EV charging 101

A comprehensive overview for Fleet owners

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Contents

Section 1

Introduction

Many organisations aim to reduce their vehicle emissions by replacing their internal combustion engine (ICE) petrol or diesel fleet with electric vehicles (EV). As the transition to EVs is in its early stages in Australia, none of the wide variety of pathways available to implement EV charging have been implemented at scale yet. This paper provides a comprehensive overview of the technical and commercial specifications of EV charging infrastructure technology and options for fleet vehicles (Fleet).

A Fleet is defined here as a set of vehicles that are operated by an organisation, which they want to transition to EVs, or where a business may have an interest in encouraging the adoption of EVs in their supply chain. Some examples of Fleets are commercial delivery vans, trucks and passenger vehicles owned by an organisation for ad-hoc or regular staff use or outsourced delivery companies engaged by an e-commerce operator.

The focus of this knowledge paper is on Fleet charging, and so information on public charging, where the charging points are openly accessible to the public, is not covered. Long-haul heavy-duty vehicles are also excluded, due to the limited number of EVs currently available in this category. As adoption increases, future versions of this paper will cover additional vehicles and use cases.

Section 2

The case for EVs

There are three main reasons why organisations consider transitioning their ICE vehicles to EV:

1. Lower operational and maintenance costs
2. Sustainability goals
3. Better user experience

1 | Lower operational and maintenance costs

The operating cost of EVs is lower than that of ICE vehicles.

One reason is due to more efficient drivetrains that use less energy, resulting in lower fuel costs. Additionally, EVs lead to lower maintenance costs due to fewer moving components and a longer lifespan of consumable parts, like brakes. Below are a few examples of comparative running costs between ICE and EVs, assuming 12,000km driven per year (source: Transport for NSW).

Small vehicle	EV	ICE	Difference
Vehicle model	Hyundai Kona Elite	Hyundai Kona Go	
Annual fuel cost	$443	$1,773	EV cost is 75% lower
Annual maintenance cost	$478	$548	EV cost is 12% lower
Medium vehicle	**EV**	**ICE**	**Difference**
Vehicle model	Polestar 2 Standard Range	Volvo S60 T5 Momentum Auto AWD	
Annual fuel cost	$471	$1,930	EV cost is 75% lower
Annual maintenance cost	$275	$1,127	EV cost is 75% lower
Utility vehicle	**EV**	**ICE**	**Difference**
Vehicle model	LDV eT60 Auto	Toyota Hilux Workmate Manual 4x2 Double Cab	
Annual fuel cost	$830	$2,835	EV cost is 70% lower
Annual maintenance cost	$413	$608	EV cost is 28% lower
Commercial van	**EV**	**ICE**	**Difference**
Vehicle model	EV Automotive EC11 E-Cargo	Mercedes-Benz Sprinter 414 Transfer Medium Wheelbase Auto RWD	
Annual fuel cost	$902	$2,038	EV cost is 55% lower
Annual maintenance cost	$265	$608	EV cost is 56% lower

Government grants are also available to support the purchase cost of the vehicle. We cover incentives in section 8.

2 | Sustainability

EVs produce fewer carbon emissions than comparable ICE vehicles, and as such, switching to EV is a key way for organisations to meet their sustainability goals.

Emissions from businesses fall into three categories:

- **Scope 1 emissions** are direct emissions from a business, such as the exhaust from company vehicles.
- **Scope 2 emissions** are fuel that is burnt outside of your business, but used onsite, like electricity.
- **Scope 3 emissions** refer to all emissions from your suppliers as well as customers in buying and using your product.

Pollution from a company-owned Fleet is a large component of Scope 1 emissions for most organisations. Vehicles owned by contractors are considered Scope 3 emissions. Transitioning to EVs is the most cost-effective way of reducing these emissions. According to a study by the Union of Concerned Scientists, EVs produce fewer greenhouse gas emissions than their ICE counterparts – even when powered by the most carbon-intensive power sources like coal power plants. Furthermore, as more renewables are deployed in the grid, the emissions associated with EVs will continue to decline, making them an increasingly sustainable solution. You could also take control of the cost and source of green electricity, by installing solar panels (PV) at your site.

The lifetime emissions of an EV, including the emissions from its production, are lower than an ICE vehicle. Several reports from the US Environmental Protection Agency, the International Energy Agency and the US Department of Energy show that the Cradle-to-Grave emissions of an EV – emissions in manufacturing and disposing it at its end of life – are half that of an ICE vehicle.

Organisations that are committed to sustainability and reducing their carbon footprint have an opportunity to lead the way in the transition to EVs. By demonstrating their commitment to sustainability, organizations can not only reduce their own carbon footprint, but also encourage others to adopt EVs and contribute to the wider transition to a sustainable future.

> **"From cradle to grave, EVs are cleaner...excess manufacturing emissions are offset within 6 to 16 months of average driving."**
>
> Cleaner Cars from Cradle to Grave, a study from the Union of Concerned Scientists 2015

3 | Better user experience (UX)

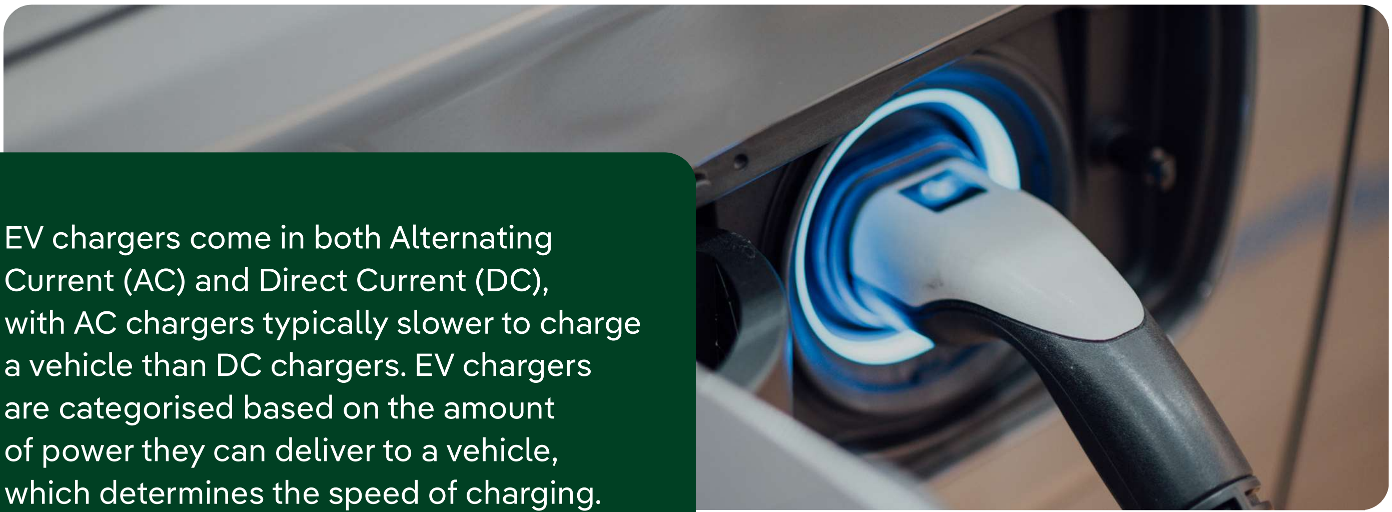
The UX of EVs is generally considered to be better than that of ICE vehicles, as EVs are quiet, smooth and responsive. As electric motors can provide full torque from standstill, acceleration can be effortless.

Users appreciate the convenience of charging the vehicle at their own premises. For Fleet, charging an EV at your business which is already wired with electricity is more desirable than needing a petrol truck to come to your premises for fueling, or utilising off-premises petrol stations. A study by JD Power in 2022 shows that there is high satisfaction amongst new and repeat EV buyers, when considering UX, range anxiety, availability of charging infrastructure, vehicle quality and reliability. Organisations stand to gain significant cost, sustainability and usability benefits by switching their Fleet from ICE to EVs.

> **"Satisfaction among first-time electric vehicle EV buyers is almost as high as it is for EV veterans."**
>
> JD Power 2022 US Electric Vehicle Experience Ownership Study

Section 3

EV chargers and charging plugs



EV chargers come in both Alternating Current (AC) and Direct Current (DC), with AC chargers typically slower to charge a vehicle than DC chargers. EV chargers are categorised based on the amount of power they can deliver to a vehicle, which determines the speed of charging.

The slowest charging rate would be through a wall socket that supplies 2kW and charges a typical passenger vehicle in 35 hours. The fastest chargers are 350kW DC chargers that can charge a typical EV in 30 minutes.

The table below shows the range of chargers available and how long it takes to charge a typical medium-sized passenger EV with a 70kWh battery.

Charger type	Power rating	Charging time[1]	Range/hour[2]
Level 1 - AC, single phase Approx size: 0.3m(W) x 0.2m(W) x 0.2m(D)	2	35	10
Level 1 - AC, single phase Approx size: 0.5m(W) x 0.3m(W) x 0.2m(D)	7	10	40
Level 2 - AC fast charger, three phase Approx size: 1m(W) x 0.4m(W) x 0.2m(D)	22	4	100
Level 3 - DC fast charger, three phase Approx size: 1.2m(W) x 0.5m(W) x 0.4m(D)	50	2	250
Level 3 - DC rapid charging, three phase Approx size: 2.0m(W) x 1.0m(W) x 0.5m(D)	350	0.25	1000

[1] Hours. Typical 70kWh battery
[2] km. Typical efficiency 19kWh/100km

Issues around safety, load management and scaling must be considered when using wall sockets. Usually this is a short-term solution for two to three vehicles.

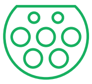
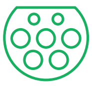
AC versus DC charging

You will notice that the low-powered chargers supply AC and the high-powered ones supply DC. This is because the battery in an EV stores energy as DC. When charging via an AC charger, the vehicle's internal converter must convert the AC power from your building's power supply to DC to be stored in the EV battery.

This conversion process is slow and a bottleneck for charging speeds. A DC charger has an AC to DC converter built into it, powering the battery directly. This removes the conversion bottleneck and enables for high-power charging, within the limits of the battery and vehicle's charging rates. This additional conversion component in DC chargers means that they are inherently more expensive than AC chargers.

Charging connector types

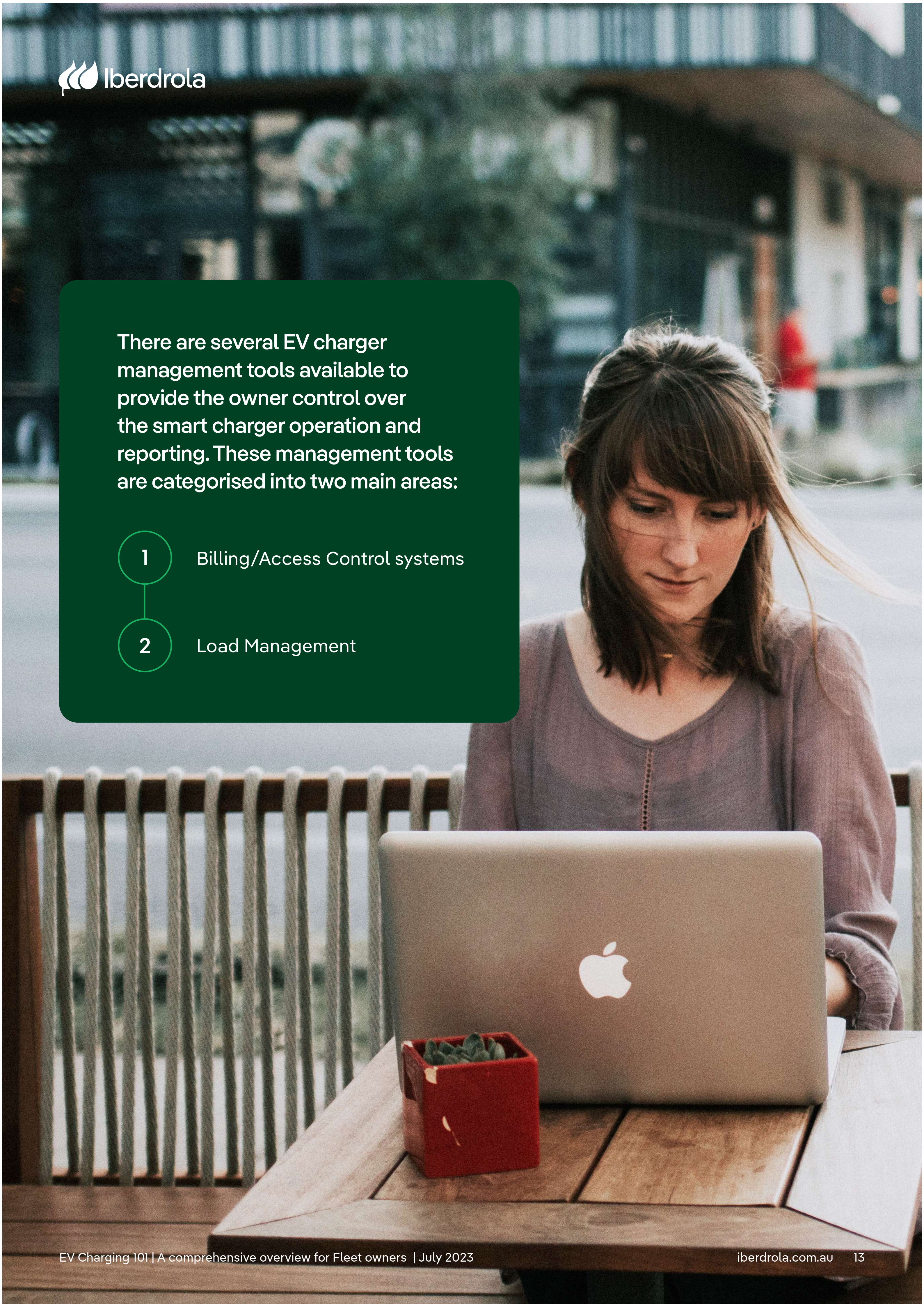
A connector is the plug that attaches to the EV when charging. Historically, there have been several connector types supplied by vehicle and charger manufacturers. Going forward, there is consensus on standardizing the connector types. These standardised connector types for Australia are outlined in the table below.

Type	Connector Shape	Power Range	Supplier
1 - AC Connector not on commercial chargers - supplied with car		< 2kW	OEM
2 - AC		7kW - 22kW	OEM/charging station
CCS - DC		> 50kW	Charging station
CHAdeMO - DC Currently in use, but being phased out in Australia		> 50kW	OEM/charging station

This section highlighted several types of EV chargers and connector types that may be available for an EV. In the upcoming section we discuss the typical scenarios how an organisation may use and charge EVs.

Section 4

Billing/Access Control and Load Management



There are several EV charger management tools available to provide the owner control over the smart charger operation and reporting. These management tools are categorised into two main areas:

1. Billing/Access Control systems
2. Load Management

1 | Billing/Access Control systems

These tools allow an owner to control which users have access to the chargers and how much they are charged for electricity. They report charging session logs for usage patterns, billing and reporting – which may be used for planning future EV or charger purchases.

Access is typically controlled via RFID tags, magnetic strip cards and/or mobile apps. Most owners provide Fleet vehicles charging free of cost or they bill monthly, as opposed to ongoing payments as the EV charges. So, the billing system's primary task is to provide reconciliation of charging practices, to manage electricity purchases and understand usage.

There are over a dozen billing systems available, some of the more common ones used in Australia are Chargefox, Everty, Ampeco, Exploren and Driivz. They provide options for fully managed services or self-management, which can also include technical support for end users.

2 | Load Management

A large number of EV chargers being utilised concurrently in a facility can overwhelm the site's electrical capacity, especially when high power Level 2 or Level 3 chargers are installed. For comparison, a single Level 2 charger may draw 22kW of power, which is the same as a commercial air conditioning system.

Therefore, as more EV chargers are added, they will compete for site electrical capacity, and a Load Management System (LMS) is required to control the power supplied to each charger.

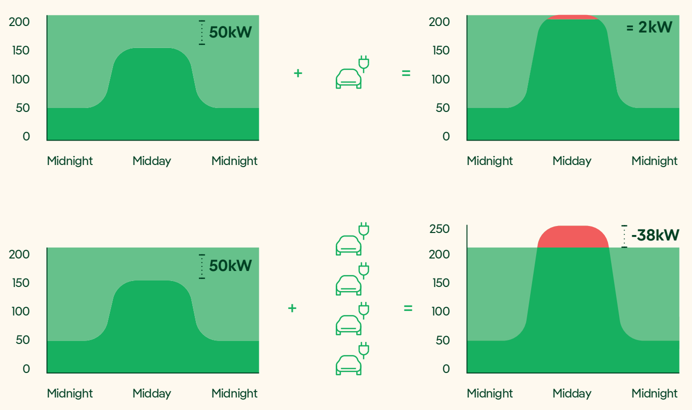
An LMS can also communicate with solar PV, battery, air conditioning or any other controllable loads to optimise the EV charging within the site's electrical capacity and manage charging times to minimise electricity costs, such as scheduling EV charging when electricity costs are low or ramping down charging to minimise usage during peak demand.

The LMS can also be used to provide priority charging, by supplying maximum power to chargers with EVs that are used more often and ramping down the ones that will be parked for longer durations. This can allow for the installation of a consistent model of charger across your parking lot, but with the flexibility to configure charging routines as your Fleet's requirements evolve. As the physical installation of the chargers is the most disruptive and costly part of the purchase, an LMS helps maintain optionality for this fixed infrastructure. LMS systems are typically supplied by the manufacturer of the charger; however, several of the billing system providers also include load management capabilities.

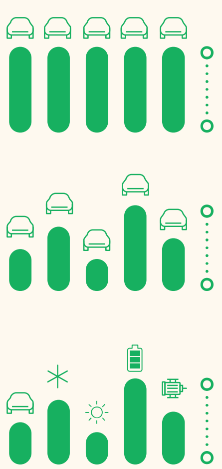
Now that we understand the various types of charger hardware and software options, the next section will explain several use cases for EVs and the relevant chargers for them.

An LMS optimises usage

Adding chargers may use up or exceed your site electrical capacity, requiring a LMS



LMS implementation options



Balanced - All chargers are ramped up and down at the same time. Responding to the overall site electrical capacity.

Prioritized - Chargers can be ramped based on priority of charging needs of different vehicles.

Prioritized Multi-Load - Chargers are ramped along with other loads, like air-conditioning, solar PV, batteries, etc. to optimise use of green energy and optimising for site capacity.

Section 5

Suitable chargers for various Fleet types

To design appropriate charging infrastructure and supply them with green energy, it is essential to understand the various usage scenarios and deploy solutions accordingly. The key drivers for determining appropriate EV charging amenities are:

Charging location

Are the vehicles being charged in a facility that you control, such as a place of work? Or is the charging happening in uncontrolled environments, such as the drivers' homes or public charging?

Vehicle type

How efficiently does an EV use its battery? How large is the battery range? These items determine how fast and how often the vehicle will need to be charged, respectively.

Charge duration

How long can the EV be charged for continuously? That is, will the vehicle be left to charge overnight, or will it require charging multiple times per day, e.g. between shifts? This determines how fast the charging speed needs to be.

Distance travelled

How predictable is the route that the vehicle travels every day? How frequently does the EV travel this route? And does it need charging between these trips? The former tells us how easily charging can be planned, potentially reducing cost. The latter helps understand the need for top up charging between trips.

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Suitable chargers for various Fleet types

Below we outline some scenarios and the appropriate EV chargers. These scenarios are not mutually exclusive or exhaustive – one or more may apply to your organisation.

Staff owned or pool vehicles

These are staff-owned vehicles or company-owned vehicles, shared by staff. They are parked in the office during working hours, for long durations of time. Typical driving is between home and work, with semi-regular use during working hours. This means that the distance travelled per day is typically less than 100 km.

Charging location
Office or administration building.

Charge duration
Long duration 7-15 hours per day.
Mostly working hours.
Quick top up - 15 minutes to 2 hours.
Working hours.

Vehicle type
Small to medium passenger vehicles.
Average efficiency of 19kWh/100 km.
Average range of 200-400 km.

Distance travelled
Less than 100 km per day.

Charger selection

Long duration
As close to one per vehicle, 2kW to 7kW, adding 10 km to 40 km of range per hour. Enough to supply the 100 km of range per day.

Quick top up
Shared 22kW chargers, adding 100 km of range per hour. Enough to top up vehicles that may be used more often and require fast charging in the working day.

Light commercial vehicles at a depot or factory

Typical examples of such vehicles are delivery vans, 4-ton trucks and 12-seater vans. They are driven continuously during working hours and parked at the depot/factory after hours. These vehicles operate within metro city limits and travel up to 300 km per day, usually on a set route. Their charging times and durations can therefore be planned, predictably.

Charging location
Depot or factory, usually overnight

Charge duration
Long duration – 7-15 hours per day.
Mostly after working hours.
Quick top up – 15 minutes to 2 hours.
Working hours, between runs or shifts.

Vehicle type
Light commercial van, truck or bus
Average efficiency of 25kWh/100 km
Average range of 200-400 km

Distance travelled
Less than 300 km per day

Charger selection

Long duration
As close to one per vehicle, 7kW - 22kW, adding 30 km - 80 km of range per hour. Enough to supply the 300 km of range after hours.

Quick top up
Shared DC chargers, greater than 50kW, adding 100 km of range per hour. Enough to top up vehicles during working hours.

Heavy commercial vehicles at a depot or factory

Typical examples of such vehicles are semi trailers, 50+ seater buses, garbage trucks, etc. They are driven continuously during working hours and parked at the depot/factory after hours. These vehicles operate within metro city limits and travel up to 200 km per day, usually on a set route. Their charging times and durations can therefore be planned, predictably.

Charging location
Depot or factory, usually overnight

Charge duration
Long duration – 7-15 hours per day.
Mostly after working hours.
Quick top up – 15 minutes to 2 hours.
Working hours, between runs or shifts.

Vehicle type
Heavy trucks and buses
Average efficiency of 100kWh/100 km
Average range of 200-400 km

Distance travelled
Less than 200 km per day

Charger selection

Long duration
As close to one per vehicle, 22kW, adding 20 km of range per hour. Enough to supply the 200 km of range after hours.

Quick top up
Shared DC chargers, greater than 120kW, adding 100 km of range per hour. Enough to top up vehicles during working hours.

Uncontrolled off-site charging

Charging location
Offsite

Charge duration
Various

Vehicle type
Various

Distance travelled
Various

These vehicles do not charge at facilities or chargers controlled by your organisation. However, they may form a part of your emissions profile, therefore, requiring you to find ways to monitor their emissions and offset them. Examples of such vehicles are leaseback vehicles for staff or contractor vehicles. Offsetting the emissions of these vehicles requires visibility of their charging sessions, the emissions profile of the electricity used for charging and a simple way to offset those emissions.

There are several ways this can be achieved. Three common ones are:

Deploy chargers

Supply chargers at the locations where these vehicles will be typically charged, e.g. homes of employees with leaseback EVs. Then monitor the emissions through the charger management software and offset them via purchase of Large-scale generation certificates (LGCs). This option requires a capital investment that will need to be recovered or written off, when the emissions from these EVs are removed from your emissions profile, such as the employee leaving your organisation.

Green tariff

Enter into a green electricity retail agreement that allows for the EV users to use your electricity retailer for green electricity. This requires the EV user to change retailers.

Synthetic offsets

Arrange for the EV user to record their charging sessions and their emissions profiles, then offset those emissions via purchase of LGCs. This could be a self-serve option, where the users can lodge and claim LGCs, via the Iberdrola Green the Team platform.

In summary, the type of EVs in your Fleet and their routes will determine which chargers are appropriate for your site. Once you have selected the chargers, the next section will explain the key considerations in installing and operating them.

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Section 6

Considerations for installing and operating EV chargers

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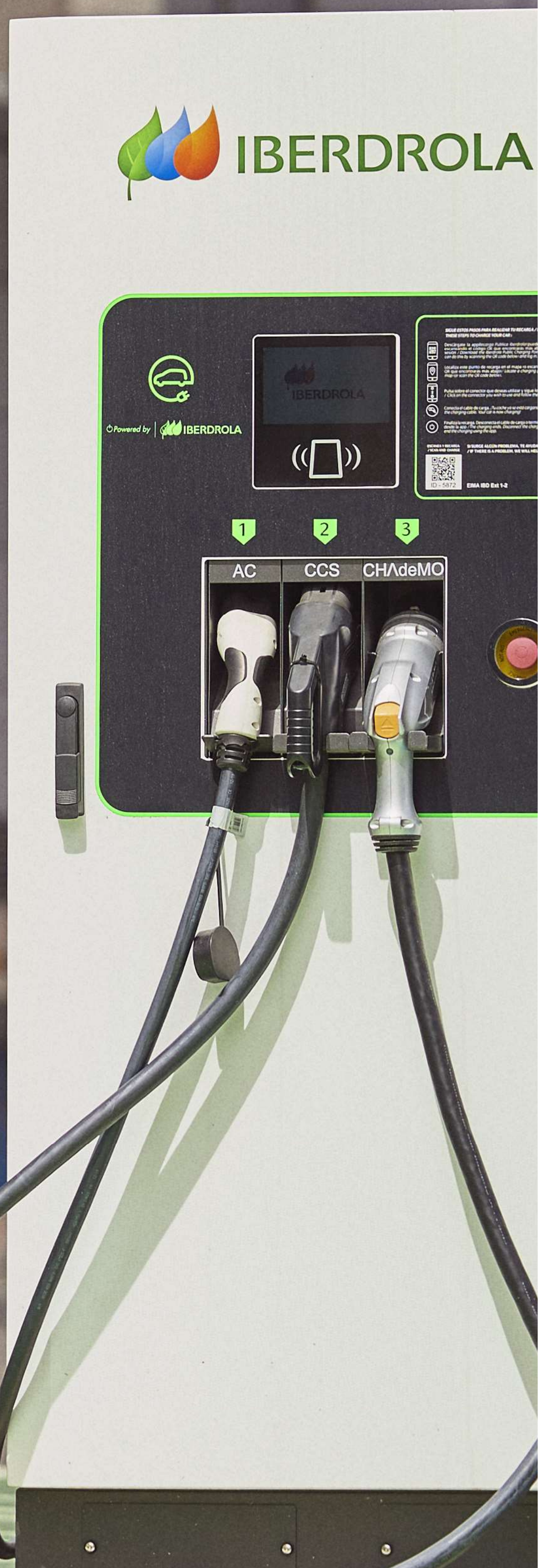
The process of procuring and operating an EV charger infrastructure is like most electrical assets in a facility, except that the adoption of EVs is still in the early stages, so a business will have to estimate the requirement for chargers and how they should be managed.

As mentioned previously, an EV charging Fleet can become the biggest electrical load on a site, so planning for and considering the electrical constraints of your facility should be a key part of the initial design process. In this section we explain the key steps involved in designing and installing the chargers, followed by avenues for funding procurement of the asset and related services/tools.

- Design, installation and maintenance
- Funding and scoping the works
- Project timeline



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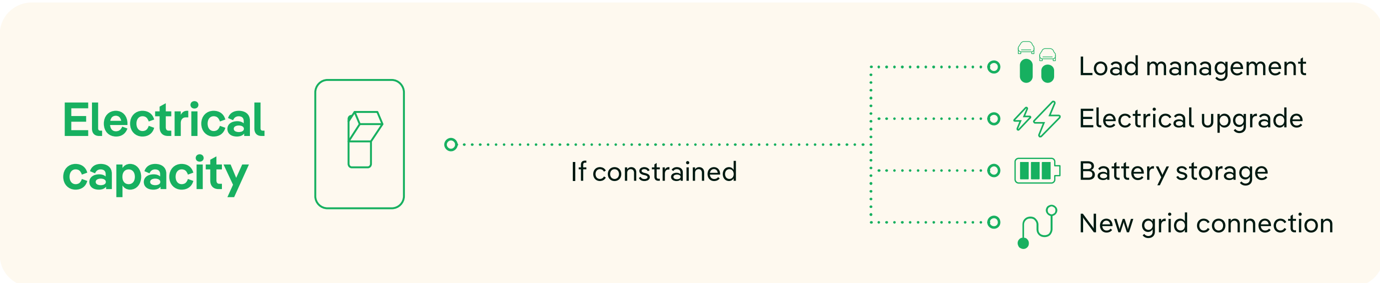
Design, installation and maintenance

Step 1 Site selection and electrical capacity

The previous section explained the types of chargers that may be required or desired for a facility, this step reviews the site-specific constraints and determines how many chargers can practically be installed. Site constraints can be categorised in two buckets – location of charging bays and electrical capacity.

Location of charging bays

Assuming a site has the adequate number of parking bays available for EVs and those bays are accessible and visible to EV users, items that drive cost and complexity in installing chargers are the distance and terrain of the cable route between the charger and the site switchboard. The simplest and lowest cost scenario will be the install of chargers right next to the site switchboard, along a wall, indoors. This means a short cable route, no ground works and chargers that do not need weather protection. The complex and costly scenario would be the installation of chargers several hundred meters from a switchboard, across a concrete car park and with the cable needing to turn several times along the route. This scenario adds the cost of civil works, larger cables to avoid losses and risk of underground services clashing with the charger cables.



Electrical capacity

Once the number of EV chargers to be installed is confirmed, their total peak power draw is used to determine the electrical capacity required on a site. For example, if five 7kW and two 22kW chargers are required, then the onsite switchboard must have a capacity of 79kW or roughly 120 Amps per phase. Furthermore, if the switchboard is not the main switchboard and is a distribution board downstream of the main board, then the cables between the main switchboard and distribution board must be capable of safely supplying 79kW. Inadequately sized cables and circuit breakers can cause nuisance tripping or overheating and set off fires. If the site does not have adequate electrical capacity for the number of chargers required, then there are a few ways to still install the chargers:

1. Add an LMS that enables sharing electrical capacity between the chargers. For example, if the available capacity is 50kW, then that is shared across all the chargers, but some of them can be supplied at full power, if others are not in use, or the vehicles connected to them are nearly at full charge.
2. Upgrade the site's electrical infrastructure, worthwhile if a large number of EVs are expected to charge and not enough vehicles can be charged even with load management.
3. If an upgrade of the electrical infrastructure is not possible or is prohibitively expensive, battery storage can be installed to supplement site capacity. The battery stores energy when electrical capacity is available, ready to supply the chargers as required.
4. If there is a preference for the users of these chargers to be supplied electricity through a dedicated electricity account and not from the site's existing one, adding a new meter and grid connection may be required, which can carry additional cost and complexity.

Step 2 Approvals and installation

Once the site has been selected and electrical capacity assessed, the next step is to obtain the necessary permits and approvals. If there are no electrical or physical constraints to installing the chargers, typically no external authority approvals would be required, although you may still need internal approvals from a landlord or strata. In case electrical upgrades or civil works are necessary, approvals from grid network providers, Council and building permits may be required. Items in the car park that should be considered beyond charger selection are:

Line markings and painting of parking bays for EVs

Signage identifying EV charging bays, operating instructions, etc.

Wheel stops and bollards for protecting the chargers.

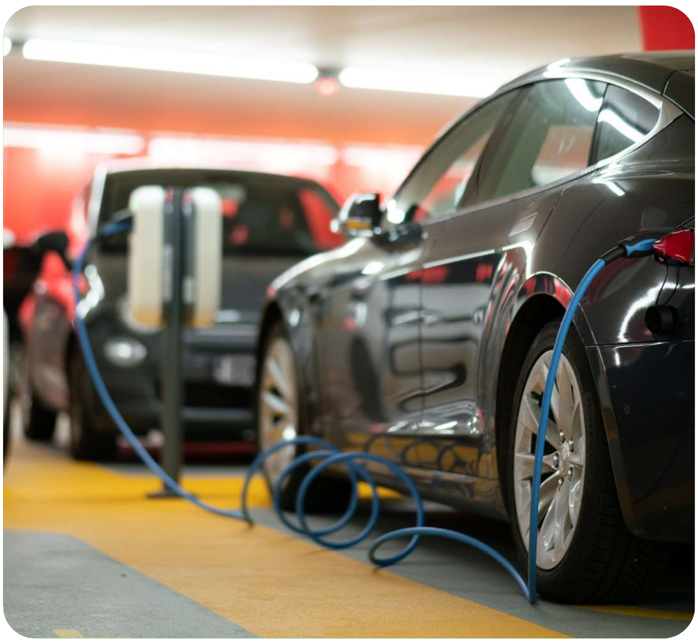
Fire protection:

- Is your fire suppression system suitable for EVs?
- Is the car park layout designed to prevent fire propagation?

Detailed design and engineering, approved by suitable qualified professionals, is essential for ensuring the installation team is provided a clear scope of work. This not only includes For Construction drawings, but also WHS plans, Quality Management plan, Inspection and Testing plan and commissioning plans. The installation of EV chargers requires qualified electricians and civil contractors, so several trades may need to be coordinated to complete the work. Depending on the size and complexity of the project, a project manager or head contractor should be engaged to manage the scope and cost.

Step 3 Operation and maintenance

The final step is the operation and maintenance of the EV charger infrastructure. With minimal moving parts (usually cooling fans), EV chargers are relatively low maintenance pieces of equipment. However, they are devices that are handled daily by users, and they are installed in relatively public locations. Therefore, regular inspections for physical wear and tear are essential. The parking bays, areas around them and signage for users need to be maintained to ensure clear and safe access is available to the chargers.



Funding and scoping the works

Procuring EV charging infrastructure may not only comprise the physical installation – design, engineering charger hardware and electrical and civil works – it may also include services like billing systems and load management systems. Depending on the internal capabilities and funding appetite within your organisation, below are some of the ways these solutions could be procured:

Capital expense and in-house operations and maintenance
Assess your EV charging needs internally. Engage a contractor for the design and installation of the chargers, as a capital expense. Purchase billing and load management software directly from vendors, selecting the level of automation desired. Maintain the chargers using your facilities team and provide tech support to users in-house.

Managed service
A service model including all the hardware, installation, software and maintenance services, wrapped into a single fixed monthly fee. A managed service means the asset is not on a balance sheet and does not impact your credit rating. The billing and tech support is undertaken by the managed service provider, with reporting and analytics provided monthly.

External design and management, capital expense
Engaging a turnkey engineering, procurement, construction and maintenance company to manage the install and maintain the billing and technical support. All paid as a capital expense.

External design, capital expense
Using an external expert to calculate/plan your EV charging needs, assess the site, and design the charger system. Then engaging with trades directly for install, vendors for software and in house maintenance and technical support.

Model	Use Case Definition	Design	Procurement & Construction	Maintenance	Tech Support	Billing
Self managed	In house	In house	In house	In house	In house	In house
External design	3rd party	3rd party	In house	In house	In house	In house
External design & Management	3rd party	3rd party	In house	In house	3rd party	3rd party
External design, procurement & Management	3rd party	3rd party	3rd party	3rd party	3rd party	3rd party
Charging as a Service	3rd party	3rd party	3rd party	3rd party	3rd party	3rd party
	All inclusive service for a fixed monthly fee.					

Project timeline

From concept to commissioning, a typical EV charging installation project will take about 15* weeks. The below diagram shows the typical stages and their durations:

Use case →
4-8 weeks

- Vehicles
- Routes/Schedules
- Stakeholder input

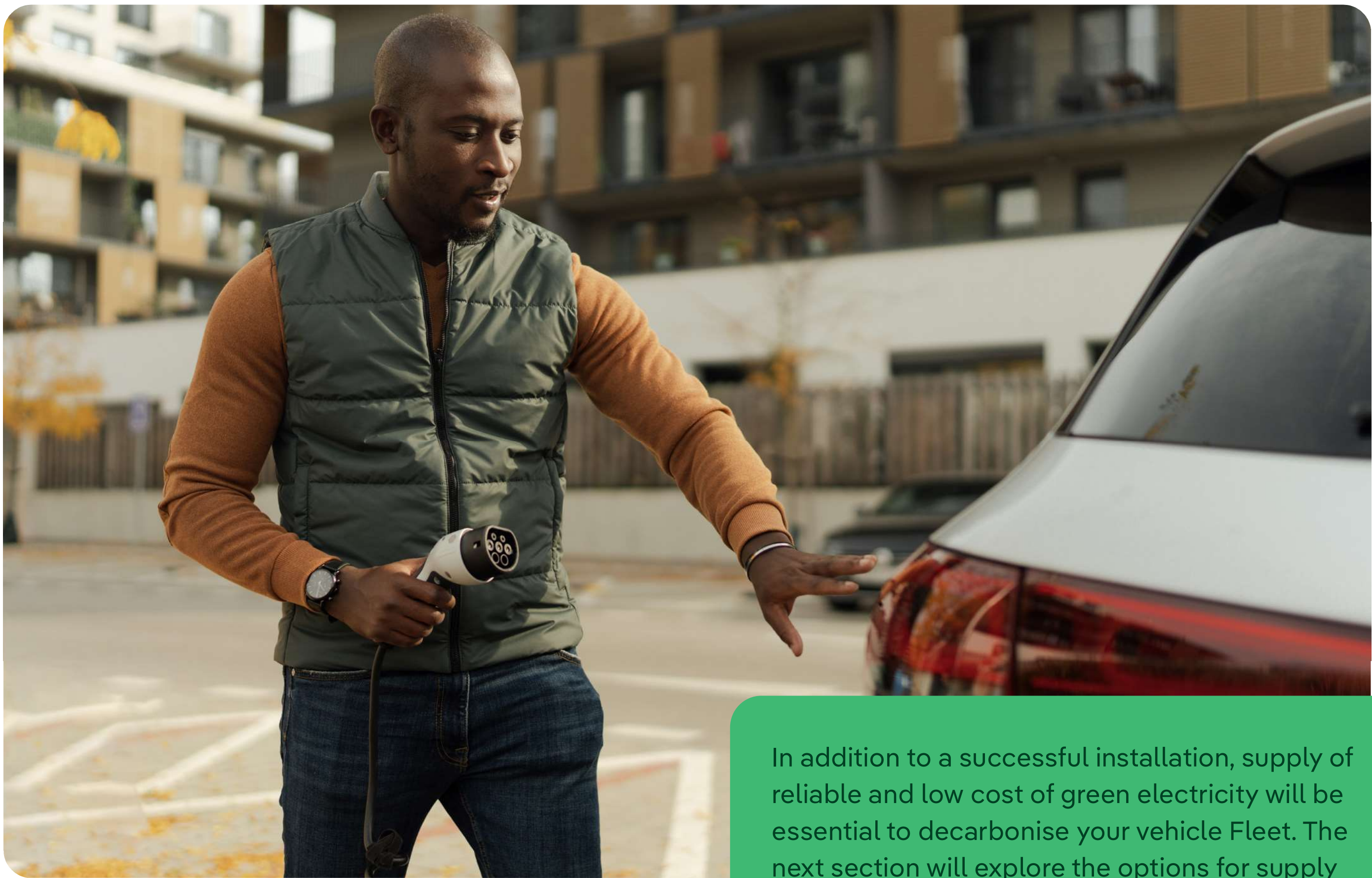
Design →
3-6 weeks

- Charger selection
- Electrical review
- Constructability
- Load review

Procurement and construction
3-6 weeks

- RFP
- Selection
- Procurement
- Site setup
- Construction
- Comissioning

*AC Chargers only



In addition to a successful installation, supply of reliable and low cost of green electricity will be essential to decarbonise your vehicle Fleet. The next section will explore the options for supply of green, low cost electricity.

Section 7

Optimising electricity rates and ensuring supply of green energy

As EVs have the potential to become your site's largest power draw, they may also become one of your largest electricity costs. Even though the cost of electricity and efficiency of the vehicles means that your Fleet's fuel costs will be much lower than ICE vehicles, the cost of electricity can be managed to further reduce the cost of owning an EV.

For organisations that also want to ensure that their EVs are charged using green electricity, it is important to have appropriate retail contracts and onsite renewable energy in place for real emissions reductions, as grid electricity isn't 100% green. Below are some ways in which this can be achieved:

Negotiate rates for cost optimisation

It is not enough to get the lowest peak, shoulder and off-peak rates for electricity. Consider your charging times and patterns and focus on minimising the electricity rate for that time. This means that it may be appropriate to accept a higher rate in one period if a lower rate can be received in times when EVs are being charged. That is, calculate the total energy cost, rather than just focusing on rates.

Green energy from the grid

Most electricity retailers can offer green energy plans that will supply grid electricity accompanied by green certificates, to offset the carbon emissions for the electricity supplied. An increasing number of organisations are alert to greenwashing, and are demanding that the electricity they buy not only be accompanied by green certificates, but it be supplied from clearly identified renewable energy generators in the grid. In your retail contract negotiations, consider the value of receiving green energy from named renewable energy generators.

Implement an LMS for peak demand reduction

A peak demand charge can be up to 40% of an electricity bill, which is usually calculated based on the highest power drawn from the grid in any 15 to 30 minutes interval across the month or year. If the EV charging schedule allows, implementing a load management system that smooths out the maximum power drawn by EV chargers can help reduce this charge.

Onsite solar PV with LMS

An LMS can be implemented onsite that communicates between the EV chargers and any solar PV that may be available to supply energy. As onsite solar would typically be the lowest cost energy available to your facility, directing its generation to the EV chargers will provide the lowest fuel cost for your Fleet.

The enthusiasm for transitioning to EVs is also being well supported by government incentives. The next section lists the various grants and tax breaks available for organisations looking to purchase EVs.

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Section 8

Federal and state level incentives for chargers and vehicles

There is strong support for the adoption of EVs and EV charging, both at the state and federal levels.

Below is a summary of the primary incentives available for businesses interested in transitioning their ICE fleet to EVs. Only Fleet-applicable incentives are listed here, there are also other public or destination charging incentives available.

Federal	Grants	Tax or fee relief
Vehicle incentives	$62.6 million funding package for small businesses to decarbonise, which can include Fleet electrification.	• Luxury Car Tax threshold increased to $84,916. • Fringe Benefit Tax eliminated for EVs. • Removal of the 5% import tariff for EVs priced under the Luxury Car Tax limit.
Charger incentives	$250m ARENA Future Fuels program.	N/A
NSW	**Grants**	**Tax or fee relief**
Vehicle incentives	$3,000 for the first 25,000 vehicles costing less than $68,750.	• Stamp duty waived for vehicles costing less than $78,000. • EV drivers are also allowed to use the T2 and T3 transit lanes.
Charger incentives	$105 million in the Drive electric NSW EV fleets incentive	N/A
VIC	**Grants**	**Tax or fee relief**
Vehicle incentives	$3,000 for the first 20,000 vehicles costing less than $68,740.	$100 discount on registration annually.
Charger incentives	$19 million EV charging infrastructure across regional Victoria and support Fleet charging.	N/A

QLD	Grants	Tax or fee relief
Vehicle incentives	$3,000 for first 15,000 vehicles costing less than $58,000	• Lowest registration fees. • Lower stamp duty.
Charger incentives	N/A	N/A
SA	**Grants**	**Tax or fee relief**
Vehicle incentives	$3,000 for the first 7,000 vehicles costing less than $68,750.	Free registration for three years
Charger incentives	N/A	N/A
NT		**Tax or fee relief**
Vehicle incentives	N/A	• $1,500 subsidy on stamp duty. • Cheaper registration.
Charger incentives	$2,500 grant for charger installation.	N/A
WA	**Grants**	**Tax or fee relief**
Vehicle incentives	$3,000 for the first 10,000 vehicles costing less than $70,000.	Exemption from the 10% on-demand transport levy.
Charger incentives	$10 million for grants of up to 50% of the cost of installing electric vehicle charging infrastructure for small and medium-sized businesses.	N/A
ACT		**Tax or fee relief**
Vehicle incentives	Up to $15,000 in interest free loans for vehicles costing up to $77,565.	• Waived Stamp duty. • Free registration for two years.
Charger incentives	N/A	N/A
TAS	**Grants**	**Tax or fee relief**
Vehicle incentives	N/A	• Free stamp duty for two years. • Free registration for two years for rental companies and coach operators.
Charger incentives	N/A	N/A

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Section 9

Key takeaways

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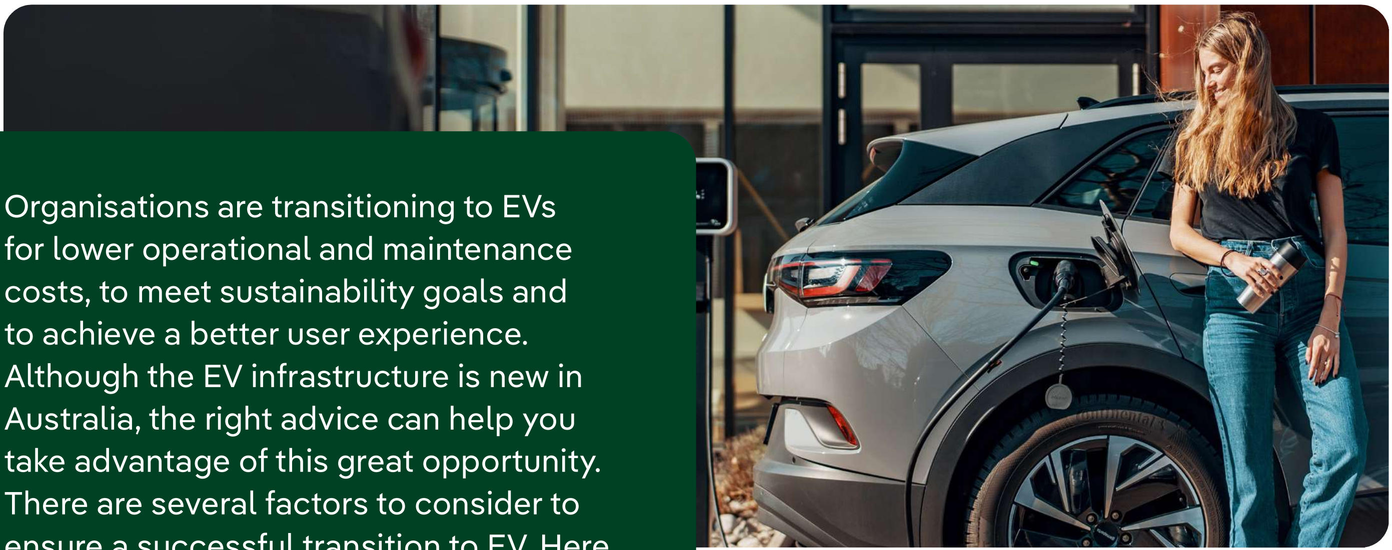

Organisations are transitioning to EVs for lower operational and maintenance costs, to meet sustainability goals and to achieve a better user experience. Although the EV infrastructure is new in Australia, the right advice can help you take advantage of this great opportunity. There are several factors to consider to ensure a successful transition to EV. Here are some key takeaways to keep in mind.

Benefits of EV Fleet Ownership

EVs can reduce emissions, lower operational costs and offer a better user experience. Although EVs provide a significant ownership cost and emissions advantage over ICE vehicles, their adoption does require a Fleet owner to supply both vehicles and fuelling infrastructure (chargers).

Procurement of Green Energy

To ensure your EVs are charged using the lowest cost green electricity, load management and vehicle scheduling should be synchronized with electricity tariffs. Careful attention should be paid to the source of the green energy to avoid reputational damage from accusations of greenwashing.

Installation

The installation of EV chargers requires consideration of a site's electrical and civil infrastructure. Load management and scheduling will play an important part in operating EVs since chargers can become the largest energy user at your facility.

Incentives

Australia's commitment to renewable energy also means there are a number of government-supported incentives available that organisations can take advantage of for the adoption of EVs and installation of charging infrastructure. Each state has its own program, and there are federal incentives that could also be accessed.

Charger Selection

Consider the speed of charging, vehicle routes and schedules, and where they will be parked after hours to select the most appropriate chargers for your fleet.

By considering these factors, an organisation can make informed decisions about buying, installing and maintaining EV chargers and vehicles – leading to a successful transition to EV Fleet ownership.

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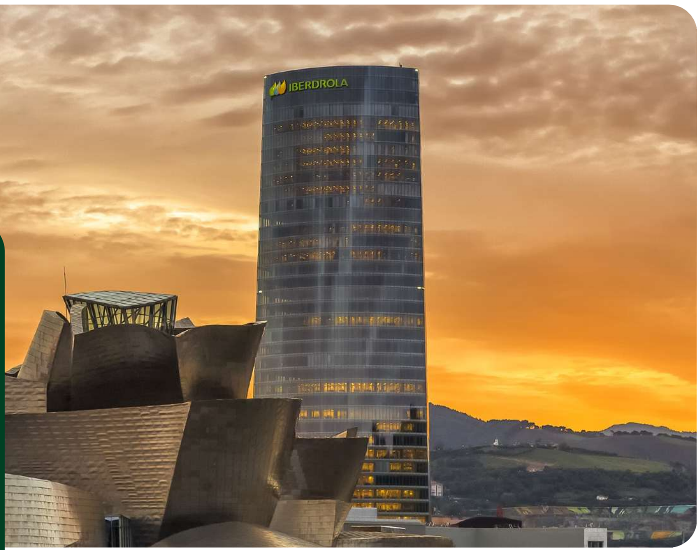
Section 10

About Iberdrola



Iberdrola Australia is a part of the Iberdrola Group, one of the world's largest renewable energy companies.

Our mission is to make a positive impact on the planet, and one way we're doing that is through our focus on transport electrification. We've already installed the largest wind power facilities in the world, and now we're turning our attention to making a difference in transportation.

We're excited to announce our new sustainable mobility plan, which involves installing and operating approximately 150,000 electric vehicle charging points across the world in homes, companies and public highways in cities as well as the main motorways and highways over the next five years. Iberdrola Australia's Smart Solutions business is here to help commercial, industrial and urban transport sector customers electrify their transportation Fleet and provide charging access for end-users nationwide.

We take pride in leading Australia's transition to a clean future, today. We put customers at the centre of the renewable energy transition by providing clean energy solutions. With one of the largest portfolios of renewable energy assets in the country, we're well-equipped to support the decarbonisation of transportation. With Iberdrola Australia, you can be a part of the revolution toward sustainable energy and join us in making a positive impact on the planet.

Our customers include

- Universities
- Councils
- Manufacturers
- Commercial property owners
- Large-scale infrastructure asset owners

By partnering with our customers, we help them achieve their sustainability and renewable energy goals through the provision of charging infrastructure and services, onsite clean energy generation and electricity sourced from renewable energy.

If you would like to explore the details of the process of installing EV charging in your organisation, please feel free to contact us:

smartenergy@iberdrola.com.au

iberdrola.com.au