

# ELECTRIC VEHICLE DRIVER'S GUIDE



**ARVAL**  
BNP PARIBAS GROUP

For the many journeys in life

June 2024



# WELCOME TO THE EV\* WORLD

Thank you for ordering your first Electric Vehicle.

Congratulations and welcome to the growing community of EV drivers!

You're on the right path to experience all its advantages: zero CO<sub>2</sub> emissions while driving, minimal noise, no smell, no vibration, optimum power from start-up...

However, driving an EV can be apprehensive for new EV drivers:

- Where can I quickly **charge my battery** if my range is low?
- How can I **reduce my energy costs**?
- How can I **extend my battery range**?
- How can I **preserve the battery life**?

This guide aims at answering these questions and providing you support in driving and charging your car to enhance your experience.

# SUMMARY



## SPECIFICATIONS

### 01 Battery Overview



## CHARGING YOUR EV

- 02 What factors impact your charging time?
- 03 Slow charging, fast charging: what connectors can you use?
- 04 How to quickly calculate your charging time?
- 05 How to preserve your battery range and life?
- 06 How to charge safely and save time and money at home?
- 07 How to improve charging on the go for you and other EV drivers?
- 08 How to use public charging points?



## DRIVING YOUR EV

- 09 Driving an EV versus an ICE
- 10 How to maximize your battery range?
- 11 How to plan for longer journeys?
- 12 How to preserve your battery range and life in extreme temperatures?



# A FEW TECHNICAL SPECIFICATIONS



## 01 - BATTERY OVERVIEW

- EVs are powered by a **battery**.
- They must be **plugged-in** to be recharged.
- Battery capacity is expressed in **kWh** (kilowatt-hour), which represents the energy storage capacity, directly related to the vehicle's range, expressed in **kilometers** (miles).
- The higher the capacity, the longer the vehicle's range.
- Vehicle consumption is expressed in **kWh/100 km** (kWh/100 miles).
- The range varies by make and model, but also by many factors influenced by your **driving habits** or **external conditions**.
- Just like your phone, the ability of an EV battery to store electrical energy **slightly decreases over time**.



### GOOD NEWS IS:

You have control over many of these variables to extend the battery range and battery life!



# SPEED OF CHARGING: THE MAIN FACTORS



## 02 - WHAT FACTORS IMPACT YOUR CHARGING TIME?

The **time to charge** your EV depends on:

- the **capacity of the battery**
- the **state of charge of the battery**
- the **speed of the charging point** (slow charging at home, fast charging along highways for example, ...)
- the capability of the **onboard charger**
- **ambient temperature.**

The more powerful the charging point and the onboard charger (in kW), the faster the battery will charge.

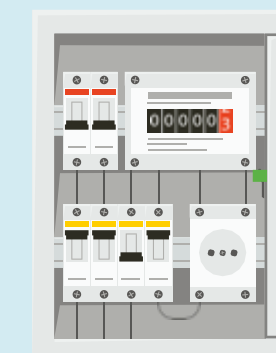
<sup>1</sup> *Alternative Current*

<sup>2</sup> *Direct Current*

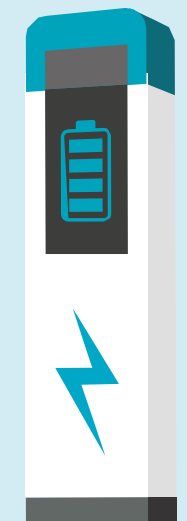
**1** Maximum **power** of the **onboard charger**



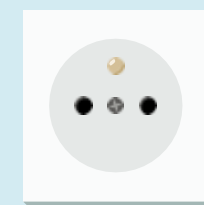
**2** **Charging cable** to plug in a domestic socket or charging unit



**3** **Charging power** of the socket or charging point



**4** **Circuit breaker** with an adequate amperage



DID YOU KNOW

You can find the battery capacity and onboard AC<sup>1</sup>/DC<sup>2</sup> charging capabilities in the technical sheet of your vehicle.










# CHARGING YOUR EV: THE DIFFERENT TYPES OF CHARGE POINTS



## 03 - WHAT CONNECTORS CAN YOU USE? ALTERNATING CURRENT (AC) CHARGING: SLOW CHARGING



	Slow charging (Level 1)	Moderate charging (Level 2)
Plug types	Standard household outlets (Type A, B or G)	Type 2 connector for Europe
Charging connector	<div></div> <div>Type GType A</div>	<div></div>
Power rating	2-2,5 kW	7 kW is the most common (3,7 kW, 11 kW and 22 kW also available)
Charging speed	Adds ~3-8 km (2-5 miles) of range per hour of charging	Adds ~16-48 km (10-30 miles) of range per hour of charging
20-80% charging time	~8-20 hours depending on battery capacity	~3-8 hours depending on battery capacity
Availability	At home or any standard electrical outlet	At home with dedicated charging stations, workplaces, and public charging stations



# CHARGING YOUR EV: THE DIFFERENT TYPES OF CHARGE POINTS



## 03 - WHAT CONNECTORS CAN YOU USE? DIRECT CURRENT (DC) CHARGING: FAST CHARGING

	Fast charging	Ultra fast charging
Plug types	CCS (Combined Charging System), Tesla Supercharger	CCS, Tesla Supercharger V3
Charging connector	 Tesla charger	 CCS plug (most common)
Power rating	50 kW	150 kW to 350 kW
Charging speed	Adds ~95-130 km (60-80 miles) of range per hour of charging	Adds ~290-400 km (180-250 miles) of range per hour of charging
20-80% charging time	~30-60 minutes depending on battery capacity and charging infrastructure	~20-40 minutes depending on battery capacity and charging infrastructure
Availability	At highway rest stops, public charging stations and a few workplaces	Growing network of high-powered charging stations along major highways and urban areas



# CALCULATE THE SPEED OF CHARGING









## 04 - HOW TO QUICKLY CALCULATE YOUR CHARGING TIME?

$$\text{Charging time}^1 = \frac{\text{Capacity}^2 \text{ (kWh)}}{\text{Power}^3 \text{ (kW)}}$$

- 1** Theoretical times can be influenced by number of **simultaneous charges** in a charging station.
- 2** Capacity = Vehicle **battery capacity**.
- 3** Power = Power provided by the **charging solution** or **maximum power of the charger** of the vehicle if < charging solution power.

The onboard charger delivers a different maximum power if AC or DC charging.

3 examples:	 AC: 3.7 kW	 AC: 11 kW	 DC: 150 kW
<b>SKODA ENYAQ 180</b> Capacity: 77 kWh Power: 7.2kW (AC) / 120kW (DC) 	77/3.7 = <b>20 h 48 min</b>	77/7.2= <b>10 h 41 min</b>	77/120 = <b>38 min</b>
<b>HYUNDAI TUCSON</b> Capacity: 13.8 kWh Power: 7.2kW (AC) 	13.8/3.7 = <b>3 h 43 min</b>	13.8/7.2 = <b>1 h 55 min</b>	13.8/7.2= <b>1 h 55 min</b> <small>Prefer an AC charging if available</small>
<b>TESLA Model Y</b> Capacity: 60 kWh Power: 11kW (AC) / 170kW (DC) 	60/3.7 = <b>16 h 13 min</b>	60/11 = <b>5 h 27 min</b>	60/150 = <b>24 min</b>



# BEST PRACTICES OF CHARGING



## 05 - HOW TO PRESERVE YOUR BATTERY RANGE AND LIFE?

Aim for optimal charge level which is between 20% and 80%. The recharging time increases considerably under 20% and beyond 80%, much more significant with a fast charger.

**Use the intelligent system** (available in most EVs) to automatically stop charging once the battery is 80% charged.

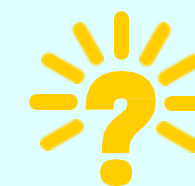
**Periodically, fully charging the battery** helps to balance its internal elements. Reserve these full charges for longer trips.

**Opt for shorter, more frequent charging sessions**, instead of long charging sessions.

**Prefer slow charges** and reserve fast charging for long trips.

**If you don't use your vehicle for a long period, charge your EV at least at 50%;** some functionalities or circumstances use the battery even while the vehicle is off.

OPTIMAL CHARGE  
**20 to 80%**



DID YOU KNOW

Most EVs come with 2 cables: a Type A (or G) charging cable that plugs into regular domestic sockets and a "Type 2" fast charging cable for home and public charge points. Note a few manufacturers don't provide both.



# CHARGING AT HOME



## 06 - HOW TO CHARGE SAFELY AND SAVE TIME AND MONEY AT HOME?

Always recharge at home/office when it's possible. Keep in mind public charging, in particular fast and **super charging**, is noticeably more expensive than home charging.

Charge your EV from a dedicated charge point rather than a domestic socket whenever possible. Or at least, use a reinforced socket.

Take advantage of off-peak hours if available by your energy supplier.





# CHARGING ON THE GO: OPTIMAL USAGE



## 07 - HOW TO IMPROVE CHARGING ON THE GO FOR YOU AND OTHER EV DRIVERS?

**Select the appropriate charging power** considering the duration your vehicle will be stationary and the capability of the onboard charger.

**Make the most of free fast chargers at supermarkets and retail outlets.**

**Ensure you have the necessary charging cable** (type 2) on hand. A few charging points don't provide adapted cables (fast chargers always).

**Use fast charging stations for ~ 30 minutes**, especially during peak times.

**Give priority to vehicles with immediate charging needs.**

**Park in a charging space only for charging purposes.**



**After reaching your desired charge level, leave the charging area promptly to avoid any billing surprises** (many charging stations invoice for the use of the parking spot once charging is complete) and to allow others to use the space.

**Display a courtesy sign inside your vehicle** indicating your estimated return time is a considerate gesture toward the next user.



# PUBLIC EV CHARGING: KEY STEPS



## 08 - HOW TO USE PUBLIC CHARGING POINTS?

Prior to charging, **some networks require identification or registration.** Use the Arval charging card, a RFID card, a mobile application, or follow the instructions displayed on the charging station.

**Plug the cable into the charging compartment of your EV, then plug the other hand into the charging station** (Order may vary).

**Select the desired charging mode** (fast or moderate) if available.

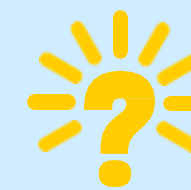
**Follow the instructions displayed on the screen.**

Indicator light changes when charging begins.

**Stop charging following the instructions. Press the “unlock” button of your EV if needed** (next to the charging connector or on the dashboard) to release the cable.

If necessary, **pay as instructed:** Arval card, credit card, mobile application or any other accepted method.

For any station issues, contact the operator listed on station.



DID YOU KNOW

Some apps allow you to monitor the charging status remotely.





# DRIVING AN EV VERSUS AN ICE\* VEHICLE



## 09 - DRIVING AN EV PRESENTS NO DIFFICULTY VERSUS DRIVING AN ICE\* VEHICLE. HERE ARE A FEW KEY DISTINCTIONS TO BE AWARE OF:

**EVs don't have a gearbox.** You can enjoy the seamless acceleration without worrying about gear changes and focus on the road ahead.

**EVs operate almost silently compared to ICE vehicles, but they generate a specific "low-speed" sound for pedestrian safety.** Remain vigilant to your surroundings, especially in areas with pedestrians or cyclists.

**EVs offer greater acceleration, especially from a standstill.** Practice gentle acceleration to avoid sudden jolts, and familiarize yourself with the sensitivity of the accelerator pedal.

**Most EVs come with regenerative braking; this results in a different braking feel compared to traditional vehicles** for which you need to familiarize yourself and allow for longer braking distances.

*\* Internal Combustion Engine*



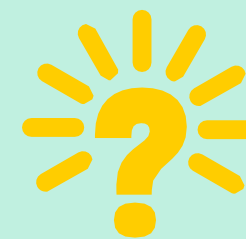
# DRIVING YOUR EV: YOUR PERSONAL DRIVING STYLE IS KEY



## 10 - HOW TO MAXIMIZE YOUR BATTERY RANGE?

### ADOPT AN ECO-DRIVING STYLE

- **Maintain a moderate speed.**
- **Maintain a steady pace**, minimizing sudden accelerations and anticipating braking.
- **Use your speed limiter** and/or **cruise control** on the highway.
- **Engage the “eco” mode** in town.
- **Use the regenerative braking**, ideal for urban environments, traffic jams and mountainous roads.
- **Remove unnecessary items** from your vehicle, especially heavy loads and those affecting aerodynamics like roof bars and boxes.
- **Avoid not driving your EV during several weeks.**



DID YOU KNOW

### WHAT IS THE REGENERATIVE BRAKING?

Unique to EVs, it allows them **to recover energy during deceleration** and replenish the battery instead of wasting it as heat.

The best way to fully benefit from its advantages is to maintain steady speeds, anticipate traffic and braking distances.





# MANAGING LONGER JOURNEY



## 11 - HOW TO PLAN FOR LONGER JOURNEYS?

**Plan your route and charging stops** in advance to avoid any charging problems and unnecessary detours.

**Use web and app based resources** such as Chargemap or Google Maps to plan your journey.

**Stop wherever possible at a location that has more than one charge point** to reduce the chance of a queue or broken charge point.

**Aim to recharge before your battery reaches 20%.**



**DID YOU KNOW**

The energy is shared when different drivers use the same supercharger.

Take into consideration the speed of charging is divided to estimate your charging time.



**TAKE AT LEAST A 20% MARGIN FOR PLANNING YOUR JOURNEYS.**



# DRIVING YOUR EV WITH EXTREME TEMPERATURES



## 12 - HOW TO PRESERVE YOUR BATTERY RANGE AND LIFE IN EXTREME TEMPERATURES?

Your EV performance is influenced by **environmental conditions**, especially temperature, manageable with proactive measures.

### IN COLD WEATHER:

**Preheat the car while plugged in** (it's the energy from the grid that is used, not your battery's one) **10 to 15 minutes before** your departure time.

**Use energy-efficient heating options like seat and steering wheel warmers** to reduce less efficient ordinary heating.

### IN HOT WEATHER:

**Park in shaded areas** even if it's a bit further from your destination.

**Avoid charging during peak heat.**

**Drive even more smoothly.**

**Open windows at lower speeds** (but avoid on highways as it disrupts aerodynamics).





**DRIVE CAREFULLY AND ENJOY YOUR CAR!**

## Contact us



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# My ArvalDriver



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