove the contribution to wider network upgrades for demand connections ('shallow' charges) – 100% of reinforcement costs paid for via DUOS tariffs
  - Reduce the contribution to wider network upgrades for generation/storage connections (lower 'shallow-ish' charges) – generation customers contribute towards the reinforcement costs at their voltage level of connection (only), with 100% of reinforcement costs at higher/lower voltage levels paid for via DUOS tariffs
  - Demand and generation customers continue to be responsible for paying for connection extension assets.
- A key driver for reform was the previous approach was seen as as a barrier to net zero, given the high upfront connection charge, and the need for significant numbers of low carbon technologies to connect to the grid. Ofgem noted public EV charging stations as an example of the new business models negatively impacted by the previous approach. The previous approach also involved a 'free rider problem' – as network upgrades typically occur in step changes due to economies of scale, there was the risk of new connections holding back and waiting for another connection to trigger and pay for the network upgrade, and then connect at lower cost using the new spare capacity paid for by the previous connection.
- The main downside of the reform was lower signals to new connections to connect into low congestion parts of the grid. Ofgem mitigated this by introducing the High Cost Cap for demand connections.

| | | |
|---|---|---|
| **Type of regulatory intervention** | • Common charging methodology required to be applied consistently across all distributors, called the Common Connection Charging Methodology – distributors are required to follow as a licence condition.<br>• Regulator mandates the high-level strategic direction after significant industry and consumer group consultation.<br>• Industry working group determines the implementation detail, which is then submitted to the regulator for final approval. | |
| **Impact on EV public charging infrastructure** | **Impact on connection timeliness**<br>• No direct impact on connection timeframes in most circumstances.<br>• Might increase connection timeframes for very high cost connections, due to incentive to find a new lower congestion connection site. | **Impact on connection cost**<br>• Connection cost for vast majority of connections significantly reduced.<br>• High cost cap applies to rare connections required very expensive network upgrades, encouraging EV operators to avoid the cost by finding less congested connection sites. |
| **Baringa assessment** | • Ofgem's assessment approach (charging principles and criteria) demonstrate a sensible framework to promote low carbon technologies and progress towards net zero, while still adopting a specific technology neutral approach.<br>• Ofgem's considerations in determining the connection boundary demonstrate the need not to consider this issue in isolation, but in concert with the approach to DUOS tariff structures, price control expenditure forecasts and other customer protection mitigation measures.<br>• Ofgem's approach moving to a 'shallow' connection charge for demand connections combined with the introduction of the High Cost Cap, strikes a reasonable balance between reducing barriers to connection for the vast majority of new connections, including public EV charging stations, while protecting consumers from subsidising very high cost new connections. | |

Source: Access and forward-looking charges - SCR - Final decision, Ofgem, May 2022.

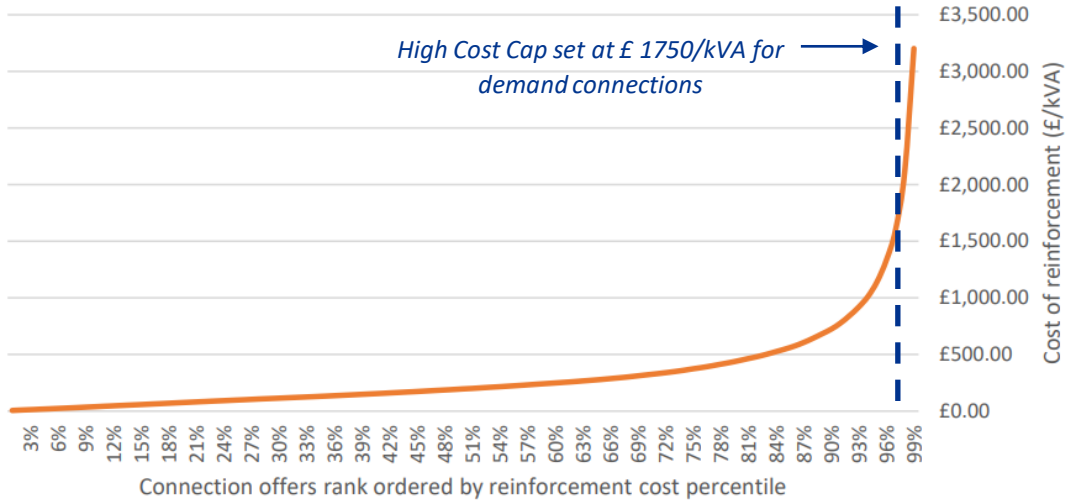
# A shallow charge + the High Cost Cap, strikes a balance between reducing barriers to connection for the vast majority of new connections, while protecting consumers from subsidising very high cost new connections.

## Summary of Ofgem's decision to change the connection charge boundary

| | Extension assets | Reinforcement assets at connection voltage | Reinforcement assets at connection voltage +1 |
|---|---|---|---|
| Current arrangements | Connecting customer pays 100% | Connecting customer pays a proportion of the reinforcement costs | Connecting customer pays a proportion of the reinforcement costs |
| New arrangements (Demand) | Connecting customer pays 100% | Fully funded by the DNO via DUoS | Fully funded by the DNO via DUoS |
| New arrangements (Generation) | Connecting customer pays 100% | Connecting customer pays a proportion of the reinforcement costs | Fully funded by the DNO via DUoS |

- Ofgem's assessment was primarily principles and criteria (qualitative analysis) based, informed by modelling (quantitative) analysis. Its approach supports low carbon technologies while being broadly technology neutral. One of its criteria was 'arrangements support decarbonisation, primarily by enabling uptake of low carbon technologies through enabling quicker connections and reducing network cost. However, they will not provide any undue preferential arrangements based on technology or user type'.
- Ofgem quantified the impact of the connection boundary change. It estimated this would *increase* system costs in present value terms by £380m over 17 years. Notwithstanding this cost, it considered the costs would be outweighed by the broader (non-quantified) benefits of supporting the transition to net zero by reducing the barriers to investment for new low carbon technologies.
- Ofgem's decision to reduce and not entirely remove the contribution to reinforcement costs for generation connections was because it estimated this would increase system costs further by an additional £1b. This is because it considered new generation connections have more locational flexibility than new demand connections, and therefore retaining some form of locational price signal via connection charges is important for generation.

## High cost cap – protecting all customers from paying for very expensive connections




- Ofgem acknowledged that removing the contribution to wider reinforcement costs for demand connections reduced the incentive to connect at low congestion parts of the network, and increased the risk that the broader customer base would have to pay for network upgrades triggered by new customers.
- To mitigate this risk, Ofgem introduced a High Cost Cap (HCC) for demand customers. This requires connections to pay for all the wider reinforcement costs (at voltage level of connection plus one up), if the cost of connecting them is above a certain £/kVA connection cost, set at £1750/kVA. This cap was based on an analysis of historical data, calibrated at a level where no more than 5% of new connections in any distribution network would have breached this cap historically.
- It is therefore expected the HCC will be triggered rarely, and provide a strong incentive for those connections to find lower congestion parts of the network to connect to and thereby avoid breaching the cap. A similar concept to the HCC already applies to generation connections.

Source: Access and forward-looking charges - SCR - Final decision, Ofgem, May 2022, pp.39-50.

# DUOS tariff structures in the UK have been under long term review since 2018. At present, public EV charging stations are likely to face an agreed capacity with exceedance charges tariff structure.

- Ofgem approves changes to the methodology to calculate DUOS tariffs set out in the relevant industry code (DCUSA), but it does not approve individual tariffs.
- The Common Distribution Charging Methodology (CDCM) establishes the tariff setting methodology for customers connected at the low voltage (LV) or high voltage (HV) levels. For small residential and business customers with a smart meter, the retailer faces a time-of-use energy (pence/kWh) tariff with peak, shoulder and off-peak rates, plus a fixed charge. While the tariff structure is consistent across all distributors, the times that peak, shoulder and off-peak rates apply is tailored to the distributor's network.
- For larger LV/HV business customer, the tariff consists of lower time-of-use (pence/kWh) energy rates, a fixed charge, plus:
  - Agreed capacity and exceeded capacity charges (pence/kVA/day), and
  - Reactive power charges (pence/kVArh)
- These larger business customer tariff rates can be standard or site-specific depending on the size of the customer.
- The Extra High Voltage Distribution Charging Methodology (EDCM) establishes the tariff setting methodology for customers connected at the extra HV level (at or above 22kV). The EDCM contains two alternative methodologies that distributors may choose from which are referred to as the Long Run Incremental Cost (LRIC) method and the Forward Cost Pricing (FCP) method. Tariff rates are calculated for each individual customer and consist of the same structure: a fixed charge (p/day); super red energy charge (p/kWh); capacity charge and exceeded capacity charge (p/kVA/day).
- The current approach has been under review since 2018. Initially, Ofgem had proposed to review the structure of DUOS tariffs as part of same Significant Code Review (SCR) process used to reform connection charges. However, in 2021, it decided to limit the scope of that review (to only connection charges and access rights) and it instead split off DUOS tariffs into a separate standalone DUOS SCR with a revised timeframe. Ofgem had intended to complete the DUOS SCR over 2022, however, it is running behind schedule, and it is currently unclear when this review will be complete, notwithstanding its already 5 years since Ofgem formally began a review of DUOS tariffs.

| | | |
|---|---|---|
| **Type of regulatory intervention** | • Similar to connection charges, there's a common charging methodology required to be applied consistently across all distributors. For LV/HV customers, this is called the Common Distribution Charging Methodology (CDCM); for extra HV customers, this is called the Extra High Voltage Distribution Charging Methodology (EDCM). Both enable some degree of discretion by the distributor in its implementation on specific defined aspects.<br>• Also similar to connection charges, the regulator can set the high-level strategic direction for industry through an SCR. However, for DUOS tariffs this has been under review since 2018 with no end yet in sight. | |
| **Impact on EV public charging infrastructure** | **Impact on connection timeliness**<br>• No direct impact on connection timeframes. | **Impact on connection cost**<br>• DUOS charges are ongoing, rather than born at the time of connection.<br>• The agreed capacity with exceedance charge approach in the UK creates an incentive to reduce peak demand. If EV charging operators are not able to effectively reduce their peak demand, this can result in high network bills for high capacity needs / low energy throughput charging stations in the early years of operation. |
| **Baringa assessment** | • The current structure of DUOS tariffs has been in place since before EVs were a common technology. Given little tangible outcomes have resulted from the review yet, it is too early assess.<br>• Our main takeaway is on governance and prioritisation – that Ofgem's lack of prioritisation means the tariff structures have remained under review, resulting in consequential uncertainty for a long period of time, which is undesirable. | |

Source: Access and forward-looking charges – SCR – Launch decision, Ofgem, December 2018.

# Australian case study

## Public EV charging stations

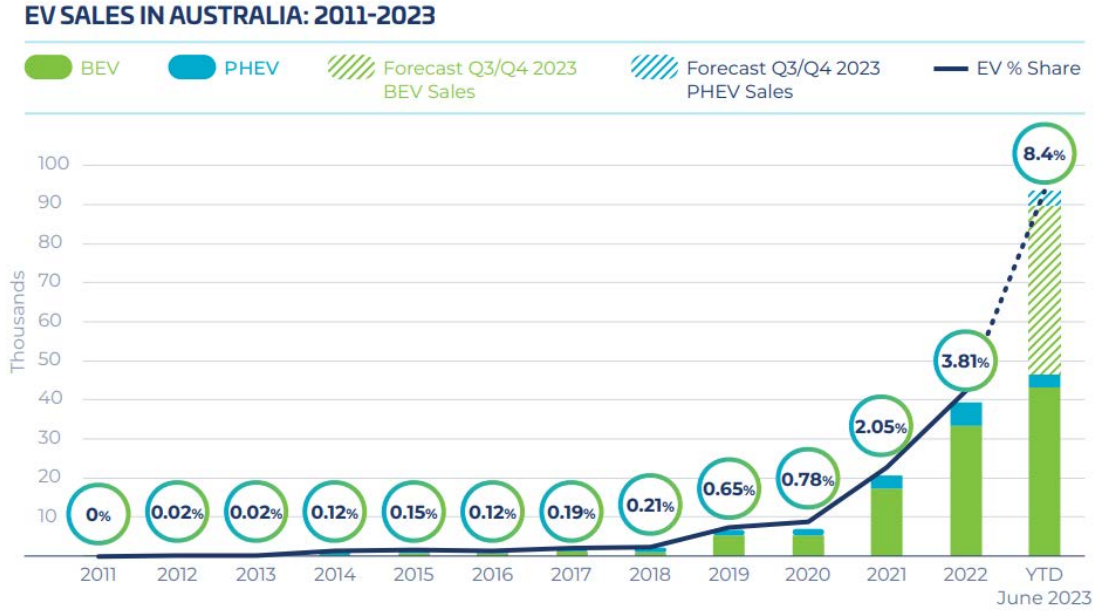
 

# Australia's public EV charging network remains nascent, while EV uptake continues to increase. Addressing gaps in regional coverage and accommodating charging consumption patterns present key opportunities.

### EV uptake in Australia

The adoption of electric vehicles in Australia has been steadily growing, albeit from a relatively low base. This growth has been influenced by increasing awareness of environmental concerns, technological advancements, and improving vehicle models. As of 2022, EVs accounted for 3.8% of all new car sales in Australia–an increase from the 2.1% sold in 2021. There are several reasons for the slowed uptake including:

- The upfront cost of EVs remains a barrier for many consumers. Although prices have been gradually decreasing, EVs often have a higher initial purchase price compared to traditional internal combustion engine vehicles.
- Concerns related to EV range, charging infrastructure, and familiarity with new technology have contributed to slower adoption rates. Some consumers are still hesitant to transition to EVs due to these perceived challenges.

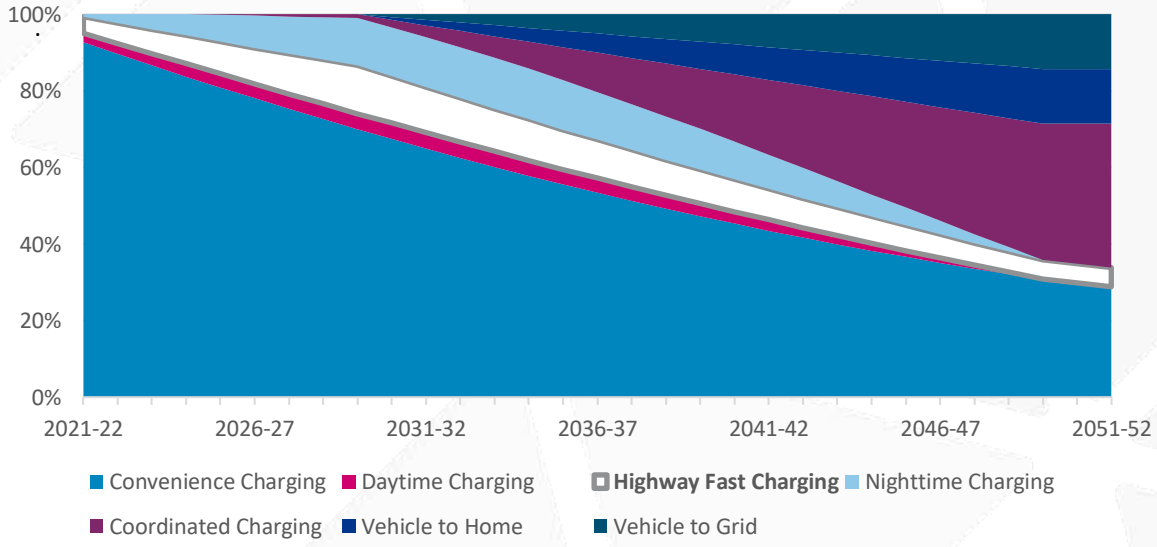



Source: State of Electric Vehicles, EV Council, July 2023, p. 8

### Australian EV charging consumption behaviour

The Australian Energy Market Operator (AEMO) projects distribution of different EV charging methods in Australia over multiple years. Their Electric Vehicle databook shows key insights including a significant shift towards user convenience charging, a gradual growth of daytime and highway fast charging, emergence of nighttime charging, and the anticipated adoption of coordinated charging, vehicle-to-home, and vehicle-to-grid solutions. This data reflects the evolving landscape of EV charging strategies, with convenience charging dominating and innovative solutions like vehicle-to-grid gaining traction.

The chart below depicts the EV charge type forecast by percentage. While a significant majority (92%) of EV charging currently takes place at home, investment in public charging infrastructure has been steadily increasing over the past 4 years and is forecast to continue. The current share of fast charging behaviour is 5% and this is expected to peak in 2030 at 12.6% of total charging behaviour. From then, projections suggest that coordinated charging (presumably led by distributors) will displace both fast and convenient charging to become the primary method of EV charging behaviour.




Source: Electric Vehicle Assumptions Book, AEMO, 2021

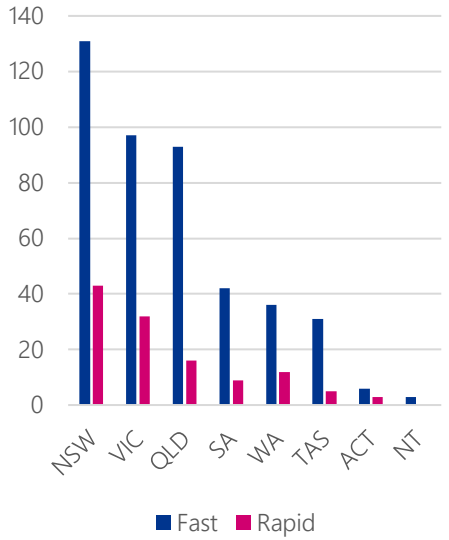
# The market for public EV charging operators across Australia is growing, yet challenges persist, particularly in addressing the distribution of charging infrastructure and the need for faster charging speeds.

### Number and growth in public EV charging stations in Australia

Notably, one of the challenges affecting EV uptake in Australia has been the limited availability of public charging infrastructure, particularly fast chargers. The lack of a comprehensive and easily accessible charging network has been a deterrent for potential EV buyers. Australia has over 4900 public EV charging stations, including both fast and slow chargers. additionally, the number of charging stations per capita was lower compared to countries with higher EV adoption rates. In Australia, the public charging network is growing.

As of June 30, 2023, there were 558 high-power public charging locations and 967 individual high-power public EV chargers operational, marking a 57% increase from the previous year. Many public charging stations are established through partnerships between government bodies, local councils, private charging network operators, and other stakeholders. These partnerships help in sharing the costs and responsibilities of setting up and maintaining charging infrastructure.

**Number of fast and rapid charging stations**




**Key charging infrastructure providers**

ABB

JOLT

bp

JET CHARGE

wallbox

Source: State of Electric Vehicles, EV Council, July 2023, p. 18

### Government efforts to improve the EV market

Various state and federal government incentives and rebates have been introduced to encourage EV adoption. These incentives include grants for purchasing EVs, discounts on registration fees, and tax benefits. Fast chargers only account for a small portion of and this is only likely to increase as Government and states and territories commit to invest in public charging infrastructure.

### NSW government investing a total of $171M under its EV Strategy

NSW is committed to a robust Electric Vehicle Strategy that sets ambitious targets: achieving over 50% of new car sales as EVs by 2030, with a further goal of EVs making up the majority of new cars sold by 2035. This strategy encompasses a comprehensive approach to integrating EVs into the energy grid. Recognising the potential strain on the electricity network due to increased EV adoption, the government is actively working to ensure seamless integration by leveraging rooftop solar, batteries, and smart charging technologies and other forms of CER. The strategy also emphasises bidirectional charging capabilities, enabling EV batteries to support the grid during peak electricity demand, thus facilitating a productive relationship between EVs and the energy system.

Central to this strategy is the development of a robust charging infrastructure. The NSW Government is dedicated to co-funding public fast and rapid charging stations through EV fast charging grants. These stations, managed by charging point operators, will be strategically located across the state to provide convenient and widespread access. A significant investment of $171 million over four years has been earmarked for the expansion of EV charging facilities, aiming to cover key areas such as major commuter corridors, highways, residential zones, and transportation hubs. To encourage broad participation, the funding process involves a competitive application approach, with applicants required to contribute at least 50% of the project's capital cost. Furthermore, the government has unveiled an electric vehicle fast charging master plan to guide the rollout of public fast charging stations. This plan not only outlines the existing and future network but also assists industry players and planners in identifying optimal locations for these vital charging points. In addition to infrastructure development, the NSW Government is creating partnerships with small tourism businesses to encourage EV infrastructure investments at regional tourism destinations, further reinforcing the commitment to sustainable transportation solutions.

Source: NSW Electric Vehicle Strategy, NSW Government, 2021

# EV sales in AU have begun to accelerate, and the lack of public fast charging infrastructure is seen as a key barrier to further uptake – governments and stakeholders are seeking to address this constraint.

## Commonwealth Government National EV strategy

With the release of the National EV Strategy, the Commonwealth Government recognises the key role EVs can play in storing and dispatching excess power generated from renewable energy, and assist in electricity grid management. While the market share has been gradually increasing, it remained relatively low compared to other countries with more aggressive EV adoption targets. The National EV Strategy aims to:

- Increase the uptake of EVs to reduce our emissions and improve the wellbeing of Australians
- Increase the supply of affordable and accessible EVs
- Establish the resources, systems and infrastructure to enable rapid EV uptake
- Encourage increase in EV demand.

The strategy underscores the significance of robust charging networks. To achieve this, the strategy proposes investments in charging infrastructure projects, making EV charging points more widespread and easily accessible across Australia's urban and regional areas. This expansion aligns with the broader goal of making EVs a practical choice for Australians, irrespective of their location.

It also seeks to establish partnerships with the private sector. These collaborations are anticipated to spur innovation and drive the growth of charging networks that cater to varying consumer needs, whether they require rapid charging at highway stops or convenient charging options in urban areas.

## EV industry advocacy

The EV industry has long advocated for greater reforms to better enable Australians to adopt and transition towards EVs. A key component of this is the acknowledgement of limited charging infrastructure.

The narrative from peak bodies such as the Electric Vehicle Council (EVC) has long been that establishing public charging stations requires coordination with electricity distributors, regulatory approvals, and network capacity assessments. Connection timeliness and costs can vary, with some charging operators facing delays or unexpected expenses due to the technical and regulatory complexities.

The DUOS tariff pricing components of EV charging stations have been a contentious issue amongst advocates. New EV charging stations typically have a lower utilisation of the network and can therefore experience a higher cost per unit of energy than other customers on similar tariffs. This cost profile has been described as significant and potentially unfriendly to the deployment and ongoing operation of fast charging stations. The EVC has historically advocated for changes in network tariff design.

## Regulatory framework constraints for EV chargers

For distributors, the deployment of fast charging equipment is often impeded by the need to upgrade the existing site connection and surrounding network infrastructure.

- Improving visibility of network capacity information offers a multitude of benefits for the planning and deployment of charging infrastructure. One key constraint is the need for compliance with technical and safety standards, ensuring that the integration of EV charging stations does not compromise its stability or the safety of other users.
- Better network visibility information potentially reduces the number of individual applications needed for planning multiple EV infrastructure sites, with a higher probability that the selected sites will be fit-for-purpose.
- There are some variations across dsitrbutors in tariff structures, including time-of-use pricing, demand charges, and capacity-based charges, which can create complexities for both charging station operators and EV users. Proposals and trials have been introduced to separate medium business tariffs for EV charging stations. In response, networks are considering changing the threshold at which capacity tariffs apply, to directly addressing the feedback from the EV industry.

Source: National Electric Vehicle Strategy, DCCEEW, 2023

# The National Electricity Rules and AER guidelines provide a common regulatory framework for distributors, with the degree of prescription vs discretion for distributors differing based on regulatory policy topic.

The Australian energy regulatory landscape consists of two distinct frameworks: the National Electricity Market (NEM) covering the east and southeast coast states states where the majority of the population lives, and the smaller Wholesale Energy Market (WEM) in Western Australia (WA). The NEM and WEM are physically separate energy systems. This report focuses on the NEM, and where differences exist between states and distributors, uses New South Wales (NSW) and the NSW distributor, Ausgrid, as a case study. Regulatory examples from the WEM are also brought in where there is a particularly relevant example for public EV charging stations, such as with EV specific network tariffs in WA.

In the NEM, the key regulatory framework is the National Electricity Rules (NER) set by the Australian Energy Market Commission (AEMC) and administered by the Australian Energy Regulator (AER). This provides a common framework covering all distributors in the NEM, however, the degree of common prescriptive approach vs individual distributor discretion differs based on regulatory area between network visibility, connections process, connection charges and network tariffs. Further, not all regulatory topics are covered by the NER and specific state-based regimes exist for certain areas (e.g. elements of the connection process).

**NEM**

**National Electricity Law (NEL)**

The energy sector in Australia is governed by federal and state legislation, which includes acts and regulations. These laws set the fundamental framework for energy regulation and establish the roles, responsibilities, and powers of various regulatory authorities.

The key legislative instrument is the NEL. This is state-based legislation with each NEM state agreeing to the same legislation to form a national framework.

In WA, the Electricity Corporations Act 2005 applies.

**National Electricity Rules (NER)**

The NER are the primary regulatory instruments in the Australian electricity sector. These rules are made by the AEMC, an independent body responsible for developing and amending the national energy market rules. The NER set out the detailed operational and market rules for the electricity sector.

The NER can be changed by the AEMC. The AEMC cannot initiate its own rule change. Instead, its role is to independently assess proposed rule changes submitted by market participants and other stakeholders. Proposed rule changes undergo a public consultation and assessment process.

**AER guidelines**

The AER is the primary regulatory authority responsible for economic regulation of energy networks; along with the monitoring, enforcement and compliance with the energy rules for all market participants.

The AER issues guidelines that provide detailed guidance on the application of the rules – either binding or non-binding guidelines depending on the topic. These guidelines help stakeholders understand their obligations and facilitate consistent regulatory practices.

**Industry guidelines and knowledge sharing**

In addition to AER and ERA guidelines, there are industry-led guidelines developed by Energy Networks Australia. These guidelines are typically non-binding but provide best practices and industry standards for various aspects of energy operations, such as connections.

In addition, innovation funding to energy networks from the Australian Renewable Energy Agency (ARENA) is tied to requirements to publish knowledge sharing reports to encourage innovation and best practice.

**WEM**

The Electricity Networks Access Code and Pilbara Networks Access Code provide the primary economic regulation framework for electricity networks in WA, depending on their location.

Separate rules, called the WEM Rules, govern market operation including dispatch, trading and settlement. Recently, a new State Electricity Objective has been introduced to support the uptake of new technologies (focused on distributed energy resources) and consideration of the environment, emissions, prices and reliability.

Each set of rules are administrated by the Economic Regulation Authority (ERA) of Western Australia.

The ERA issues guidelines that offer detailed guidance on the application of the codes and rules. These guidelines assist stakeholders in understanding their obligations and navigating the regulatory requirements of the WEM.

Sources: National Electricity Law, National Electricity Rules

# Network visibility and the connection process are part regulated/part industry-led, with the AER approving connection charges and DUOS tariff structures at the 5 yearly regulatory determination stage

| Regulatory framework | Element | Description |
|---|---|---|
| Network visibility | Degree of granularity | Network Opportunity Maps (NOMs) published by the industry body provide consistent, transparent annual planning data to help identify capacity constraints and display detailed information including locations and charging capacity of existing EV charging infrastructure. |
| | Frequency of updates | The NOMs are updated annually to account for the latest release of Distribution Annual Planning Report (DAPR) published by distributors. |
| | Ease of access | These are accessible to the general public as the NOM is published on the ENA website and are free to access. |
| Connection process | Timeframes and application requirements | For negotiated connections, the timeframe between the submission of a connection application from the proponent that is compliant and the connection offer from the network that meets network access standards is 65 business days. |
| | Contestability | Contestability arrangements differ by state, for example in NSW, where provision of connection work is contestable, customers will engage and pay for their own Accredited Service Provider (ASP) to install the connection assets (i.e. extension/upgrade of the network). |
| | Dispute resolution | The AER oversees dispute resolution which begins with a notification, assessment of whether the complainant has utilised the dispute resolution process of the business, factoring in the local regulations and cost of work and then issuing a preliminary assessment. |
| Connection charge | Components | Connection charges are comprised of the sum between: costs for alternative control services, pioneer scheme payments for assets previously funded by existing customers, and capital contributions from new customers for any required augmentation works. |
| | Depth of charge | To enable a new customer to connect to the network may require investment in both assets to extend the network to the new connection site and network upgrades (aka augmentation or reinforcement) to the existing shared network. How these costs are recovered from the new connection (via upfront connection charges) or wider customer base (view ongoing DUOS tariffs) is referred to as the 'depth' of the connection charge. |
| | Degree of upfront cost recovery | |
| Distribution use of system (DUOS) tariffs | Tariff structure | Different jurisdictions within the NEM have varied tariff structures, including time-of-use (TOU) tariffs or peak demand charges. Each regulatory period, distributors are required to submit a tariff structure statement (TSS) to the AER for approval. |
| | Degree of customer choice | The pricing principles for tariff proposals include consumer understanding and engagement. In practice, the AER has required distributors to offer tariff choice for small customers. For large customers, the degree of choice differs by distributor. |
| | Technology neutral or specific | Tariff structures in the NEM do not emphasizes technology specific pricing. However, in Western Australia the ERA has approved an EV charging specific tariff for the WA distributor. |

# Access to network data is publicly available to EV proponents seeking to optimise benefits from local capacity information – equipped with knowledge to commence a connection application.

Network visibility provides essential information about the distribution network's capacity, load patterns, and future infrastructure plans. This data is valuable for EV charging operators when planning new charging stations as operators can identify areas with high demand, evaluate the adequacy of network infrastructure to support charging needs, and strategically select locations that ensure optimal service coverage. In Australia, the Network Opportunity Maps (NOM) published by the industry body Energy Networks Australia (ENA) provide consistent, transparent annual planning data to help identify opportunities for distributed generation, energy storage and other non-network solutions.

**Degree of granularity**

- The first layer of the NOM shows available distribution capacity at the zone substation level, which can be segmented over a 10-year timeframe (2022-2031). Peak day available capacity is a secondary layer which can highlight areas of significant network congestion. Specific information on EVs such as registrations and charging sites can also be overlaid to illustrate potential opportunities.
- The maps are not advertised to be used as the basis for any investment decision, by the ENA as they do not verify the accuracy of the material being published – only consolidate.

**Frequency of updates**

- There are few requirements on networks to release data for the low-voltage network currently, with Distribution Annual Planning Reports (DAPR) limited to high-level network information. While networks will voluntarily release some data, a lack of common definitions of what is needed makes information requests diverse and costly to respond to. As a result, the capacity information in the NOM is updated annually to account for the latest release of network DAPRs.
- EV related data is supplied by the Electric Vehicle Council industry advocacy body and is updated 6-monthly in June and December.

**Ease of access**

- These maps are intended to make data on electricity network planning and investment more accessible and consistent. They are published on the ENA webpage and can be accessed by any member of the public for free.

Source: Network Opportunity Maps, ENA

| | | |
|---|---|---|
| **Level of regulatory intervention** | • While the DAPR published by networks, such as Ausgrid, are a regulatory requirement under the Rules, the NOM is an industry body initiative to consolidate the network capacity data from the DAPR into a consistent and easy to access format. In addition, data is included that goes beyond DAPR requirements such as EV charging sites. This provides a more holistic and meaningful representation of investable areas of opportunity within the NEM.<br>• The AER is exploring the first phase of a Network Visibility project uplift to focus on developing a clear pathway for delivering datasets to the market and identifying network opportunities. It is expected that this would formalise the NOM requirements as a compliance tool to be published by networks. | |
| **Impact on EV public charging infrastructure** | **Impact on connection timeliness**<br>• Direct impact, the detailed NOMs with EV relevant data enables both networks and proponents to assess conditions and submit/prioritise connection requests efficiently, reducing the waiting time for EV charging operators to obtain approval for new connections. | **Impact on connection cost**<br>• No impact currently, however network visibility may result in efficient investment allocation in the long-term as it would encourage only cost-effective network upgrades, which may assist in reducing overall connection costs for EV public charging operators. |
| **Baringa assessment** | • The granular level of detail, particularly in the NSW region of the NOMs significantly influences the ability of EV public charging operators to understand the potential for submitting a connection application. It is increasingly crucial in ensuring the seamless integration of EV public chargers with the electricity network.<br>• In addition, the NOM empowers proponents with valuable insights into network conditions and electricity load, enabling them to make data-driven decisions for EV public charger connections. This allows for greater level of specificity within applications as it is likely to only encourage connection requests in areas where there is both network capacity and demonstrable appetite for charging. | |

# NOMs provide detailed information as they show progression of load growth relative to capacity over time, to help identify gaps in existing EV charging infrastructure provision and areas of available capacities.

**Average Hourly Weekday Traffic Volume**

Display Variable: 12 AM Average Hourly Weekday Traffic Volume
Time: 2021-01-01T00:00:00.000000000Z

**6 PM**

- 7,598 to 8,682
- 6,514 to 7,598
- 5,429 to 6,514
- 4,345 to 5,429
- 3,261 to 4,345
- 2,177 to 3,261
- 1,092 to 2,177
- 8 to 1,092

**Available Distribution Capacity**

Display Variable: Available Capacity (MVA)
Available Distribution Capacity
Time: 2021-01-01T00:00:00.000000000Z

**Available Capacity (MVA)**

- 15 to 225
- 10 to 15
- 3 to 10
- -3 to 3
- -10 to -3
- -15 to -10
- -59 to -15

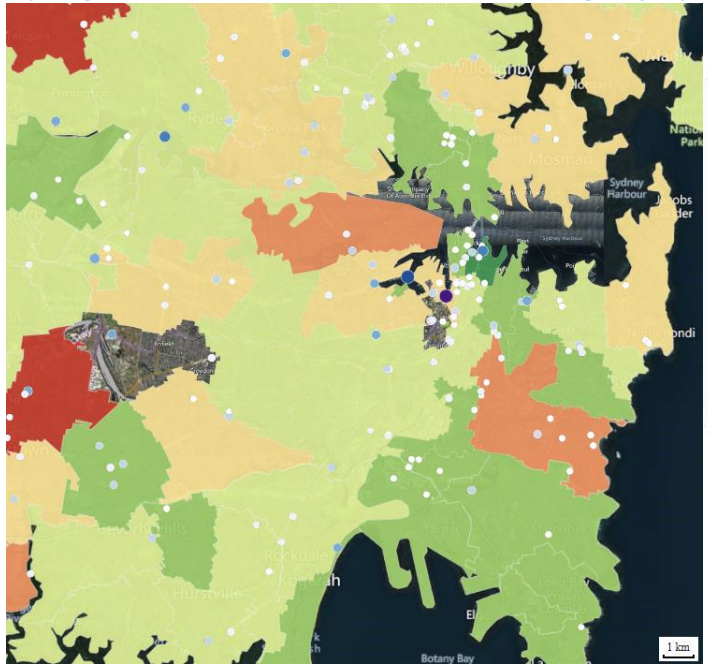
**EV charger locations**

Display Variable: Number of cars which can simultaneously charge EV charger locations
Time: 2021-01-01T00:00:00.000000000Z

**Number of cars which can simultaneously charge**

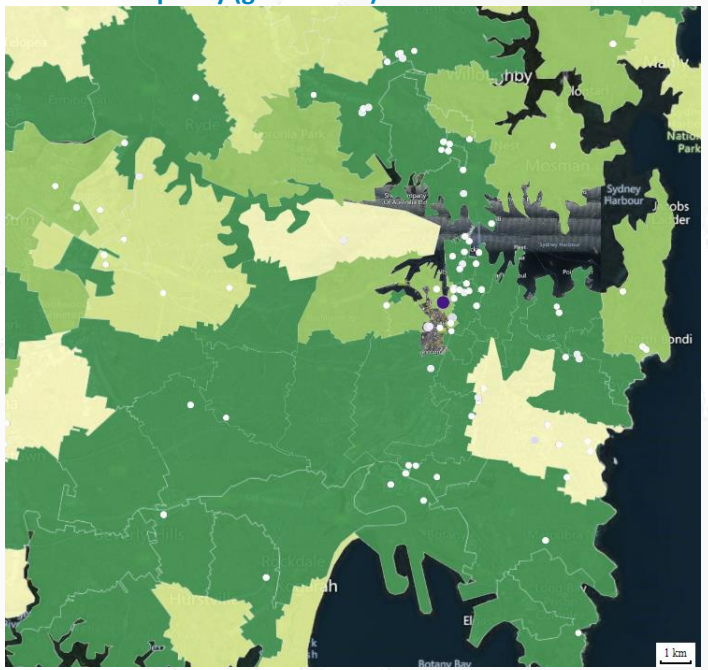
- 17.6 to 20.0
- 15.3 to 17.6
- 12.9 to 15.3
- 10.5 to 12.9
- 8.1 to 10.5
- 5.8 to 8.1
- 3.4 to 5.8
- 1.0 to 3.4
- (No value)

## Average hourly weekday traffic (blue dot) against peak day capacity at 6pm (green zone) and no. of EVs that can be charged (purple dot)




- This NOM shows the hourly weekday traffic volumes of all vehicle technology types (EV and non-EV) at different monitoring stations, recorded in number of vehicles per hour at 6pm, and is a critical variable that indicates potential volume and timing of charging needs, dictated by passing road traffic.
- This will help EV charging operators understand the level of potential EV throughput within a given location with the assumption that more of these vehicles will be electric in nature, given current purchasing trends in Australia. Areas that are a deeper blue represent attractive locations.

## Number of EVs that can be charged (purple dot) against available capacity (green zone)




- This NOM shows the number and location of current EV charging stations. Beyond that, it illustrates the number of vehicles which can simultaneously charge – the points are additionally scaled in size by their numeric value.
- Note that some stations are plotted directly on top of each other where multiple network providers and/or charge heads of differing types are at the same site.

Source: Network Opportunity Maps (nationalmap.gov.au)

# The Rules stipulate how distributors should respond to connection applications, and connection guidelines published by the ENA are a voluntary industry code intended for consistent adoption amongst distributors.

The National Electricity Rules (Rules) and Consumer Energy Resource (CER) Connection Guidelines set out the framework, principles, approach and technical settings for Australian distributors to adopt in the development and application of their technical requirements for grid connection. The guidelines provide for a level of consistency between Australian distributors' technical requirements for grid connection in terms of both structure of presentation and the requirements themselves. The guidelines are viewed as a voluntary industry code and supplement the Rules.

The connections process can involve significant costs for EV public charging operators. These costs include connection fees, design and engineering expenses, metering requirements, and other associated charges. This process and details on timeframes and process is presented on the next slide.

**Contestability**

- Contestability arrangements differ by state. For example, in NSW, where provision of connection work is contestable, new customers will engage and pay for their own Accredited Service Providers (ASP) to install the new connection assets (extension or upgrading of the network). In this case there is no separate connection charge payable to a distributor, either as an upfront charge or through their regular electricity bill. Contestable services provided by an ASP include the design and construction of connection assets at the customer's premises and may include augmentation of the distribution system.
- For Ausgrid, if they determine that any of the required work for a new connection is a contestable service, the customer must engage a suitably authorised ASP to complete the work. The charges for contestable services are unregulated and subject to agreement between by the customer and their selected ASP.
- Ausgrid only funds augmentation works associated with basic connection services (i.e., where there is minimal work required)

**Dispute resolution**

- The Rules outline the dispute resolution between distributors and customers during the connection process. Clause 5A.G.3 legislates that a relevant dispute could be effectively resolved by some means other than an access determination, and the AER may give the applicant and network involved in the dispute notice of the alternative means of resolving the dispute, such as a jurisdictional ombudsman.

| | | |
|---|---|---|
| **Level of regulatory intervention**  | • Distributors must process and review connection applications in accordance with the connection process outlined in the Rules. However, distributors do not publish formal guidance on these processes as part of the 5-yearly regulatory determination. This results in minor nuances across the distributor connection policies across the NEM. The AER does not explicitly approve these processes.<br>• The guidelines published by the ENA provide for a level of consistency between distributors' technical requirements for grid connection in terms of both structure of presentation and the requirements themselves and are seen as best practice. These guidelines provide greater clarity on what steps of the connection process distributors should adopt (see next slide). | |
| **Impact on EV public charging infrastructure**  | **Impact on connection timeliness**<br>• Direct impact, the connections process for EV charging infrastructure can be time-consuming and subject to delays if the application is not completed properly. | **Impact on connection cost**<br>• Potential impact, costs include connection fees, design and engineering expenses, metering requirements, and other associated charges. |
| **Baringa assessment**  | • The Rules are clear for timeframes related to the connection process, but the appropriate format of the application is set out and determined by the distributor. This can lead to potential inconsistences between distributors within the same state, contributing to challenges for potential EV public charging operators. If there is a slow and/or fragmented process in designing connections, this can further add to the challenges.<br>• In NSW, where augmentation is contestable, the connection process has an impact on the breakdown of the connection charge and customer funded assets. | |

Source: CER Connection Guidelines., ENA, May 2018

# The connection process for EV public chargers involves navigating regulatory approvals, network capacity assessments, and potential upgrades to facilitate seamless integration with the electricity network.

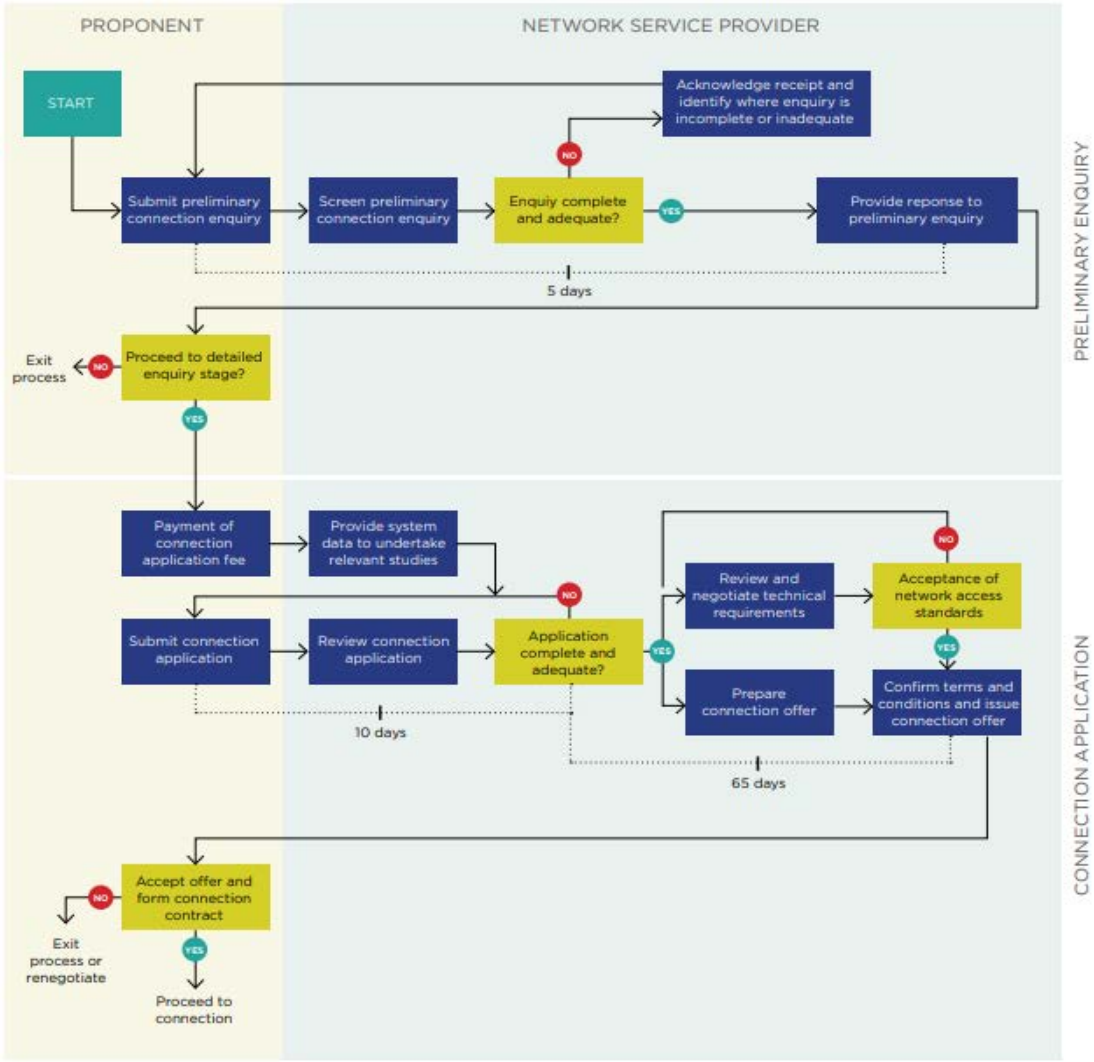
**Timeframe**

- For standard connections, the required timeframe between the submission of connection from the proponent and the connection offer from the network for a complete and adequate application is 10 business days. However, the nature of EV public charging points mean that they are likely to fall under non-standard connections / negotiated connection arrangements.
- Negotiated connections are more complex as these applications do not meet all technical requirements and therefore require negotiation before network approval. Distributors have to explain how the technical settings may vary by connection type or location and are therefore more appropriate for EV public chargers. The negotiations connection process enables interested EV charging proponents to work with distributors to establish customised connection arrangements that meet specific energy needs. Negotiations may include discussions about network capacity, infrastructure requirements, costs, and technical considerations. This approach aims to ensure that energy distribution aligns with the unique requirements of each consumer while maintaining the integrity and stability of the broader electricity network. These are only applicable where the connection service is provided in a contestable market such as in NSW.
- While the negotiated connections process is flexible, it still operates within the broader regulatory framework set by energy authorities to maintain network stability and security. The negotiated connection process is split into two phases preliminary enquiry and connection application. When a proponent submits a preliminary enquiry, the distributor has 5 business days to respond whether the proponent can proceed to a connection application.

**Application detail**

- The connections process for EV charging applicants must ensure compliance with safety standards, electrical codes, and grid interconnection guidelines. When an applicant submits a connection application to Ausgrid, they must also submit the expected and planned future maximum demand calculations. Prospective EV charger applicants have 10 days to prepare a complete and adequate application that meets these requirements. The distributor then has 65 business days to review technical requirements, negotiate the connection offer and accept the terms and conditions.

**Overview of negotiated connections process**




Source: CER Connection Guidelines., ENA, May 2018, p. 18

# Public EV charging operators may be subject to pay for the necessary extension work and/or a share of the cost of upgrading capacity of the network when connecting.

The AER develops and publishes connection charge guidelines which inform the development of connection policies by distributors. The AER's guidelines ensures that connection charges are reasonable and reflect the efficient cost of providing the service.

**Components and formula for the AER connection charge guideline**

- The connection charge is calculated in accordance with the general formula in the next slide.

**Depth of connection charge and capital contribution from the customer**

- Connection works may involve augmenting the network by installing new network infrastructure; or upgrading, reconfiguring, or decommissioning existing infrastructure. Where a capital contribution is required, distributors will note this and specify the amount of the contribution in the connection offer.
- The threshold for determining whether an upfront capital contribution is required must be based on a unit measure of customer demand determined by the distributor. This amount must be fixed for the duration of the regulatory control period. For example, Ausgrid does not require retail customers to contribute to the costs of a network augmentation via an upfront capital contribution if the customers is connected to the LV customer with a maximum capacity less than:
  - 100 amps single phase for a customer in a rural area; or
  - 100 amps per phase, three phase, in a non-rural area.
- These maximum demand thresholds have been determined having regard to the principles set out in the AER guidelines, and as a result the depth of the connection charge varies slightly across different distributors.

**Distinction between upfront vs ongoing nature of the connection charge**

- Upfront connection charges cannot be recovered through retail bills (these are ongoing charges). For large customers, the capital contribution must be paid as a lump sum before the distributor will commence any works and are required upfront.
- Conversely, ongoing charges are collected through distribution use of system (DUOS) tariffs.

Source: Connection Charge Guidelines, AER, April 2023

| | | |
|---|---|---|
| **Level of regulatory intervention** | • The AER has published a Connection Charge Guideline. Each distributor must develop its connection policy in accordance with this guideline. The connection charge is set by the local distributor and not the retailer. The precise calculation methods are published by the distributor and set out in its Connection Policy. These connection policies are approved by the AER.<br>• Ausgrid's connection policy sets out the circumstances in which connection charges are payable and the basis for determining the amount of those charges. | |
| **Impact on EV public charging infrastructure** | **Impact on connection timeliness**<br>• Direct impact, connection charges that have a higher upfront component may slow down the end-to-end connection process, as they must be paid prior to any augmentation works required for the connection | **Impact on connection cost**<br>• Direct impact, these connection charges form a significant component of the total costs of connection for EV public charging operators in NSW. |
| **Baringa assessment** | • Capital contributions designed to partially contribute to network augmentation is a cost reflective approach linked to the impact of an individual customer at a specific location on the network.<br>• However, the downside for the energy transition is that this can constitute a higher upfront cost for a public EV charger early in its operation when customer demand and subsequently revenue is forecast to be low. | |

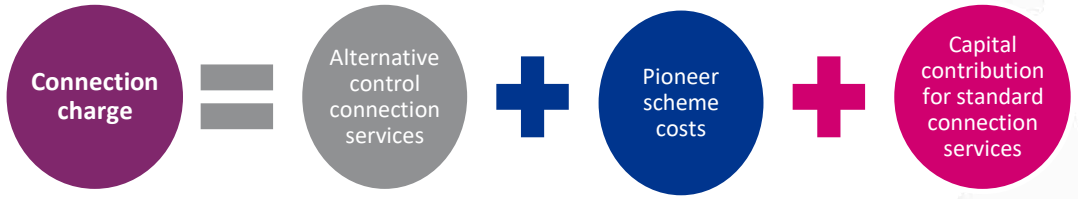
# The AER prescribes the components of connection charges for distribution networks. Distributors are required to reflect this within their individual connection policies.

The precise threshold levels, which determine how large customers are defined for the purposes of connection charges, will be set out by each distributor in their connection policy – which must be approved by the AER. The connection charges are consistent with the NER and thus impose no additional requirements on distributors. Distributors detail how each of the connection charges is determined within their own connection guidelines.

**Components and formula for the AER connection charge guideline**

- The connection charge is calculated in accordance with the general formula in the figure below.
- Alternative control services are usually only applicable in circumstances where there are a small number of customers who are infrequent, and the costs can be directly attributable to them. These often service basic connections, as the provision of these services involves minimal or no augmentation of the distribution network.
- Pioneer scheme contributions refer to where a customer uses a network extension that was fully paid for by another customer within the last 7 years and are required to pay a portion of the extension assets. The connection applicant (the subsequent customer) may be required to share costs of the original customer's connection by making an appropriate contribution towards the cost of the shared asset. If other customers subsequently connect, the connection applicant may recover a proportion of the contribution they paid from the subsequent customers. The pioneer scheme only applies if the amount payable is greater than the threshold of $1000 real 2012 (adjusted for CPI).
- Capital contributions are paid by the connection applicant towards the cost of extending or augmenting the distribution network or installing or upgrading new connection assets required to enable the new connection or connection alteration to be made.

**AER connection charge formula**




Source: Connection Charge Guidelines, AER, April 2023, p. 6

# Distributors propose tariff structures to the regulator for approval which must align with common pricing principles. A number of different approaches exist between distributors under these principles.

DUOS charges relate to the costs of transporting electricity from the transmission network, or generators embedded in the distribution network, direct to customers. DUOS tariffs contribute to the overall cost structure for EV public charging operators. The specific DUOS tariff structure can vary based on factors such as location, time of use, and demand, ultimately tariff structures can support or restrict public charging infrastructure investment

**Design and cost structure**

- Different states and territories may have varied tariff structures, including time-of-use (TOU) tariffs or peak demand charges. DUOS tariffs in Australia are designed to be cost reflective and encourage load shifting and manage peak demand on the distribution network.
- In Australia, public fast charging sites are often assigned to large business tariffs due to site capacity alone (e.g., sites featuring multiple 50kW or 150kW or 350kW chargers) but forecast site volumes of consumption are far below the volumes typical of large customers.

**Choice considerations**

- Tariff structures that align with EV charging patterns, such as providing incentives for off-peak charging or demand response, can foster the growth of public charging infrastructure. Providing the right signals to EV owners or EV charging stations will induce them to make the right decisions

**Technology neutral or specific**

- Technology-neutral tariffs treat EVs similarly to other, without specific tariffs exclusively for EV charging.
- Conversely, specific tariffs designed exclusively for EVs may incentivise EV charging during specific periods or locations.

We have illustrated a comparison of Ausgrid's tariff structures against other approaches in Australia on the following slides.

| | | |
|---|---|---|
| **Level of regulatory intervention** | • Australian distributors are required to develop a tariff structure statement (TSS) outlining the proposed DUOS pricing structure for the next regulatory period and an indicative pricing schedule for each regulatory year.<br>• There is continued debate on whether EV charging stations could be exempted from tariff class assignment criteria so that they may access small customer TOU tariffs and avoid large customer demand tariffs, as tariffs need to be designed in a way that supports the rollout of public EV charging stations, and balances potential costs to all consumers. | |
| **Impact on EV public charging infrastructure** | **Impact on connection timeliness**<br>• Potential impact, operators may prioritise areas with more favorable tariff structures or explore collaborations with distributors in regions with more attractive tariff conditions. | **Impact on connection cost**<br>• Direct impact, DUOS tariffs represent the ongoing cost of operating EV public charging infrastructure as they influence charging behaviour. |
| **Baringa assessment** | • Operators need to factor these costs into their pricing models and business plans, as higher DUOS tariffs can impact profitability and charging rates offered to end-users.<br>• Until a true cost reflective tariff can be developed, EV industry has advocated for assigning EV charging sites onto small business tariffs. | |

Source: Network tariff reform explainer, AER

# There are contrasting approaches to setting cost reflective tariff structures – whilst industry specific tariffs are avoided on the east-coast, Western Power in WA has adopted a public EV charger specific tariff.

Connection size

| | Ausgrid | AusNet | western power |
|---|---|---|---|
| **Large business** | **12 month rolling peak demand**<br>• HV tariffs are comprised of the following:<br>• Fixed daily access charge<br>• Energy charge during seasonal evening peak windows<br>• Capacity charge applied to the customer's highest demand during any 30-min period over a rolling 12 months<br>• New customers cannot select whether they are assigned a capacity tariff, demand tariff, or energy only tariff, based on their self-predicted energy use. | **Critical Peak Demand (CPD)**<br>• During peak periods, AusNet nominate 5 CPD days. These days generally happen on days with extreme temperatures or consecutive days of hot weather. On each CPD day, between 3pm and 7pm AEDT, consumers are encouraged to reduce electricity demand to minimise the CPD charge on their electricity bill. | **Technology specific**<br>• Western Power has a HV EV charging service tariff<br>• It consists of fixed daily use of system and metering charges<br>• There is also an on-peak and off-peak energy use of system charges and metered demand daily charges |
| **Medium business** | **12 month rolling peak demand**<br>• LV tariffs for medium business customers mirror the HV tariff structure:<br>• Fixed daily access charge<br>• Energy charge during seasonal evening peak windows<br>• Capacity charge applied to the customer's highest demand during any 30-min period over rolling 12 months | | **Technology specific**<br>• Western Power also has a LV EV charging service tariff<br>• It consists of fixed daily use of system and metering charges<br>• There is also an on-peak and off-peak energy use of system charges and metered demand daily charges |
| **Small business** | Choice between **Time of Use (TOU)** or **Monthly demand**<br>• Fixed daily access charge<br>• Energy charge during seasonal evening peak windows<br>• Off-peak energy charge during all other times.<br>• **Monthly demand**: additional peak demand charge applied to customer's highest demand during any 30-min period during peak periods that is reset monthly | | |

Sources: Ausgrid TSS 2024-29, p.25; AusNet TSS 2021-26, p.21; Western Power TSS 2022-27, p. 47

# While its appropriate to have more cost reflective and complex tariffs as customer size increase, the adoption of industry or technology specific tariffs is new and debatable.

Connection size

## Large business

### Ausgrid

| 12 month rolling peak demand HV | |
|---|---|
| **Fixed** | Daily access charge: c/day |
| **Peak energy** | c/kWh charge between 3-9pm weekdays during Summer and Winter |
| **Off-peak energy** | c/kWh charge for all other times |
| **Peak capacity** | c/kW/day charge applied to highest kW during any 30-min period between 3-9pm in last 12 mnth |

### AusNet

| Critical Peak Demand (CPD) | |
|---|---|
| **Fixed** | Annual standing charge: $/year |
| **Peak energy** | c/kWh charge between 7am-11pm weekdays |
| **Off-peak energy** | c/kWh charge for all other times |
| **Capacity** | $/kVA/yr fixed value charge |
| **CPD** | $/kVA/yr average of 5 recorded between 3-7pm on 5 days nominated in advance |

### Western Power

| Technology specific (Electric Vehicle charging HV) | |
|---|---|
| **Fixed** | Daily access charge: c/day<br>Daily metering component: c/day |
| **Peak energy** | c/kWh charge between 3-9pm daily that varies with network utilisation (based on intervals with demand greater than 10kW) |
| **Shoulder/Off-peak/super off-peak energy** | c/kWh charge for all other charging windows (9-11pm, 11pm-6am, 6-9am, 9am-3pm) that varies with network utilisation |
| **Metered demand** | c/kVA/day charge that varies by maximum demand during 30 min interval in peak period |

| Technology specific (Electric Vehicle charging LV) | |
|---|---|
| **Fixed** | Daily access charge: c/day<br>Daily metering component: c/day |
| **Peak energy** | c/kWh charge between 3-9pm daily that varies with network utilisation (based on intervals with demand greater than 10kW) |
| **Shoulder/Off-peak/super off-peak energy** | c/kWh charge for all other charging windows (9-11pm, 11pm-6am, 6-9am, 9am-3pm) that varies with network utilisation |
| **Metered demand** | c/kVA/day charge that varies by maximum demand during 30 min interval in peak period |

## Medium business

| 12 month rolling peak demand LV | |
|---|---|
| **Fixed** | Daily access charge: c/day |
| **Peak energy** | c/kWh charge between 3-9pm weekdays during Summer and Winter |
| **Off-peak energy** | c/kWh charge for all other times |
| **Peak capacity** | c/kW/day charge applied to highest kW during any 30-min period between 3-9pm in last 12 mnth |

## Small business

| Time of Use (TOU) | |
|---|---|
| **Fixed** | Daily access charge: c/day |
| **Peak energy** | c/kWh charge between 3-9pm weekdays during Summer and Winter |
| **Off-peak energy** | c/kWh charge for all other times |

Sources: Ausgrid TSS 2024-29, p.25; AusNet TSS 2021-26, p.22; Western Power TSS 2022-27, p. 48

# Some tariff structures incentivise behaviour on certain peak days, others penalise peak usage, but a technology specific approach can combine dynamic pricing and tailored incentives to optimise EV charging.

| Impact on EV public charging infrastructure  | Ausgrid | AusNet | western power |
|---|---|---|---|
| **Impact on connection timeliness** | • No direct impact on connection times. | • No direct impact on connection times. | • No direct impact on connection times. |
| **Impact on connection cost** | • Direct impact.<br>• Tariff cost will depend on the size of the connection's electricity consumption. Ausgrid is moving to permit more customers access to time-of-use energy only tariffs, currently with a limit of 40 MWh/annum increasing to 100 MWh/annum.<br>• Customer's larger than 100 MWh/annum will face peak capacity tariffs, based on their highest 30 minute demand period over the previous 12 months during 3-9pm. This is complemented by peak energy charges which apply only in summer and winter months between 3-9pm.<br>• The application of peak capacity charging components over a rolling 12 month period can be challenging for customers to respond to as it means they need to monitor (and control, if necessary) their energy usage all year long between 3-9pm. 'One bad' 30 minute period could result in high network charges that take 12 months to roll off. | • Direct impact.<br>• AusNet's CPD tariff approach can encourage users of public EV chargers to avoid charging their vehicles during peak demand periods on the nominated CPD days when electricity prices are elevated.<br>• There are only 5 nominated CPD days within the peak summer period, so this behavioural change can result in a reduction of the overall charging load during these targeted peak windows, alleviating stress on the network.<br>• By managing charging demand more efficiently and with a lower level of effort, EV charging operators may experience lower connection costs since the need for costly ongoing network infrastructure upgrades to handle peak charging demands is reduced and smoothed over time. | • Direct impact.<br>• Technology-specific EV charging tariffs are tailored to encourage EV adoption and optimise the utilisation of charging infrastructure.<br>• Western Power's HV and LV EV charging specific tariffs directly influence charging behavior by offering pricing structures that align with different charging patterns. These tariffs provide lower rates during off-peak hours to incentivise EV charging when overall network demand is lower.<br>• Western Power's EV tariffs are unique as industry or technology specific tariffs are generally avoided by distributors and discouraged by regulators. |

# Application to New Zealand

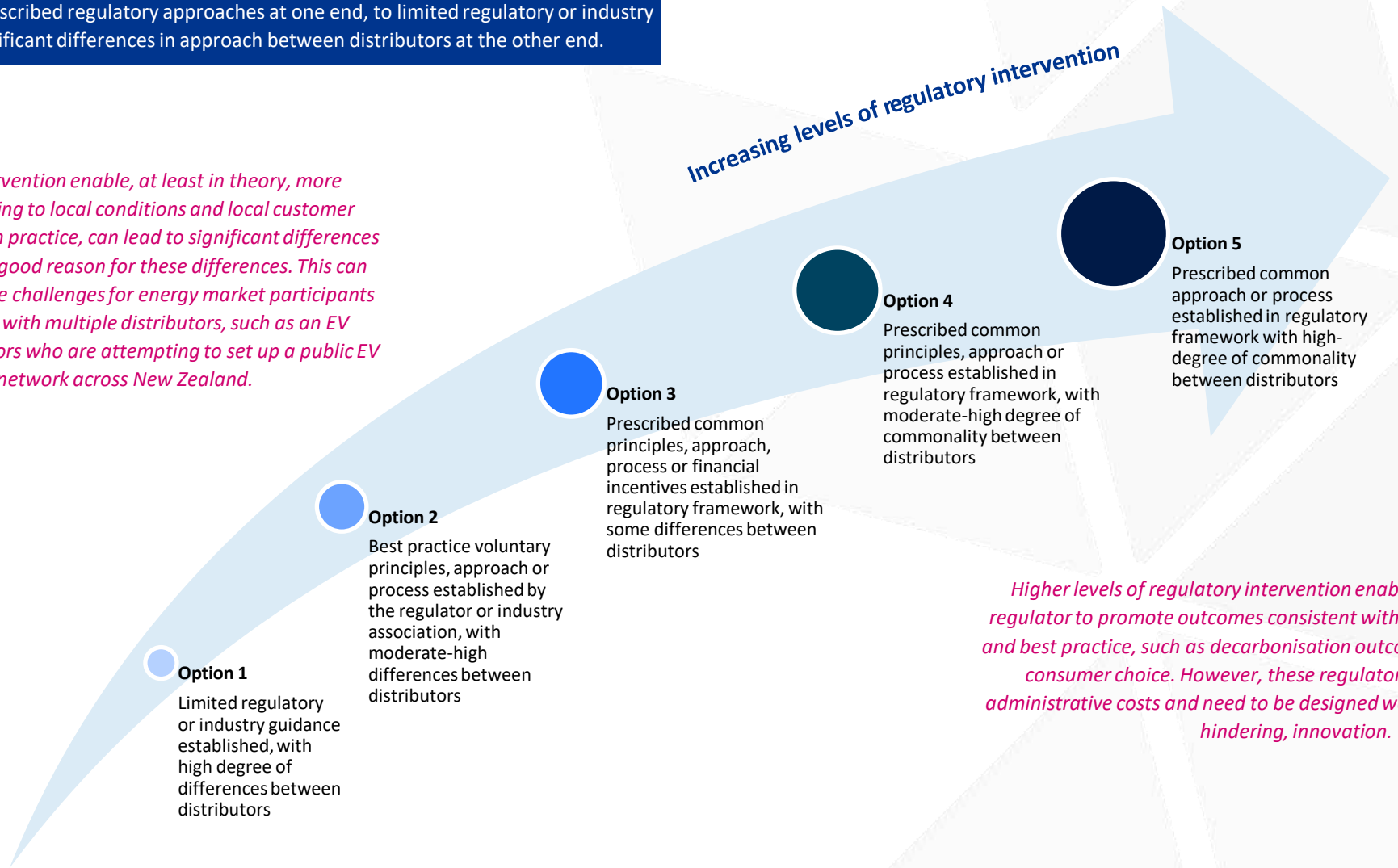
## Public EV charging stations

# Regulatory interventions can be conceptualized along a spectrum of options. Each point along the spectrum has certain benefits and downsides. The degree of intervention should be tailored to the problem at hand.

The degree of regulatory intervention can be conceptualized along a spectrum of options. These range from common prescribed regulatory approaches at one end, to limited regulatory or industry guidance with significant differences in approach between distributors at the other end.

*Lower levels of intervention enable, at least in theory, more innovation and tailoring to local conditions and local customer preferences. However, in practice, can lead to significant differences in approach without a good reason for these differences. This can significantly increase the challenges for energy market participants who need to engage with multiple distributors, such as an EV charging station operators who are attempting to set up a public EV charging network across New Zealand.*




*Higher levels of regulatory intervention enable the government or regulator to promote outcomes consistent with government objectives and best practice, such as decarbonisation outcomes, cost efficiency and consumer choice. However, these regulatory processes involve administrative costs and need to be designed well to foster, rather than hindering, innovation.*

# Higher levels of regulatory invention and distributor consistency apply in AU and the UK, compared to the light-handed NZ approach leading to significantly more industry differences and less regulatory oversight.

| Topic | New Zealand | Australia | UK |
|---|---|---|---|
| **Network visibility** | • Some asset management information required to be published in standardised form by all distributors, however, limited network visibility information is available and the degree that distributors proactively assist prospective connections to find locations with low congestion differs between distributors. | • Annual planning and reporting requirements require the publication of information on capacity constraints and availability at a locational level, along with the planned upgrades.<br>• This was supplemented by an industry-led initiative to create a user-friendly common web portal covering all distributors. | • Financial incentives (rewards and penalties) apply to all distributors to make network visibility information available.<br>• Additionally, some network utilisation information is required to be published annually. |
| **Connection process** | • A regulated access regime applies to distributed generation but not to demand-side connections, such as public EV charging stations. | • Connection processes are guided through high-level regulatory process requirements, supplemented by detailed best practice industry guidance developed through the industry association. | • A complex combination of regulatory requirements and financial incentives (rewards and penalties) guide the connection process.<br>• Regulatory requirements focus on information provision, maximum timeframes, and dispute resolution mechanisms. Financial incentives are used to improve the quality of the connection process and the customer experience. |
| **Connection charges** | • Distributors are required to publish their capital contribution policies, however, they may amend these at any time and significant differences in approach exist between distributors. | • Distributors are required to submit connection policies for regulatory approval that align with high-level principles established in a guideline published by the regulator. | • A common approach to upfront vs ongoing recovery of connection costs applies to all distributors. Connection charge methodology established through a mixture of regulator-led and industry-led reforms. |
| **DUOS tariffs** | • The regulator publishes best practice principles and assesses distributors' tariffs against these principles, however, distributors are not required to amend their tariffs in response to a negative 'scorecard'. | • Distributors are required to submit tariff structures for regulatory approval that align with high-level principles establishes in the rules by the rule-maker, supplemented by further guidance from the regulator. | • Common tariff structures apply to all distributors, with limited differences between distributors. Tariffs established through a mixture of regulator-led and industry-led reforms. |

**Legend**

More light-handed regulation and differences between distributors — 1 2 3 4 5 — More regulatory invention and consistency between distributors

# New Zealand can learn from both Australia and the UK to enhance the deployment of public EV chargers, particularly around improving network visibility and streamlining the connection process.

New Zealand can draw valuable regulatory insights from both the Australian and UK experiences to accelerate the installation of public EV fast chargers. Several strategies could be considered:

- Outline a standardised regulatory framework that sets clear guidelines for connections, including EV chargers. This framework could streamline distributor connection approvals, technical specifications, safety standards, and connection procedures to simplify the approval process for charging infrastructure projects.
- Collaborate with energy distributors to proactively plan for increased EV charging demand. Learning from Australia's challenges, ensuring adequate grid capacity for fast chargers is crucial. Establishing mechanisms for sharing grid capacity data with charging operators can aid in optimal charger placement.
- Establish consistent and transparent smart tariff structures for commercial and industrial customers, including EV chargers, that encourage demand flexibility – noting that further research (including preferably trials) will be required into the design of those smart tariffs within the NZ market context.

| Regulatory framework element | Opportunities for New Zealand |
|---|---|
| Network visibility | 1. **Improving network location and capacity information**: Learn from Australia's approach to sharing network integration insights. Collaborate with energy distributors to provide information about network constraints and capacity in specific areas. This can guide the strategic placement of charging stations. Additional information disclosure requirements that could be required under the Commerce Commissions Targeted Information Disclosure Review may provide relevant information.<br>2. **Evaluate the opportunities for improved data sharing from charging networks** in the UK. Establish partnerships with charging operators to share information about charger availability, status, and charging speeds. |
| Connection process | 1. **Connection regime for demand connections**: Can a mixture of regulatory requirements for new aspects (max connection timeframes, contestability, dispute resolution mechanisms), supplemented with detailed industry best practice guidance developed through the industry association.<br>2. **Learn from the UK's emphasis on financial incentives:** We note financial incentives could only be adopted by ComCom for price controlled distributors, so this is not a complete solution that could apply to all distributors. However, that is not a reason to exclude financial incentives where they can be applied.. |
| Connection charge | 1. **Clear capital contribution policies:** The UK's practice of transparently communicating connection costs to charging operators clearly outlines cost components such as network upgrades, infrastructure installation, and any applicable fees. At minimum, provide charging operators with preliminary cost estimates.<br>2. **Standard connection charges**: Both Australia and UK distributors estimate connection charges early in the planning process. Consider establishing predictable cost caps on connection charges. This can provide charging operators with a maximum limit on costs, enhancing predictability and reducing financial uncertainties. The UK has adopted a practical approach that balances competing objectives. |
| Distribution use of system (DUOS) tariffs | 1. **Consider governance reforms to promote reform**: Consider an approach inspired by the UK's mix of regulator-led and industry-led processes, however, ensure reform process timeframes are timely unlike in the UK.<br>2. **Conduct stakeholder consultation**: Engage with charging operators, energy distributors, and regulatory bodies to develop DUOS tariff structures collaboratively. This ensures that the tariffs strike a balance between supporting charging infrastructure growth and ensuring network stability.<br>3. **Avoid customer group specific tariffs**: Smart tariffs that encourage demand flexibility should be available to a wide range of customers, not just public EV charging stations. |

# We agree that increased network visibility is important for the large number of new connections likely to be needed to support decarbonization. NZ distributors can start simple and advance over time.

| Topic | Concerns raised by Drive Electric (Concept Consulting report) | Drive Electric (Concept Consulting)'s possible solution | Baringa assessment |
|---|---|---|---|
| **Network visibility** | • Distributors differ in how proactively they assist access seekers to find connection points with low congestion, and consequently, low connection charges.<br>• A reactive connection-by-connection approach to inquiries may have been sufficient in the past, but a more proactive approach is needed in the future given the significantly increased volumes of connections expected and speed of connection needed for decarbonisation. | • Making two types of information more visible to prospective connections would be particularly useful: (1) geographic information on the location and key attributes of assets such as transformers; and (2) capacity information on areas of high and low congestion.<br>• On (1), GIS information could be published where available; and (2) distributor's could create and publish 'heatmaps'. | • We agree that improved network visibility for prospective connections is useful and increasingly important to manage proactively, given the increased number of connections likely to occur to enable decarbonisation of the energy system.<br>• The examples from Australia and the UK show potential approaches to achieve this. While both countries are currently at a relatively 'advanced' stage in their approach to network visibility (with even more advanced approaches expected to occur in the future), both countries started with simpler approaches – for practical reasons, we would expect New Zealand would also need to start simple and become more advanced over time.<br>• Simple initial approaches could include (1) static heatmaps which are periodically updated; and (2) simple Excel-based downloads from distributors' websites which show nameplate capacity and maximum actual demand at each substation.<br>• We also note the Commerce Commission already requires distributors to report on network use at the zone sub-station level and is looking to clarify and strengthen these requirements, with a final decision early next year. |

Drive Electric submitted a briefing note it commissioned from Concept Consulting to MBIE which identifies concerns it has with the impact of the regulatory framework on the ability to deploy public EV charging stations in New Zealand, along with high-level thoughts to help identify areas for future possible solutions.

In this section of our report we map those concerns and possible solutions to the four key regulatory areas in this report and present our assessment.

Source: Baringa analysis; Distribution network access for public EV chargers – Overview and options, Concept Consulting, April 2023

# We are not persuaded there's a case for a distinct EV charger access regime. We consider there is value in an access regime being extended more broadly, such as to DER or C&I connections.

| Topic | Concerns raised by Drive Electric (Concept Consulting report) | Drive Electric (Concept Consulting)'s possible solution | Baringa assessment |
|---|---|---|---|
| **Connection process** | • An access regime exists for distributed generation but is more 'hands off' for other access seekers.<br>• Distributors differ in how much (and how) they control who can conduct connection work.<br>• Restrictive practices reduce contestability and the ability for access seekers to find cheaper alternative quotes for connection work than the distributor's offer. | • There should be a distinct access regime for EV charging stations, which could cover: (1) application processes and timesframes; (2) access terms and dispute resolution; (3) application fee limits; and (4) a requirement to charge low connection charges.<br>• The Electricity Authority has consulted on whether it should expand the access regime to cover DER, which would include public EV charging stations, however, a distinct access regime for EV chargers would be better.<br>• Improving contestability for connection work via an access regime could reduce costs and lead times. Improved contestability would lead to many benefits including: (1) more competitive cost discipline on distributors for connection works; and (2) more choice for access seekers including more bespoke connection offers to match access seeker preferences. | • Drive Electric / Concept Consulting has not put forward a clear case for why a dedicated access regime for EV charging stations is necessary.<br>• We consider the option being consulted on by the Electricity Authority, to expand the access regime to DER, appears preferable as it would benefit a wider range of connections.<br>• Broader again, increasing contestability to DER and non-DER connections could bring about the similar benefits in choice and potential cost reductions to that wider group, as Concept Consulting identify as benefits for EV charging stations. This could start with certain broadly defined connection types, such as commercial and industrial customers, and expand over time.<br>• We note in order to effectively promote a contestable market for electricity connection design and construction contractors, a degree of uniformity between distributors would be important. Significant differences in approach would increase the administrative cost of contractors working across multiple distribution zones, and therefore limit the growth of this market. |

Source: Baringa analysis; Distribution network access for public EV chargers – Overview and options, Concept Consulting, April 2023

# Reducing upfront connection charges to promote low-carbon technology connections needs to be balanced with mechanisms to avoid triggering unnecessary network upgrades paid for by other consumers.

| Topic | Concerns raised by Drive Electric (Concept Consulting report) | Drive Electric (Concept Consulting)'s possible solution | Baringa assessment |
|---|---|---|---|
| **Connection charges** | • Distributors can choose what portion of connection costs to recover through upfront connection charges (capital contributions).<br>• Capital contribution policies differ between distributors (100% upfront; maximum investment value; standard charges; or formula driven) and tend towards high upfront connection charges. Distributors also differ in the 'depth' of the connection charge.<br>• High upfront connection charges reduce the distributor's cost recovery risk, but also: (1) places a higher cost burden on access seekers (versus other customers); and (2) weakens a distributor's direct incentive to ensure connection costs are efficient.<br>• Distributors are required to publish capital contribution policies, however, they can adjust these at any time and also apply case-by-base discretion. During the regulatory period in between expenditure allowance resets, if the distributor increases its policy towards capital contributions, it will lower the distributor's recorded actual capex (net of capital contributions) and artificially appear as an 'efficiency' or 'cost reduction' which it will be rewarded for (if the distributor is price controlled). | • There should be limits on the amount of upfront connection charges that distributors can apply.<br>• Cost recovery risk on distributors (and therefore the incentive to increase upfront connection charges) could be reduced through the Commerce Commission reducing efficiency incentives or introducing reopener provisions for expenditure allowances. | • We consider there can be benefits in reducing upfront capital contributions in order to promote new low-carbon technology connections, but this needs to be balanced with the need to avoid connections in high congestion areas triggering upgrades which are paid for by other consumers. The UK provides an interesting example of an approach to balance these competing objectives.<br>• We consider caution should be applied in reducing efficiency incentives or increasing reopener provisions. This risks increasing costs for consumers overall and significantly increasing the administrative burden on the Commerce Commission and distributors to deal with increased regulatory processes (along with increased burden on consumer groups and other stakeholders to engage in these processes). A range of options could be explored to address volume risk. These include: (1) the design of the overarching control mechanism (revenue vs price control); (2) separate efficiency incentive adjustments for changes in 'volumes' vs 'unit costs'; (3) or reopener provisions but in limited and defined specific circumstances. |

Source: Baringa analysis; Distribution network access for public EV chargers – Overview and options, Concept Consulting, April 2023

# We are not persuaded there's a case for a specific public EV charging tariff. The same smart tariff can be offered to broader sets of customers to encourage demand flexibility.

| Topic | Concerns raised by Drive Electric (Concept Consulting report) | Drive Electric (Concept Consulting)'s possible solution | Baringa assessment |
|---|---|---|---|
| **DUOS tariffs** | • Distributors typically assign public EV charging stations to general non-residential tariffs.<br>• Some distributors already apply industry specific tariffs, such as for irrigators, but don't for EV charging stations. | • Introduce specific tariffs for public EV charging stations. This would: (1) enable 'smart' tariffs that reward flexible demand; (2) allow cross-subsidy issues to be addressed at an aggregate level; and (3) manage tariffs in a way that improves predictability for EV charging station operators. | • We don't recommend specific tariffs for public EV charging stations be introduced.<br>• While every customer and customer type differs in their consumption and load shape, impact on the network, and ability for demand flexibility – the fundamental cost drivers for distribution networks and principles which should guide tariff design apply broadly.<br>• Dedicated tariffs for one specific customer group also creates a 'slippery slope' of of other customer groups claiming they are 'unique' and lobbying for dedicated tariffs.<br>• Smart tariffs could be introduced to promote flexible demand, but these could apply, for example, to all commercial and industrial (C&I) customers. This would therefore encourage demand flexibility from a wider set of connections, not just public EV charging stations. If there's concerns about the impact changing the tariff design for all C&I customers would have, then more cost reflective tariffs that reward flexibility could be introduced on an opt-in basis. |

Source: Baringa analysis; Distribution network access for public EV chargers – Overview and options, Concept Consulting, April 2023