ChargeUp
EUROPE

2023 State of the Industry Report

Insights into the European electric vehicle charging industry

Remco Samuels

President, ChargeUp Europe. CEO EVBox

I joined EVBox over two years ago and now have the honor to be leading ChargeUp Europe as President in 2023. In my first months, I've seen the depth at which our members understand the great responsibility we have to contribute to the EU's energy transition. It is a pleasure to work with so many amazing people in this industry, sharing a similar vision.

ChargeUp Europe brings the industry together through collaboration. We have tackled many topics such as our pan-industry campaign on improving grid connection procedures, working with DSOs, and setting standards for roaming. Together we are committed to delivering a reliable and seamless charging experience for EV drivers, creating a consumer-centric model for charging infrastructure in Europe, and incentivizing investment in electric mobility. Our main priority is a regulatory framework that removes obstacles and promotes harmonization. This is the only way for the EU to reach its climate targets. The agreement on the Alternative Fuels Infrastructure Regulation is a big step in the right direction.

We are proud to present the second edition of our State of the Industry Report. A combined effort, this report brings valuable insights on the current state of EV charging in Europe, and highlights many of the solutions that our sector is developing to make the green and digital transformation a success.

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Frans Timmermans

Executive Vice President, European Commission

This report comes on the back of a momentous year for the European Union's path to climate neutrality. More and more milestones are being anchored into law, and the switch to electric mobility is steadily accelerating across our continent.

By 2050, nearly all vehicles on our roads will have to be zero-emission. The Climate Law requires it, European cities demand it, and our manufacturers are gearing up for it. New legislation is paving the way.

For cars and vans, we now have a clear horizon: in 2035, all new cars and vans will have to be zero emission. European car makers are overwhelmingly choosing to electrify their fleet to meet these targets. For trucks and buses, the shift to a zero-emission future is happening as well, with a proposal for revised emission standards now on the table. Here again, electrification will play an important role, especially for shorter-distance trucks and city buses.

However, to make the transition to zero-emission mobility a reality, it has to be supported by the right infrastructure. Every driver in Europe should have the certainty that they can travel in confidence throughout the continent. It's why the recent agreement on the Alternative Fuels Infrastructure Regulation is crucial. Charging infrastructure is the backbone that will make emobility part of everyone's daily life and the mandatory deployment targets for electric recharging and hydrogen refuelling will ensure the infrastructure is there, ready for you when you need it, where you need it.

Zero emission road transport is no longer a distant dream, but a transformation happening right under our eyes. It will make Europe less dependent on imported fossil fuels and enable our industry to expand its competitive edge in the global clean tech race.

2023 has brought many emobility successes to celebrate, and as the EV charging industry will know well:
This is just the beginning!

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2023 State of the Industry Report

1 Who we are

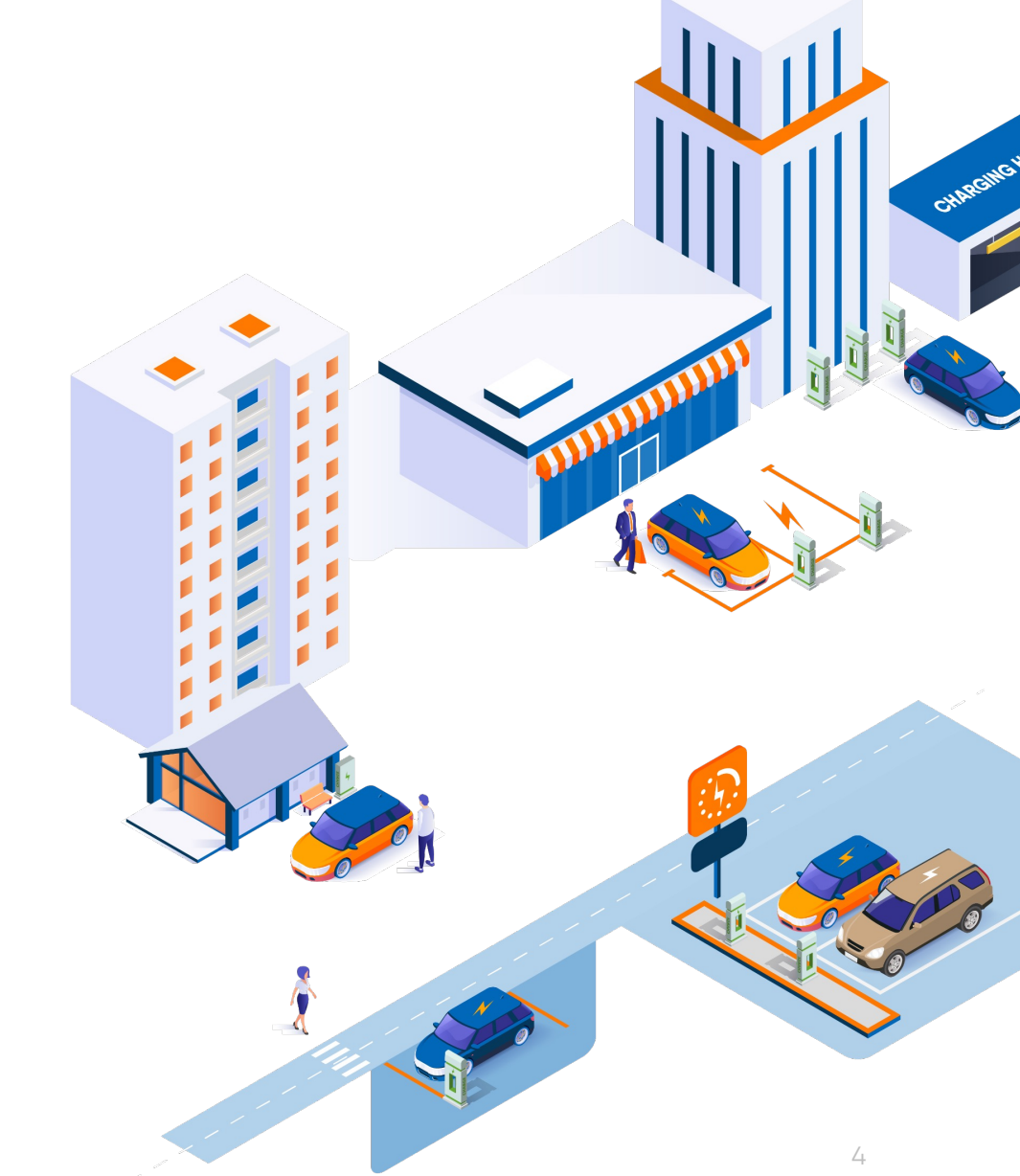
2 The state of EV charging

3 The customer experience

4 Heavy duty vehicle charging

5 Workforce and hardware

6 Charging up Europe's energy transition



ChargeUp EUROPE

1 Who we are

Our values and members

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Our values

Consumer first

The EV driver is at the center of what we do. Our industry aims to provide an excellent user experience.

Open market model

An open, competitive market for EV charging ultimately provides the best customer service and allows for new entrants.

Open standards and protocols

These are key to communication between vehicle-charger-backend systems, and a key enabler of a pan-EU internal market for EV charging.

Safety and security

Both physical and cyber security related to recharging are essential for EV drivers and the mainstream success of the emobility transition.

Partnership

Especially in an interconnected industry like emobility, we work together with other industries, nongovernmental organizations, and policymaking stakeholders to build the optimal EV driving and charging ecosystem.

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We represent the entire EV charging ecosystem

34 members, active throughout Europe

We're proud that our membership reflects the entire EV charging value chain, from hardware manufacturers and software developers to emobility service providers (MSPs), charge point operators (CPOs), roaming platforms, fleet operators and other emobility solutions providers, all working together to deliver for Europe's EV drivers.

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2 The state of EV charging

Now and in the future

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The EV fleet in Europe is growing quickly, despite major headwinds over the course of the last year. With the recently passed regulation on CO2 emissions standards for cars and vans phasing out tailpipe emissions by 2035, the direction of travel for policymakers, automotive original equipment manufacturers (OEMs), investors, and everyone, is clearly set.

The amount of EV charging infrastructure, both publicly accessible and private, is surging, whether analyzed by installed capacity or number of charging points.

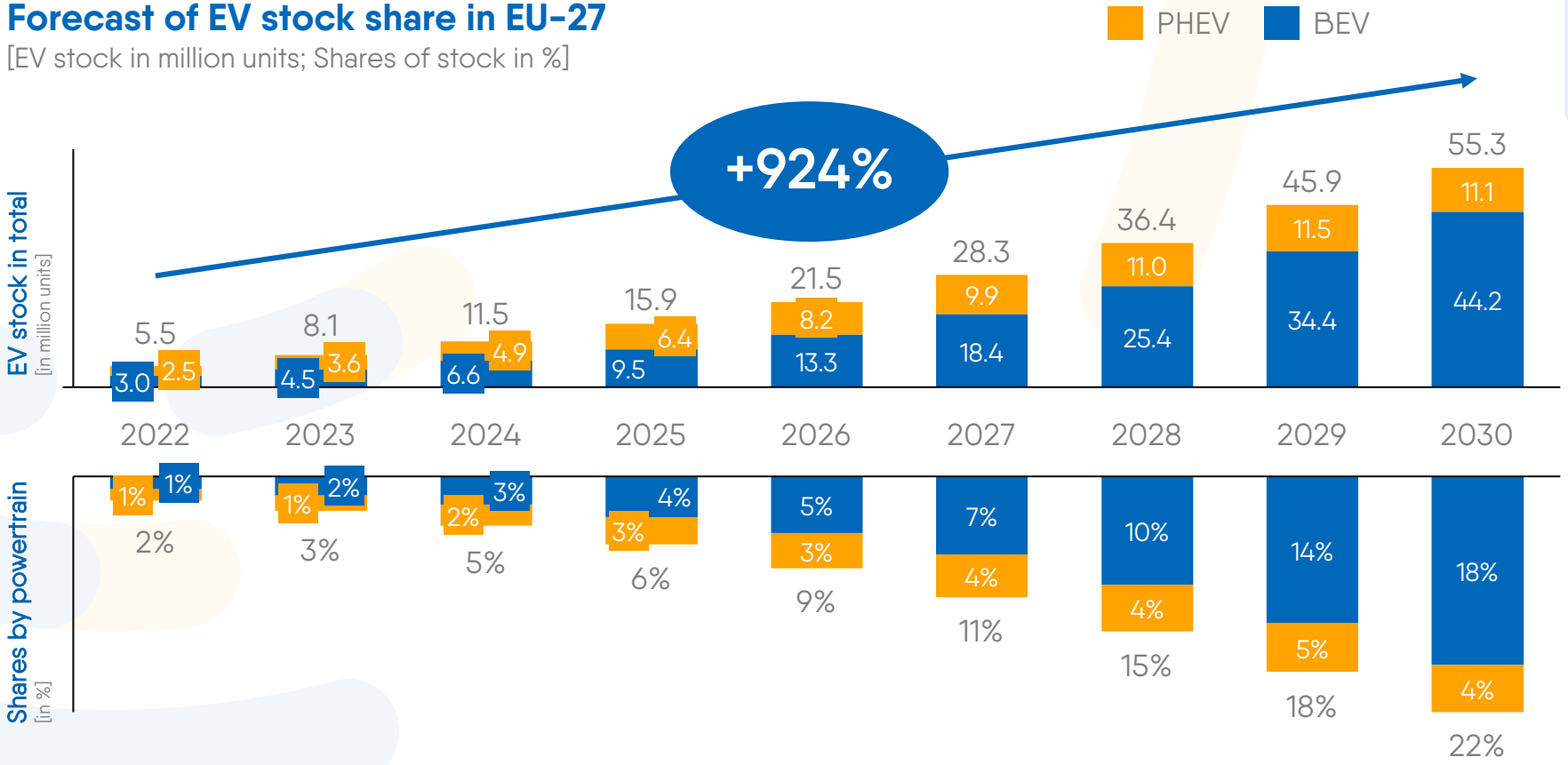
However, for both EVs and chargers, the spread across the EU is uneven, with certain markets accounting for the majority of these developments and others a significant minority. This disparity highlights the great concerns around the deepening of a two-speed Europe divide and the risk of leaving someone behind in this important transition. The Alternative Fuels Infrastructure Regulation (AFIR) establishes a minimum floor, but further action will be needed to address this.

Nonetheless, the EV and EV charging markets are dynamic and quickly evolving, as befits our relatively young but maturing sector. We are hard at work deploying the infrastructure to support Europe's rapidly growing and diversifying EV fleet.

The EV fleet in Europe is growing quickly…

Forecast of EV stock share in EU-27

[EV stock in million units; Shares of stock in %]



EVs includes:

- BEVs: full battery electric vehicles
- PHEVs: plug-in hybrid electric vehicles

- With 34% year-on-year growth and 924% total through 2030, EVs are quickly becoming mainstream and will become a dominant transportation mode, reaching a total fleet size of almost 16 million EVs by 2025 and more than 55 million by 2030
- In 2022, BEVs accounted for 53% of EVs – by 2030 BEVs should account for 80% of EVs
- The electrified share of the European Union's vehicle stock will raise from 2.3% in 2022 to 22.1% in 2030

Source: P3 analysis

The figures on this slide include passenger cars up to 3.5t

Forecast based on OEM electrification objectives and CO2 fleet emission targets of -55% (as compared to 95 gCO2/km baseline)

+924% is the growth rate calculated with rounded data

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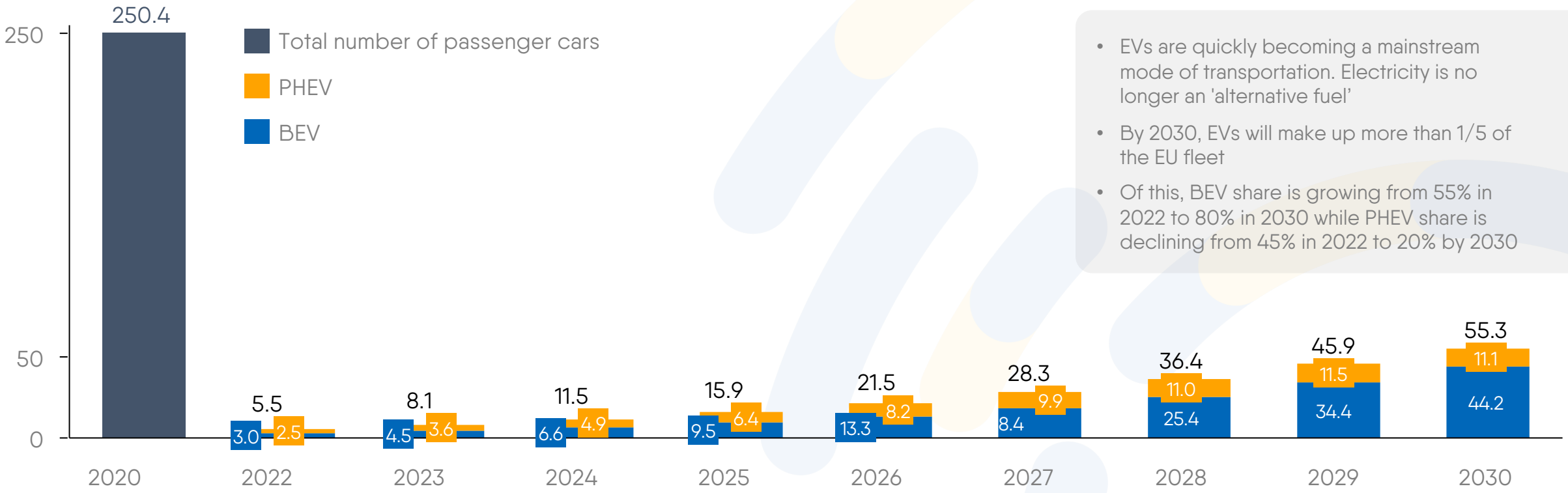
...becoming a larger part of the overall EU fleet

Forecast of EV stock by powertrain in EU-27

[in million units]



- EVs are quickly becoming a mainstream mode of transportation. Electricity is no longer an 'alternative fuel'
- By 2030, EVs will make up more than 1/5 of the EU fleet
- Of this, BEV share is growing from 55% in 2022 to 80% in 2030 while PHEV share is declining from 45% in 2022 to 20% by 2030

Source: P3 analysis

The figures on this slide include passenger cars up to 3.5t

Forecast based on OEM electrification objectives and CO2 fleet emission targets of -55% (compared to (as compared to 95 gCO_2/km baseline)

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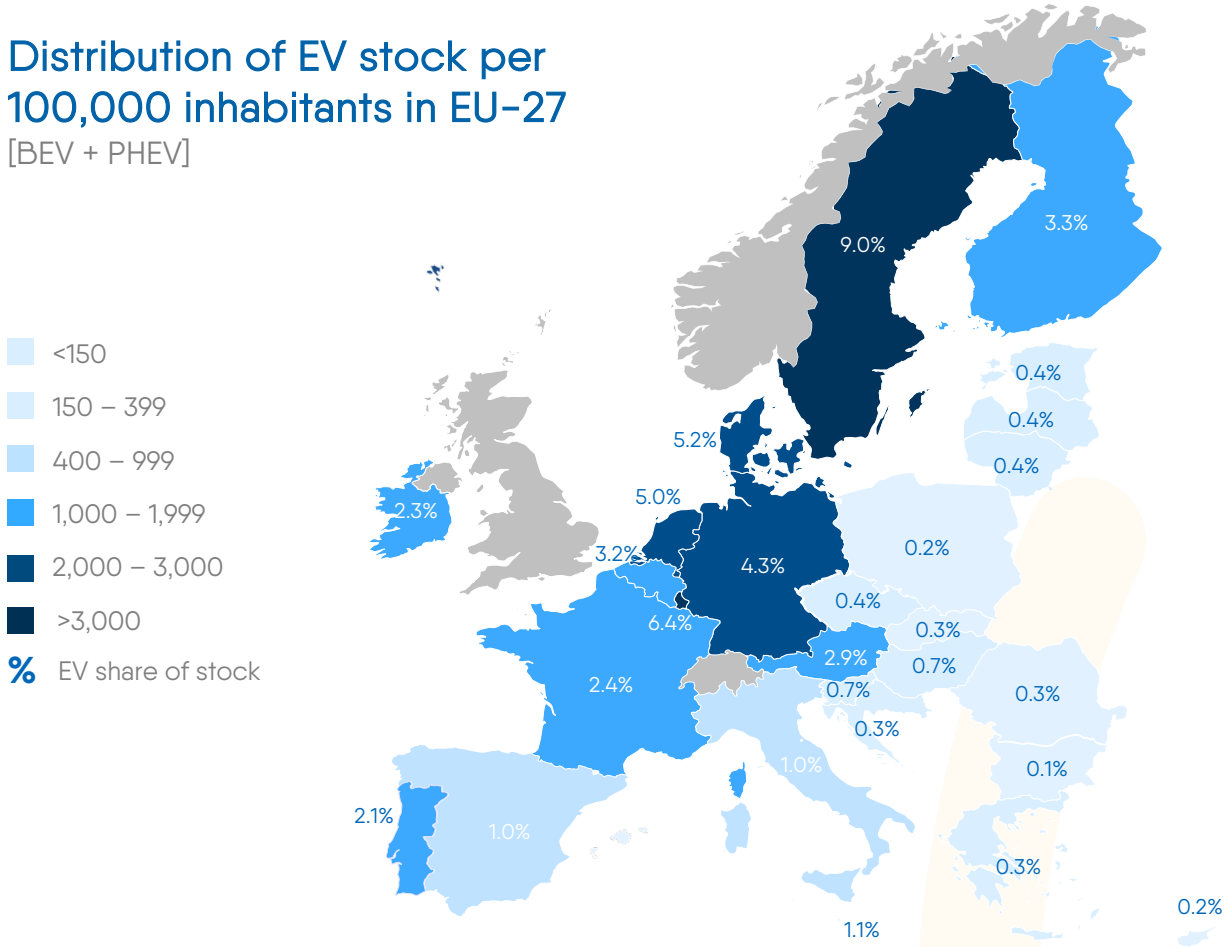
But EV distribution remains uneven

Distribution of EV stock per 100,000 inhabitants in EU-27

[BEV + PHEV]



Distribution of EV stock

- Germany and France have the largest total number of EVs (55% of all EVs in the EU). Sweden, Italy, the Netherlands and Spain have more than 200,000 EVs each
- Sweden and Luxemburg are leading in electrification in relation to their population, while Germany and France occupy ranks seven and nine in this category
- In the Eastern European countries, Slovenia is now leading with nearly 400 electric vehicles per 100,000 inhabitants; Poland leads in this region in terms of total number of vehicles with more than 48,000 EVs, but still only 0.2% of the fleet

National electrification shares of stock

- The Nordic and Benelux countries continue having the highest EV shares of their national vehicle stocks
- Three countries – Romania, Germany, and Greece – more than tripled their shares compared to 2021
- The gap between the shares of Northern as well as Western and Eastern European countries further increases with Sweden having a share of 9.0% and Bulgaria having a share of 0.1% EVs in their national fleets

As the map shows, a two-speed Europe does exist and needs to be addressed

Source: P3 analysis based on figures from EAFO and ACEA

Analysis is based on vehicle stock at end of 2022

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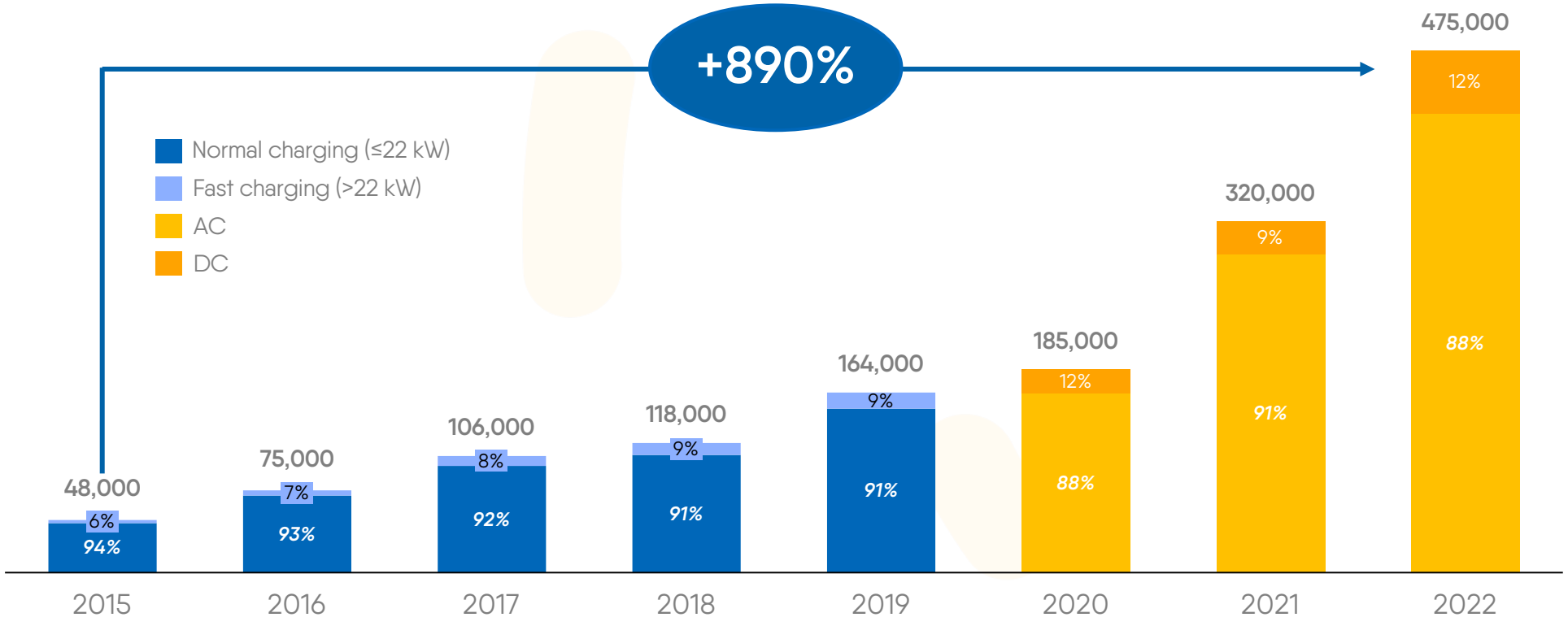
Charging infrastructure deployment has significantly ramped up in recent years

Stock of public charging infrastructure in EU-27 divided by type of charging point

[in total numbers]



- From 2020 to 2022 the average annual growth rate of public charging infrastructure was 61%. From 2015 to 2022 it was +39%
- AC charging points (≤22 kW) multiplied more than ninefold in the last seven years
- Over the same period, the number of fast charging points (>22 kW) has increased nineteen-fold, while their share of public charging points has risen by six percentage points
- The deployment of DC fast chargers has far outpaced that of AC chargers in the last few years

Source: P3 analysis based on EAFO

Data rounded to nearest thousand

Structure of data changed after 2019, chart reflects this

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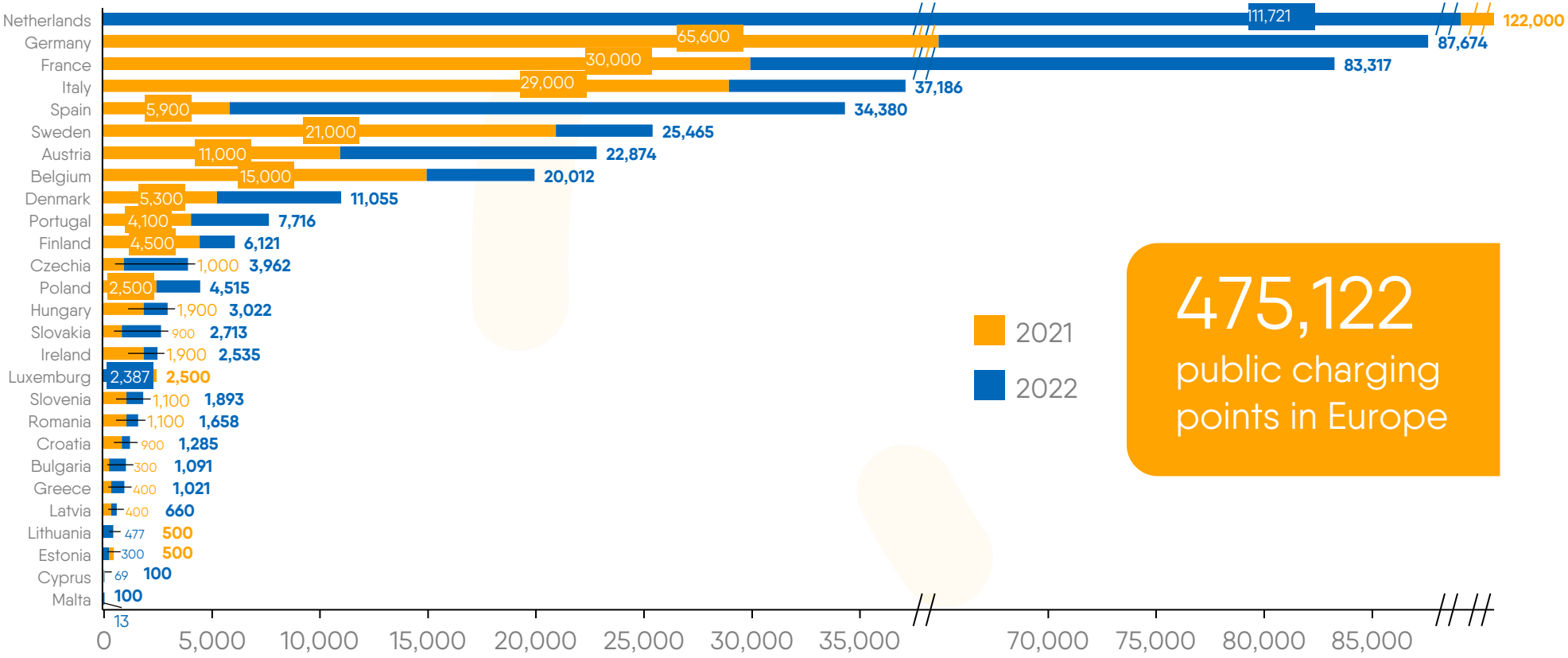
Growth of charging points across Europe

Installed public charging infrastructure per country in EU-27

[in charging points]



475,122
public charging points in Europe

- Compared to 2021, the number of publicly accessible charging points increased by more than 40% – from 330,000 to 475,122
- The Netherlands, Germany, and France dominate with 60% of the EU's public charging points
- Public charging infrastructure decreased in the Netherlands, Luxemburg, Lithuania, and Estonia[1]
- Spain saw the largest single year jump due to Royal Decree-Law 29/2021, of December 21, which set urgent measures for the promotion of emobility

[1] The table indicates a decrease of public charging infrastructure in some countries. This is either based on data inconsistencies or a larger share of charging stations previously identified as publicly accessible having been reclassified as private charging stations

Source: P3 analysis based on data from EAFO, status Q4 2022. Data rounded to nearest hundred

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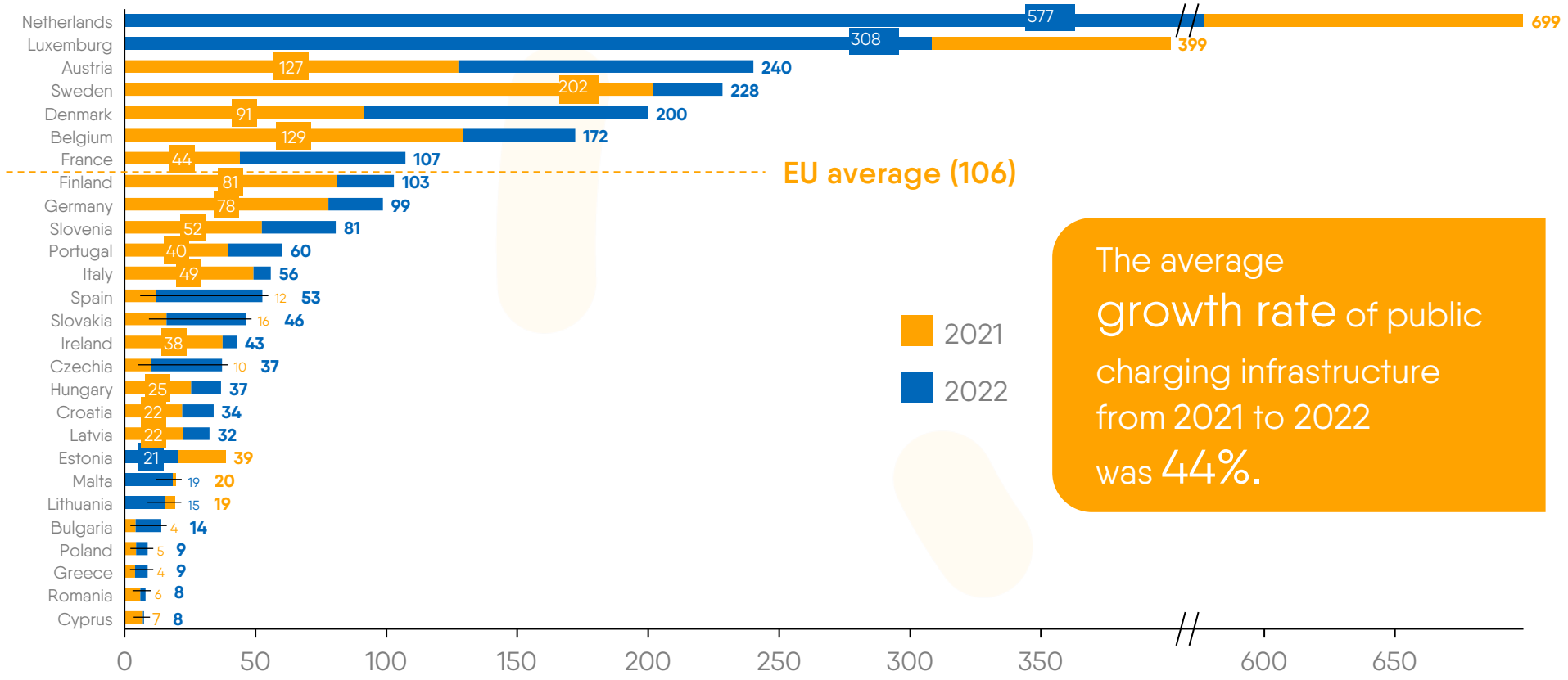
Growth by population density

Installed public charging infrastructure per 100,000 inhabitants per country in EU-27

[in charging points]



The average **growth rate** of public charging infrastructure from 2021 to 2022 was **44%.**

- There are 106 public charging points on average in the EU – up from 73 in 2021
- In 2022, seven countries exceed that average
- Spain and Italy, though having comparably many charging points in total, have only a moderate amount of charging infrastructure in relation to their population
- The five countries having the fewest charging points per 100,000 inhabitants from 2021 remain the same, even though Bulgaria tripled the amount

Source: P3 analysis

[1] Share of charging points previously identified as public have been re-classified as private charging stations

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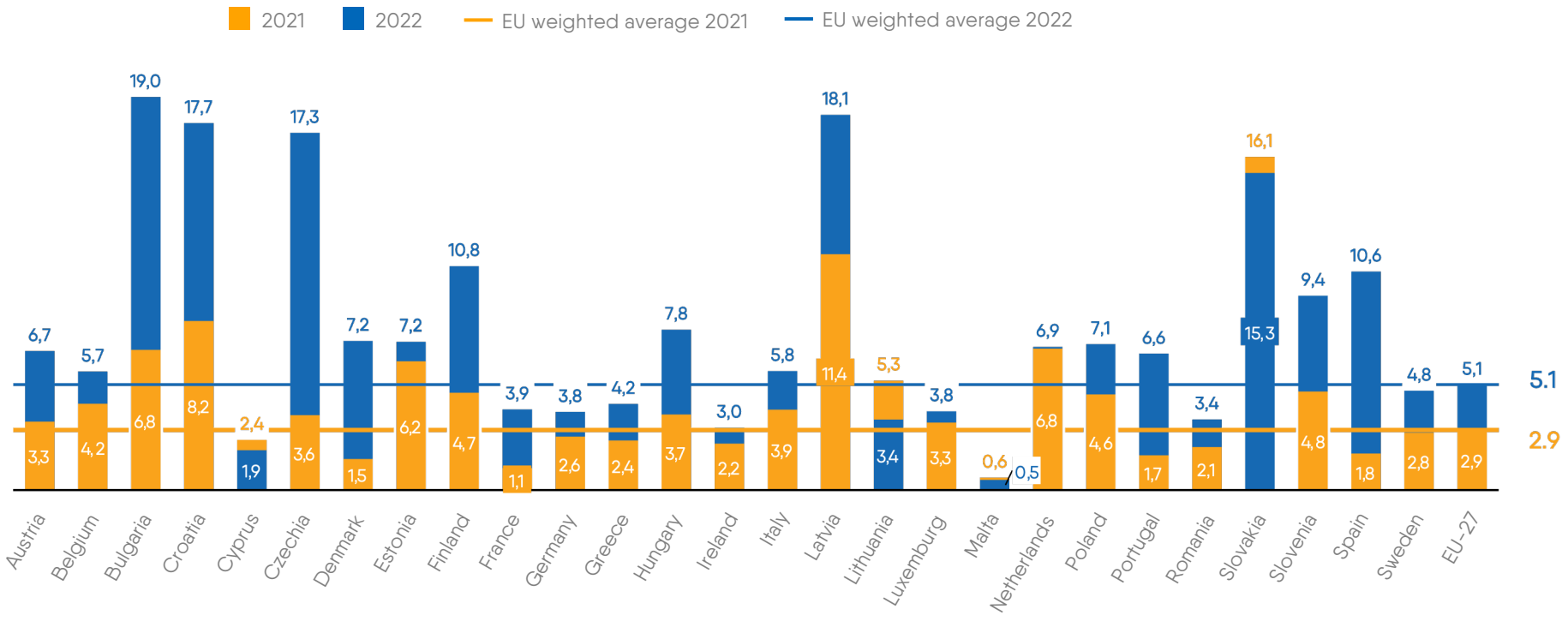
Installed capacity per BEV has also grown...

The number of charging points and their distribution is still important but not as singularly as before. As the capacity of EV batteries and the power that charging stations can dispense have increased, the metric of installed capacity per EV (and peak network capacity) has become more important than the number of charging stations per EV. This is also reflected in the capacity target in AFIR.

Installed capacity of public charging infrastructure per battery electric vehicle per country in EU-27

[in kW per BEV]



- While in 2021 the installed charging capacity of public charging infrastructure per BEV amounted to 2.9 kW across the EU, this number rose to 5.1 kW in 2022
- While some countries had an increase in installed capacity of ≥8 kW (Bulgaria, Croatia, Czechia, Slovakia, and Spain) from 2021 to 2022, others even decreased their charging capacity per BEV (Cyprus, Lithuania, and Malta)

Source: P3 analysis based on data from EAFO and ACEA, status Q4 2022

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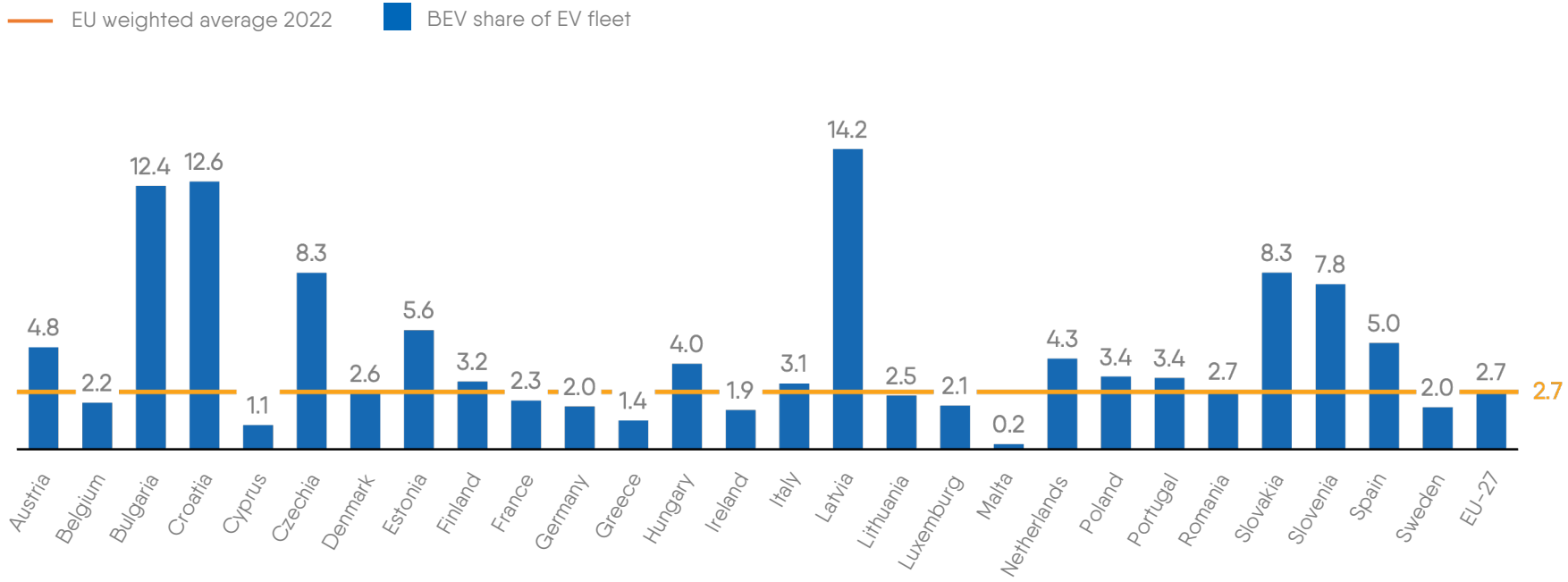
...and is sufficient to support the overall EV fleet

Installed capacity of public charging infrastructure per electric vehicle per country in EU-27

[in kW per EV]



- On average, there are 2.7 kW of installed charging capacity for every electric vehicle driving in the European Union
- Generally, there is a trend seen in countries with the least number of public charging points to provide an above-average amount of installed charging capacity
- The leading countries in electrification France, Germany, Sweden, and Luxemburg provide a below-average charging capacity installed per EV ranging from 2.0 to 2.3 kW

Source: P3 analysis based on data from EAFO and ACEA, status Q4 2022

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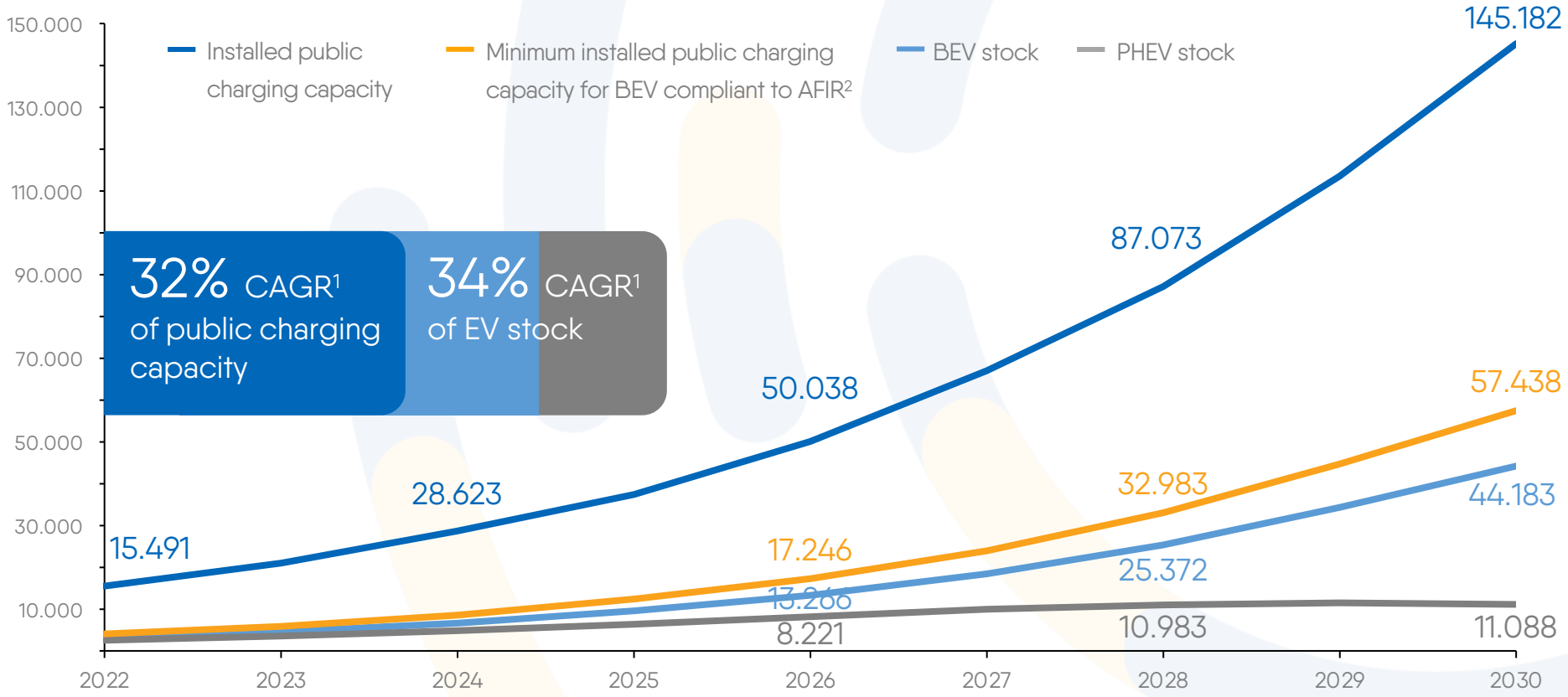
Installed public charging capacity expected to far exceed AFIR targets

Forecast of installed capacity from public charging infrastructure and electric vehicle stock in EU-27

[Charging capacity in MW; EV stock in 1,000 units]



AFIR installed capacity targets will not by themselves stimulate the deployment of additional public charging infrastructure

- The installed public charging capacity is forecasted to increase nine-fold in the next 8 years
- However, with a 10-fold multiplication, the growth of EVs is stronger
- While in 2022, 351 EVs share 1 MW of installed charging capacity, 381 EVs will share 1 MW public charging capacity by 2030

Source: P3 forecast with status quo based on data from EAFO and ACEA, status Q4 2022
[1]CAGR: Compound Annual Growth Rate; [2]1.3 kW capacity per BEV considered

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From fuel pumps to fast chargers: locations evolving to better serve EV drivers

Market conditions and charger locations are changing as emobility becomes a mainstream transport mode. DC fast charging isn't only meant for highways anymore. The transition of ‘fuel’ stations to charging stations reflects this.

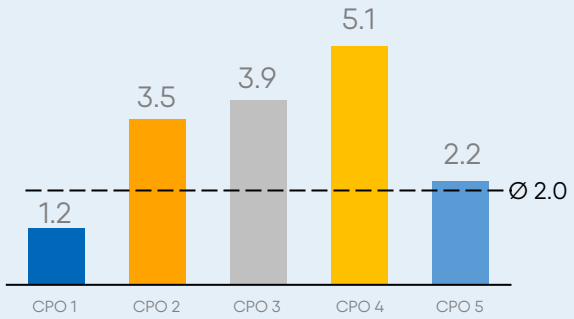
CASE STUDY

Shell Recharge

Drivers will often base their on-the-go recharging decision on where they would want to spend their time waiting while their car is being charged or where they can make use of other services to best use their time. This is why Shell recently redeveloped its Hofplein-square service station in downtown Rotterdam, which has been serving petrol since the 1930s. With the transition to sustainable mobility, the fuel pumps and underground tanks are now making way for fast chargers.

This is the first site in the Netherlands where Shell has converted a traditional station with petrol and diesel pumps into a so-called mobility hub. Here, customers can charge their EVs at one of the twelve ultra-fast charging points. The iconic Shell location at Hofplein-square aims to add additional services in the future. Shell plans to expand its offering focussing on shared mobility, where the hub will offer electric bicycles, scooters and cars for those who prefer to move sustainably, but don’t have their own (electric) means of transport.

Average number of charging points per location



Many locations are just standalone AC chargers, or locations with a handful of DC chargers. Hubs are newer, emerging models, especially along highways and at rest stations.

Source: CUE survey (n=51,267 CPs) | Only CPO responses included

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Different markets have different characteristics

Highest national shares by charging technology in EU-27[1]

[in %]

AC

1.	Netherlands	97.0 %
2.	Belgium	95.6 %
3.	Luxemburg	94.9 %
4.	Greece	93.4 %
5.	Denmark	90.7 %

DC

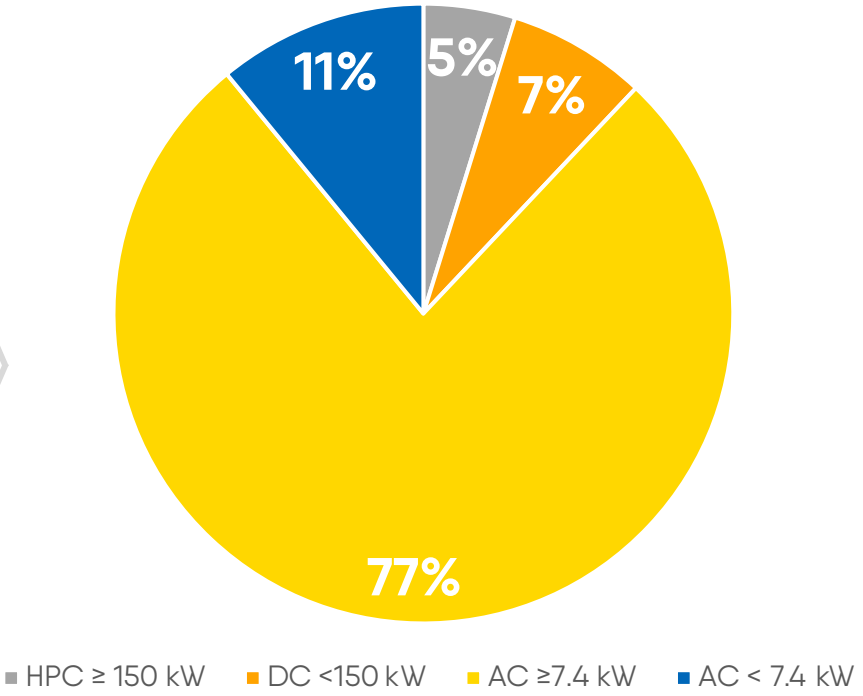
1.	Romania	32.2 %
2.	Czechia	27.8%
3.	Poland	26.9 %
4.	Croatia	26.5 %
5.	Portugal	25.1 %

HPC

1.	Germany	10.2 %
2.	Finland	8.6 %
3.	Croatia	6.5 %
4.	Bulgaria	6.4 %
5.	Denmark	5.2 %

Installed public charging infrastructure by charging technology in EU-27

[in %]



Countries with more public charging points tend to have a lot more AC chargers and be in Northern or Western Europe. They have usually started their EV transition earlier. Countries in Eastern Europe tend to have started their deployment later, have fewer stations but more high-powered DC ones. These differences are due to the state of technological development when a given country started deploying the chargers, how the charges were financed, and local market conditions.

- Compared to 2021, Greece newly appeared in the AC ranking and Bulgaria made it in the HPC ranking.
- Germany is now number one when it comes to HPC charging points while still having many charging points in total. It is the only country keeping its place in the TOP-5 HPC ranking – Finland, Croatia, Bulgaria, and Denmark replaced Poland, Czechia, France, and Ireland
- AC / DC split has practical consequences as well – in terms of energy capacity needed, dwell time and how many vehicles can charge on a station

Source: P3 analysis

[1]Only countries with >1,000 public charging points considered

Generally speaking, alternating current (AC) charging is lower power (< 22 kW) and found in homes, workplaces and long-duration public settings

Direct current (DC) is usually higher power (50+ kW) and found where drivers want to recharge quickly, like on highways

High power charging (HPC) refers to chargers greater than or equal to 150 kW, also commonly referred to as ultra-fast chargers

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Highway service areas of the future are already here

CASE STUDY

FASTNED

Fastned will build the first ‘highway service area of the future’ in Gentbrugge, Belgium. Having won the concession in a tender organised by the Flemish road authority, Fastned will develop and operate two large fast charging stations with 12 charging points each on both sides of the E17 highway near the city of Ghent. These ‘highway service areas of the future’, will serve electric cars only and provide additional services such as toilets, sandwiches and coffee. The stations will have the capacity to charge up to a thousand EVs per day, delivering each car up to 300km of range in just 15 minutes.

Fastned has been a front runner in accelerating the shift to electric mobility for over a decade and is now showing again how good the experience can be for EV drivers. The two new large drive-through stations will have 400kW chargers, providing energy only from sun and wind.

Fastned uses the EU's Guarantee of Origin (GoO) system to ensure that for every kWh of electricity they sell, one kWh of renewable energy has been produced. Fastned does this on a country-by-country basis as much as possible, to stimulate local renewable production.

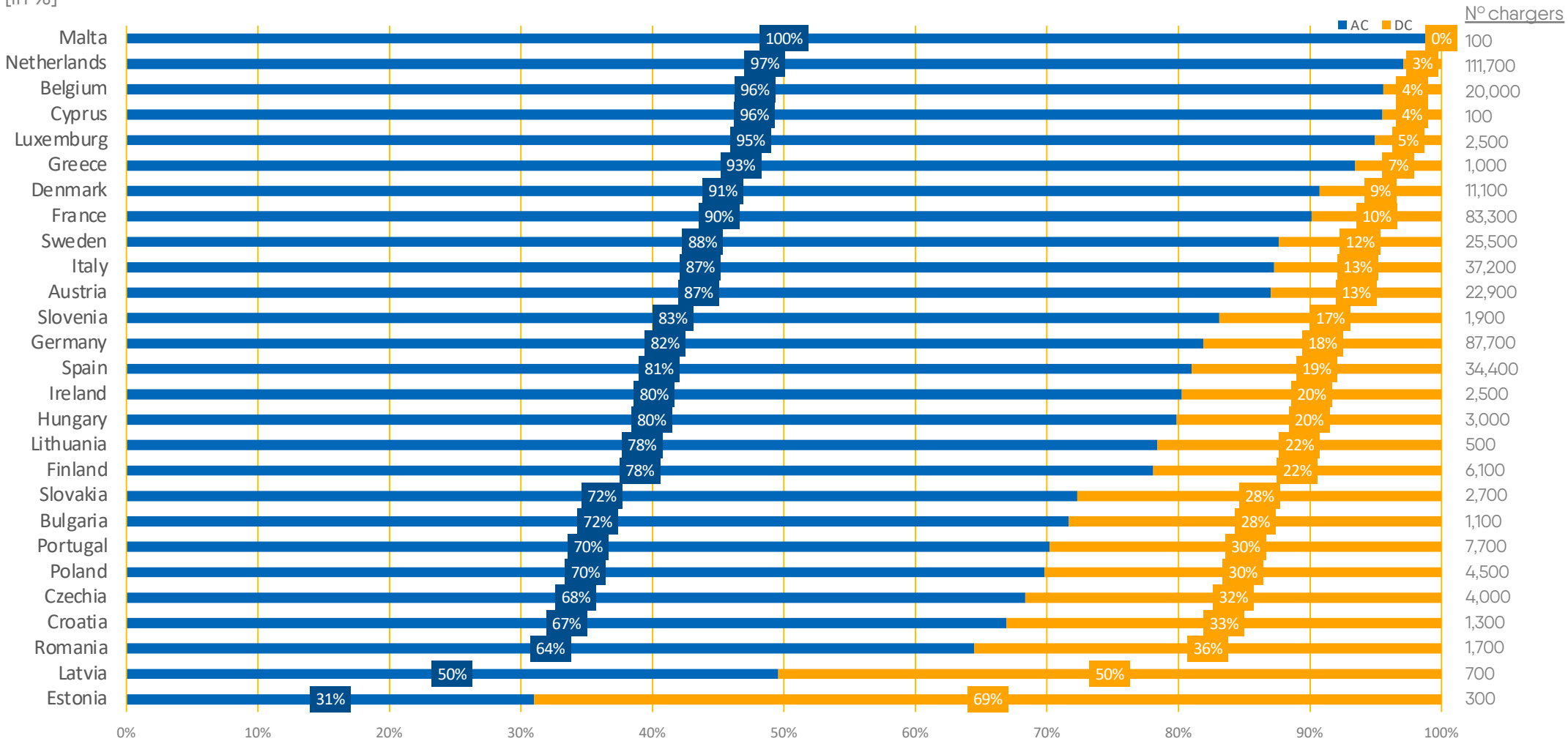
This station design welcomes all EVs, including longer vehicles such as trailers and trucks. It will be equipped with the iconic yellow canopies covered with photovoltaic panels, that protect drivers from the rain and are designed for safe and easy charging.

AC/DC split by country

88% of public charging points in the EU are AC charging points, predominately located in Western and Northern Europe

Installed public charging infrastructure by charging technology per country in EU-27

[in %]



Source: P3 analysis

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Public AC charging plays an important role

Public AC charging provides a solution for people without access to a private charger to charge for an extended period of time and at lower costs. Even for those with other charging options, it provides an ideal way for drivers to 'top up' their vehicle and conveniently charge in the background, while doing something else. For many businesses, public AC charging is a way to provide multiple charging stations on multiple parking spaces while minimizing additional electrical capacity needs.

CASE STUDY

TotalEnergies

As part of a 10-year public service delegation agreement, SAEMES was chosen in 2020 to run the Madeleine car park "La Place de la Madeleine" in Paris. This car park, which is owned by the City of Paris, has nearly 1,000 spaces spread over five floors. Based on its investment strategy to promote the ecological transition, SAEMES undertook a complete renovation of this location to prepare the development of electromobility by outfitting 50% of the spaces with charging stations for EVs in 2022.

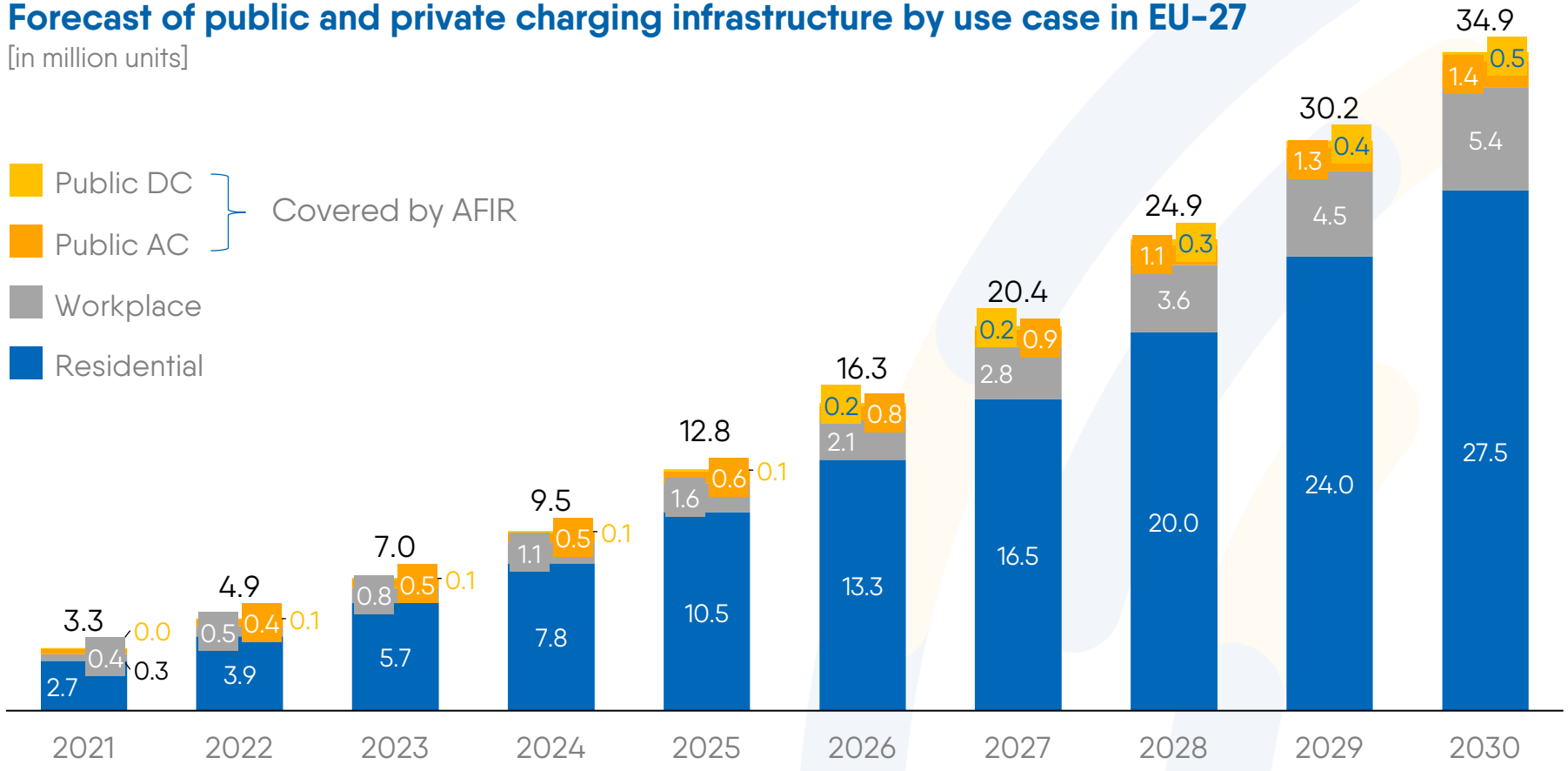
It has over 500 charging stations, 30 of which are dedicated to electric two-wheelers, making it France's biggest EV charging location. The charging points deliver a power of 7 or 22 kW. The investments, carried out by SAEMES, took place over a short period of time and were deployed by a TotalEnergies & Sogetrel consortium selected after a call for tenders.

SAEMES provides a complementary service to its subscribers and hourly guests through an affordable, controlled, and transparent pricing policy for the electric recharging offer (payment based on kWh consumed). Payment can be made by mobility operator card or by bank card online, via a QR code displayed on each terminal. The habits and behavior of EV drivers are ideally matched by these payment choices.

The most charging, by far, takes place in private settings

Forecast of public and private charging infrastructure by use case in EU-27

[in million units]



- The total stock of the charging infrastructure in EU-27 countries will increase to almost 35 million charging points by 2030
- Residential charging will continue to make up the majority of the available charging infrastructure (79%), followed by workplace charging (15%)
- The number of public AC charging points will more than quadruple. However, the share will decrease from 8% to 4% by 2030
- Fast charging will grow significantly to ~500,000 charging points by 2030, however this will represent only 1.4% of the overall market

Source: P3 analysis

Forecast based on OEM electrification objectives and CO2 fleet emission targets of -55% (as compared to 95 gCO_2/km baseline)

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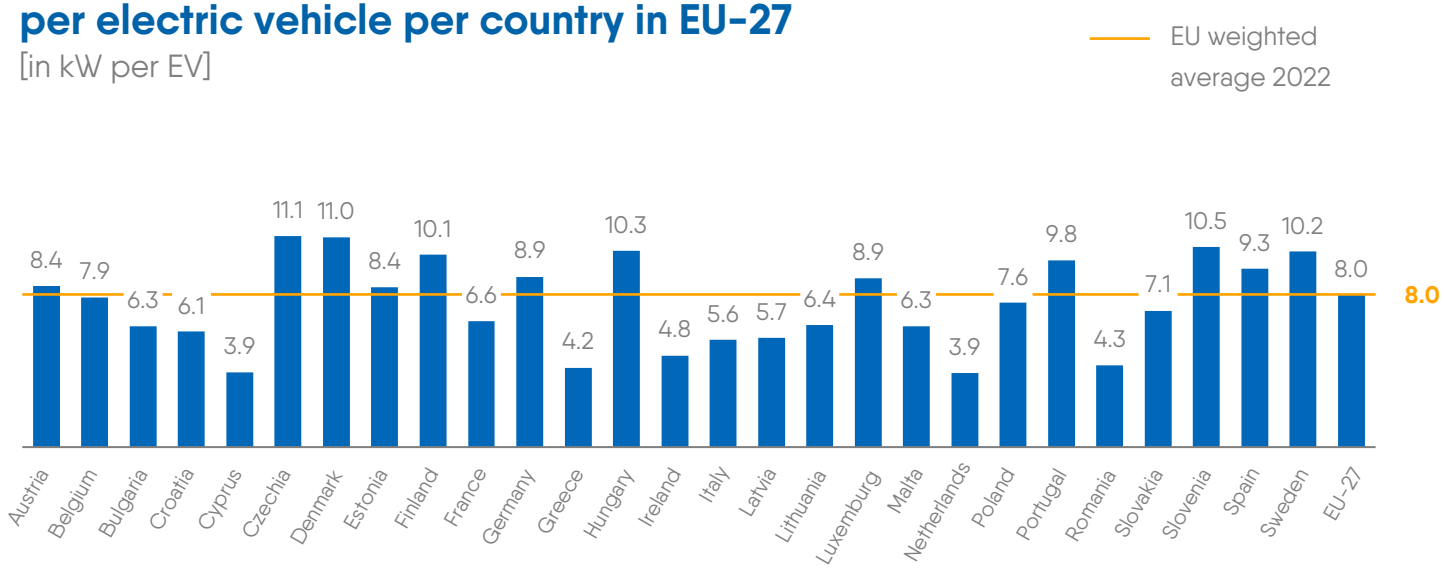
In terms of installed capacity, private charging also dominates public

Installed capacity of private charging infrastructure per electric vehicle per country in EU-27

[in kW per EV]



Source: P3 analysis

[1] Residential and workplace charging infrastructure

- On average, installed private capacity in the EU exceeds that of installed public capacity by 5.9 kW
- For every EV in the EU there is 8.0 kW of private installed charging capacity

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Workplace charging plays a key role and is an important growth area

Charging at one's workplace is the most popular way to charge away from home. It could become even more important as people in multifamily homes or without a dedicated place to charge become EV drivers, thus making charging at work a convenient and affordable option. As cars are parked for long periods of time during the day, it's an ideal place for smart charging to take place, as well as to access the many benefits provided by emobility, such as cheaper electricity tariffs and on-site renewable generation.

CASE STUDY

edp

EDP installed 173 charging points in its office building in Lisbon with a total dedicated power of 560kW, thus providing EV charging solutions to its employees.

At the same time, EV charging infrastructure in private locations, as is the case for office buildings, often requires power management solutions as the load demand from EV charging may vary at different times of the day.

The installation of these charging points was implemented to allow the integration of EDP's smart charging solution, thus ensuring:

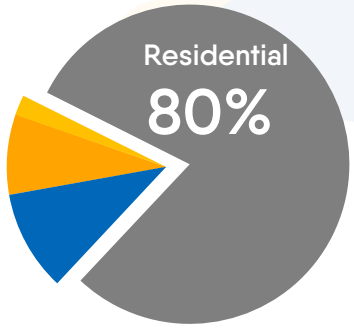
- Load balancing of ongoing EV charging sessions within the total power capacity dedicated to chargers and the building's general electrical installation
- Remote management of load balancing
- Regular updates of the smart charging algorithm
- A future-proof multi manufacturer solution

Charger distribution by use case (2022)

Public DC
2%

Public AC
8%

Workplace
10%



Chargers installed at workplaces equal the combined shares of public chargers (AC & DC). Residential chargers are the most common type of EV charging infrastructure.

Source: P3 analysis

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3 The customer experience

Driver behavior, user experience, and business solutions

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Driving an EV is fun, freeing and exciting. It's a computer and battery on wheels which opens up whole new vistas for travel and adventure. Charging should be reliable, safe, and convenient too, smoothly integrated into an EV driver's life.

A great benefit of charging an EV is that drivers can and should charge wherever they park, and not have to go to a designated filling station to charge. Thus, charging is often located at places people want to be at - hence the term 'destination charging.' Drivers can 'top up' their vehicle while doing something else, more akin to plugging in one's phone or laptop, than refueling a combustion engine car.

For highway stops on long distance or intercity trips the recharging model is more like 'refueling' - of filling up quickly while getting a drink or stretching one's legs.

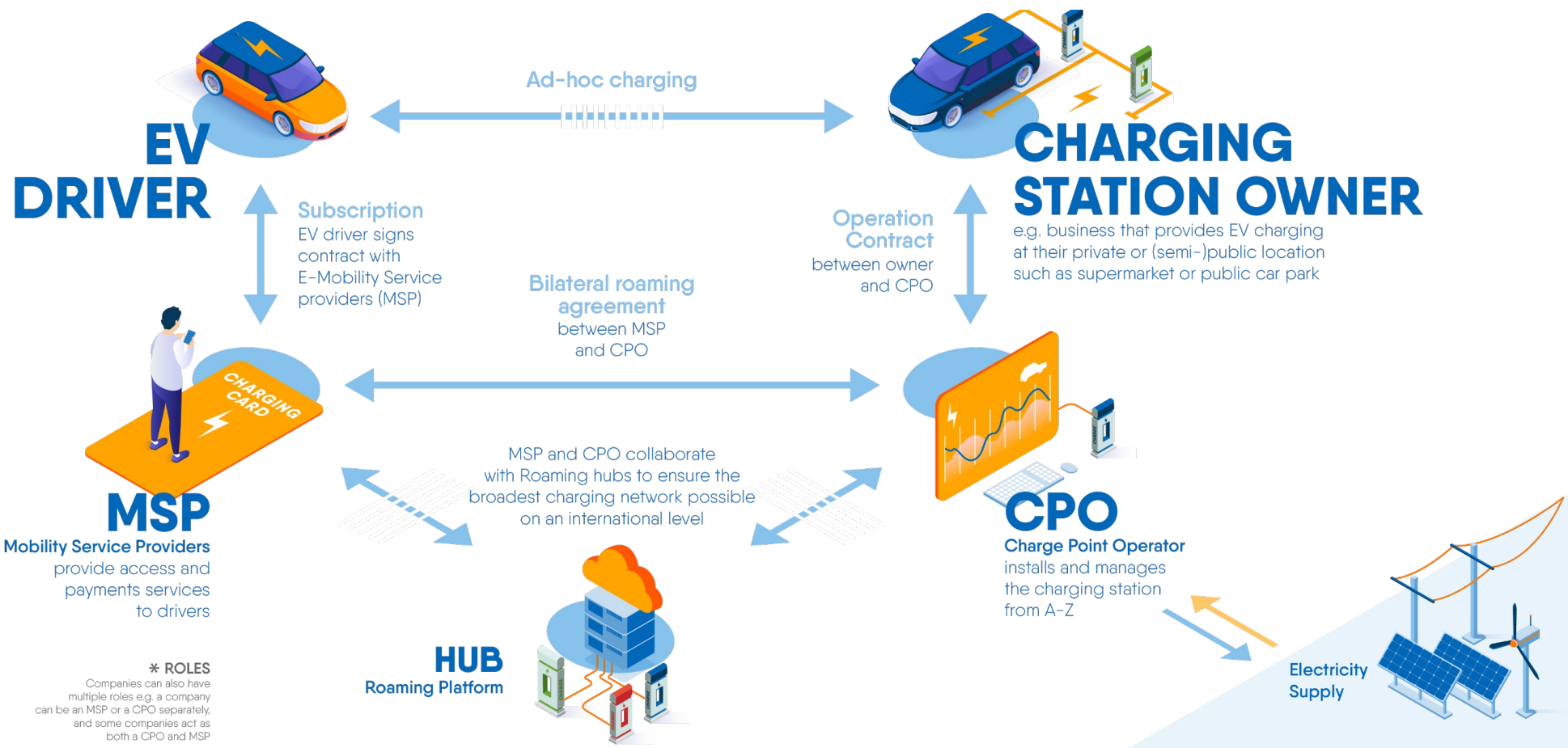
There are a diversity of recharging approaches for different types of EVs, drivers, and use cases. For companies providing charging services, positive customer experience is critical to the uptake of EVs. It's therefore not an exaggeration to say that the interests of CPOs , MSPs, and drivers aligned.

Location partners are clients too, and this is also true for them. The need to deploy more and more charging infrastructure to keep up with the demand will mean that more and more types of businesses host charging stations – and the experience of those customers, including many small businesses, is as important too. It's our job as the EV charging industry to provide chargers and related services running smoothly and optimally, so our partners can focus on their core businesses.

It's an exciting, dynamic time to be providing EV recharging services.

EV charging ecosystem

The EV charging ecosystem consists of multiple entities with different functions that work together to serve the EV driver. Openness and Interoperability are key to making this ecosystem function properly and optimally.



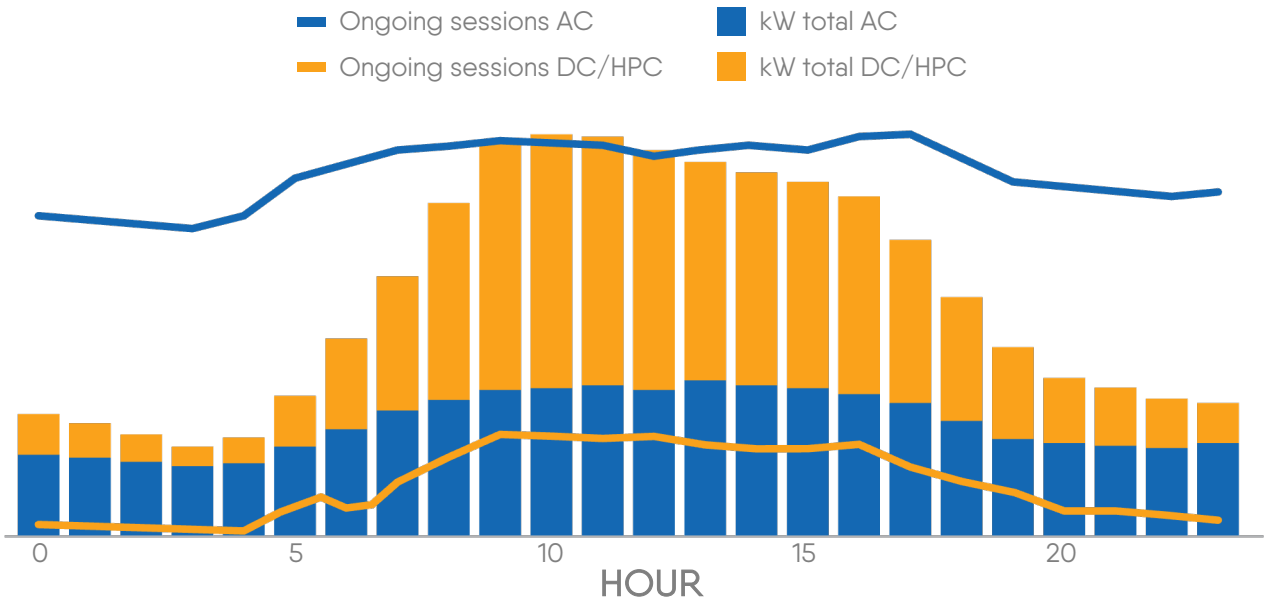
ChargeUp EUROPE

Understanding utilization of the public charging network through data

Plugsurfing's research shows that charging sessions concentrate on the 8 AM to 4 PM time window when people are traveling. AC charging sessions are more evenly distributed throughout the day and night and by far the most frequent method of charging even on a public charging travel network like Plugsurfing.

CASE STUDY

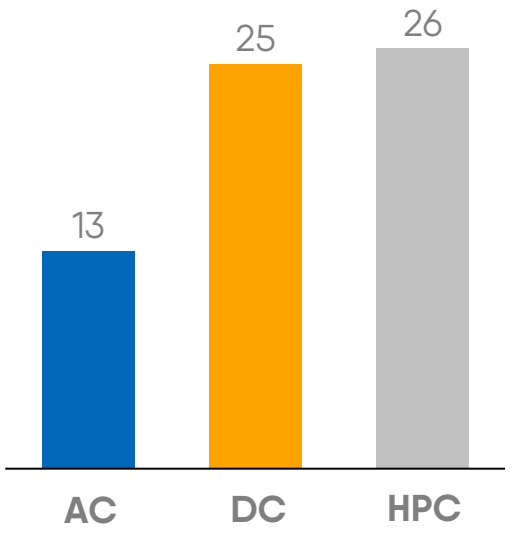
Plugsurfing



Source: Aggregated data from Plugsurfing's MSP network in Germany in September 2022

Average dispensed energy per charging session

[in kWh]



Source: CUE survey (n_{AC}=5 | n_{DC}=6 | n_{HPC}=7)

- EV drivers charge 13 kWh of electricity on average when using public AC charging points
- Compared to AC charging, the energy delivered per session is approximately double when using public DC and HPC charging points
- People use AC charging where they go, and DC charging to fill an empty battery while on-the-go

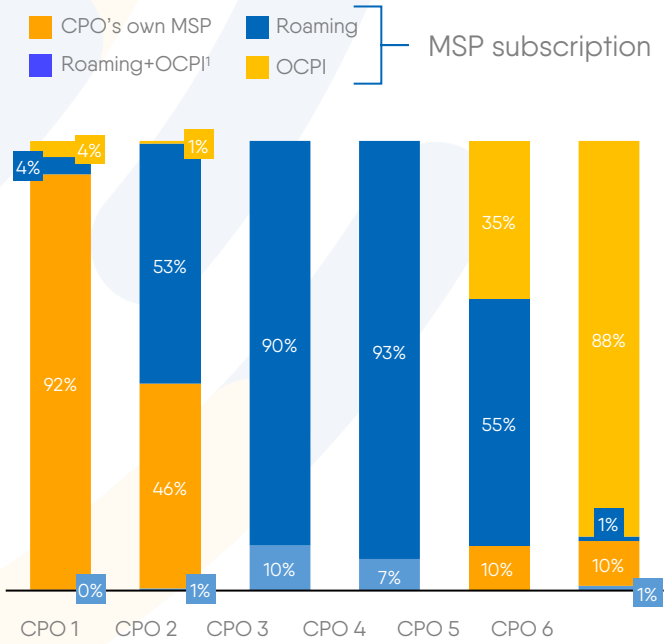
ChargeUp EUROPE

How drivers authenticate

Authentication is the process by which a driver identifies themselves at a charging point, either via their subscription or ad-hoc. In the case of subscription, the CPO confirms the driver's MSP contract is valid and eligible to be used at that charger. With ad-hoc charging, the CPO checks that the payment card is valid and that the driver is an authorized user. In a sense, driver authentication is like logging into an online account as a user or a guest.

Authentication types used at public charging points

[in %]



> 90%

Authentication via MSP contract in CUE member networks

- Customers preferred authentication methods vary across networks, with some used over 90% of the time
- Ad hoc authentication is performed less than 5% of the time
- 4 out of 6 CPOs indicate that customers authenticate themselves via roaming at the majority of charging sessions

Source: CUE survey (n=6)

[1]One member only delivered a combined value for roaming and OCPI

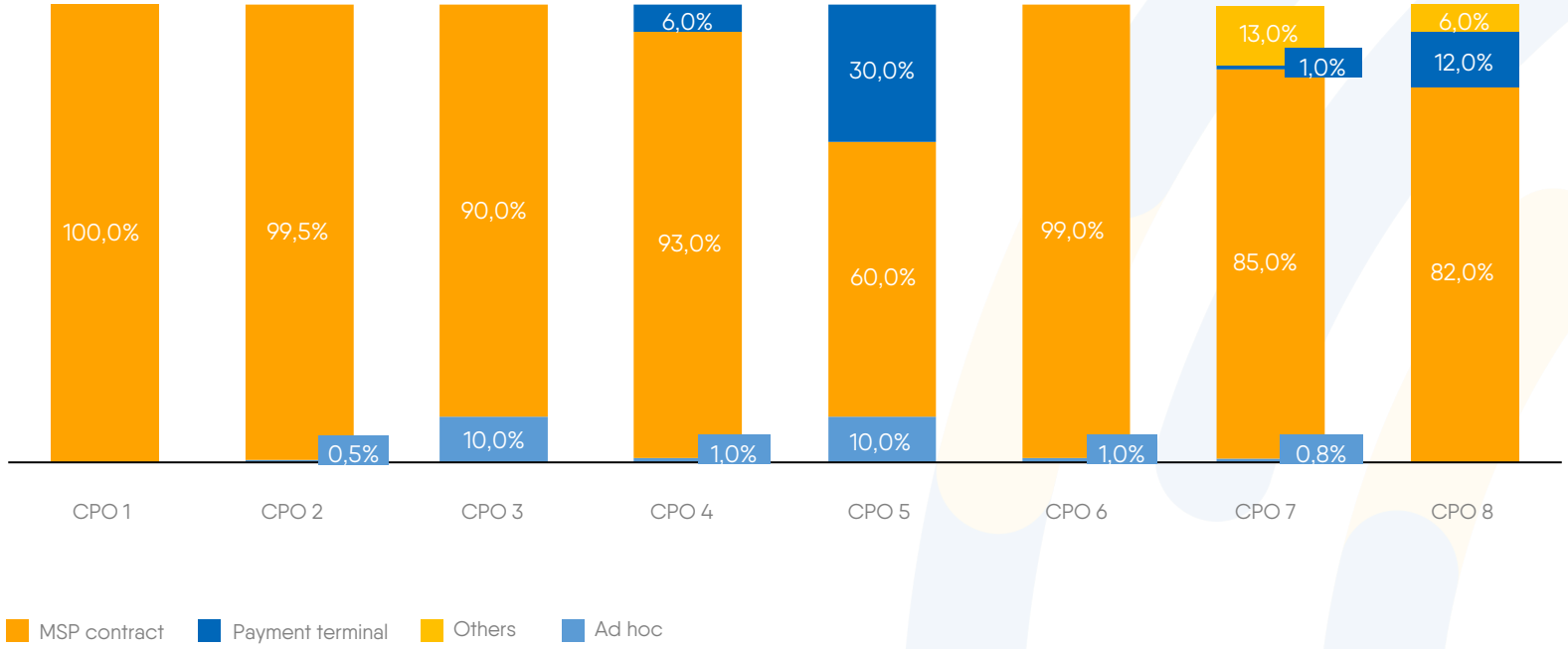
ChargeUp EUROPE

How drivers pay

As the data shows, MSPs are by far the most preferred way to pay for charging by drivers and play a central role in the market.

Payment types used at public charging points

[in %]



Source: CUE survey (n=8)

MSP subscriptions offer EV drivers:

- flat rate pricing
- promotional offers
- preferential pricing
- monthly invoices
- payment method of their choice
- remote start and stop
- multi-user accounts
- a prerequisite for Plug & Charge
- & much more!

ChargeUp EUROPE

Roaming: conveniently connected, the smart way to charge

Roaming is the backbone of out-of-network and cross-border charging. It enables a seamless experience for drivers charging away from home or their preferred operator. MSPs use roaming connections to provide services for drivers regardless of many different charging stations and networks, via a single app or charge key, wherever they go across Europe.

Roaming takes place either by direct connections through the Open Charge Point Interface (OCPI) or platforms like Hubject and Gireve. OCPI allows for a direct connection between the CPO and MSP, transferring real-time data like station availability and price to the MSP for drivers to see. Platforms act as a middleman and ultimately transfer the same information but make it much easier for MSPs to offer many charging points to drivers without much hassle.

ChargeUp Europe MSP members include,

on average, 296,000 charge points

in their networks across Europe

Source: CUE survey (n=5)

The United States (US) has included OCPI capability as a minimum standard for charge points in its National Electric Vehicle Infrastructure Standards and Requirements, setting the stage for services to create roaming networks in the US. While in Europe industry is much further than the US in adopting roaming, there is currently no standard for its implementation.

ChargeUp EUROPE

Plug & Charge: creating a seamless and hassle-free experience

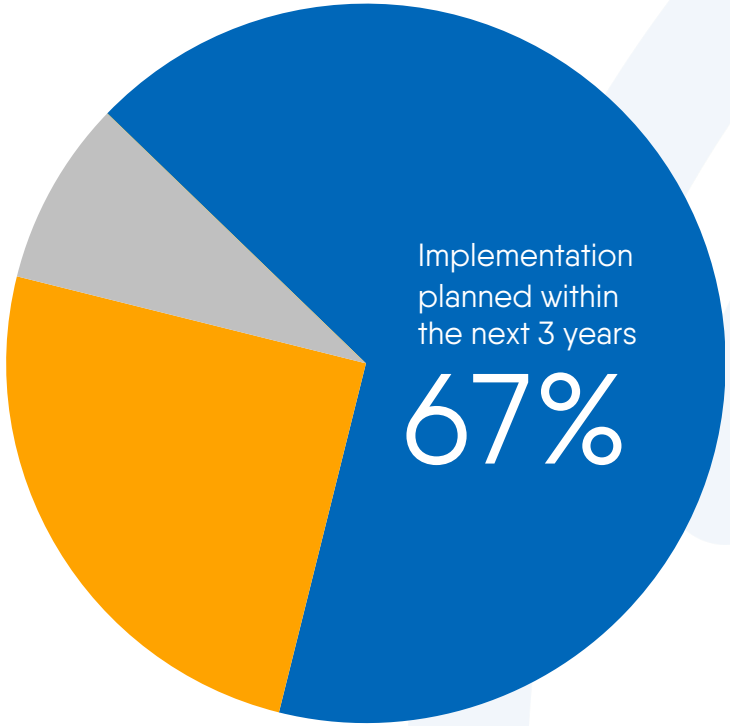
Plug & Charge (PnC) allows an EV driver to plug their car into the charger, and charging starts automatically. It's ideal from a driver experience perspective, but it requires tight coordination between OEMs, MSPs, and CPOs to make it work.

Plans on implementing Plug & Charge in charging networks

[in number of respondents]

Not decided on implementation yet 8%

Implementation already started 25%



How does PnC work?

- The vehicle and charger must both support PnC and the driver needs an MSP to support the transaction
- The PnC session is managed through a driver's MSP contract, in the form of digital certificates installed in the EV itself
- When a driver with a contract and a PnC supporting vehicle arrives at a PnC supported charger, she only needs to plug the car into the charger and the rest of the transaction will happen via secure alternatively encrypted communication between the car and charger
- The CPO authorizes the charging through ISO-15118-2 or -20, an international standard for vehicle-to-charger communication
- The MSP then receives the approval from the CPO to verify the payment and initiate the charging session.
- When the driver is ready to depart, she indicates that via charger display screen or mobile app, unplugs the car and drives off – she will be billed via her regular monthly invoice from her MSP

Source: CUE survey (n=11)

ChargeUp EUROPE

Plug & Charge: a call for market governance

For PnC to work, market rules must exist to enshrine openness and protect EV drivers. They must have the ability to choose their authentication method and MSP of choice. If the ability to switch providers is too burdensome or complicated, drivers could be 'locked in' to a predetermined ecosystem provided by the OEM.

CASE STUDY

HUBJECT

Hubject's Plug & Charge solution is based on the international standards of ISO 15118-2 and ISO 15118-20 and manages the exchange of secure certificates between the EV and the charging station. PnC implementations rely on coordinated efforts between OEMs, MSPs, and CPOs.

In the past, MSPs have expressed concern about the lack of control on the installed contract in the vehicle, which could lead to market advantages for MSPs who have close-knit relationships with the OEM, and lead to drivers being locked into a single contract.

In response to this concern, Hubject has added the Multi-Contract Handling function to their PnC service. Multi-Contract handling enables the creation of multiple contracts for one vehicle that the EV driver can choose from as needed. The installation of a new contract into the EV is possible through the OEM or the CPO backend, and installation as well as deletion of a contract is possible at any time. Several OEMs have already committed to the use of Multi-Contract Handling, as it offers the flexibility EV drivers need in their daily lives.

ChargeUp Europe advocates for a code of conduct for PKI[1] ecosystems to ensure interoperability and non-discriminatory contract handling between them. This would ensure that any driver can charge any EV, on any (publicly accessible) charging station, using any service provider.

[1] Public key infrastructure (PKI). For more detail, see Public Key Infrastructure Market Principles, ChargeUp Europe, 2023.

ChargeUp EUROPE

Professional services support EV drivers and businesses

To provide EV drivers the smooth and reliable recharging experience they need, professional CPOs and MSPs offer a range of services to support them. These services will become even more important as EVs enter the mainstream. Not all companies provide the same services, and as the needs of EV drivers change, these services will continue to evolve.

MSP services

- Contracts and stable pricing
- Promotions and special offers
- Mobile applications
- Navigations services
- Invoicing
- GDPR protections
- Roaming services
- Plug & Charge possibilities
- Smart charging options

CPO services

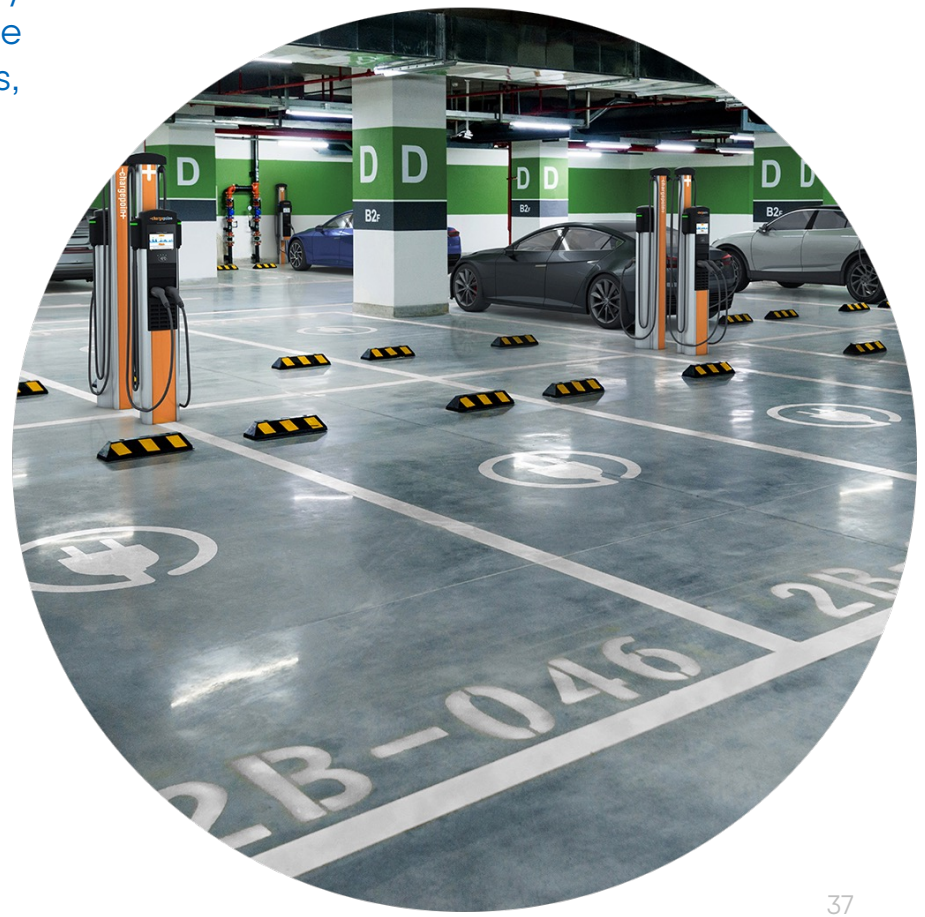
- 24/7 customer support help line
- Reliable service
- High uptimes thanks to preventive maintenance
- Clean and safe locations
- Easily accessible stations
- Proper weather protection
- Access to convenience food services, toilets, etc.

Source: CUE survey (n=11)

The list of services is representative; different CPOs and MSPs offer different services

Businesses are also our end customers

When we talk about who customers are, they are not just EV drivers themselves but also the companies and destinations which host charging infrastructure on their premises. They do it to provide more charging spaces for the public and generate revenue, or to provide more amenities, a more compelling offer, and more inviting locations for their own tenants, employees, guests, or customers. These properties rely on professional operators to manage the charging infrastructure so they can focus on their core business and the customers they serve.



CASE STUDY

chargepoint®

Sonepar is a B2B electrical equipment distributor that serves professional electricians who undertake residential, commercial and industrial projects for end-users. As a leader in the world's electrical equipment market, the company employs 46,000 individuals and handles one million online orders each day.

In support of its commitment to reducing CO2 emissions, Sonepar has chosen to replace its 1,000 company vehicles with electric and hybrid models. The company has also made plans to install 1,000 EV charging stations, which will make Sonepar one of the largest EV charging networks in France.

“With 1,000 22kW chargers installed in our 400 branches, we needed a strong management tool. That's why we chose the ChargePoint solution, which brings us a very efficient operating system and secures a very good level of service - with pricing management capabilities."
Hervé Vancompernolle Exclusives Brands & Partnerships Director, Sonepar

ChargeUp EUROPE

Workplace charging supports fleet electrification and EV driving employees

Corporate fleets comprise a dominant share of new vehicle sales and a key part of the transition to EVs. When fleets have a reliable, reserved place to charge, owners can invest in them with confidence. Employers with dedicated space for recharging infrastructure are therefore able to make this transition smoothly. CPOs and MSPs can support these efforts through professional station operation services, user and energy management, remote monitoring, maintenance, and more.

CASE STUDY

ABL+ reev

For the IT service provider DATEV, electromobility is central to the company's comprehensive sustainability strategy. For this reason, the electrification of the vehicle fleet was pushed forward and a company-owned charging infrastructure with 44 charging points at seven locations was set up. In this way, e-company cars as well as the private vehicles of employees or customers can be conveniently charged and automatically billed.

Charging insights help fleets go electric

CASE STUDY

ALD Automotive

With current socio-economic challenges faced by all fleets, ALD Automotive has recognized that vehicles need to be kept on the road for longer periods of time, which could pose a risk to fleet operational efficiency and cost effectiveness.

TCO+ combines existing TCO (Total Cost of Ownership) and industry insight to provide customers with an understanding of their current fleet to help shape their future fleet. TCO+ delivers financial analysis that is tailored specifically to the customer, a driver, journey profile and charging profile.

TCO+ also includes the cost of downtime from charging a vehicle during the working day, the cost of installing charging points at the employee's home or depot, cost to the employer of reimbursing the employee for domestic energy consumption, and the true cost of using public network charging. A vehicles VOR (Vehicle Off Road) and its associated in-life maintenance costs are also factored into the analysis to provide market leading insight for customers to make the best decisions when resolving the complexities of transitioning to electric.

TCO+ dives into the world of electric commercial vehicles by shining a light on how to maximize operational performance. TCO+ offers market-leading insights and consultancy service that could be a key part of vehicle and manufacturer fleet selection. It provides true confidence due to evidence-based decision making, allowing fleets to plan for more challenging situations before they happen and provides true cost transparency.

ChargeUp EUROPE

4 Heavy duty vehicle charging

Making logistics clean, smart, and sustainable

ChargeUp EUROPE

An increasing number of electric heavy duty vehicles (HDVs) are expected on European roads in the coming decades. The expected AFIR requirements for HDV charging and ongoing legislative discussions for tighter CO2 standards for trucks, trailers, and buses raise the level of ambition for this segment even more.

In the current stages of HDV electrification, charging is primarily taking place around urban areas, areas with a high density of delivery centers (and depot charging options), and along predictable routes. In order to seize the full power of cost-effective decarbonization, challenges arising around on-the-go infrastructures need to be tackled.

HDVs account for disproportionate emissions and pollution from road transport, making decarbonizing this segment especially impactful. While still in the nascent phase, work to roll out charging infrastructure for HDVs is underway.

Heavy duty vehicles: preparing for scale

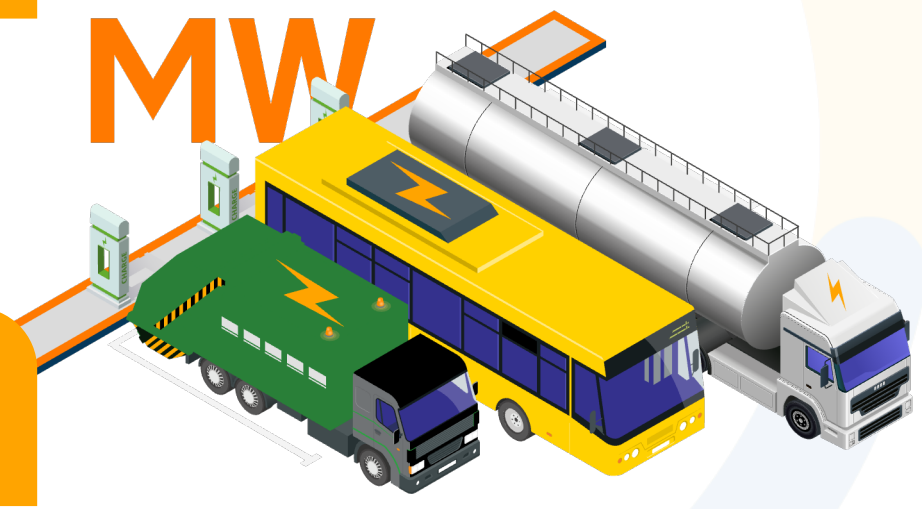
We surveyed our members to understand what it would take to bring HDV charging to scale and at least meet the AFIR targets. This is what's needed:

Finding locations

Finding large enough parcels of land, especially for safe & secure parking and near TEN-T roads is a central challenge. Member States should develop site allocation strategies with streamlined permitting.

Grid connections & power

HDV charging locations need access to MWs of power. This means high voltage connections, which take years to establish. Electrifying the TEN-T needs to be a priority for Member States, DSOs, TSOs[1], and national regulators.



Finances & customer demand

End customer demand is just beginning. Member States and the EU can help improve the TCO of vehicles, especially for SMEs, by, for example incentivizing private charging via carbon credits for private, depot charging.

Interoperability & standards

Improving the flow of data from truck to infrastructure to freight operators' scheduling systems to grid would allow optimized route & grid planning.

[1] DSO (Distribution system operator) | TSO (Transmission system operator)

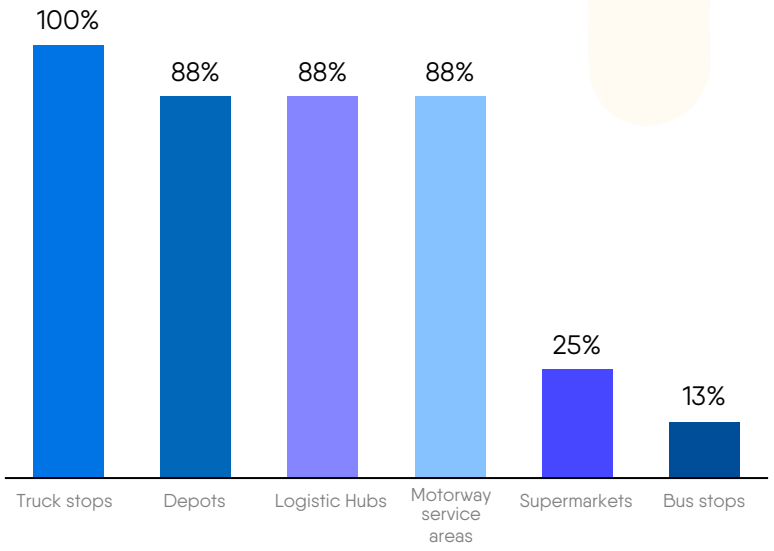
ChargeUp EUROPE

Heavy duty vehicles: plans for deployment

ChargeUp Europe members are already working to deploy charging infrastructure for the projected 270,000 - 520,000 electric HDVs expected on Europe's roads by 2030.[1]

Planned locations for HDV charging points

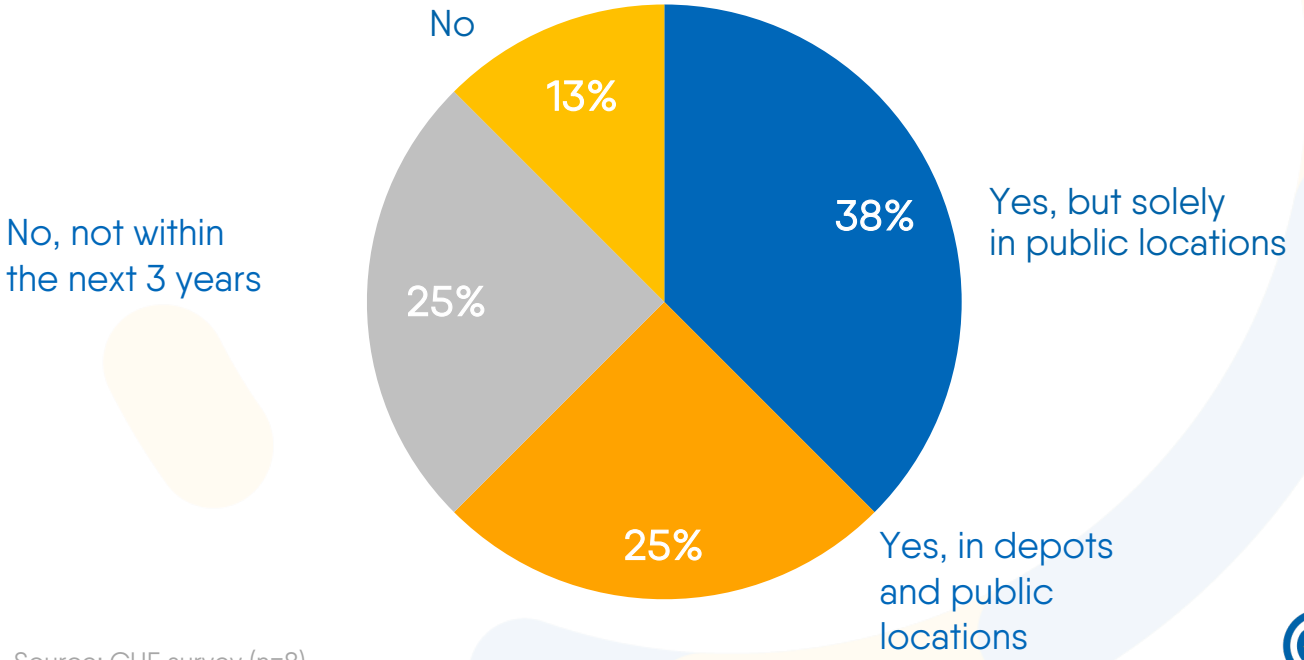
[in % of respondents]



Source: CUE survey (n=9)

Plans on installing charging points with Megawatt Charging System (MCS)

[in % of respondents]



Source: CUE survey (n=8)

[1] For more detail, see Life is a Highway: Driving the Electrification of Heavy Duty Vehicles, ChargeUp Europe, 2023.

ChargeUp EUROPE

Powering buses and heating buildings

CASE STUDY

EKOENERGETYKA SMART ENERGY SYSTEMS

Ekoenergetyka - one of the technological leaders among manufacturers of high-power charging infrastructure in Europe - has designed and implemented a state-of-the-art energy system with charging infrastructure for electric public transport buses for Stadtwerke München GmbH /SWM/ and the Münchner Verkehrsgesellschaft (MVG).

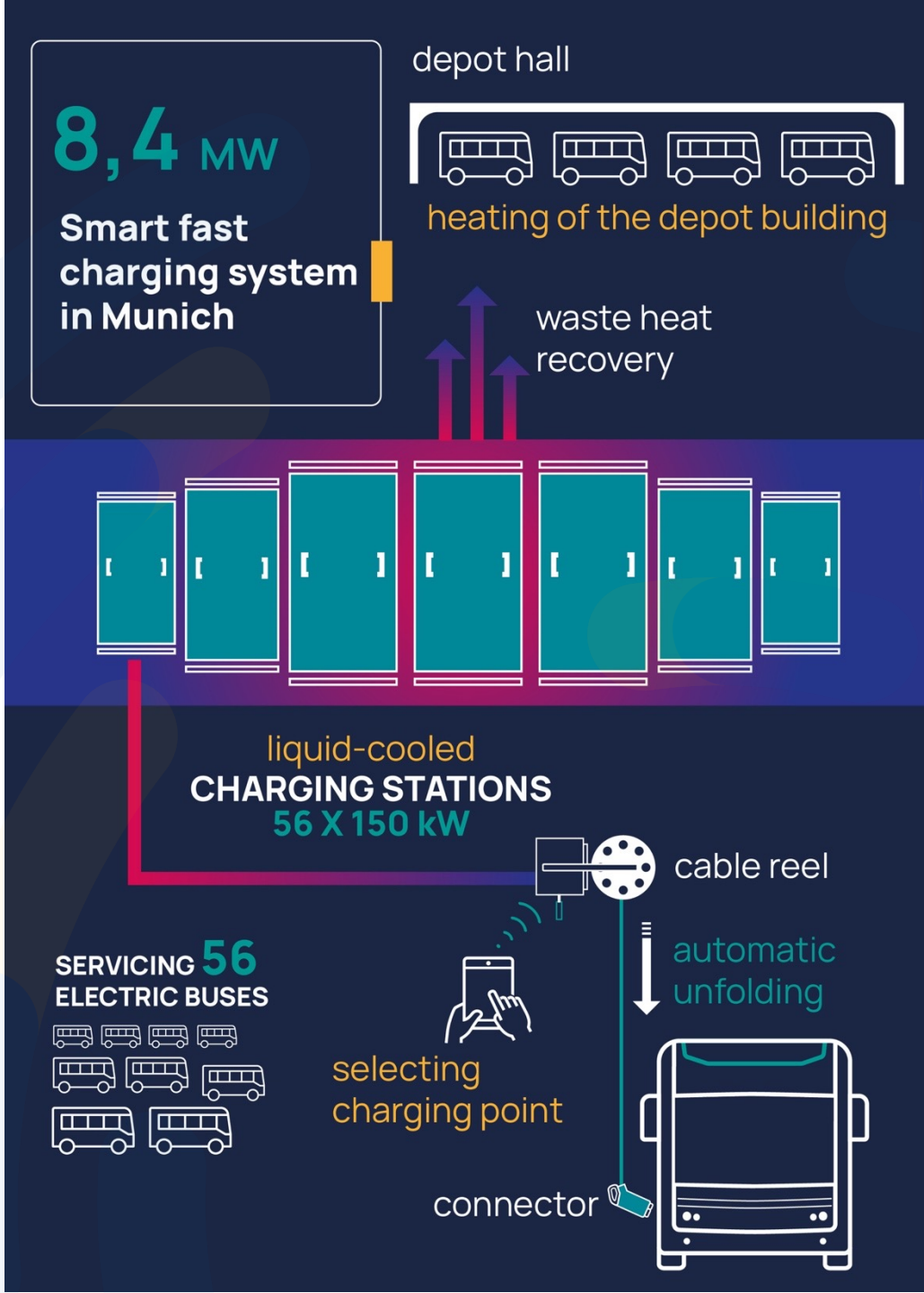
The German public transport operator has built a München-Moosach depot, which will eventually manage around 200 electric buses.

Ekoenergetyka-Polska installed a smart fast charging system there, consisting of 56 liquid-cooled stations with a total capacity of 8.5 MW, and the waste heat they generate is used to heat the depot building.

The charging stations, each with a capacity of 150 kW, not only supply power to the electric buses, but are also an alternative source of heating for the complex, an innovative solution, even on a global scale, and perfectly in line with the Munich-based company's environmental strategy. SWM declares that they intend to fully electrify bus traffic in Munich by 2035. Ekoenergetyka's unique solution allows the city's ambitious and ecological strategy to be realized, and it is part of Ekoenergetyka's mission to implement electromobility.

A practical solution from the point of view of consumers is the intuitive and simple use of the interface to select a specific charging station. The connectors extend automatically from a ceiling-mounted coil, directly to the vehicle's berth. The entire system can be remotely monitored 24 hours a day.

For the project, Ekoenergetyka-Polska chose German partner WISAG Elektrotechnik Bayern GmbH & Co.



5 Workforce and hardware

The people and tech that make it happen

ChargeUp EUROPE

EV chargers are more than just a wall-socket or plug. They are complex, internet-of-things devices.

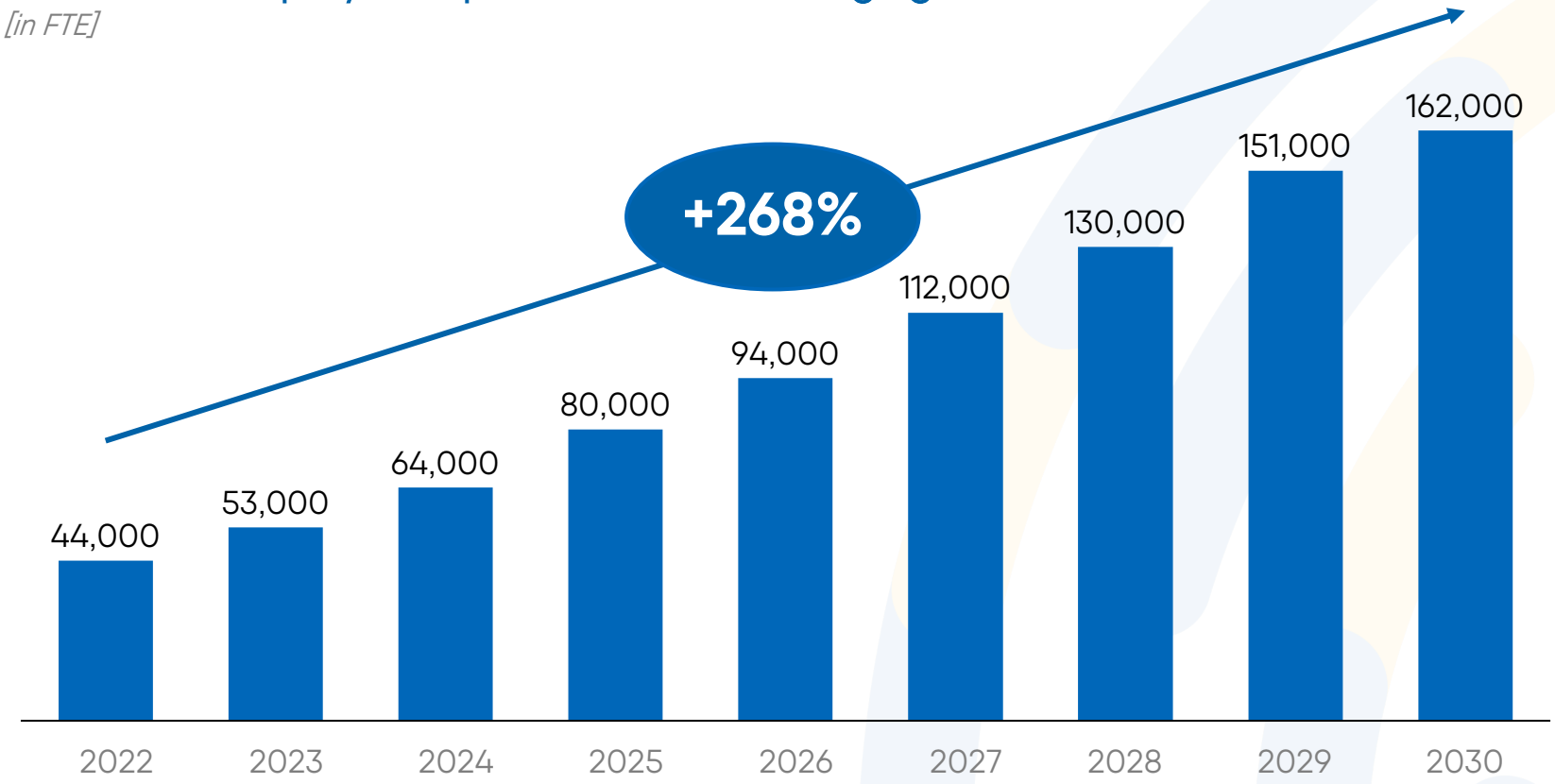
Our sector operates at the intersection of energy, digital and transport - and the charging hardware facilitates that intersection. Components in the stations manage the energy flows, communicate securely with various backend systems to provide station information or transact payments, and communicate with the vehicle itself.

The devices, as well as their component parts and raw materials, are parts of global supply chains. At the same time important parts of the production and assembly takes place in Europe, creating jobs here. As the industry grows, so will direct employment. More can be done to ensure proper education and training pathways exist, and that our sector contributes to Europe's growing digital and clean energy industries.

The EV charging sector is growing, creating more jobs

Forecast of employment potential for the charging market in EU-27

[in FTE]



The emobility industry creates clean and climate tech jobs in Europe in areas like manufacturing of the high-tech components, the installation and maintenance of the chargers themselves, IT services, etc. Many of these jobs can only be done locally, as they're related to the installation and maintenance of hardware.

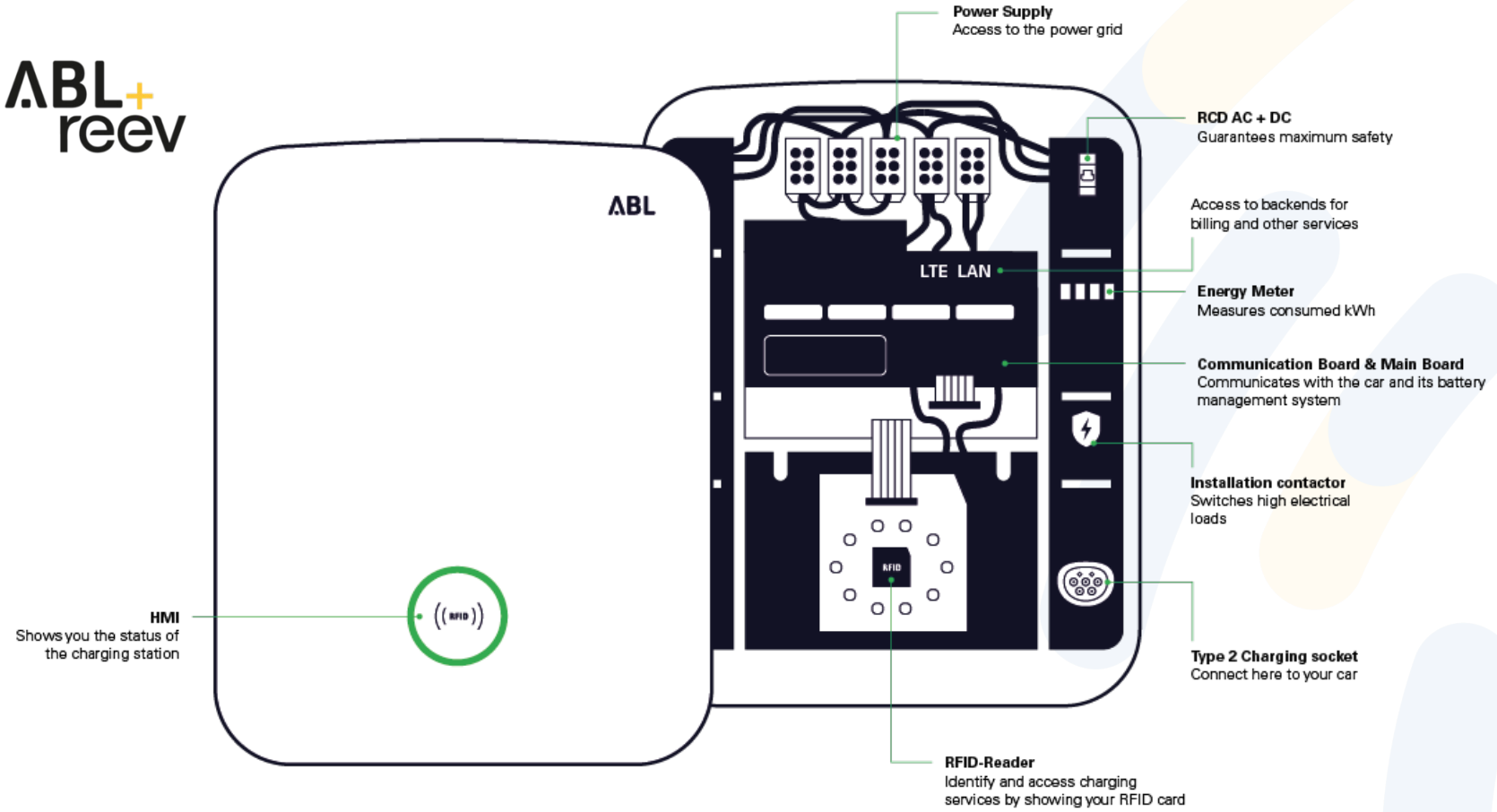
- In 2022, 44,000 full-time employees were needed in the EU's EV charging industry, which is an addition of 9,000 jobs compared to 2021
- On average, the EV charging industry will require about 14,750 new positions per year until 2030
- This leads to the creation of more than 118,000 new jobs by 2030

Source: P3 analysis (incl. jobs in following sectors: hardware, planning & installation, operation, electricity sales, IT backend provision, MSP services)
Rounded to the nearest hundred

ChargeUp EUROPE

Behind the plug: what's in a charging station?

Chargers communicate not just with the vehicle, but also to the CPO backend, the wider emobility ecosystem, and beyond. An AC charger is tightly packed to fit the tech into the small space of the charger. DC chargers are typically more complex, but given their size can accommodate larger components.



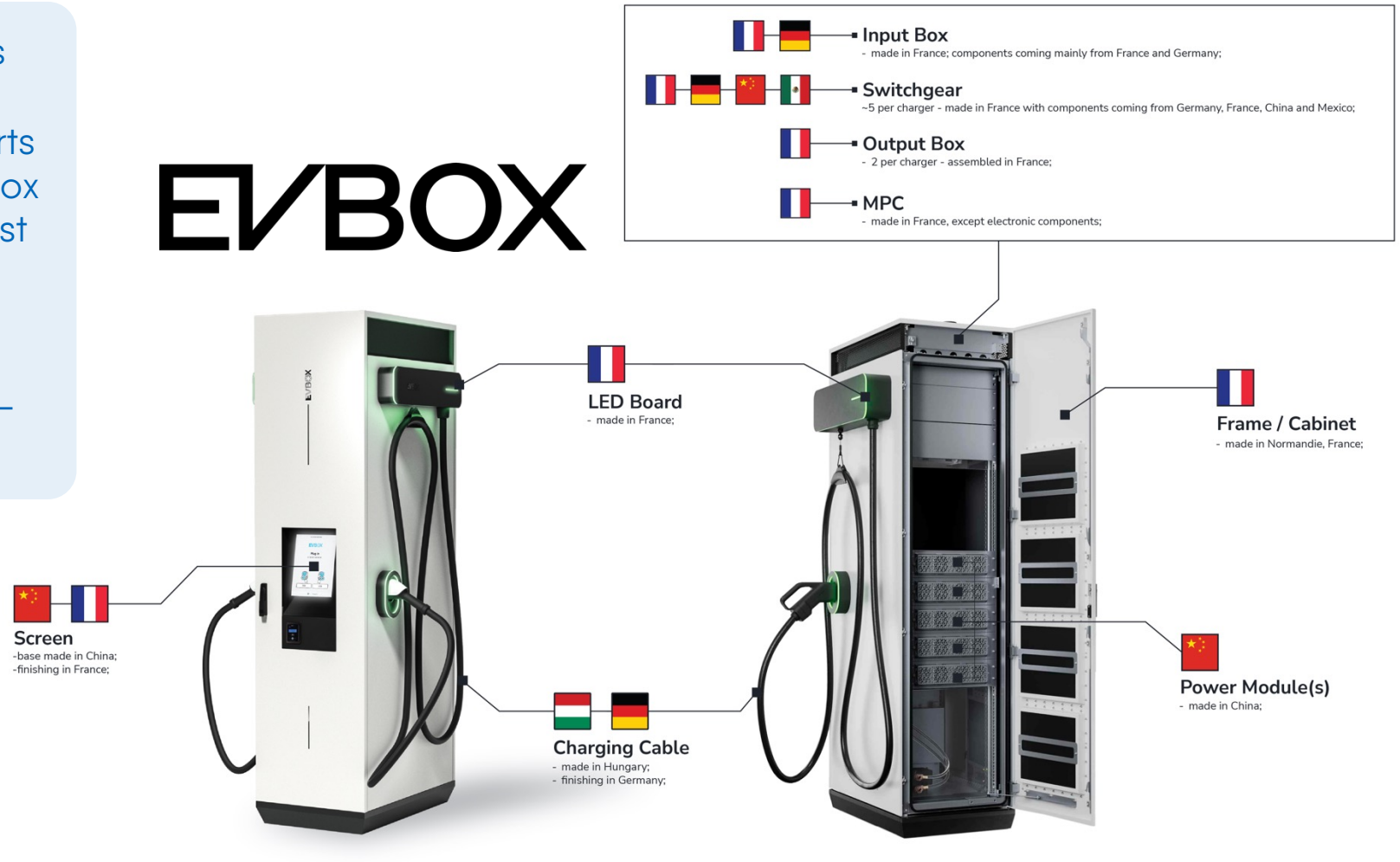
Pictured: ABL Wallbox eM4 Twin

Europe needs accelerated programs to train workers on everything from the manufacturing, installation, and maintenance of these chargers so that industry can keep up the pace of the emobility roll-out. Many research & development roles will also be required to innovate and develop new products. The lack of a trained workforce could present a significant bottleneck to the success of the emobility and energy transitions.

ChargeUp EUROPE

Emobility contributes to Europe's digital-industrial economy

A DC charger is more complex and has more components than an AC charger. The sourcing of these materials and parts results in charging stations like the EVBox Troniq Modular, made in France. The vast majority of the components for DC chargers are manufactured in Europe, demonstrating how the EV charging industry contributes to Europe's digital-industrial economy.



Pictured: EVBox Troniq Modular

Recycling and repairing EV chargers contributes to Europe's circular economy

CASE STUDY

EVBOX

EVBox, a leading provider of flexible and scalable charging solutions, teamed up with Drake & Farrell, a top provider of circular supply chain solutions, to increase the circularity of its value chain. The partnership gives EVBox a higher degree of control over the lifecycle of its products and increase the potential for reusing and recycling its charging stations and their components.

Drake & Farrell fully repairs faulty charging stations to their original state when possible, and diligently dismantles them when repair is not. The charging stations themselves, or their spare parts and materials, then get a second life by being used to replace other charging stations where they can. For parts that cannot be reused, the materials are recycled and find their way back into the economy in a new form, reducing waste and saving resources.

Drake & Farrell also provides the tools to help EVBox investigate and better understand the root causes of possible hardware issues and solve them with greater precision. With over 15 years of experience in supply chain circularity, Drake & Farrell is a frontrunner in supporting the electric mobility sector with multiple forward and reverse process solutions. On a pilot project, it was observed that over 50 percent of the charging stations could be successfully repaired and reused. For the remaining stations, parts and components could be successfully harvested to further improve customer support efforts and reduce environmental impact.

6 Charging up Europe's energy transition

Bridging consumers, EVs, and energy systems

ChargeUp
EUROPE

The transition from a centralized, fossil, based energy system to a distributed, decarbonized one is the challenge of our times – and a momentous undertaking. Electrifying transportation is one key part of the overall transition to decarbonized, electrified societies. As big as the scale of the change is, it is essential. It will bring incredible benefits to society in the form of cleaner air, more sustainable, resilient energy systems, and new economic opportunities. The possibilities are vast.

The emobility industry is hard at work transitioning our energy systems to this paradigm. Load management and managed charging can minimize the need for additional power generation by spreading out and optimizing the use of energy already produced. EVs provide a controllable flexible load which utilities directly or other market players (with customer approval and compensation) can utilize as needed and agreed. This way it can curtail demand, serve as virtual power plants, provide balancing services, and more.

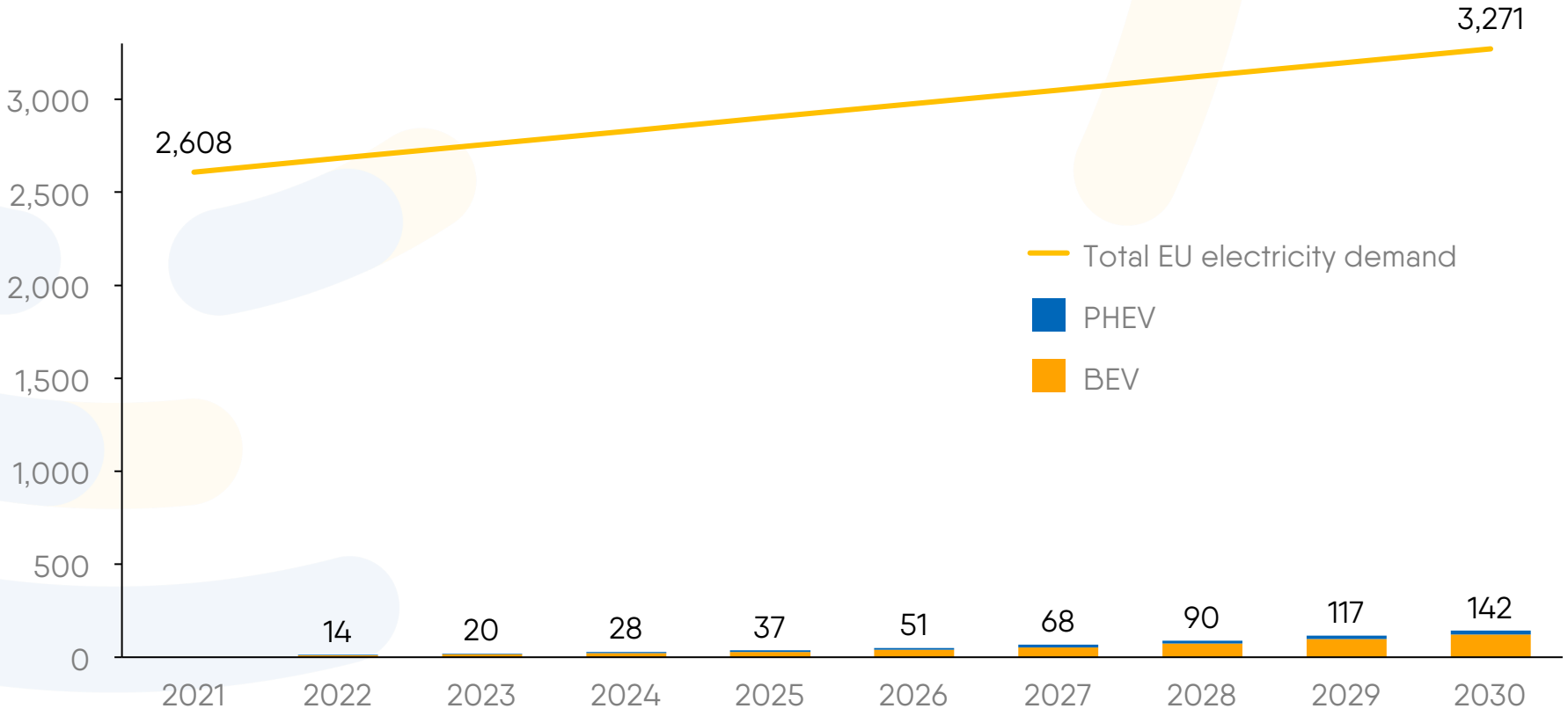
Renewable generation sources are integrated into ever more charging stations, both private and public, providing locally produced, renewable power directly to the vehicle, to an auxiliary (2nd life) battery at the location, or directly to the grid. And since EVs are batteries on wheels, they can also take part in bringing cleaner power to places which need it through bidirectional charging.

This is a transition and there are many challenges, especially regulatory ones, which must be addressed to unleash the full potential of emobility at scale. EV charging stations, and the companies which operate them and provide connected services, serve as the bridge between EVs and the grid. They are working with EV drivers and stakeholders across sectors to solve each issue and move on to the next one.

EVs will account for only 4% of the EU's electricity demand by 2030

Forecast of annual electricity demand of electric vehicles in EU-27

[in TWh]



- Today, the annual electricity demand of EVs in the EU amounts to 14 TWh, or about 0.49% of overall demand
- The demand will increase to only 4% of overall electricity demand by 2030 – to 142 TWh
- This overall demand will be moderated by managed charging, demand response mechanisms, and time of use charging, all of which support a healthy grid

Source: iea and P3 analysis | Assumptions: Increasing energy efficiency of EV powertrains and average annual mileage of PHEVs over time
Rounded to the nearest full value

ChargeUp EUROPE

Ultra-fast and solar: local renewables for EV charging

CASE STUDY

zunder

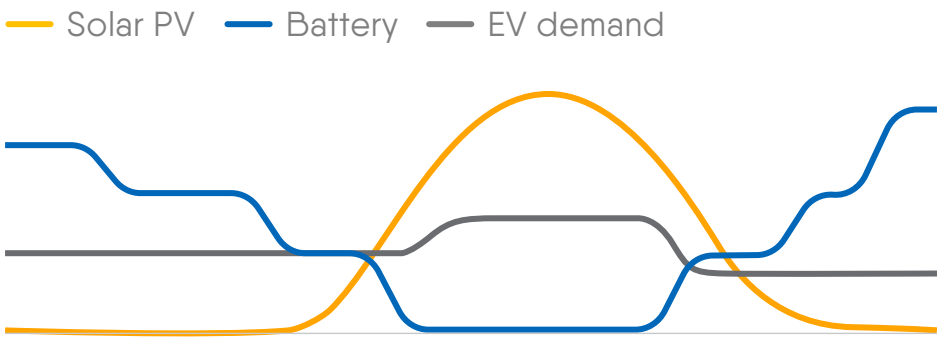
Zunder operates charging stations that are powered by renewable energy only. By adding solar panels to ultra-fast charging stations, Zunder allows drivers to charge their EV with electricity produced on site directly with solar energy. When demand for energy is not high, the charging station with solar panels can be self-sufficient: it will require very little or no power at all from the grid. Overall, up to 40 percent of the power at the Jerez de la Frontera (Spain) location can be generated by the solar panels.

The new ultra-fast charging station in Jerez offers 360 kW charging and is the latest addition to a network that already includes several charging stations equipped with solar canopies. These stations not only produce local renewable energy, but also provide electric vehicle users with much needed shelter from the rain or the sun. Ultra-fast charging stations equipped with solar panels will from now on be standard on Zunder's charging network, greatly improving user experience.

Integrating renewables and storage for off-grid EV charging

CASE STUDY

AFRY



The two main bottlenecks for the fast deployment of charging infrastructure are land availability and grid connection. They are often related, and charge point operators are looking for lands with the right size of grid connection to foster the deployment and reduce capital and operating expenditures. As an example, some attractive locations for passenger cars or trucks along highways, are not selected to avoid high grid reinforcement cost. A sustainable solution to this problem is off-grid EV charging stations powered by renewable energy sources.

AFRY can see an upcoming trend on charging stations installation with solar panels and storage, whether connected to the grid, or fully off-grid.

This trend is visible in the US, Australia and southern Europe, on countries with high solar radiation. The charging station could start as an off-grid installation and be later connected to the grid, to cover the rising demand for EV charging. When connected to the grid, a low-voltage connection can be sufficient.

With the electricity prices rising, and the storage and photovoltaic prices falling, those installations are becoming economically more attractive. Nonetheless, an evolution of European and national regulations and funding schemes for infrastructure is necessary to encourage those sustainable charging stations to emerge, to limit the impact on the grid, and contribute even more to the decarbonization of the transport sector.

Smart charging: from early market to scale

CASE STUDY

The aVEnir project gathered thirteen industrial and academic partners, covering the entire value chain of the French electric mobility ecosystem to facilitate the integration of EVs into the grid, and to enable the large-scale development of electric mobility.

The project aims to develop and validate, in real conditions, future smart charging solutions (V2G, photovoltaic and EV synchronization, modulation or charging shift) and to study the opportunities they offer in response to DSO grid dimensioning et operation issues.

The objectives were to experiment and characterise, in real conditions, the interactions between public Electricity Distribution Network (EDN), Electric Vehicles Recharging Infrastructures (EVRI) and EVs. This, by developing, testing and deploying architectures and communication chains (IS to IS and smart metering chain) to allow the DSO to send a signal to CPO or flexibility aggregator to activate the smart charging of EVRI.

Several situations have been tested, such as V2G (Vehicle to Grid) use cases, synchronisation techniques between EV charging and photovoltaic production, and charging modulation or charging shift (use case example: the charging point infrastructure owner chooses a faster and/or cheaper connection to the grid in exchange of allowing flexibility on specific periods of time)

The consortium members have been then able to assess the opportunities provided by EVs for managing flexibilities locally, on the electricity grid, taking as well into account user acceptance of the solutions.

These experiments have been mainly located in complementary areas (urban, peri-urban, rural) and concern different types of EVRI sites (public roads, company sites, shopping centres, collective housing).

The objectives were to prepare the industrialisation of the tested solutions, taking into account technical, economical, sociological and regulatory issues.

In 2030, it will be possible to control EV charging at a large scale, as interoperable solutions will be widely deployed by the industry's players. DSOs are essential players in ensuring the deployment of electric mobility. Their ability to interact in a standardised way at a European level with EV charging stakeholders is key to ensuring the deployment of smart charging solutions that will benefit customers and the electricity system.

What is smart charging?

Smart charging (or 'smart recharging') means an operation in which the intensity of electricity delivered to the battery is adjusted in real-time, based on information received through electronic communication (AFIR)

Types of smart charging:

V1G Ability to modulate the power flow from grid/charger to EV

V2X EV dispensing energy and serving as a power source for something else (but not back into the grid)

V2G EV dispensing energy back into the grid

ChargeUp EUROPE

Breaking down silos: integrating energy and transport for maximum benefits

E-mobility integrates the transport and energy (and digital) sectors in new and deeper ways than they have before been. Continuing to treat these as distinct realms, coupled with siloed thinking and ways of operating, prevents holistic problem solving and from taking advantage of the full system integration benefits e-mobility can bring to EV drivers and the overall energy system. And the US has seen the benefits of integrating energy and transport.

A large cross-section of CPOs and energy companies came together to call for needed grid connection reforms and streamlining to roll out EV charging infrastructure. Further action on this topic is urgently needed.

CASE STUDY

Joint Office of Energy and Transportation

Electrified transport merges transport, energy and digital realms.
As such, the siloed thinking and policymaking present obstacles to rapidly scaling the emobility ecosystem and to taking advantage of its full potential – not just in transport but in system integration, energy storage, a controllable, flexible load, and more.

A model initiative to breaking down these silos is the US Joint Office of Transportation and Energy. This office combines staff from the Department of Transportation and from the Department of Energy into a central planning and execution unit for the Administration's EV charging priorities. Because they are familiar with different ways of thinking, come from different departments and can draw upon different groups of colleagues, they are able to help align transportation objectives and resources (such as the federal interstate highway corridors) with energy system realities and needs in a more streamlined and proactive fashion. The problems and benefits from electrified transport are not limited to one area or the other.

ChargeUp EUROPE

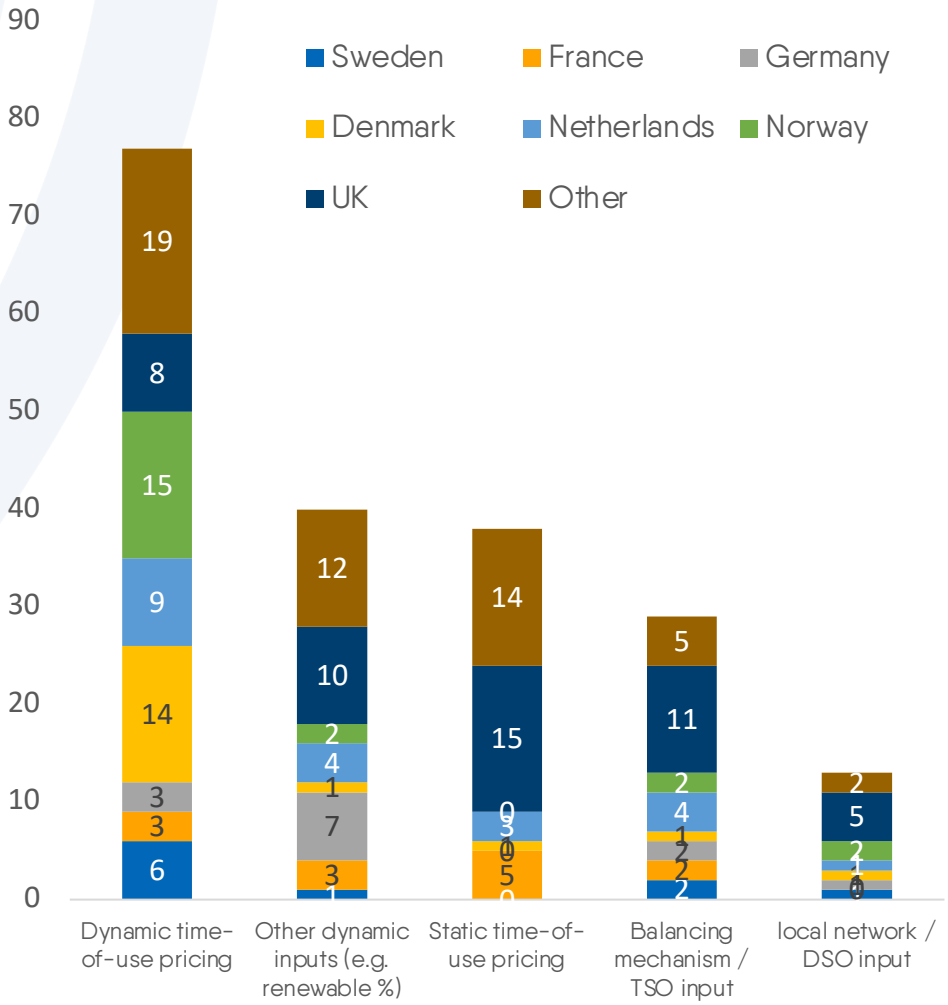
~140 smart charging options available in Europe today: national regulations prevent wider adoption

This flexible charging process saves users money and turns all EVs into powerful energy system assets. It also generates benefits for all electricity consumers, not just EV owners: charging when electricity prices are low promotes better use of the grid and of cheap renewables, reducing system costs for all.

Close to 140 smart tariffs and services are on offer in Europe today and this number is growing fast. These offerings help EV users automatically shift their charging to the most beneficial times, without compromising their needs. Financial savings come from time-varying energy tariffs and, increasingly, from dynamic prices that follow the spot market. Not all EV users across Europe have equal access to these savings, however, as there are still considerable differences in national regulatory frameworks.

Making user-centric smart charging tariffs and services the default option for private and public charging is needed to help ensure that all Europeans reap the benefits. Energy market reforms can help increase revenues from smart charging by better capturing the value of EV participation in flexibility markets at the local and national levels. This, in turn, allows aggregators to stack various services and multiply the benefits. To make smart charging broadly available, it is also critical that grid operators prepare local power networks through digitalisation and increased transparency.

Source: The time is now: smart charging of electric vehicles, Regulatory Assistance Project (RAP), Jaap Burger, Julia Hildermeier, Andreas Jahn, Jan Rosenow, April 2022



ChargeUp EUROPE

CPOs, DSOs, and regulators creating win-win solutions

CASE STUDY greenway

Innovative approaches in the regulation are needed to ensure that the transition to emobility succeeds, especially in lower utilization locations and markets. The development of the 'e-tariff' in Slovakia and Poland is such an example.

The economics of charging come down to how much each charger is utilized. The majority of costs for charging services – i.e. amortization, IT systems, regular maintenance, land lease - are fixed, regardless of the amount of energy delivered by the charger. In many countries one of the largest costs is the fixed energy tariff (the maximal contracted power) paid to the DSO, often known as the capacity charge. Especially at fast charging locations, it can reach ~10K EUR / month, regardless of how much the charger is used.

In Poland, GreenWay and the Polish Alternative Fuels Association developed the concept of the, e-tariff, a special rate structure for public charging stations, with a lower fixed fee when utilization is low. When utilization grows, so does the variable fee, to compensate the network operator for the previous period. Thus, for the DSO it is revenue neutral, while reducing costs on the CPO during the critical early days:

Utilization (as compared to the reserved power)	<= 10%	>10%
Reserved power (fixed fee)	25% correction factor	100% (or no correction)
Delivered energy (Variable fee)	200% correction factor	150%

Total DSO monthly for 150 kW DC charger

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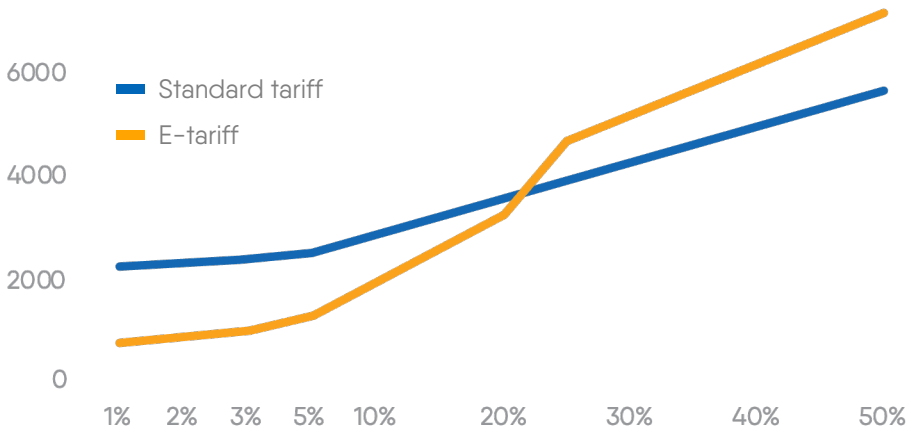

Time utilization of 150 kW charger

After a few rounds of negotiation with the national ministry, regulator and DSOs in Poland, all parties jointly backed the e-tariff, which went into force in April 2021.

As a result, there is a significant reduction in DSO fees paid by the CPO where charger utilization is low:

After its success in Poland, the idea was championed by GreenWay in cooperation with the Slovak EV Association, and the Slovak regulator adopted its own e-tariff in 2021.

The e-tariff has helped speed up the deployment of charging infrastructure by improving the economics and reduced the risk associated with low utilization, which is crucial especially in the initial stage of EV development.

Looking forward

ChargeUp EUROPE

Lucie Mattera

Secretary General ChargeUp Europe

Another year concludes on a picture of rapid expansion and transformation, promising technological developments that will spur the integration of digital, energy and transport systems, and continued innovation to best serve the needs of EV drivers of all types. From 2021 until the end of the decade, the number of charging points will have increased over ten times. Growth in the workforce should be close to +270%. Smart charging will be the default in public charging infrastructure, while destination charging will contribute to taking the electric drivetrain fully mainstream. With key regulatory milestones in place – starting with the 2035 emissions phase-out, a shift unthinkable just a few years ago – emobility has been fully recognized as a core part of Europe's future green, digital, and industrial economy.

The time has now come for the enabling conditions of an even faster deployment to come much more sharply into focus. Legal uncertainty is still unacceptably high, from the taxation of energy supply to VAT regimes. Technical and regulatory barriers mean that precious resources are spent on adaptation to local requirements, rather than deployment and innovation. The driver's experience is still far from seamless, due to the lack of standards supporting smooth communication between systems and interoperability. The geopolitical winds are turning, with heightened concerns over Europe's industrial basis in a global race for clean tech that is heating up. Administrative delays – for land access, permitting, and others – continue to throw sand in the gears. And crucially, Europe does not have a grid that can support its vast electrification agenda – not even close. The work on enabling conditions must pick up speed, now. ChargeUp Europe will play its full role in driving forward this agenda.

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