

Electric Vehicle Guide for Drivers

The Journey
Begins Here and Now

Key Highlights

Why choose EV over ICE?



Benefits [\(Link\)](#)

Environmentally friendly alternatives as they **produce zero tailpipe emissions.**



Incentives [\(Link\)](#)

There are incentives for EVs:

- **EV Early Adoption Incentive**
- **Enhanced Vehicular Emissions Scheme**



Safety [\(Link\)](#)

EVs are **less prone to catching fire** than other vehicles. Singapore adopts standards to ensure safety of EVs and EV chargers.

Types of chargers



EVs in Singapore are fitted with 2 types of charging inlets (Type 2 and Combo 2), which are found at all public chargers. [\(Link\)](#)

AC Chargers



Type 2

- Predominantly with power rating < 23kW.
- **Main mode of charging.**
- **Lower cost** of charging and **widely available.**

DC Chargers [\(Link\)](#)



Combo 2

- Predominantly with power rating: $\geq 23\text{kW}$.
- For opportunistic and urgent charging.

Charging speed is dependent on:

- **EV's on-board charger** [\(Link\)](#)
- **Power rating of chargers**
- **State of Charge (SoC)** of EV battery: Usually fastest when SoC is 20%- 80%. [\(Link\)](#)

How to charge my EV?

1 **Locate Chargers and start charging:** [\(Link\)](#)



2 **After the charging session:** [\(Link\)](#)



Do not press the e-stop button unless it's an emergency.



Coil the charging cable neatly after use.



Move your EV when charging session has ended.

3 **Make Payment via:** [\(Link\)](#)



EV Charging Operator App



QR Code



Payment Terminal



01

EV101

Singapore's Electrification Vision,
Fundamentals of EV
Did you know?

Singapore's Electrification Vision

2025

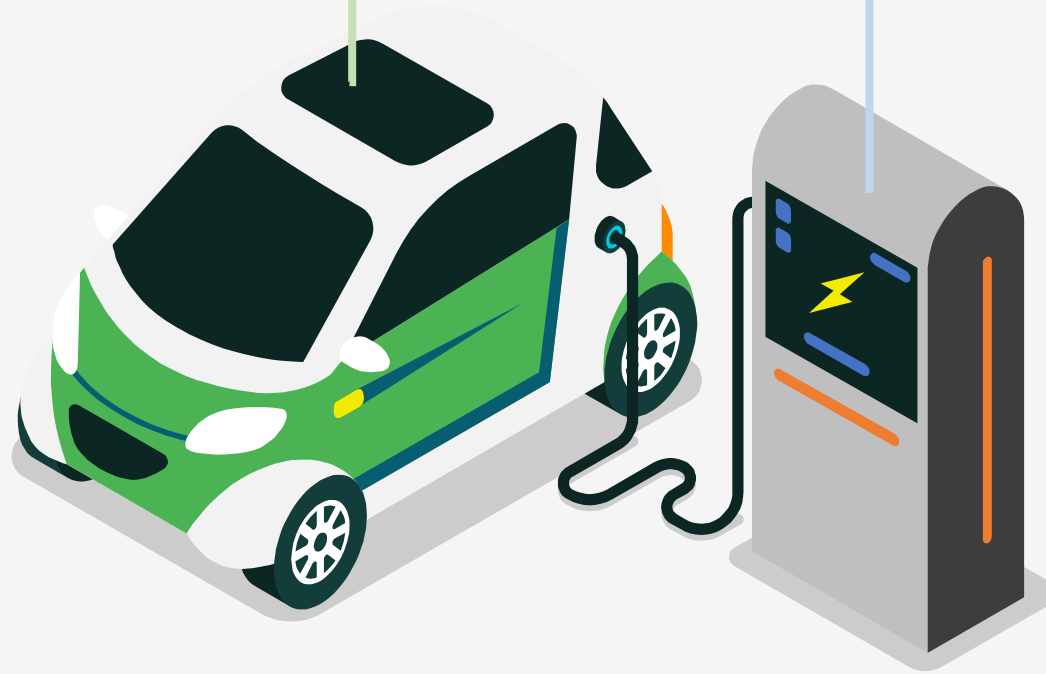
No new diesel car registration.

2030

All new car registrations will be cleaner-energy vehicles.

2040

All vehicles to be cleaner energy vehicles.



2025

Every HDB town is EV ready.

2030

60,000 EV Charging points, in tandem with EV adoption.

2050

Singapore has committed to significantly reduce land transport emissions in absolute terms, in alignment with our net zero target by 2050.

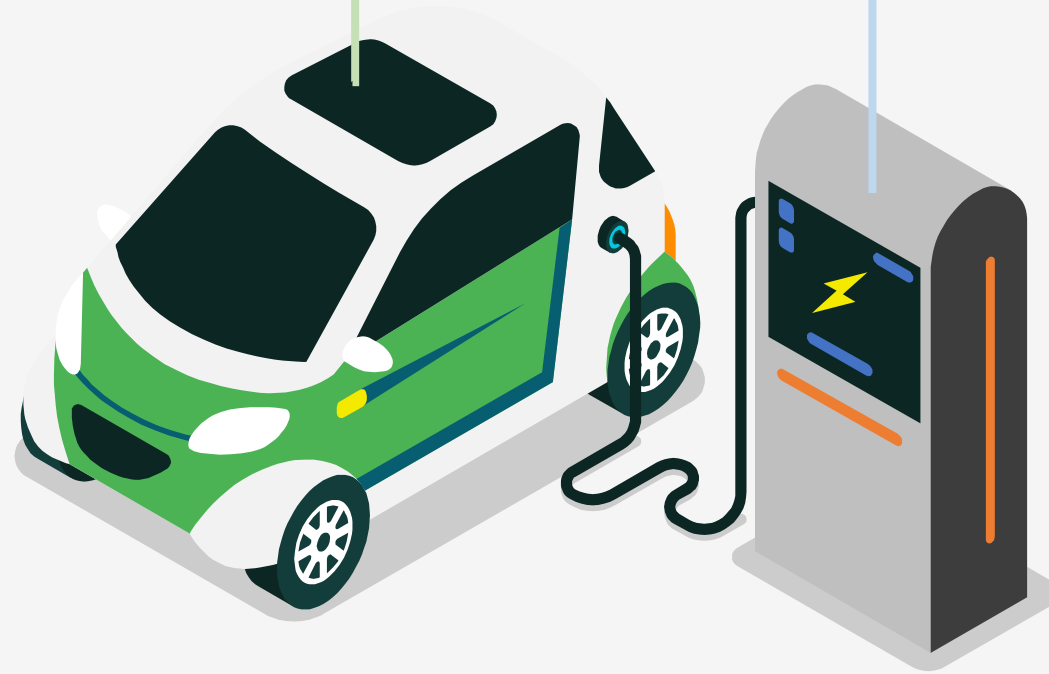
Electrification Progress

> 1/3

of new cars registered
in the first half of 2024
were electric.

> 18,000

cars, or 2.7% of our total
population, are electric.



> 1 in 2

HDB carparks are now
equipped with EV chargers.

> 13,800

charging points islandwide.

What is an EV?



EVs are vehicles **powered by electrical energy stored in rechargeable batteries**, unlike conventional petrol-fueled Internal Combustion Engine (ICE) vehicles. Therefore, making them environmentally friendly alternatives as they **produce zero tailpipe emissions**.

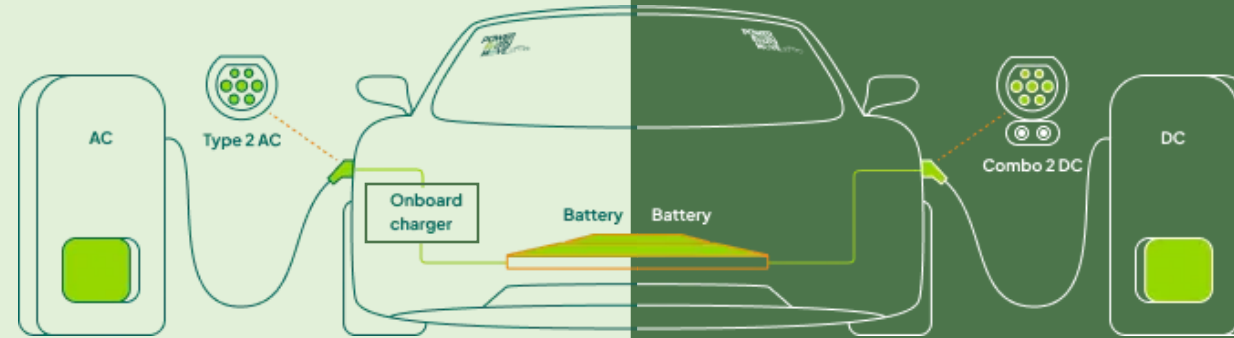
EV vs ICE: Understanding the Equivalent Terms

To help you navigate the world of electric vehicles, here's a quick comparison between familiar Internal Combustion Engine (ICE) vehicle terms and their Electric Vehicle (EV) counterparts:

ICE	EV
Fuel Retailer - Manages petrol stations	EV Charging Operator - Operates charging stations
Petrol Station - Where you refuel your vehicle	EV Charging Station - Where you recharge your EV
Fuel Pump - Dispenses petrol / diesel	EV Charger - Supplies electricity
Fuel Pump at Petrol Station - Fills your tank quickly	DC (Direct Current) Fast Charger - Charges your EV quickly
Home Fuel Tank (Rare) - Rare personal fuel tanks	AC (Alternating Current) Charger - Slower, but convenient for overnight charging
Fuel Gauge - Measures fuel level	State of Charge (SoC) - Measures battery charge
Engine Power (Horsepower) - Power output of engine	Power Rating of Motor (kW) - Power output of motor
\$/Litre - Unit Cost for Fuel Price	\$/kWh - Unit Cost for Charging Price

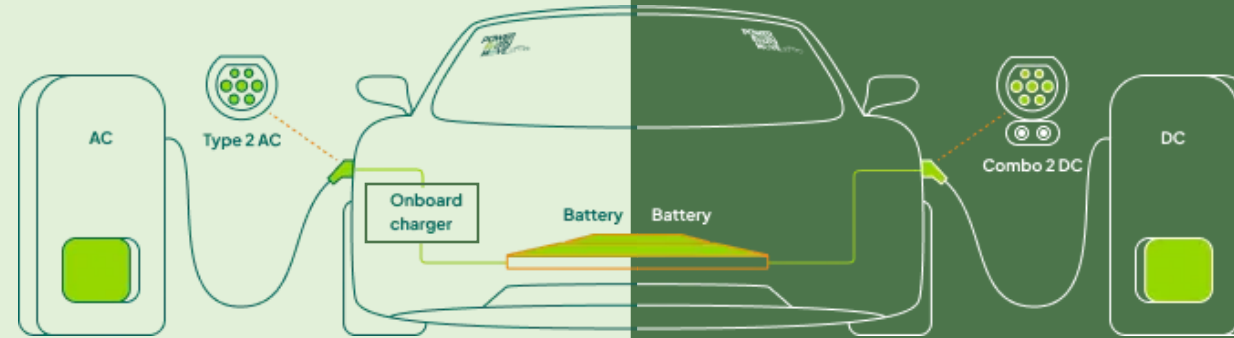
Types of Chargers

Alternating Current (AC) Chargers



- Predominantly with power rating of $< 23\text{kW}$.
- Charges an average EV battery from 20% – 80% in around 4 hours^[1].
- Lower cost of charging and widely available (e.g. residential carparks).
- Gentler on the batteries^[3].
- Rate of AC charging is limited by the onboard charger.

Direct Current (DC) Chargers



- Predominantly with power rating of $\geq 23\text{kW}$.
- Charges an average EV battery from 0 – 100% in around 1.5 hours^[2].
- Typically higher cost of charging and located within shopping malls and petrol kiosks.

[1] Assume average EV battery size of 68.7kWh ([link](#)), and use of a 11kW charger.


[2] Assume average EV battery size of 68.7kWh ([link](#)), and use of a 50kW charger.

[3] <https://saemobilus.sae.org/content/2015-01-1190/> and <https://www.sciencedirect.com/science/article/pii/S2590116819300116?via%3Dihub>

Did you know?

#1: Total cost of ownership of EVs is lower than ICE cars.

Total cost of ownership is calculated over 10 years:



Incentives to reduce upfront cost

EV Early Adoption Incentive	Enhanced Vehicular Emissions Scheme
45% rebate off Additional Registration Fee (ARF) for fully electric cars and taxis, capped at \$15,000.	\$25,000 and \$5,000 rebates for VES Band A1 and A2 cars respectively.



Lower mileage cost

	Fuel / Electricity needed for 100km (A)	Cost of Fuel / Charging (B)	Average Cost per 100km (A) x (B)
ICE	6.4 L	\$2.87 / L ^[1]	\$18.37
EV	16 kWh	\$0.62 / kWh ^[2]	\$9.92



Lower maintenance cost

Less maintenance required for EVs due to:

- **Fewer** moving parts. Absence of engines, transmissions, and fuel & exhaust systems.
- **Less** fluids to replace (e.g. ICE-related hydraulics) and no oil change.
- **Longer component lifespan.** Electric motors and batteries have fewer parts that can wear out over time.

[1] Average 95-octane fuel cost in August 2024.

[2] Average charging price for 7.4kW public chargers as of August 2024.

Did you know?

#2: EVs are less likely to catch fire compared to other engine types^[1].



Did you know?

Singapore's vehicle approval regime **adopts the international automotive standards** like the United Nations Economic Commission for Europe R100, which includes tests for both the vehicle body and the high voltage battery.

In addition, EVs are equipped with **Battery Management System which ensures that the battery operates within safety limits while charging and discharging**, thereby mitigating the risks of electrical, thermal or mechanical failures.

EV chargers must comply with safety and performance standards under the Technical Reference 25 (TR25) before they can be type-approved in Singapore. The EV Charging Act also stipulates **proper installation of EV charging facilities and mandates periodic safety inspections.**



[1] Fire Stats for EV <https://www.straitstimes.com/singapore/transport/ev-fire-cases-rise-with-growing-adoption>

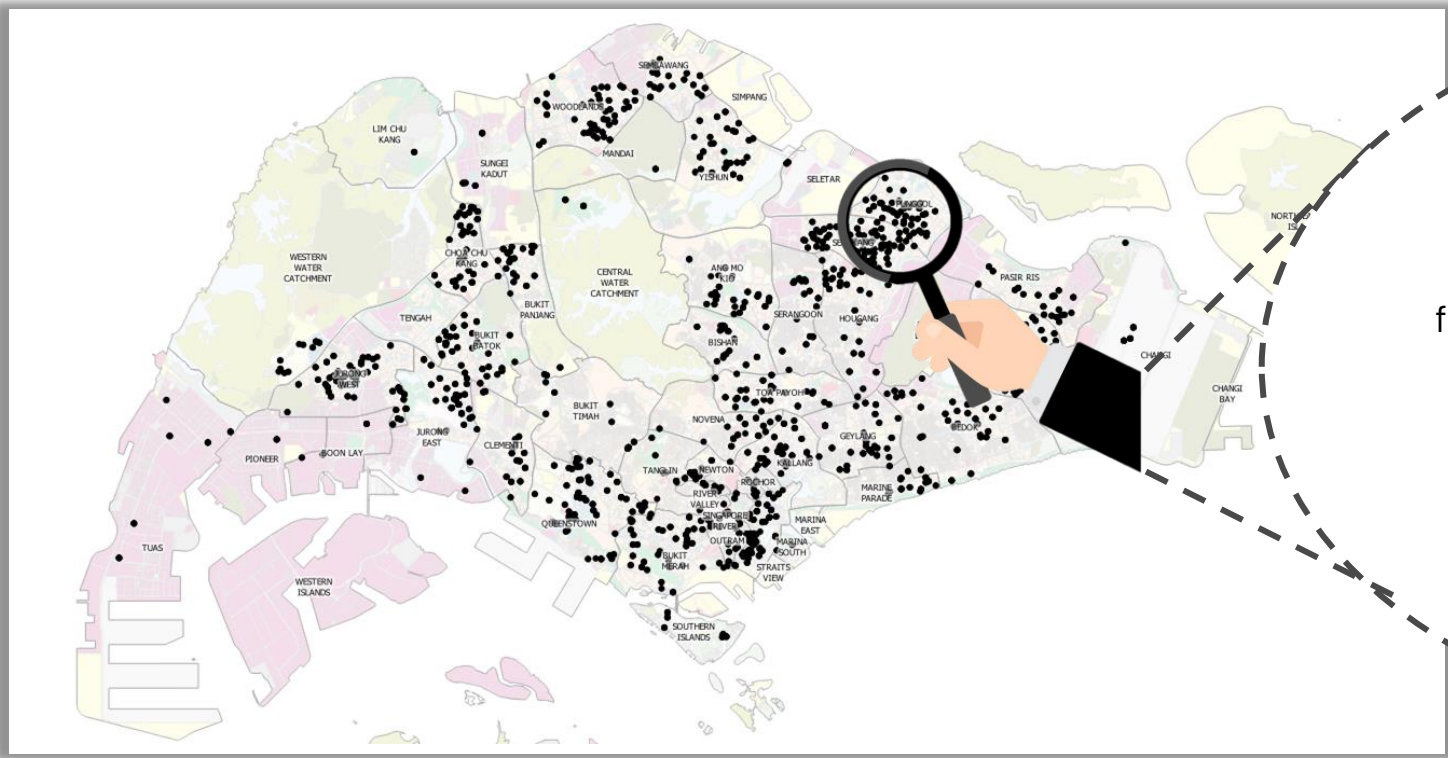
Did you know?

#3: Publicly accessible chargers are readily available.

Did you know?

We have more than 6,700 publicly accessible charging points island wide and we are deploying more chargers progressively across Singapore.

Every HDB Town will be an EV-Ready Town by 2025, with EV chargers at nearly 2,000 HDB carparks.



Locate your nearest charger via the MyTransport App!

More information on the charger's location (including the floor), availability, and charging fee can be found on the app.

The image shows a smartphone screen displaying the 'EV CHARGING NETWORK' interface. At the top, there is a search bar labeled 'Address for EV charging:'. Below the search bar, there are three filter buttons: 'Available', 'Unavailable', and 'No Info'. The main part of the screen shows a map with several red lightning bolt icons indicating the locations of EV charging stations. The map includes street names like 'Yio Chu Kang Rd' and 'Greenwich V'. Other landmarks like 'ITE College Central' and 'Amoy Quee Car' are also visible on the map.

The data provided is accurate as of July 2024.

Did you know?

#4: The de-registration value of EV is seemingly lower¹² due to upfront ARF rebates.

Did you know?

Buying an EV

When you purchase an EV, you receive a rebate on the Additional Registration Fee (ARF) upfront, lowering your initial cost.

De-registering an EV

The ARF determines your Preferential ARF (PARF) rebate, which is a component of your de-registration value (De-registration value = COE rebate + PARF rebate).

Since this ARF is lower, the PARF rebate received upon deregistering your vehicle is lower, and consequently the resale value of the EV is typically lower than that of a similar petrol car.

Essentially, the benefit of the PARF rebate is realised upfront when purchasing your EV, reducing the initial cost. This means you get the savings **now** rather than at the **de-registration stage**.

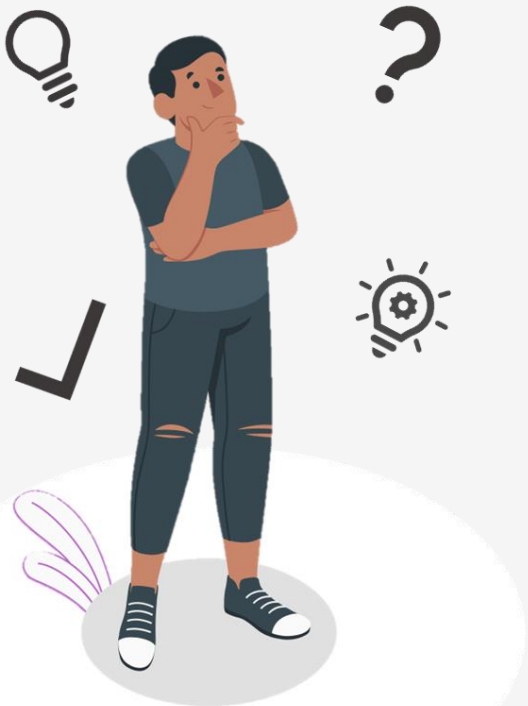
 Click [here](#) to learn how to calculate your ARF and PARF values!

02

Switching to EV

What to look out for when purchasing an EV instead of an ICE vehicle?

What do I need to look out for when purchasing an EV instead of an ICE vehicle?



**Type of Vehicle
Charging Inlet**



Mileage



**Limit on Maximum
Charging Rate**



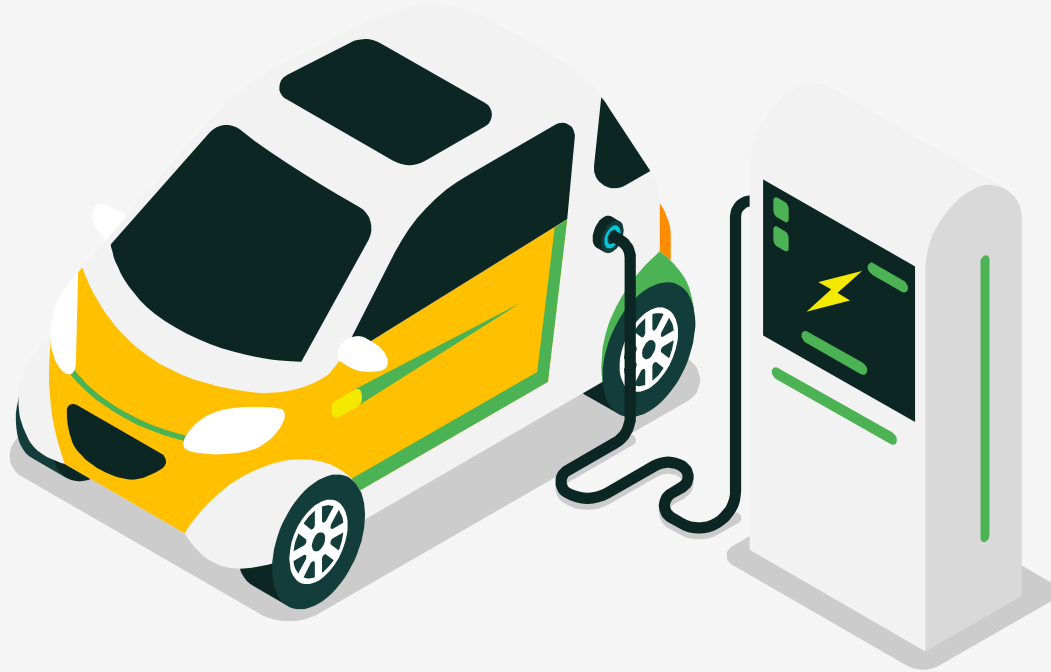
Charging Curve



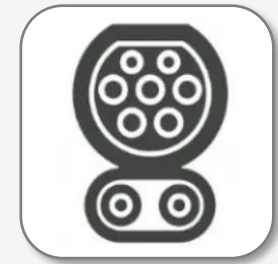
**Requirements for
Charger Installation
at Private Residences**

Type of Vehicle Charging Inlet

EV cars in Singapore are fitted with 2 types of charging inlets that are compliant with TR25:



Type 2
Alternating Current
(AC Charging)



Combo 2
Alternating Current and
Direct Current
(AC and DC Charging)



Mileage

Select an EV that suits your driving and charging needs. A high battery capacity EV may offer longer range and convenience but could cost more upfront^[1] while a shorter-range EV may require more frequent charging. You do not need to make dedicated pit-stops for charging. Charge where you live/work/shop, without changing your routine.



Model A



Model B



Model C

Retail Price

\$172,888

\$197,800

\$251,000

Battery Capacity (A)

50 kWh

58 kWh

81kWh

Battery Efficiency (B)^[2]

5.46 km/kWh

6.25 km/kWh

6.10 km/kWh

Average Mileage (C)

50 km / day

50 km / day

50 km / day

Estimated Interval between Charging Sessions

$(A) \times (B) \div (C)$

~5 days

~7 days

~9 days

[1] <https://about.bnef.com/blog/lithium-ion-battery-pack-prices-rise-for-first-time-to-an-average-of-151-kwh/>

[2] <https://ev-database.org/cheatsheet/energy-consumption-electric-car>



Limit on Maximum Charging Rate

Consider the power capacity of the EV's onboard charger and the maximum fast charging rate for each EV as it would limit the maximum power that the battery can receive.

		Vehicle A	Vehicle B
Vehicle Specification	Maximum On-board Charging (Affects AC Charging Rate)	22 kW	11 kW
	Maximum Fast Charging Rate (Affects DC Charging Rate)	90 kW	210 kW
Maximum Charging Rate of EV at			
A 22 kW AC charger		22 kW	11 kW
A 50 kW DC charger		50 kW	50 kW
A 240kW DC charger		90 kW	210 kW



DID YOU KNOW?

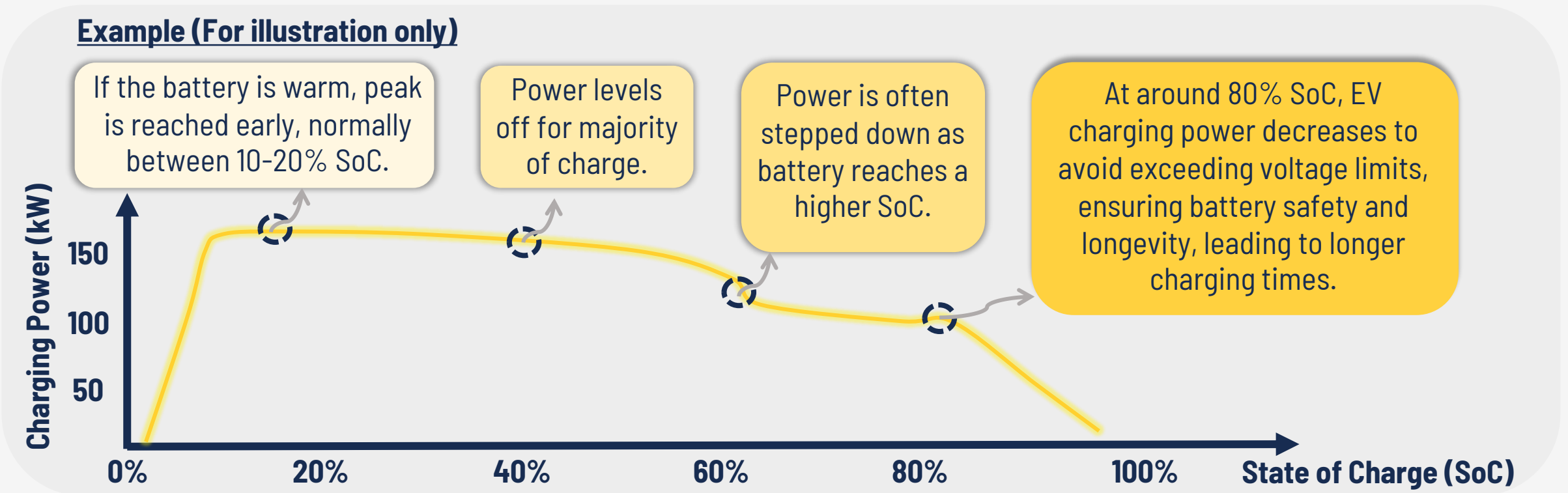
For AC charging, an EV can support either:

- **1-phase charging** (up to 3.7kW, 7.4kW) or
- **3-phase charging** (up to 11kW, 22kW, 43kW).

Note: If an EV that only supports 1-phase charging is connected to a 3-phase 11kW charger, the vehicle will still limit charging to 3.7kW.

Charging Curve

The charging curve of an EV car battery represents how the battery's state of charge (SoC) changes over time during the Direct Current (DC) charging process. Understanding the charging curve helps users gauge how long it will take to charge the battery fully. **Charging speed is typically fastest between an SoC of 20% and 80%.**



Important Note: Users should refer to the vehicle's manual for an accurate charging curve.

Charger Installation at Private Residences

EV charger owners are required to register their chargers with LTA under the EV Charging Act. For residential premises, EV chargers may only be installed in garages or designated carparks.




DID YOU KNOW? Non-fixed chargers are only permitted in landed private residences, and are not allowed to be installed at non-landed private properties (e.g. condominiums).

Purchase

- Only purchase EV charger from **reliable and reputable sources**.

Don't be fooled by misleading claims!

Misleading claims:

 "CE certified, comply with IEC standards"

All EV charger models must be type-approved by LTA to ensure safety. Verify that the EV charger has been type-approved by LTA and bears the official approval label.



The list of type-approved chargers can be found on <https://go.gov.sg/regulating-safety-of-ev-chargers>.

- It is **not mandatory to engage EV Charging Operators** to operate chargers at private landed residences.

Installation

- Engage qualified personnels** to ensure that the chargers are properly installed and maintained.

A list of Licensed Electrical Worker and Equipment Specialist can be found on <https://go.gov.sg/registration-of-ev-chargers>.

- Do not install EV chargers at prohibited locations.**

More information available at <https://go.gov.sg/regulating-safety-of-ev-chargers>

Registration

- Register your EV chargers** at <https://go.gov.sg/register-ev-charger>

- Affix your registration mark** on your EV charger within 60 days of registration to indicate that it is registered with LTA.



Maintenance

- Chargers to be regularly inspected**

Frequency:

Non-landed homes
Every 6 months

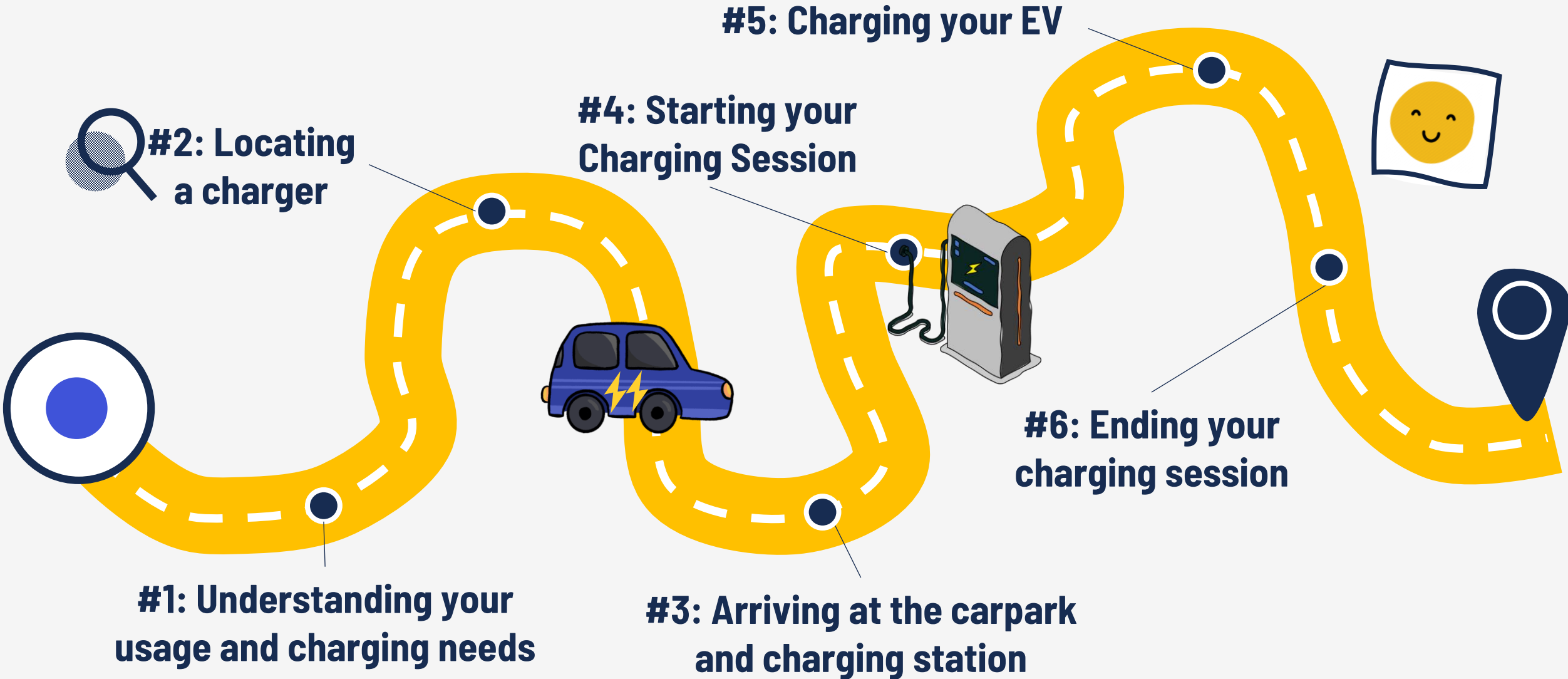
Landed homes
Every 24 months

03

Driving an EV

EV Charging Guide and Good EV
Charging Etiquette

Whether you're a seasoned driver or new to the world of electric mobility, this will help you navigate the realm of EV charging:



#1: Understanding your usage and charging needs

Design and optimise your EV charging routine. You don't need to charge daily or make drastic changes to your lifestyle. Parking fees apply for the use of car park while vehicle is charging.



AC charging at home or workplaces

An average driver^[1] would only require a full charge on an AC charger every **5-6 days**. This provides an average range of ~300km. Since you're already parked for an extended period at home or at your workplace, why not take the opportunity to charge your vehicle as well?



Opportunistic charge at malls or destination carparks during lunch or while running errands

If you don't have access to a charger at home or work, you can conveniently find AC or DC chargers while on the move to keep your EV powered up.

[1] Average daily mileage of 50km.

#2: Locating a charger

1) Scan the QR code below to download MyTransport.SG App



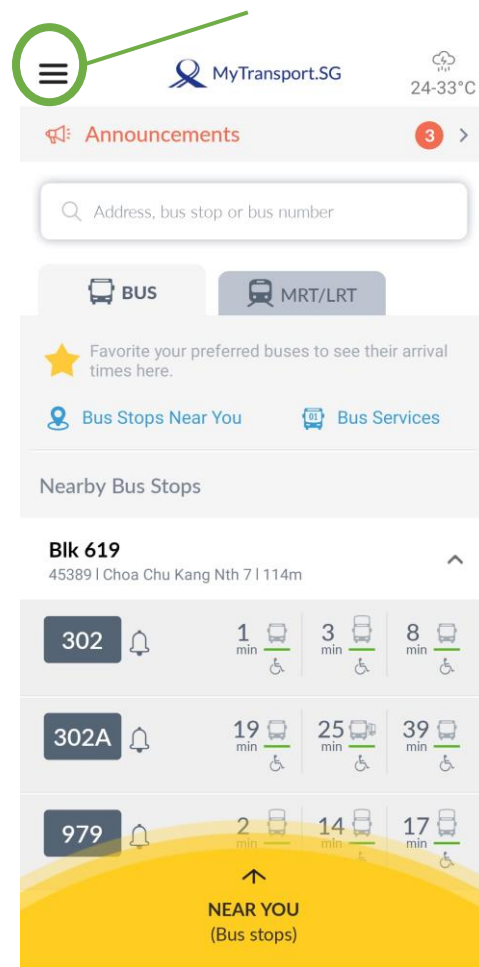
Download on the App Store



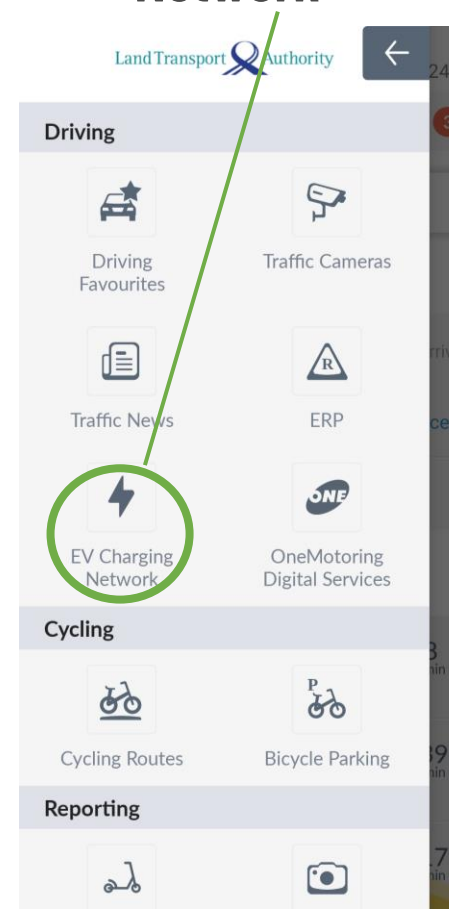
GET IT ON Google Play



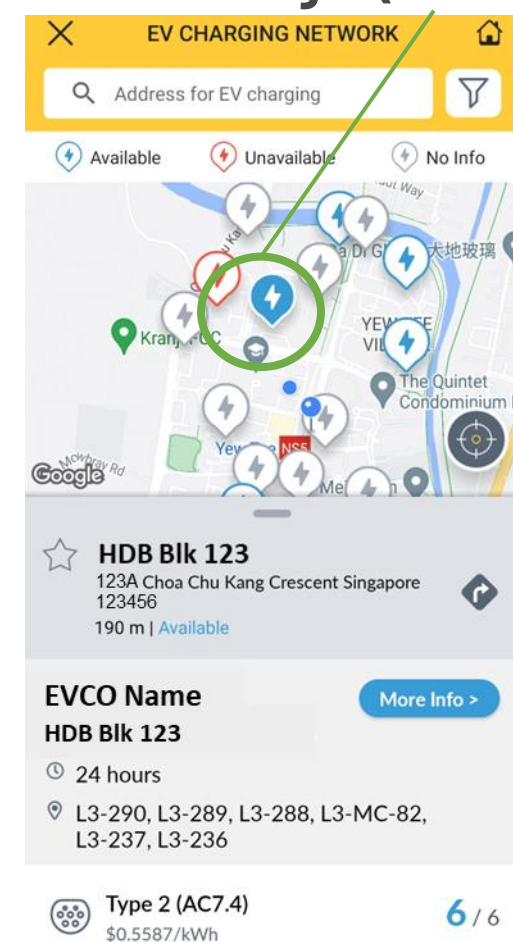
2) Select Menu



3) Select "EV Charging Network"



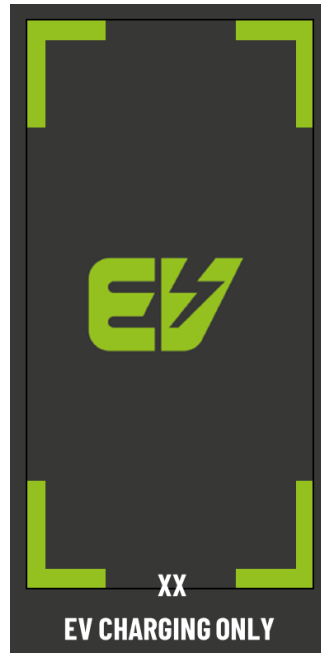
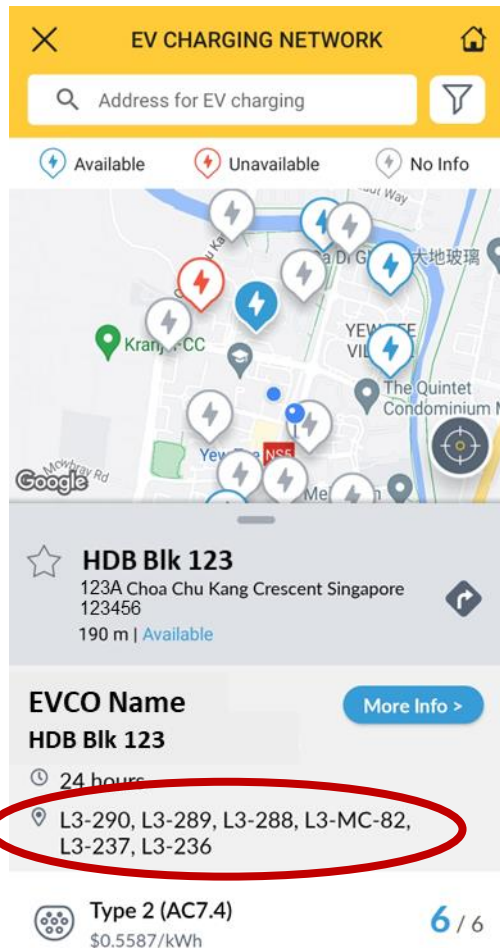
4) Locate and select an available charger (in blue)



You may also locate chargers on EV Charging Operators mobile application.

#3: Arriving at the carpark and charging station

The location of the charging station is reflected on **MyTransport.SG App**.



An EV charging lot is typically painted in green and marked with "EV Charging Only".

What happens if the lot is occupied?

Is the EV charger plugged in?

→ **Yes, EV charger is plugged in:**

- You may **locate an alternative charging station** nearby via MyTransport.SG App.
- **Do not unplug chargers from other EVs** as it may cause injury to you, damage the charger or the vehicle. Such actions may constitute an offence under the EV Charging Act.

→ **No, EV charger is not plugged in:**

You may report lot misuse via:

- [For HDB / URA Carpark] **LifeSG / OneService App** or **call the parking enforcement hotline** at 1800-338-6622. Lot misuse (including EV occupying the charging lot without the EV charger plugged in) is an offence under the Parking Places Rule and fines may be imposed.
- [For Other Carpark] **EVCO's or Carpark Operator's hotline** reflected on the EV charger or notify the **Customer Service Counter** within the mall / building.

#3: Arriving at the carpark and charging station

Charging at home? Here's your safety checklist:

! No adaptors or extension cords

These are not built for EV charging!
Using them could lead to electrocution or fire hazards.



! No 13A Household Sockets

They are not designed for EV batteries and using them is prohibited under the EV Charging Act.



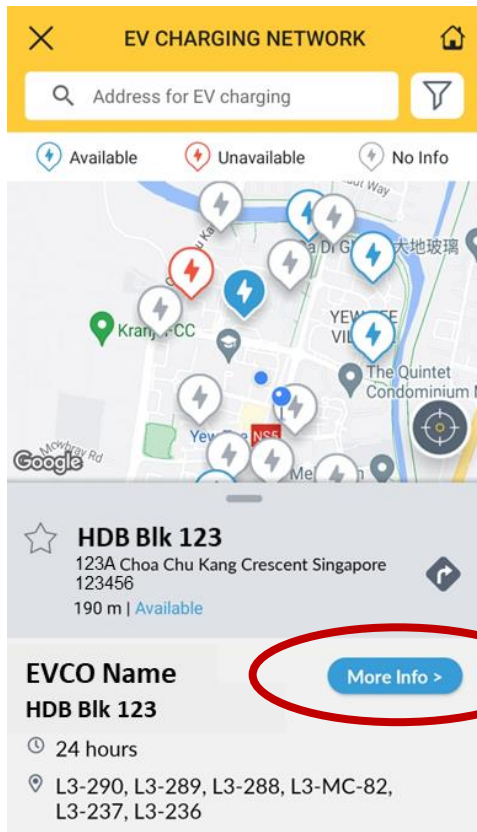
! No Home Charging for Detachable E-Motorcycle Batteries

Charge them at a Battery Charge and Swap Station (BCSS) or while securely fitted within the e-motorcycle at a designated charging station.

#4: Starting your charging session

There are a few ways to commence your charging session:

From **MyTransportSG App**, you may tap on **More Info >** to be redirected to the EVCO's app to start your charging session.



Via EVCO's App



Via QR Code

Scan the QR code on the EV charger to start your charging session.



Via Direct Payment Terminal

Tap your credit card at the payment terminal to start your charging session.



Problems with the mobile app ?

You may wish to check the following:

- Are you using the latest version of the app?
- Is your phone operating system and security updates compatible with the app?

#5: Charging your EV

Monitor your charging session and be mindful of other EV drivers who may need access to the EV chargers.

80% is good to go!



- The last 10 - 15% of a battery charge may take longer as the battery starts to cool and charging speed decreases.
- Moving your EV after it's adequately charged gives others the opportunity to charge their vehicles.



**DID YOU
KNOW?**

Some EVCOs have implemented idle fees. You may be charged for overstaying at the charging lot after the charging session is completed.



Important Note: Users should refer to the vehicle's manual for an accurate charging curve.

#6: Ending your charging session

There are a few ways to stop your charging session and make payment:



Via EVCO's App

Link your credit / debit card or top up your e-wallet on the EVCO's app.



Via QR Code

Scan the QR code on the EV charger to stop your charging session.



Via Direct Payment Terminal

Tap your credit card at the payment terminal to end your charging session.



PLEASE

Do not press the e-stop button (and isolator switches)

The e-stop button is meant for emergency situations like fire and flash flood. Activation of an e-stop button in non-emergencies may constitute an offence under the EV Charging Act. Activating the e-stop button (or turning off the isolator switch) will cause the charger(s) at the charging station to go offline and inconvenience the community.



REMEMBER TO

Coil the charging cable neatly after use

Leaving the charging cable lying around poses a tripping hazard, risks cable damage, and complicates use for the next user.



Thank you for making it to the end of this guide.
Now, buckle up, charge up, and drive into
a cleaner, greener future!

