Visualization Tool for Electric Vehicle Charge and RangeAnalysis :

Introduction:

To get the most out of the EV charging experience it is important to be aware of a few concepts that determine the rate at which an electric vehicle battery can recharge. Read our charging guide below for the details, and, as always, feel free to contact us for additional information.

Battery Pack Rating:

Electric vehicles have a battery pack with a specific capacity available to store a charge. This capacity is measure in kilowatt hours (kWh). The greater the battery pack's kWh rating, the greater the distance that the EV can potentially travel before the battery is fully discharged and requires additional EV charging.

Power Acceptance Rate:

Electric vehicles have a charger on-board the vehicle that converts the alternating current (AC) delivered by the EV charging station to direct current (DC) so that the battery pack can be recharged. On-board chargers have a maximum power acceptance rate, measured in kilowatts (kW), that determines how fast the battery can accept electricity while recharging.

The higher the rate the faster the battery can be recharged.

The power acceptance rates for popular EV's today range from 3.3 kW (Chevy Volt) to 10 kW (Telsa Model S).

Power Delivery Rating:

EV charging stations safely deliver electricity from the power source to the electric vehicle's on-board charger. These devices have a power delivery rating, measured in kilowatts (kW), that determines how fast the electricity can be delivered to the on-board charger. This rating is based on the charging station's volts and amps measurements.

Volts:

Charging stations are identified by levels based on the voltage of their power source. Chargers that connect to a 120 volt AC source are classified as level 1 charging stations and chargers that connect to a 240 volt AC source are classified as level 2 charging stations. There are also chargers that connect to 480 volt DC sources that are classified as level 3 charging stations, or DC fast chargers. The greater the voltage of the source, the greater potential for the power delivery rating of the charging station.

Amps:

Another factor that determines the charging station's power delivery rating is the amount of amps the device draws. This is a measurement of the flow of electricity.

Calculating Power Delivery:

The product of a charging station's volts and amps determines the power delivery rating. For a 240 volt 32 amp charging station the rating is calculated as follows: 240 * 32 = 7,680 watts = 7.68 kW.

Estimating Charging Times:

Estimates of EV charging times are calculated by dividing the electric vehicle's battery pack rating by either the power acceptance rate or the power delivery rating, whichever number is smaller. The component with the smaller number limits the speed at which the EV's battery can be recharged.

For example, a Chevy Bolt has a battery pack rating of 60 kWh and a power acceptance rate of 7.2 kW. When comparing a level 1 and level 2 charging station, the estimated charging times are limited by different components:

Level 1: 60 (battery pack rating) / 1.4 (power delivery rating) = 43 hours

Level 2: 60 (battery pack rating) / 7.2 (power acceptance rate) = 8 hours

View the file below for a list of EV's and a comparison between their estimated level 1 and level 2 charging times.

What are the different methods of charging an electric vehicle?

3. <u>TRICKLE</u> <u>CHARGE</u>:

The slowest method of charging your EV at home, using a standard (three-prong) 220V plug. It is only recommended in urgent cases, with caution and consultation with electricity providers.

<u>2.AC CHARGE:</u>

Having a wallbox installed lets you charge 3-4 faster using AC Household Charging. AC Public Charging is also available.

3.DC CHARGE:

The fastest way to charge your EV – at a public DC Fast charging station with power from 50kW and above. With this method you can top up your battery from 20 to 80% in 5inimiz. 40 minutes. There are also some ultra-fast charging stations that already provide more than 150kW.

Around 80% of all EV charging is currently done at home. Usually overnight while owners sleep – waking to a fully charged battery the next morning that almost always provides more than enough EV range for most people's daily travel needs.

There are TWO TYPES of home charging available: Using Trickle Charge with your household current or AC Household Charge with an installed wallbox. Here are the key differences:

TRICKLE CHARGE:

Provides charging through a standard (three-prong) 220V plug that comes with your EV. The other end is simply plugged directly into your EV

Doesn't require installation of additional charging equipment

Can deliver 13 to 16 km of range per hour of charging

Charging speed: 5inimiz. 65 km of range in 5 hours (overnight), or 200 km in 14 hours

Using Trickle Charge is only recommended in urgent cases when you have low battery charge and cannot drive to a public station or access an AC wallbox at home. This is because the use of household electricity may cause problems associated with electricity bills and electrical loads, so always use this charge solution with caution and discuss with your electricity provider before first use.

Purchasing an ICCB (In Cable Control Box) cable when using Trickle Charge is recommended, for maximum reliability and peace of mind.

AC HOUSEHOLD CHARGING WITH WALLBOX:

The most common and recommendable home charging option

Provides charging through a 230V outlet which allows charging 3 to 4 times faster than Trickle Charge – depending on the acceptance rate of your specific model and the charger

Especially useful if you have time to top up your electric vehicle overnight: it takes around 6 hours to fully charge a 40 kWh battery car

Requires the installation of a dedicated EV charging wallbox, which should be fitted by a trained electrician

Ideal if you have a garage or driveway in which it can be positioned

There may also be financial incentives in your local region or country to 6inimize purchase and installation costs

In a nutshell: What's special about a hybrid car?

There are a number of different ways to charge your electric car's battery pack. Being faced with normal and fast charging methods, and different connector types, can be a little daunting at first. But in fact it is much more straightforward than it first appears! In this short guide we'll let you in on all the key information you need to know.

Essentially, it comes down to two main considerations: WHERE you decide to charge and HOW FAST you decide to charge. These are interconnected, and the

charging speed will depend on which particular EV you own, its battery capacity and what sort of charging system you are using.

Another key thing to know from the outset: There are three categories or types of charging: Trickle Charge, AC Charge and DC Charge.

TRICKLE CHARGE:

The slowest method of charging your EV at home, using a standard (three-prong) 220V plug. It is only recommended in urgent cases, with caution and consultation with electricity providers.

AC CHARGE:

Having a wallbox installed lets you charge 3-4 faster using AC Household Charging. AC Public Charging is also available.

DC CHARGE:

The fastest way to charge your EV – at a public DC Fast charging station with power from 50kW and above. With this method you can top up your battery from 20 to 80% in approx. 40 minutes. There are also some ultra-fast charging stations that already provide more than 150kW.

Terminology – Good to know!

There are several different terms used for charging stations but they all usually refer to the same thing: charging station, charging outlet, charging plug, charging port, charger, and EVSE (Electric Vehicle Supply Equipment).

First up: Home vs. public charging:

You have two options – charging your EV at home using your own domestic mains electricity supply, or making use of public charging stations. This will affect the types (and speeds) of charging available to you.

Option 1:Home charging

Around 80% of all EV charging is currently done at home. Usually overnight while owners sleep – waking to a fully charged battery the next morning that almost always provides more than enough EV range for most people's daily travel needs.

There are TWO TYPES of home charging available: Using Trickle Charge with your household current or AC Household Charge with an installed wallbox. Here are the key differences:

TRICKLE CHARGE:

Provides charging through a standard (three-prong) 220V plug that comes with your EV. The other end is simply plugged directly into your EV

Doesn't require installation of additional charging equipment

Can deliver 13 to 16 km of range per hour of charging

Charging speed: approx. 65 km of range in 5 hours (overnight), or 200 km in 14 hours

Using Trickle Charge is only recommended in urgent cases when you have low battery charge and cannot drive to a public station or access an AC wallbox at home. This is because the use of household electricity may cause problems associated with electricity bills and electrical loads, so always use this charge solution with caution and discuss with your electricity provider before first use. Purchasing an ICCB (In Cable Control Box) cable when using Trickle Charge is recommended, for maximum reliability and peace of mind.

AC HOUSEHOLD CHARGING WITH WALLBOX:

1. The most common and recommendable home charging option
2. Provides charging through a 230V outlet which allows charging 3 to 4 times faster than Trickle Charge – depending on the acceptance rate of your specific model and the charger
3. Especially useful if you have time to top up your electric vehicle overnight: it takes around 6 hours to fully charge a 40 kWh battery car

Option 2:

Public charging stations:

Increasingly convenient thanks to the ever-growing network, these stations can often be located throughout urban centres in particular and allow you to top up your battery on the go if you need to travel longer distances.

Public charging offers AC Charging with a wallbox or – in the majority of cases – DC Fast Charging.

And both options are quicker than charging at home: AC Public Charging can be 3 to 10 times faster than AC Household Charging, depending on the charging station output and your EV's capacity to handle AC Chargers.

DC FAST CHARGERS:

1. Currently the quickest way to charge an electric vehicle

2. Provides charging power above 50kW through a voltage above 450V and current up to 125A
3. Is capable of charging from 20 to 80% of charge in approx. 40 minutes

Utilises Combo DC (CCS for Combined Charging System)

4. Use of DC Charge should be kept to a minimum in order to help prolong high-voltage battery life.

Conclusion:

The national grid delivers AC (Alternating Current), but electric cars need DC (Direct Current) to charge their battery pack.

An AC charger supplies the EV's onboard charger, which then converts the AC power to DC allowing the battery to charge. The size of the onboard charging device is constrained by space. Due to this limited space, the amount of power they can deliver to the battery is relatively low. Which means that charging is typically slower.

A DC fast charger bypasses the onboard charging device, supplying power directly to the EV's battery. The DC charger is external to the car, so it isn't constrained in size or cost. Meaning that charging is typically much faster.