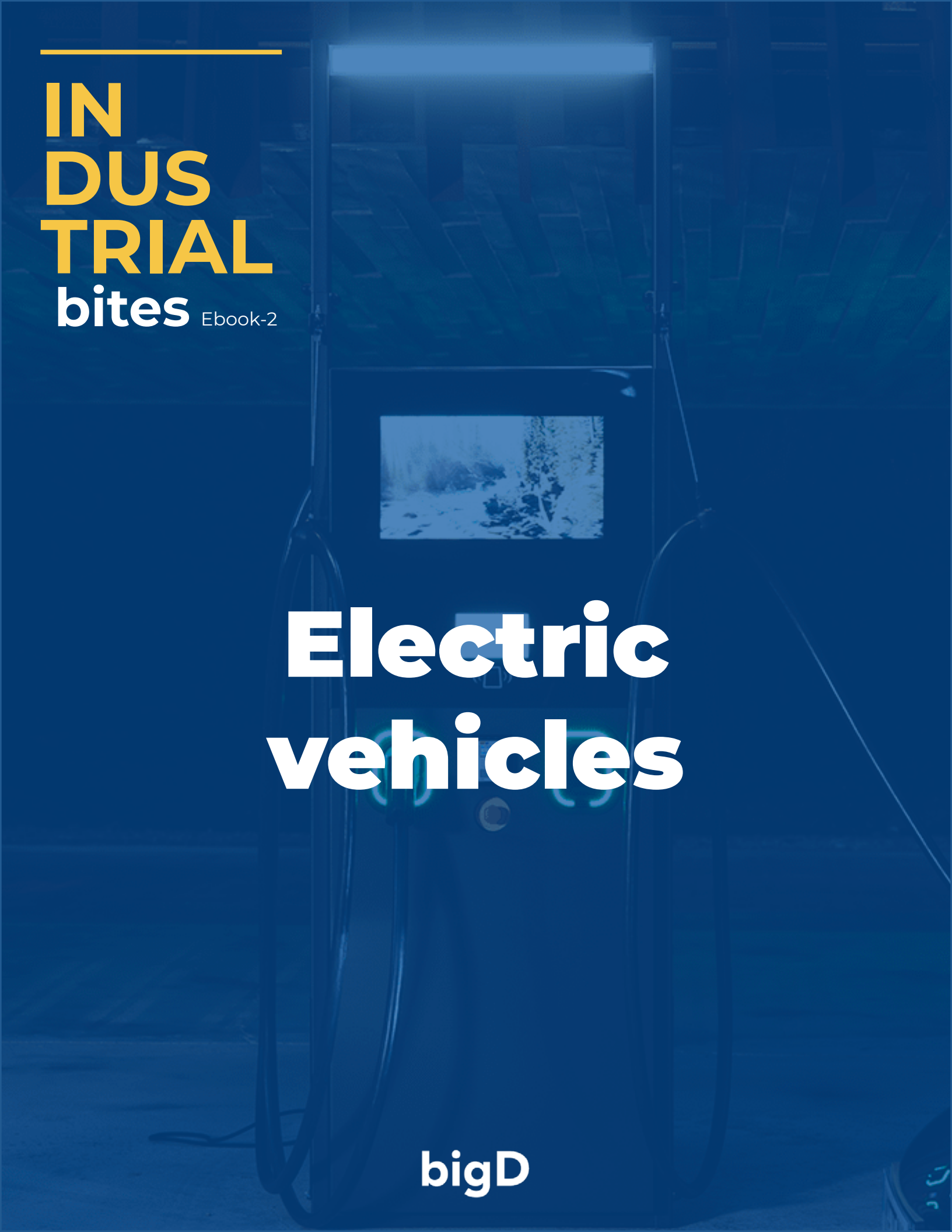

**IN
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**Electric
vehicles**

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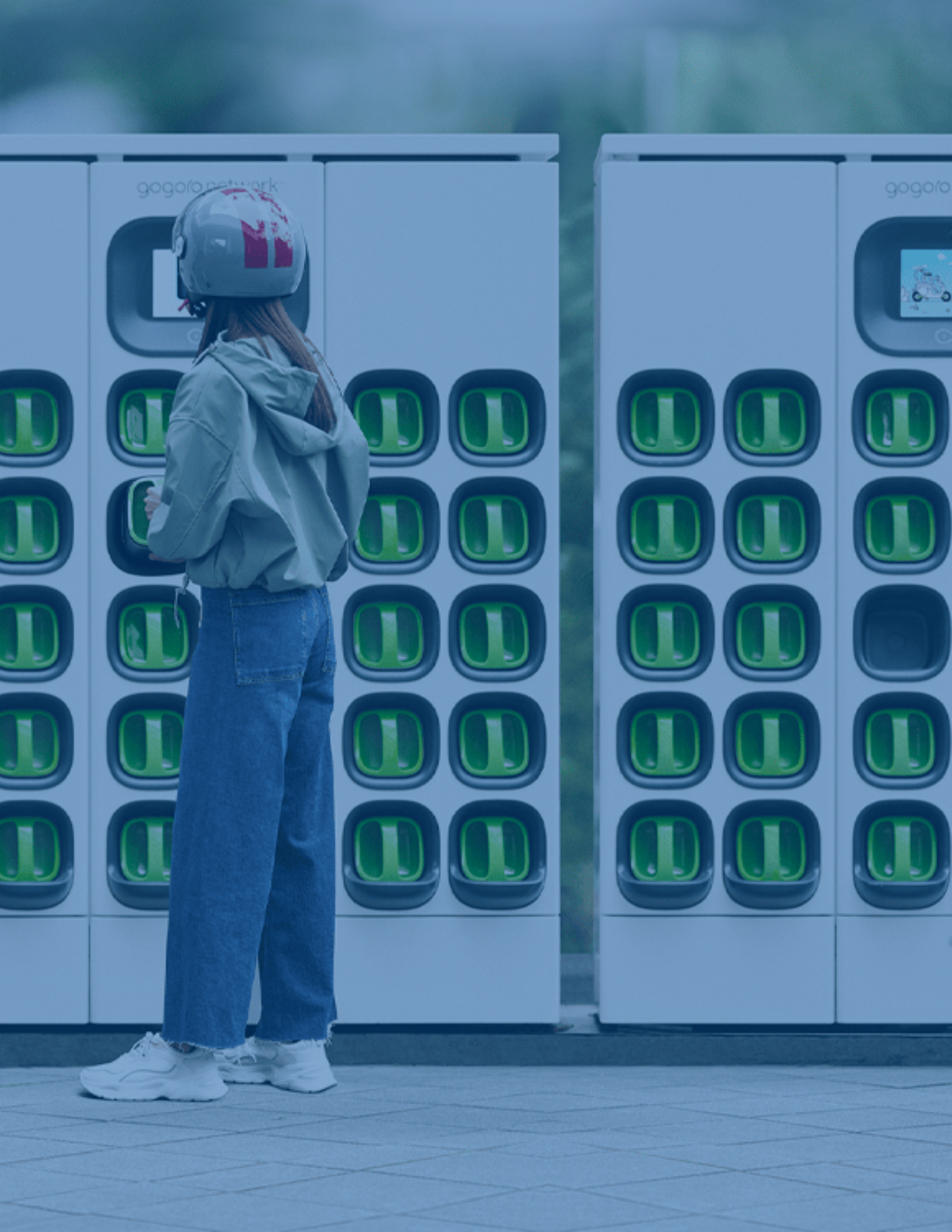
1 Battery Swapping



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Battery Swapping

“Battery swapping” or the exchange of a depleted battery for a new one in a matter of minutes in our EV (electric vehicle), is an unstoppable trend. In fact, it has already arrived from Asia to Europe, more specifically to Norway, and this is no coincidence.

Battery swapping is not intended as the only solution, it is intended as a complement to the current charging system. But perhaps in the not too

distant future, this new trend will overtake traditional charging as the preferred option among users because it is a much more agile process than fast charging. We are talking about an estimated time that varies from 3 to 5 minutes for the exchange and from 30 to 60 minutes for a DC fast charger.

In China, in 2021 the number of BEVs (pure electric cars or ‘battery-powered’ vehicles) exceeded 1,980,000 registrations according to data from the Chi-

SPOILER: we are not only going to recharge batteries.

“Battery swapping consists of exchanging the already depleted battery of an EV for a new one in a matter of minutes”.

na Association of Automobile Manufacturers. And with nearly 1,300 swap stations at the end of this year, it is expected to continue to increase to 26,000 by 2025. Currently, the two companies in charge of these facilities are NIO and Aulton New Energy.

While the sales volume of new pure electric cars registered in major Western European markets in 2021 rose to 1 million, according to [Business Insider](#).

And which was the market with the highest penetration of electric cars in Europe?

According to the [International Energy Agency \(IEA\)](#), it was Norway. Being the country with the highest proportion of electric cars in the world per capita, with 65% market share. Here we see why it is no coincidence that it is the first country to integrate Nio's battery swapping.

The idea is not new, there have already been manufacturers who thought about battery swapping but it has been a Chinese manufacturer of electric vehicles, [Nio](#), which has decided to take a risk and bet on this trend.

The number of electric vehicles around the world is increasing and the long waiting times to charge vehicles are important factors that may drive the growth of the electric vehicle battery exchange systems market in the not too distant future.

When we talk about electric car batteries, have you ever thought about a trip? And where do I charge it? When am I going to find a charging station? How long will I have to wait for the battery to charge?



[Battery storage system, designed for BeePlanet by bigD](#)

Because there are many gas stations, but not so many electric charging stations, and the time we want to wait is rather short. In the age of immediacy, who said to wait?, If we are demanding with an ecommerce, why aren't we demanding with recharging time and customer experience?

With this battery exchange service, also known as "Battery-as-a-service", an electric vehicle user drives to a battery exchange station and a system, automatically, replaces the battery with a fully charged one without the driver having to do anything. Arrive, swap the battery and drive away. It's that simple, or so it seems.

These are battery exchange stations, like the user who goes to pick up his online order in a "click & collect", where the vehicle parks and the driver waits. As a key point to highlight, the vehicle must have a special design called 'easy swap' for the exchange to take place. In other words, we need a car prepared for this.

As we can see, the market is retaking old bets that were perhaps not so viable, and the future may even surprise us with unexpected or even unthought-of twists. As Paul Gaughin used to say:

"To see I close my eyes".

2 E.V. Chargers: weren't they all the same?

From the battery to the electric car charger. Owning an electric car is not an easy task sometimes.

The E.V. is a sustainable solution but not without challenges to overcome yet. If we used to live attached to a cable, now we are too. More with several cables, and with solutions that are still underdeveloped. However, we are confident that everything will come together given the speed at which the world has been transforming in recent years.

According to the report [“Radiography of an electric vehicle user”](#) carried out in Spain by Electromaps (an electric mobil-

ity services company), it should be noted that most users recharge their vehicles by slow charging, and very few users use fast charging constantly.

When asked whether they believe there are enough charging points in Spain, the majority answer is no. 84.4% of those surveyed believe that more charging points are needed. The good news is that many of them, 85.5%, would buy back the same vehicle they currently drive.

Welcome to the world of Electric Vehicle chargers. Not all chargers are the same, and not all chargers are compatible with all cars.



[Ingeteam Rapid St 400KW, designed by bigD](#)

We read a lot about cell phone batteries and universal chargers for electronic devices, but little is written about universal chargers for electric vehicles. And we can't help but compare a “smart phone” to an electric car.

Look at the similarities. Because the battery of our “smartphone” lasts just enough to make a digital trip on the social network of choice and the autonomy of the car is in the same situation, just enough to make a trip and reach the destination. If we talk about chargers, exactly the same. Fast charging and the universal charger will be our best allies in both cases (a pity that in electric vehicles we are not so advanced).

“The battery of our ‘smartphone’ is like that of the car. They last just long enough to make the digital trip to any social network or the trip of the month, to any destination”.

There are currently a multitude of recharging devices for electric vehicles and they differ from each other by:

- The power and recharging time.
- The information exchanged with the vehicle being recharged.
- The type of charger.

And this is where the important part comes in: the types of chargers in an electric car and watch out for the power ratings!

Not all cars can be charged at the same power and each of them has an operating limit. If we overdo it, failure is assured.

The types of chargers that we highlight for electric cars are the following:

- **Schuko:** we will say that it is the one of all life. The conventional socket of any house, but with a particularly low charging speed. Very limited power and intensity. It is not designed for cars with great autonomy.

“Not all cars can be charged at the same power and each of them has an operating limit. If we overdo it, failure is assured”.



- **Type 1:** it was the first type of charger created for cars, so it is usually compatible with the first generation. It is the one with a circular shape and five terminals. It is the Japanese standard, although it also works in American and European brands. The complete charging process will take about 8 hours and operates up to 7.4 kW.
- **Type 2 or Mennekes:** this is the most common in Europe. It is flattened at the top and has seven terminals. It can operate with single-phase or three-phase loads (intensity varies) and can reach up to 44 kW of power.
- **Combined CCS:** they have become the new standard throughout Europe. It is proposed to be the universal solution because it allows both fast and slow charging, continuous and alternating with the same socket. It can reach up to 100 kW of power.
- **ChadeMo:** it is found in practically half of the fast charging stations around the world, being one of the best options. It is round, has 10 terminals, can operate with direct current and supports up to 65 kW.

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[Ingeteam's EV holder CSS,](#)
[designed by bigD](#)



For recharging, as we all know, there are not only charging stations, but also home recharging. There is no shortage of proposals for improving infrastructure and proposing new business models!

One thing we do not want to forget and here we rescue, is the one proposed by Renault a few years ago. It developed in Sweden a recharging platform, called **EIBnb**. The long-term goal was to create a change in society when using the different charging points and to improve the infrastructure of these in different countries. Through a website, users who have a charger at home for an electric car, could register on the EIBnb website and by prior agreement with other users who want to recharge their car, the recharging time (hours, days, nights, etc.)

and how much the owners of the charger will charge for the service will be established.

That said, charging points can serve as an opportunity to boost both the “domestic” infrastructure and specific urban or roadside service areas. And not just energize, but expand an infrastructure that is still scarce. Perhaps new business models or new trends will emerge that break with everything that has been pre-established. Maybe the future will surprise us with a change of course or maybe not, maybe something totally unexpected will surprise us.

We like to think further ahead and as Henry Ford said:

“If I had asked people what they wanted, they would have said faster horses”.

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[Ingeteam Rapid St 400KW,](#)
[diseñado por bigD](#)

3 Is the world ready for wireless charging of Electric Vehicles?

From the “Fantastic Car” to the “Johnny Taxi” through the most famous car in the history of comics, the Batmobile, we could easily list a few famous autonomous cars from film and television.

But we go one step further. And if the Batmobile were electric, how would it be recharged? We certainly don’t imagine Batman waiting (attached to a cable) until his Batmobile’s battery is charged and ready to cruise the streets of Gotham.

Wireless charging is starting to become a reality with a long way to go. For now it is in situ

but we do not rule out that we will be recharging a vehicle as it travels through the projects that are being developed.

The goal is to make charging as convenient and fast as filling up with gasoline or diesel, to forget about long wires running between sidewalks and driveways (and the danger that comes with it), and above all, to recharge the car regardless of the type of plug it has. Wireless charging addresses all these challenges and is attracting a growing list of well-known car manufacturers such as Volvo, BMW and [Nissan](#).

Wireless charging systems use electromagnetic induction and charge itself by simply parking on a ground platform. A plugless system is **basically composed of three parts:** the base charging unit, the vehicle charging unit or adapter and a control panel that guides you to the charging point.

The **adapter** is manufactured for different car models. It does not substantially modify the underbody of the car and is reversible, it can be uninstalled.

[Plugless Power](#) goes even further, it talks about “Driver empowerment”. They bet on the development of a simple interface that connects our charging device with our phone, watch and/or tablet to receive all the notifications that our charging system sends us.

Charge while driving! It's almost a reality.

So far we've talked about static charging, but charging on the move? This is going to be the key to the future, the most valued in electric car technology; the ability to power a car while driving on chargers embedded in the road surface is coming. Back in 2017, Qualcomm's [Qualcomm Halo technology](#) development demonstrated that it is possible to charge while driving, even with the vehicle traveling at speeds up to 100 km/hr. They called it, "Wireless Electric Vehicle Charging" (WEVC).

Beneath the surface of the 100-meter test track, Qualcomm installed a wireless charging system capable of sending power to a fleet of Renault Kangoo electric vans.

Now in 2021, we are approaching a reality not too far away because large field tests are already underway or about to begin in Europe and the U.S. From

ABB through the major car brands, more and more companies are getting involved in this type of project.

The latest significant agreement was [the agreement between Holcim](#) (a world leader in the design and manufacture of building materials and solutions) and the [German startup Magment focused on the development of wireless charging](#) to improve its magnetizable concrete technology for road surfaces and enable electric vehicles to be charged wirelessly in a much more efficient way. In addition, the Indiana Department of Transportation (INDOT) in the U.S. and Purdue University have announced **plans to develop the first road segment with this technology.**

And when you bet on new ideas without seeing the fact of being wrong as a setback, innovations end up on the market. For



now, wireless charging on the move is in the testing phase, but if agreements are reached and the testing phases progress, it will soon be a reality.

As Batman would say:

“At the end, it’s fear that makes you fail”.

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