



# Competition analysis of the electric vehicle recharging market across the EU27 + the UK

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# **Competition analysis of the electric vehicle recharging market across the EU27 + the UK**

*Market for the provision of publicly accessible  
recharging infrastructure and related services*

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## Glossary of Terms and Definitions

Term	Meaning
AC	Alternating Current
AFCA	Austrian Federal Competition Authority
AFHDV	Alternatively Fuelled Heavy-Duty Vehicle
AFI	Alternative Fuels Infrastructure
AFID	Alternative Fuels Infrastructure Directive
AFIF	Alternative Fuels Infrastructure Facility
AFIR	Alternative Fuels Infrastructure Regulation
AGCM	Autorita' Garante della Concorrenza e del Mercato (Authority for Competition and Market)
API	Application Programming Interface
ARERA	Autorità di Regolazione per Energia Reti e Ambiente (Italian Authority for the Regulation of Energy Networks and the Environment)
Aspi	Autostrade per L'Italia (Highways for Italy)
BEÖ	Bundesverband Elektromobilität Österreich (Austria Association for e-Mobility)
BEV	Battery electric vehicle
BioNGV	Bio Natural Gas
CAGR	Compound annual growth rate
CAI	Credit Agricole Italia
CAPEX	Capital expenditure
CAs	Competition Authorities
CDP	Cassa Depositi e Prestiti (Deposit and Loans Bank)
CEEAG	Guidelines on State aid for Climate, Environmental protection and Energy
CEF	Connecting Europe Facility
CJEU	Court of Justice of the European Union
CMA	Competition and Markets Authority
CNG	Compressed Natural Gas
CO <sub>2</sub>	Carbon Dioxide
CPEV	Recharging Plans for Electric Vehicles
CPO	Charge Point Operator
CPT	Clean Power for Transport
CRU	Commission for Regulation of Utilities
CSDD	Road Traffic Safety Directorate
CWaPE	Commission wallonne pour l'Energie (Wallonia Commission for Energy)
DC	Direct Current
DSO	Distribution System Operator
EAC	Κεντρική σελίδα (Electricity Authority of Cyprus)
EAFO	European Alternative Fuels Observatory
EDF	Électricité de France (Electricity of France)
EDP	Energias de Portugal (Energy of Portugal)
EGME	Electric Mobility Network Managing Entity
EIB	European Investment Bank

e-Mobi	Electromobility Non-Profit Ltd.
eMSP	eMobility Service Provider
EPMA	Environmental Project Management Agency
ERDF	European Regional Development Fund
ETC	European Territorial Cooperation
EU	European Union
EV	Electric Vehicle
FZOOEU	Fond za zaštitu okoliša i energetske učinkovitost (Fund for Environmental Protection and Energy Efficiency)
GBER	General Block Exemption Regulation
GHG	Greenhouse Gas
HEP	Hrvatska elektroprivreda (Croatian Electricity Company)
HPC	High Power Recharging points
ICA	Italian Competition Authority
ICE	Internal Combustion Engine
ICNC	Intercharge Networks Conference
INEA	Executive Agency for Innovation and Networks
JV	Joint Venture
LA	Local Authority
LEA	Lithuanian Energy Agency
LEVI	Local EV Infrastructure Fund
LNG	Liquefied Natural Gas
M1	Passenger Car
M2	Vehicle for carriage of passengers, mass $\leq 5t$
M3	Vehicle for carriage of passengers, mass $> 5t$
MECOR	Multimodal eMobility connectivity for the Öresund Region
MOL Plc.	MOL Hungarian Oil and Gas Publicly Operated Company
MOVES	Efficient and Sustainable Mobility Incentives Program
MS	EU Member States
N1	Vehicle for carriage of goods, mass $\leq 3.5 t$
N2	Vehicle for carriage of goods, mass $> 3.5t$ and $\leq 12t$
N3	Vehicle for carriage of goods, mass $> 12t$
NER	New Entrants Reserve
NIE	Northern Ireland Electricity
NIR	National Implementation Report
NKL	National Knowledge Platform for Public Recharging Infrastructure
NPF	National Policy Framework
NRP	Net Retail Price
NSAs	Network Sharing Agreements
O&G	Oil and Gas
OCPP	Open Charge Point Protocol
OEM	Original Equipment Manufacturers
ORCS	On-street Residential Recharging Scheme
PHEV	Plug-in Hybrid Electric Vehicle



PNIEC	Integrated National Energy and Climate Plan
PNIRE	National Plan for Electric Vehicle Recharging Infrastructure
PNRR	National Recovery and Resilience Plan
RDL	Royal-Decree Law
REE	Red Eléctrica de España (Electric Network of Spain)
REWS	Regulator for Energy and Water services
RFID	Radio Frequency Identification
RRF	Recovery and Resilience Facility
SaaS	Software as a Service
SEAI	Sustainable Energy Authority of Ireland
SME-s	Small and Medium Sized Enterprises
SML	Sustainable Mobility Law
SPAC	Special Purpose Acquisition Company
SPSV	Small Public Service Vehicle
TEN-T	Trans-European Transport Network
TFEU	Treaty on the Functioning of the European Union
TSO	Transmission System Operator
VAT	Value-Added Tax
VLAIO	Flanders Agency for Innovation and Entrepreneurship
V2G	Vehicle-to-Grid
ZEVI	Zero Emissions Vehicles Ireland

## 1. Executive summary

This report provides an assessment of potential competition issues in the provision of publicly accessible recharging infrastructure and related services for electric vehicles (EVs)<sup>1</sup> in the EU27 + the UK, including a more in-depth investigation of four EU Member States (Ireland, Italy, Croatia and Belgium). The overarching goal of this report is to provide:

- a factual background on industry dynamics, regulatory initiatives, public support and competitive outcomes across the EU27 + the UK and a more in-depth assessment of a subset of Member States selected as being broadly representative of the experience across the region;
- an overview of the value chain, including prevalent and emerging business models in the industry adopted by key ecosystem participants;
- a taxonomy of potential competition concerns around unilateral and coordinated conducts and distortive effects of public funding; and
- an assessment of whether there is prima facie evidence of existing anticompetitive effects.

The analysis is based on a range of sources including public information, granular recharging data, and interviews with industry stakeholders.

### ***Industry background, the acceleration of transport electrification, and variation in industry maturity across countries***

Rapid growth of EV penetration and usage is essential if Net Zero targets are to be achieved. This requires consumers to have confidence that there will be enough recharging infrastructure to meet their needs. Thus, EV recharging, and the eMobility sector more generally, has been identified as a priority for many countries in the region. As can be seen in Figure 1 below, passenger EV adoption in the EU27 + UK has increased by a factor of 11 since 2016 (reaching more than 5m EVs deployed as of October 2022). Furthermore, despite the negative trend in overall vehicle sales due to the Covid-19 pandemic and its economic effects, EV penetration among new sales has risen from 1% in 2016 to almost 20% in 2022. Nevertheless, EV penetration is still in its early stages with approximately 95% of the total fleet still consisting of internal combustion engine (ICE) vehicles.

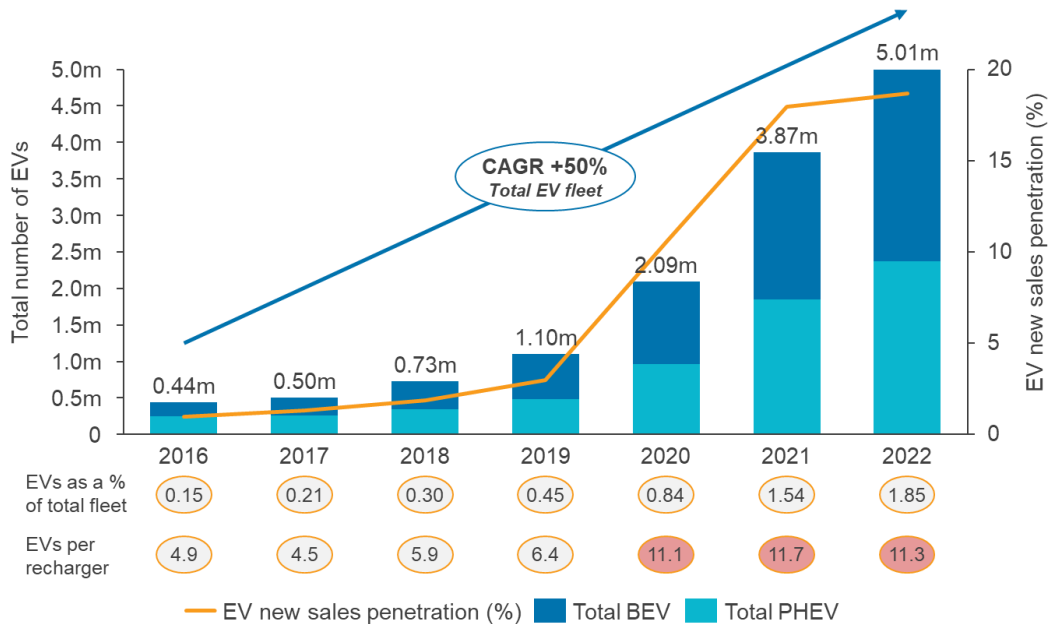
Over the same period, the number of public recharging points has been rising steadily, from approximately 90k in 2016 to over 450k in 2022. Nevertheless, from 2016 to 2022, EV recharging deployment growth (31% CAGR<sup>2</sup>) has been unable to keep up with EV adoption growth (50% CAGR), highlighting the need for faster recharging point rollout – evidenced by the EVs per recharger ratio exceeding the recommended 10 to 1 ratio as of 2020.<sup>3</sup>

<sup>1</sup> Throughout this report, the term EVs covers passenger BEVs and PHEVs unless otherwise explicitly stated.

<sup>2</sup> Compound annual growth rate

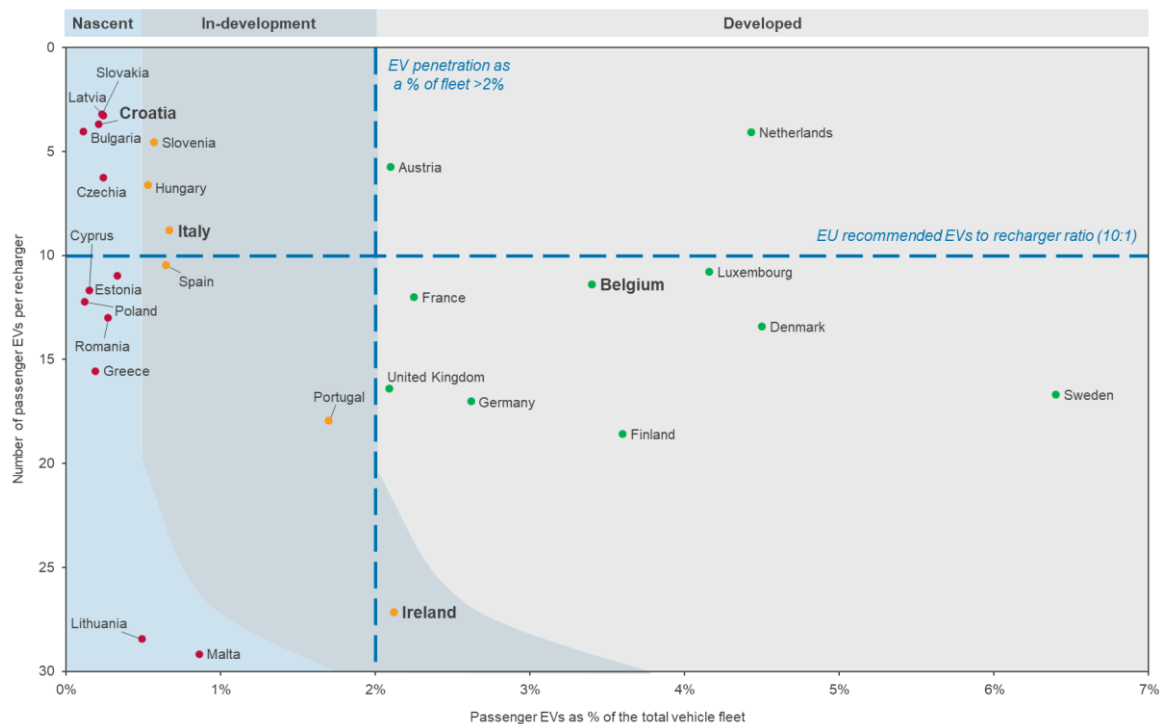
<sup>3</sup> European Commission guidance of 10 EVs per recharger to ensure adequate service levels: [2014 Alternative Fuels Infrastructure Directive](#)

**Figure 1: EU27 + the UK passenger EV growth (total EVs and share of vehicle sales)**



While the overall growth across the EU is encouraging, there is substantial variation in performance across Member States. As can be seen in the Figure below, countries exhibit varying levels of EV penetration and numbers of EVs per public recharging point (a measure of the adequacy of the recharging infrastructure). Based on these two metrics we classify countries as either “nascent”, “in-development”, or “developed”.<sup>4</sup>

**Figure 2: Countries classified by EVs per recharger vs. EV share of fleet (2022)**



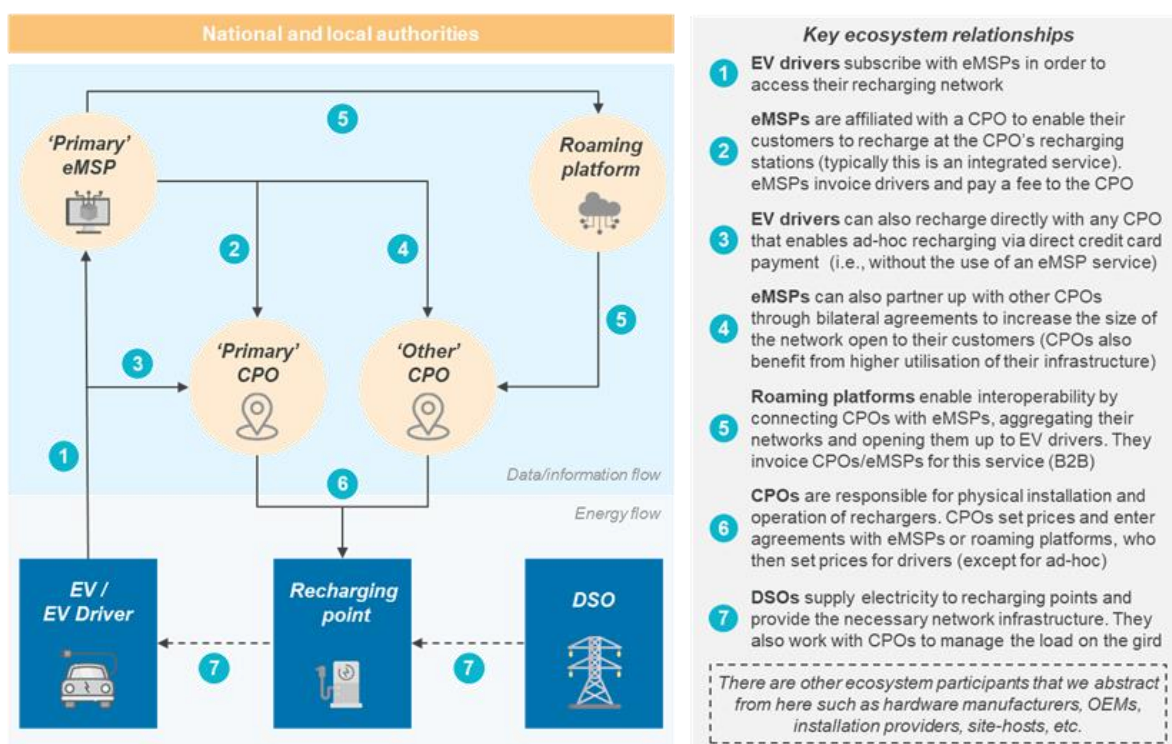
<sup>4</sup> This categorisation is useful to facilitate our analysis but is inevitably subjective and these labels will change over time as the industry matures (e.g., none of these Member States are truly “developed” as even the most developed Member State is far off the long-term goal of near 100% penetration of EVs).

### Industry value chain and key stakeholders

The most direct participants in the public EV recharging ecosystem are Charge Point Operators (CPOs) and eMobility Service Providers (eMSPs). CPOs manage the physical recharging infrastructure and eMSPs manage the digital end-customer services (e.g., access, payments, etc.). The recharging infrastructure they provide varies depending on the use case (e.g., on-route, on-street, or destination recharging points) and the technology used (e.g., slow, fast, or ultra-fast rechargers). Whilst this study focuses on the public recharging segment, there would also be additional considerations when assessing the fleet and private segments, which are out of scope in this report.

In addition to these direct participants, there is also a broader ecosystem of players such as EV manufacturers (OEMs), energy providers (including DSOs), and regulatory bodies including local authorities, who are relevant either because they provide complementary products or because they are in a position of control over where and how recharging points can be installed. These high-level relationships are depicted in Figure 3 below, with the major vertical links between ecosystem participants discussed in more detail in Section 4.

**Figure 3: EV recharging ecosystem – Communication flow and key roles and responsibilities of market participants**



NB: Whilst arrows are depicted in one direction, data and information flows back and forth from all ecosystem participants. In the case of V2G (bi-directional rechargers), electricity can also flow in both directions

### Recharging business models continue to evolve as the industry matures

The EV recharging ecosystem is evolving rapidly, and our research identified a range of different business models with different levels of vertical integration. Operators can be broadly classified as pure-plays (i.e., companies founded specifically for EV recharging) and expanding incumbents (i.e., larger players entering from other sectors including oil and gas, technology, equipment manufacturing, utilities, and automotive OEMs). Our research also indicates that the CPO and eMSP models have been converging (i.e.,

almost all CPOs act as their own eMSP). This enables them to improve the consumer experience while building a direct relationship with EV drivers.

In addition, our research identified variations in the role of the public and private sector in the EV recharging ecosystem, as well as variations in the degree of sector concentration. In nascent EV sectors, a tendency for a public sector entity, or one (or few) private players to be a clear leader in terms of number of recharging points has been noted. As geographic markets develop, new players tend to enter the recharging space, which generally leads to an acceleration in recharging infrastructure investments and an overall increasing level of ecosystem complexity and innovation.

### ***Regulatory and public support overview***

This report explores the different types of regulation and public support across the EU27 + the UK to assess how differences can impact competition within the industry. To do so, the report starts by providing an assessment of EU level regulation and public support to establish a baseline for the alignment of all geographic markets and to highlight how they conform to EU level regulation and support. Next, a summary was developed for each country, outlining major policies and regulations relevant to the sector, describing available public support, and highlighting competitive dynamics among CPOs and eMSPs. While common trends emerged from this review, such as the presence of national public support to the industry in most cases, regulation is more heterogeneous, presenting noticeable difference between developed and nascent countries. Nevertheless, EU rules provide a regulatory backbone to the sector across the EU.

The 2014 EU Alternative Fuels Infrastructure Directive (AFID) served as a basis for the EV sector regulations and standards, together with subsequent key regulatory packages including the European Green Deal and individual country level regulations and plans – which continues to evolve as the industry develops across the region. Furthermore, the European Council adopted its Common Position in an update to the AFID on 2 June 2022, which when accepted will repeal the 2014 directive and be known as the Alternative Fuels Infrastructure Regulation (AFIR). This iteration and these efforts have been geared towards creating an interoperable recharging network, both from a technical hardware and billing perspective, while also fostering growth of the EV industry across the EU.

As EV sectors mature, the driving force behind regulation often shifts from EU rules, to national and then local strategies. Typically, the varying approaches are driven by the country's objective for the eMobility sector, such as whether they are trying to develop an industry that caters to the needs of consumers such as interoperability, dynamic pricing, and user experience, or whether regulation is geared more towards target achievement (i.e., number of EVs on the roads, and rechargers available).

In terms of the totality of EU support for the sector from various sources, significant funding has been allocated across jurisdictions. Approximately €650 million has been spent or allocated for spending across the EU27 + the UK.<sup>5</sup> However, these sums are relatively modest compared to the investments deployed by ecosystem participants (i.e., public recharging points, grid upgrades, site leases, digital platforms, etc.). We estimate these to be in the order of €15 billion to date such that the aggregated sum of EU funding is less than 5% of total sector investments to date.<sup>6</sup>

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<sup>5</sup> Based on total EU funds allocated to the deployment of public recharging infrastructure in all Member States and the UK during the period 2014-2022 amount to €0.65bn (€358m for EIB, €272m for CEF and €15.5m for Interreg), see Section 3 for more detail

<sup>6</sup> Based on CRA analysis, detail in Section 5.6

Generally, across countries, a few trends can be deduced as to how the market is regulated and supported. Firstly, there has been an evolution of regulation becoming more favourable to increased competition. Second, the recharging point rollout is following EV adoption which is accelerating only after a critical mass has been reached. Finally, CPO concentration is transitioning from monopolistic/oligopolistic structures to more competitive ones over time.

### ***Assessment of potential competition concerns across the EU27 + the UK***

There is a strong economic rationale to prioritise the promotion of effective competition in public EV recharging. Weak competition is likely to be doubly harmful in markets which exhibit positive social externalities because a lack of competition does not just cause the normal concern about reduced output and consumer welfare, but also makes these social objectives harder to achieve. Based on our review we consider the following main categories of competition concerns:

**Exploitative conduct due to local market power.** We document how, even in densely populated cities, it is common to find narrow geographies with just a single CPO operating. We see some evidence of eMSPs price discriminating by geography and it is likely that CPOs will be able to charge higher access fees for recharging points situated in less competitive locations.

This issue of “local market power” is analogous to the existing situation in ICE fuel stations (albeit EV recharging points may be less constrained by the option to charge at home), and we conclude that this issue is most likely to be a cause for concern when positions of local market power are protected by local entry barriers. We identify regulatory barriers due to exclusive concessions by local authorities as a potential source of such barriers as well as potential exclusive contracts with landowners in strategic locations.

**Unilateral conduct concerns around market “tipping”.** EV recharging may exhibit density and/or network effects (e.g., because a larger operation can benefit from economies of density whereby having more users generates more utilisation of recharging points and lower unit costs).

We conclude that, while density effects are clearly present, there are other factors which may mediate against tipping including regulation that is likely to preserve interoperability across networks and the scope for entry to occur on a local level. We also estimate the level of concentration at the CPO level across Europe and note that many markets which appear concentrated are relatively nascent.

This provides some comfort that “first mover advantages” may erode over time as the sector matures. On the other hand, we discuss potential conducts (e.g., exclusive contracts) that might allow a first mover to secure its position and the key analyses in assessing such concerns.

**Unilateral exclusionary conduct.** We discuss potential non-horizontal theories of harm that might arise due to the vertical integration of CPOs and eMSPs and, moreover, if CPOs/eMSPs integrate with other actors through the value chain (e.g., DSOs, OEMs, fuel retailers, local authorities). As with all non-horizontal theories we note that it is necessary to trade-off the potential benefits of vertical integration against potential foreclosure risks.

Our assessment is that integration with energy suppliers and local authorities are the areas which might most plausibly raise concerns, although rules/regulations often exist that prevent such conduct. Our assessment is that integration with OEMs is, as things stand, unlikely to raise concerns in Europe because no OEM has achieved either a strong lead in EV sales or built an EV recharging network that is comparable to those provided by third-party operators.



**Coordinated conduct and effects due to horizontal agreements between market participants.** Turning to coordinated effects of horizontal agreements one can consider three main categories of agreement: joint ventures between CPOs (which present similarities but also key differences to network sharing agreements in other industries such as telecoms and ATM networks); bilateral arrangements between CPOs and eMSPs (which are often integrated CPO/eMSPs) where CPOs grant other eMSPs access to their network; and agreements between CPO/eMSPs and roaming platforms.

The former are the most likely to raise concerns as they involve potential agreements between direct competitors. We consider whether a similar approach should be taken as in other industries with a consideration of the potential benefits of pooled investment vs. the potential costs of reduced competition and reduced incentives for firms to enter each other's territory.

More leeway should be given to agreements between CPOs with more complementary networks (e.g., because they lack overlapping footprints) and to ones which will increase access in rural or other underserved areas where it may not be sustainable to operate multiple competing networks at the desired level of density. When it comes to the other two categories, we discuss potential concerns around information sharing and coordination as well as the key competition themes in assessing such concerns.

**Considerations around public funding and potential distortions or crowding out of private investment.** We conduct a comparative analysis of the extent of public support for the EU27 + the UK, distinguishing between national support and EU support via the Connecting Europe Facility (CEF), the European Investment Bank (EIB) and Interreg Europe, and overlaying the level of EV sector maturity, the level of CPO concentration, and the existence or not of a state-owned CPO.

We conclude that there is substantial heterogeneity of outcomes and policy approaches, with no clear correlation emerging between the level or type of public funding and sector outcomes. We highlight some relative "success stories" (i.e., countries with high EV sector maturity and relatively low CPO concentration). Although there is some correlation consistent with public support being necessary for a rapid roll out of EV recharging infrastructure, we show that examples exist of countries that achieved high levels of sector maturity with more limited national or EU public support. We find also that the presence of a state-sponsored CPO can be associated with both good and bad outcomes across countries.

We conclude that given the small scale of cumulative levels of EU public support even in cases where this support benefited a first-mover CPO in a nascent sector, there would not necessarily be a distortive effect in the long-run as the sector reached a state of maturity.

A common theme that follows from the conclusions summarised above is that optimal competition policy is likely to differ according to the state of maturity of the EV industry in each Member State. In the early stages, the focus should be on promoting investment incentives but, as the industry develops, there is a stronger case for facilitating contestability and interoperability.

### ***Detailed competition analysis of the four Member States for which we performed an in-depth market assessment***

To complement the EU-wide assessment above we conducted a more in-depth assessment of four Member States (Ireland, Italy, Croatia and Belgium), selected to cover different levels of market maturity, business models, regulatory framework characteristics, market competition, and public funding. Our key takeaways here are as follows:

- the in-depth assessments underline that competition analyses will differ at the Member State level. As well as differences in industry development, concentration and entry barriers, there are other factors which mean the theories of harm relevant in one Member State will be irrelevant in another. For example, both Ireland and Italy exhibit an integrated DSO and leading CPO but, in Belgium, the DSO is not active in the CPO layer of the value chain;
- the assessments confirm high levels of regional variation in concentration levels with competitive conditions in urban centres and motorways being less robust in Ireland, and competitive conditions in Northern Italy being very different from Central and Southern Italy. Perhaps surprisingly, however, we see that many suppliers adopt national pricing despite very substantial variation in CPO shares at the regional level. Such national pricing makes leveraging positions of local market power less straightforward;
- we see a mixed picture when it comes to evidence of erosion of first mover advantages. Both Croatia and Belgium exhibit low levels of concentration. In Italy and Ireland, we see the leading supplier (respectively ESB eCars in Ireland, Enel X in Italy) having their market position eroded, but at varying speeds. Enel X's share appears to be falling quite quickly thanks to entry by new players such as Be Charge. Similarly, ESB eCars' share has eroded through the entry of rivals such as EasyGo. However, in both cases, regional concentration or control of strategic and lucrative locations such as urban centres and motorway recharging points could persist which could in turn raise concerns over local barriers to entry;
- for what concerns coordinated conduct between players, there is no evidence of CPO joint ventures in all countries but Italy. Bilateral agreements between integrated CPO/eMSPs are common across the selected Member States, potentially representing a bigger concern when stipulated between leading firms in more concentrated markets. Roaming agreements are also common raising potential concerns over information exchange;
- concerning public support, although there has been significant public support to state-owned CPOs in Ireland and in Italy, this has been consistent with the need to kick off the EV recharging sector. Privately owned entrants have used a combination of private investment and national and EU funding. Country heterogeneity prevails here, too, with Croatia using low amounts of EU support, although its market is at a nascent state of EV car adoption, which is targeted at fast recharging infrastructure and benefiting all CPOs. Belgium country data, on the other hand, are consistent with a developed sector in Flanders which has made use of both EU funding and State aid in a manner conducive to competition; and
- consistent with our EU27 + the UK analysis, some theories of harm do not meet with much support at this stage of sector development. For example, none of these four countries exhibit an OEM that has achieved an overwhelmingly strong lead in EV sales or built an EV recharging network that is comparable to those provided by third-party operators. As such, foreclosure concerns around leveraging conducts by vehicle OEMs do not receive even prima facie support.

## Conclusion

For countries to achieve Net Zero goals, a smooth and quick transition to EVs is essential. A sufficiently dense, widespread, and publicly accessible recharging network which people can trust and easily use will therefore be critical – and healthy competitive conditions are instrumental in supporting this. Various ecosystem players (e.g., CPOs, eMSPs, public authorities, utilities, etc.) have an important role to play and some joint effort will also be needed to enable the recharging infrastructure rollout to keep pace with EV adoption.



This report evaluated the EV recharging market across the EU27 + the UK, providing a broad review of regulatory frameworks, public support, and business models to ultimately assess the competitive landscape. Although the future evolution of the sector still entails some uncertainty, it is clear competition will be central to stimulate innovation, lower prices, increase private investment, and improve the quality of the service.

Overall, the EV sector seems to be developing well, although the analysis highlights a significant level of heterogeneity across the region both in the evolution and current state of development of the sector. Although a range of competition concerns are relevant as the sector evolves, no evidence was uncovered of major competitive concerns in the current state of the sector. The evidence instead supports that countries exhibiting higher levels of concentration are generally markets in early phase and in expansion.

## 2. Introduction

### 2.1. Study context, objectives, and scope

In order to reach carbon neutrality, the European Climate Law established the goal of reducing total Greenhouse Gas (GHG) emissions by 55% by 2030 (relative to 1990 levels).<sup>7</sup> Reducing emissions from transportation will be a key part of this goal, with the European Green Deal specifying transport emissions should be cut by 90% by mid-century.<sup>8</sup> For this to be achieved, there needs to be a rapid acceleration in Electric Vehicle (EV) adoption across the European Union (EU), in particular the adoption of Battery Electric Vehicles (BEV) and Plug in Hybrid Electric Vehicles (PHEV) vs. Internal Combustion Engine (ICE) vehicles.

A sufficiently dense, widespread, and publicly accessible recharging infrastructure network is a key enabler for EV uptake. This will require a transformation of the mobility sector – in which a competitive market ecosystem would be beneficial in providing better customer choice and competitive prices.

Consequently, the European Commission selected Charles River Associates (CRA) to conduct a sector study on the competition status for the provision of publicly accessible recharging infrastructure and related services across EU Member States (MS) and the UK.<sup>9</sup> This study considers the sector evolution broadly and provides an evidence-based assessment from January 2016 to December 2022 with the main goals to:

- provide a description of the competitive conditions on the sector across the EU27 + the UK, including the existing business models of charge point operators (CPOs) and eMobility Service Providers (eMSPs);
- identify possible competition concerns resulting from the features of the sector and the conduct of the ecosystem players;
- examine the impact of any public support on the deployment of publicly accessible recharging infrastructure and related services; and
- assess the impact of the existing legal framework in the EU on competition between CPOs and eMSPs.

An overview of the study structure and analytical approach is available in Appendix B.

### 2.2. Why a competitive EV recharging sector is of key importance

EV recharging has been identified as a priority area in the EU due to the key role of EVs in driving the transportation sector to achieve Net Zero targets. This reflects the importance of supporting recharging infrastructure in order to achieve EV adoption goals, and the resulting positive externalities associated with private investment in EV recharging.

In the presence of such positive externalities, competition policy and oversight are likely to be of particular importance. This is because, in such circumstances, market power does not just cause the normal “deadweight loss”<sup>10</sup> by reducing output below its

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<sup>7</sup> European Commission, “European Climate Law”

<sup>8</sup> European Commission, “A European Green Deal”

<sup>9</sup> We note that by “sector” or “market” throughout we do not mean relevant market in the competition law sense (unless explicitly specified). A market definition exercise was beyond the scope of this report.

<sup>10</sup> The “Deadweight (welfare) loss” is a measure of the monetary value of consumers’ surplus lost (but not transferred to producers) as a consequence of a price increase. In this context, it is a measure of lost economic efficiency when the socially optimal quantity of the good is not produced due to the combined effect of monopoly pricing and the presence of a positive externality.

competitive level, but also contributes to further social harm by undermining the generation of positive externalities.

Even with effective competition, there is a further justification for industry support and subsidies to promote EV recharging and achieve positive externalities. This raises scope for complementary public subsidies and support.

This is particularly so given the complementary nature of demand for EVs and EV recharging. Investment in EV recharging infrastructure is dependent upon an expectation of sufficient EV adoption, but EV adoption is only likely to occur en masse once consumers have confidence that sufficient recharging infrastructure is available (e.g., to cater to consumers in apartment blocks for whom home recharging is less viable and to counter concerns around “range anxiety”). With scope for coordination failures, public investment can help accelerate the EV transition, especially in the early stages of development when attracting private investment in public recharging infrastructure can be risky due to uncertainty in consumer recharging practices and demand.

However, such subsidies also create risks, and it is important to ensure they do not generate distortive effects by either entrenching existing positions of market leadership, raising entry barriers, or crowding out private investment. Against this backdrop, the goal of this report is to properly document the value chain and regulatory regime across the EU and provide commentary on existing and potential competition and public funding issues.

## **2.3. eMobility sector overview, dynamics, and value chain**

An identification of current and potential competition issues in the EV sector needs to begin with a thorough overview of the current competitive landscape, the value chain and the related ecosystem of recharging infrastructure, and the latest developments in the field. We summarise our findings, which we then use to map out a taxonomy of potential areas of concern in the value chain which might result in competitive theories of harm.

### **2.3.1. Electrification of the transportation sector**

The transportation sector is currently undergoing a major transformation to electric mobility (or eMobility) that is being driven by decarbonisation goals, a shift in consumer preferences, technology improvement, and changing economics. Currently, the EU27 + the UK has a car fleet size of over 300m passenger cars, with approximately 16m new vehicles being added each year.<sup>11</sup> The EU in particular has used policy tools to support the achievement of this decarbonisation objective, specifically through the Fit for 55 package (pending formal adoption) which calls for stricter CO2 emission performance standards for new cars and vans, namely a 55% CO2 emission reduction target for new cars by 2030 compared to 2021 levels, and a 100% reduction by 2035 (corresponding to the ban on the sale of new ICE cars and vans by 2035).<sup>12</sup>

The transition away from ICE vehicles has become a significant challenge faced by all automotive ecosystem actors. To compete with ICE vehicles, EVs must be competitive in terms of affordability and convenience. This will mean that ecosystem players need to overcome challenges like achieving comparable travel range to ICE vehicles, and creating recharging solutions that are as convenient as refuelling.

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<sup>11</sup> European Alternative Fuels Observatory, “Statistics on infrastructure and fleet data for road vehicles: EU27”, October 2022

<sup>12</sup> European Council of the European Union, “First ‘Fit for 55’ proposal agreed: the EU strengthens targets for CO2 emissions for new cars and vans”, October 2022

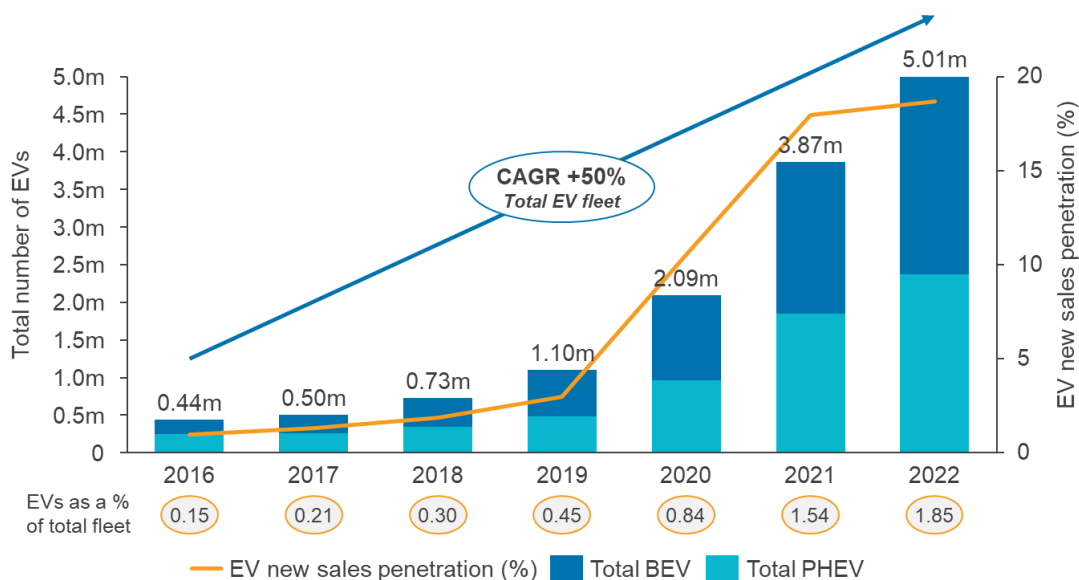
Achieving a fully competitive eMobility ecosystem that fully replaces the ICE model will require significant action from all involved parties. A well-designed, focused, and accountable system of competition and consumer policy will be a key success factor in achieving this goal. Ecosystem participants need clear and robust regulatory rules that steer the sector towards competitive outcomes by addressing anti-competitive conduct or unfair practices, and ensuring that anti-competitive mergers can be contested.<sup>13</sup> This will in turn incentivise private investment and reduce reliance on public support.

### 2.3.2. eMobility sector growth

#### Passenger EV growth

Passenger EV adoption has grown by a factor of 11, from 440k in 2016 to 5m in October 2022 as can be seen in Figure 4. Furthermore, despite the negative trend in overall vehicle sales due to the Covid-19 pandemic and its economic effects, EV penetration among new sales has risen from 1.0% in 2016 to 18.7% in 2022.<sup>14</sup> This was driven by both BEVs, accounting for 0.5% and 10.0% of EV sales in 2016 and 2022 respectively, and plug-in hybrids (PHEVs), accounting for 0.5% and 8.7% of EV sales in 2016 and 2022 respectively.<sup>15</sup> Although sales have increased year-over-year, the overall sales weakness in 2022 was partially driven by a constricted semiconductor inventory environment, which is expected to continue into 2023 and further affect EV sales.<sup>16</sup> Nevertheless, while significant growth has taken place, EV penetration is still in early stages with only approximately 1.9% of the total EU27 + UK vehicle fleet being electric. Overall, EV adoption is expected to continue accelerating across the EU27 + the UK resulting in large demand for new EV recharging infrastructure.

**Figure 4: EU27 + the UK passenger EV sector growth (total EVs and share of vehicle sales)<sup>17</sup>**



<sup>13</sup> David Stewart, "Leading the charge towards a competitive EV infrastructure market", October 2022

<sup>14</sup> International Energy Agency (IEA), "Trends in electric light-duty vehicles", May 2022

<sup>15</sup> European Alternative Fuels Observatory, "Statistics on infrastructure and fleet data for road vehicles: EU27 vehicle and fleet", October 2022

<sup>16</sup> Charles Moore, Devin Deogun, "COVID-19 and Semiconductor Issues Reemerge, Weighing on Production and Industry Performance", December 2022

<sup>17</sup> European Alternative Fuels Observatory, "Statistics on infrastructure and fleet data for road vehicles: Sweden summary", October 2022

Part of this EV growth can be attributed to the advancement of technologies. For instance, the average range of BEVs has increased from approximately 200 km in 2015 to approximately 350 km in 2020.<sup>18</sup> Similarly, automotive manufacturers have been answering consumer concerns for model diversity by expanding their vehicle offerings, with positive externalities due to improved manufacturing processes and economies of scale. In particular, the number of EV models more than doubled between 2018 and 2021 globally, increasing in Europe by 26% from 2020 to 2021.<sup>14</sup> EV pricing, however, has experienced slow improvement recently which is particularly problematic in Eastern Europe as EVs compete with a large second-hand ICE vehicle market. In Bulgaria for instance, the average EV purchase costs 50% to 75% more than the ICE equivalent.<sup>19</sup> While government incentives are trying to address this issue, subsidy schemes are often not enough to bring EV car prices in line with their ICE counterparts and have been progressively reduced, especially in more developed countries.

In the meantime, more accessible financing schemes can contribute to reducing the upfront capital expenditure burden for consumers (e.g., leasing). Overall, EV adoption is expected to continue to accelerate and will be driven by shifting consumer preferences. This trend is highlighted by the results of a mass survey of European customers, which concluded that 40% of drivers were likely to purchase an EV as their next car in 2018, compared to 67% in 2022.<sup>20, 21</sup>

While EV adoption has grown considerably in the EU27 + the UK, large disparities remain among Member States. Leading countries such as Sweden, Denmark and the Netherlands have a high EV penetration with the number of EVs per 100k inhabitants as high as 3.5k for Sweden.<sup>22</sup>

In contrast, other Member States are lagging behind, especially in Eastern Europe. Bulgaria for instance only has 50 EVs per 100k inhabitants, compared to an EU average of approximately 900. However, this can be partially driven by a lower overall passenger vehicle stock in some countries. Furthermore, while EV adoption has been on the rise in the past years, the entire value chain must be redesigned to go from ICE to electric and this has been a factor which is causing delays in customers receiving orders in some countries.<sup>23</sup> The problem is also compounded by battery supply chain challenges, with mining companies struggling to extract sufficient amounts of cobalt, nickel and lithium to keep up with demand.<sup>24</sup>

### **EV recharging sector growth**

Like EV adoption, the number of public recharging points has also been rising steadily across the EU, going from approximately 90k in 2016 to approximately 442k in October 2022, as seen in Figure 5. The observed growth is driven by a combination of regulatory and market forces. In fact, several Member States have released targets for the sector which they have been promoting through different forms of financial incentives.

Moreover, private players are entering the sector at increased rates as they try to position themselves to benefit from the future value streams emerging from the

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<sup>18</sup> International Energy Agency, "Global EV Outlook 2021", April 2021

<sup>19</sup> Euractiv Network, "For many Europeans, the electric vehicle revolution is a mirage", December 2021

<sup>20</sup> Greg Archer, "Forty percent of Europeans say the next car they buy is likely to be electric – poll", October 2018

<sup>21</sup> European Investment Bank (EIB), "Shopping for a new car? Most Europeans say they will opt for hybrid or electric", 2022

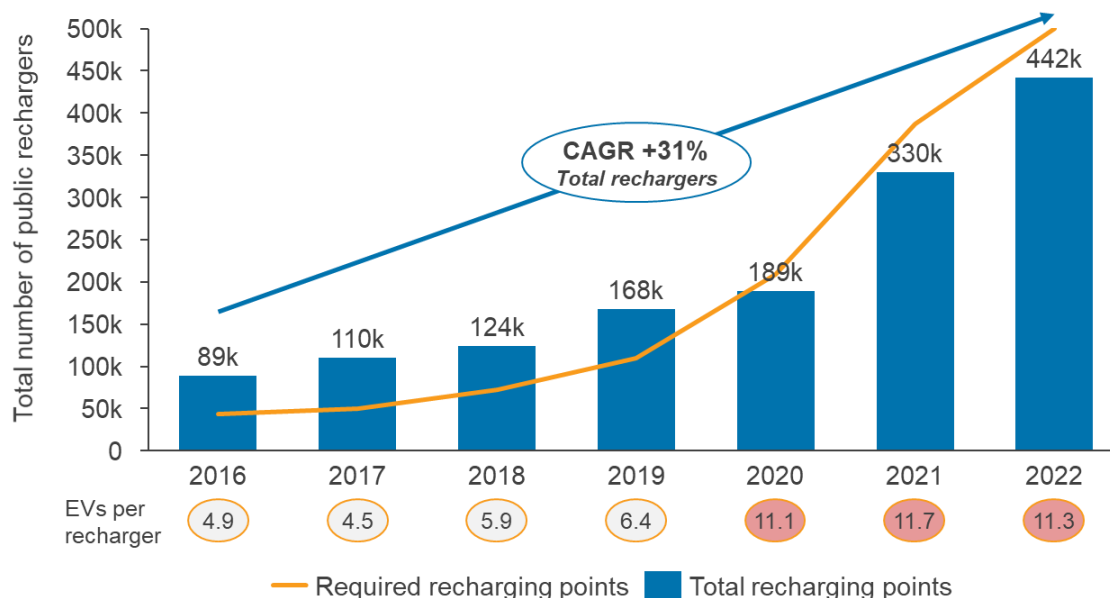
<sup>22</sup> European Alternative Fuels Observatory, "Statistics on infrastructure and fleet data for road vehicles: Sweden summary", October 2022

<sup>23</sup> Felix Reeves, "Popular electric cars hit by 'unreasonable' 18-month wait times - Tesla, Vauxhall & more", October 2022

<sup>24</sup> Isabeau van Halm, "Concerns for mineral supply chain amid booming EV sales", February 2022

eMobility transition. This trend is noticeable when assessing recent investment activity in recharging services and infrastructure, which have surged over the last few years.<sup>25</sup>

**Figure 5: EU27 + the UK public recharging points vs. required recharging points (based on the EU recommended ratio of 10 Evs per recharger)<sup>26</sup>**



The ratio of public recharging points to EVs has worsened (rising above the 10 EVs per recharger level recommended by the European Commission since 2020).<sup>27,28</sup> The European Commission set this guidance to ensure EV drivers receive a certain level of service, for instance having a ratio above 10 will subsequently increase queue times at public recharging stations. Although assessing the ratio on a national level gives a good overall indication of a country's state of development and performance in the sector, there are certain local factors which must also be considered as recharging points should not simply be spread uniformly throughout a country. For instance, urban areas will need a significantly higher number of rechargers to meet demand, while rural areas will require fewer recharging points to avoid duplication of services. Overall, recharging infrastructure has been unable to keep up with EVs, with a significantly lower compound annual growth rate (CAGR) from 2016 to 2022 (31% vs. 50%). This trend is typically true across the EU27 + the UK as depicted in Figure 6, with most countries' experiencing a lag in the EV recharging infrastructure roll-out once EVs become mainstream. Moreover, the large-scale deployment of public EV recharging infrastructure is becoming increasingly important, specifically in urban areas that do not provide access to private recharging points, and across motorways so that EV drivers can travel longer distances.

### EV recharging market maturity

There are also noticeable differences in the level of EV adoption and rollout of recharging infrastructure across the EU27 + the UK. This difference, relative to EV maturity in each country, is depicted below and must be considered in supporting a network that can enable adequate cross-border and long-distance travel. As highlighted below, the

<sup>25</sup> Glotzer, Stocker, *et al.*, "Investment in EV Charging Businesses", July 2021

<sup>26</sup> European Alternative Fuels Observatory, "Statistics on infrastructure and fleet data for road vehicles: Sweden summary", October 2022

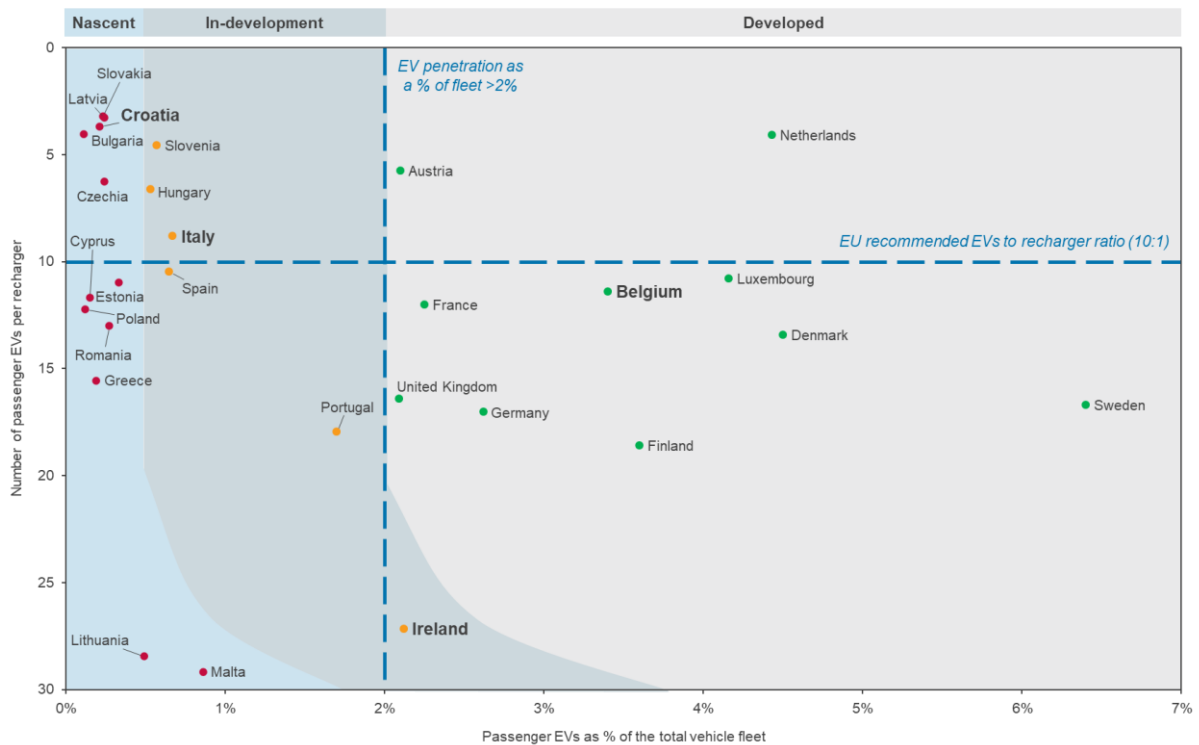
<sup>27</sup> European Commission, "Alternative Fuels Infrastructure Directive – 2014/94/EU", 2014

<sup>28</sup> "Recharger" and "recharging point" are used interchangeably throughout the report

Netherlands is the most developed EV country with high penetration of EVs as well as an extensive network of public rechargers (as of 2022, approximately 410k EVs on the road and approximately 100k public rechargers, below the EU recommended 10 to 1 ratio).<sup>29</sup> However, as depicted in Figure 6, some of the developed EV countries (e.g., Finland, Sweden, Luxembourg, Denmark) have a lower public recharging rollout than the recommended EU ratio. As of October 2022, Austria is the only other country besides the Netherlands that is within the recommended recharging ratio and also has a high level of EV adoption (>2% of the fleet is electric).

As depicted by Figure 6 below and based on EV penetration of the total fleet and the ratio of public recharging points to electric cars, each country was classified as nascent, in-development, and developed to support the ensuing analysis.<sup>30</sup> These sector maturity classifications are also summarised in Table 1 below, and simply portray a picture of country EV and recharging deployment standings relative to each other. As the eMobility transition advances, these definitions of sector maturity will shift accordingly (e.g., 2% of the total fleet being electric will likely no longer reflect a developed EV market in 2025).

**Figure 6: Countries classified by EVs per recharger vs. EV share of total fleet (2022)**<sup>31</sup>



<sup>29</sup> European Alternative Fuels Observatory, "Statistics on infrastructure and fleet data for road vehicles: Netherlands summary", October 2022

<sup>30</sup> These parameters were chosen as EVs per public recharging point is the preferred EU metric to assess whether EV recharging infrastructure is suitable and EVs as % of total fleet is the go-to metric under State aid rules for presuming the presence of market failure and the necessity of aid (see art. 36a GBER)

<sup>31</sup> European Alternative Fuels Observatory, "Statistics on infrastructure and fleet data for road vehicles", October 2022



**Table 1: EU27 + the UK EV and EV recharging sector maturity**

EV market maturity	Markets <sup>32</sup>
Developed	Netherlands, Luxembourg, Sweden, Denmark, Austria, Belgium, Finland, Germany, France, United Kingdom
In-development	Portugal, Slovenia, Italy, Spain, Ireland, Hungary
Nascent	Malta, Slovakia, Estonia, Czechia, Latvia, Croatia, Romania, Lithuania, Greece, Bulgaria, Poland, Cyprus

In addition to increased levels of EV adoption and recharging infrastructure, as geographic markets mature, certain trends are observed across various jurisdictions. In countries with nascent markets, there tends to be a prominent role played by the public sector or a single (or few) private player(s) in the local public recharging industry. As geographic markets mature, new players often enter the recharging space, resulting in an increase in recharging infrastructure investments. Complexity and innovation in the ecosystem also tend to increase in more developed sectors. Finally, levels of public support for EV adoption and recharging infrastructure generally vary across different sector maturity levels (but no clear trend was observed). These trends will be further detailed in the regulatory and competition sections of this document.

### **EV recharging equipment types**

It should also be noted that public recharging speed throughout the industry is described using terms of recharging speed and power capacity. Within this document, these have been categorised into three distinct levels. Each level has different characteristics with respect to mainly time and cost. These terms are summarised at a high level in Table 2 below and explained in more detail within the business models section of this document.

**Table 2: Recharging speed terminology<sup>33</sup>**

Recharging speed	Recharger installed capacity	Typical application
Slow (AC)	Below 22 kW	On-street, home, etc.
Fast (AC or DC)	Between 22 kW and 150 kW	Destination, work, etc.
Ultra-fast (DC)	Above 150 kW	On-route, motorways, etc.

### **Future considerations for smart recharging**

Another consideration is the lack of smart recharging capabilities in the majority of currently deployed recharging points. Smart recharging refers to the ability to vary the level of recharging speed and the timing of recharging, as well as the ability to provide a two-way flow of energy between the EV and the grid. Smart uni- and bi-directional recharging of EVs has significant potential for increasing the flexibility and cost-effectiveness of the electricity system and could contribute to a higher penetration level of variable renewable electricity generation within the energy mix. Moreover, smart recharging contributes to the optimisation of electricity grids thanks to flexibility services provided directly by EV users or through aggregators. This will be a necessary feature needed in a future where most cars are electric to ensure the grid can support this

<sup>32</sup> Countries considered in the in-depth market review within this are shown with bold text

<sup>33</sup> Table is a generalisation to orient the reader, more detailed descriptions are provided in the business models section of this report and it should be noted that different schemes and Member States refer to these terms in slightly different way



additional load. For example, when assessing a future scenario where 80% of cars in the EU are electric, the European Environment Agency concluded that the share of electricity required for EVs could represent up to 25% of total electricity consumption.<sup>34</sup> As a result, the recharging points without smart capabilities will soon become obsolete and will need to be replaced by technologies able to provide at least some level of demand side response.<sup>35</sup> Moreover, a proposal to regulate and accelerate this transition has recently been published by the European Commission.<sup>36</sup> The level of smart recharging will vary based on the user requirements and local grid capacity. Specifically in the case of on-route, smart recharging is unlikely to happen unless the local grid cannot fulfil the power demand to recharge quickly, in which case the car will recharge slower than the driver might have hoped (effectively shifting demand). Conversely, in the case of on-street recharging, where the EVs are often plugged in for approximately 10 hours overnight, the power demand can be managed throughout that period to ensure it supports the local grid (either with demand response, or bi-directional V2G services in years to come) while also fulfilling the EV driver's charge requirements when they disconnect the recharger at the end of a session.<sup>37</sup>

### **2.3.3. EV recharging ecosystem and value chain**

Significant investment is underway throughout the recharging sector. In exploring sector investment dynamics and how players are responding to the requirements of the value chain, it can be observed that businesses are responding to the environmental challenges and changing consumer demands through progressive investment flows within the sector.<sup>38</sup> Investments are driven from both private and public sources to target different areas of the industry. Figure 7 below illustrates the key interlinkages between players operating across the value chain. It can be observed that different players tend to participate in specific roles within the recharging ecosystem where they may be best positioned to serve consumer needs.

For example, Charge Point Operators (CPOs)<sup>39</sup> manage the physical recharging infrastructure assets, while eMobility Service Providers (eMSPs)<sup>40</sup> operate in the digitised services space and provide end-customer services (e.g., mapping, access, payments, etc.). Both functions have evolved in recent years as players seek to improve profitability margins, leading both to business model specialisation and integration. This has led to varying service offerings by country, influenced by factors such as customer journey needs, availability for growth opportunities, cost efficiency, and asset utilisation. Both CPOs and eMSPs tend to occupy central roles within the ecosystem value chain and coordinate other players that provide additional required services and inputs, such as electricity supply from DSOs, EV interface systems from original equipment manufacturers (OEMs), and the regulatory bodies that govern and support the build-out of the sector.

This EV recharging ecosystem enables the supply of electricity from energy suppliers through the recharging point infrastructure that connects to EVs. In turn, eMSPs enable the financial transaction between the EV driver to all ecosystem participants, namely

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<sup>34</sup> European Environment Agency, "Electric vehicles and the energy sector - impacts on Europe's future emissions", March 2021.

<sup>35</sup> Less relevant for the on-route fast and ultra-fast rechargers, where cars are plugged in for a relatively short amount of time

<sup>36</sup> European Parliament, "Amendments of Directive 2014/94/EU of the European Parliament and of the Council", 2022

<sup>37</sup> Vehicle-to-grid technology (V2G) allows an EV recharger to not only recharge a vehicle, but also take energy from the vehicle. With the number of EVs growing, this has the potential to access enormous amounts of energy storage capability.

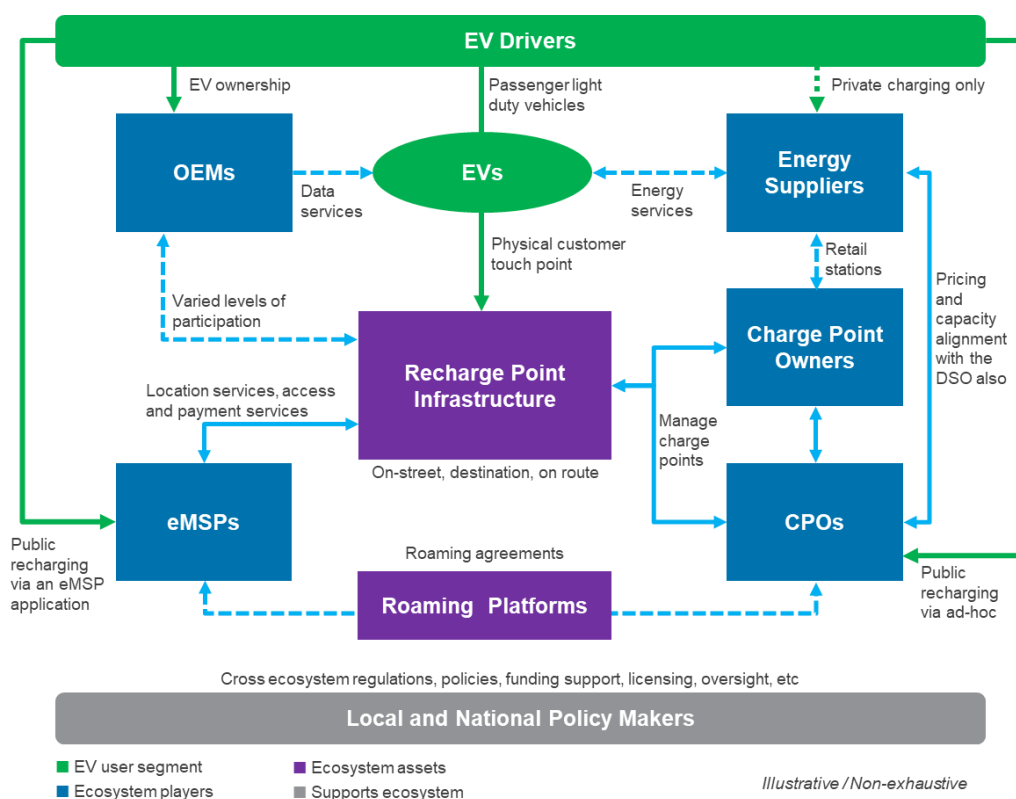
<sup>38</sup> Glotzer, Stocker, *et al.*, "Investment in EV Charging Businesses", July 2021

<sup>39</sup> A charge point operator (CPO) installs and maintains recharging stations so drivers can recharge their electric vehicles. CPOs can either own and operate a set of recharge stations, or simply operate them for third parties.

<sup>40</sup> An eMobility Service Provider (eMSP) offers EV charging services to EV drivers. They provide access to recharge points within the EMSP's network – or other networks via eRoaming.

the CPO, charge point owner, and energy supplier. A roaming platform would be paid directly by the eMSP or CPO via a fee for accessing/sharing the network through the roaming platform, but this is typically a fixed fee (rather than variable by recharging transaction volume or value). These ecosystem roles and linkages are explained in more detail in Section 4, but at a high-level they create scope for distinct business models with varying levels of vertical integration which can indirectly impact competition in the sector. In particular, installing a new recharging point will typically require the cooperation and consent of both electricity network operators (DSOs) and local governmental bodies which can raise concerns when either of these assume additional roles in the value chain (e.g., acting as CPOs).

**Figure 7: Indicative eMobility ecosystem participation and linkages**



## 2.4. Competitive assessment across the EU27 + the UK

Having set out the required background on the value chain, supplier business models, and the regulatory framework, the report provides: a taxonomy of potential competition concerns; an assessment of whether these concerns are manifesting based on high-level review of outcomes in the EU27 + the UK; and the key competition themes in assessing these concerns on an ongoing basis.

Our taxonomy of theories of harm is closely linked to the value chain set out above. In summary, the key competition considerations we explore are:

- potential competition concerns due to unilateral exploitative conduct and the potential for local market power to be exacerbated by entry barriers due to either “natural monopoly” or regulatory barriers (e.g., due to local authorities providing concessions to CPOs on an exclusive basis);
- concerns that recharging markets could exhibit density or indirect network effects that could lead to market “tipping”, and that unilateral conducts such as exclusive

dealing, bundled pricing, or closed recharging networks could result in CPOs/eMSPs operations consolidating around few competing players;

- non-horizontal theories of harm whereby integration between CPOs and other actors in the value chain could result in conflicts of interest and exclusionary conduct. We consider such theories in respect of integration between CPOs and eMSPs, and between CPOs/eMSPs and various other actors including DSOs, ICE fuel retailers, local government authorities, and EV manufacturers; and
- coordinated conduct and effects of horizontal agreements between market participants. In particular, we consider the impact of CPO collaboration agreements, access agreements between integrated CPO/eMSPs and roaming platform agreements, and draw parallels where applicable with network sharing agreements (NSAs) in other industries such as telecoms and ATMs.

Additionally, we examine whether correlations emerge between the level and type of public funding and market outcomes across the EU27 + UK in terms of market maturity and CPO concentration.

**Assessment on local market power.** Based on the experience in the ICE fuel retailing, similar positions of local market power may appear in EV recharging. While consumer substitution patterns in EV recharging are likely to differ (e.g., because of the longer time it takes to recharge a vehicle vs. fill up and because of the prevalence of home recharging that does not have an ICE equivalent), this is due to consumers' willingness to make trade-offs between price and convenience, which can lead to narrow geographic markets where retailers in certain locations, such as remote areas or strategic positions subject to barriers to entry (e.g., motorway service stations) have a significant market power.

Consistent with this we document how, even in densely populated cities, it is commonplace to find narrow geographies with just a single eMSP operating. We also see some evidence of eMSPs price discriminating by geography and it is likely that CPOs will be able to charge higher access fees for recharging points in less competitive locations.

Our view is that direct competition interventions aimed at addressing positions of local market power may be unlikely to be viable and could be counterproductive. This is because such interventions could deter entry and investment in areas which might have characteristics akin to a natural monopoly, where low levels of local demand are insufficient to support multiple competing CPOs. In particular, if a government agency regulated prices charged in a particular market by incumbents with high market power, this would lead to a decrease in profitability that would in turn discourage new investment and entry, as the returns to investment may not be deemed sufficient.

However, there remains an important role for competition policy to reduce entry barriers in local markets. This can include ensuring that local authorities incorporate competition considerations when allocating concessions for CPOs to operate. We document examples from across the EU where changes have been made to ensure best practices in local tendering processes.

**Concerns around market tipping and high levels of concentration in national markets.** The next category of concern we explore is the potential for persistent positions of market power due to the existence of density and/or indirect network effects.

As a first step we document, to the extent possible based on imperfect public data, the level of concentration among CPOs across the EU27 + the UK and consider whether high concentration levels seen in some countries are likely to indicate persistent competition issues vs. temporary first mover advantages. As seen in Table 3 below, the EU27 + the

UK present a mixed picture, with some markets exhibiting low concentration and others high concentration, while continuous new entry and expansion is contributing to a rapidly evolving picture in nascent/in-development markets.

**Table 3: Overview of concentration levels by country based on public data<sup>41, 42</sup>**

Country	Level of CPO concentration	Description (details available in country summaries in Appendix A)
Netherlands	Low	Highly fragmented market. Players include Vattenfall (utility), Shell (O&G), Allego, Greenflux, Last Mile Solutions (pure player)
Germany	Low	40+ CPOs in the market, including global players such as Shell (O&G), Tesla (OEM) and Allego (pure player)
Austria	Low	250+ CPOs, with a 12-player association accounting for 40% market share (regional utilities and OEMs incl. ABB & Siemens)
France	Low	20+ CPOs with limited market share. Izivia (utility, EDF) is the largest, TotalEnergies (O&G) and Shell (O&G) are also present
United Kingdom	Low	50 CPOs, with no player controlling more than 17% market share and numbers rapidly changing (e.g., Ubitricity)
Portugal	Low	Highly fragmented market with 76 active CPOs including MOBI.E (pure player), Engie (utility) and Repsol (O&G)
Slovakia	Low	GreenWay (pure player) has 20% share, followed by ZSE (utility, E. ON) with 10%, MOL (O&G) and Tesla (OEM) are also present
Romania	Low	Small market with 10+ CPOs incl. Renovatio (pure player) and Enel x (utility), MOL (O&G), E.ON (Utility), EV-mag (pure player)
Sweden	Medium	4 key CPOs: Recharge Infra (owned by utility Fortum), Vattenfall InCharge (utility), E. ON (utility), and Mer (state utility Statkraft)
Finland	Medium	Virta (part owned by utility E.ON) and Fortum Charge & Drive (utility) are the 2 main CPOs, other smaller providers are present
Belgium	Medium	EVBox (pure player), Allego (pure player), TotalEnergies (O&G), and Blue Corner (pure player) have 85% share <sup>43</sup>
Croatia	Medium	Top 3 players account for 70% market share, with Hrvatski Telekom (telecoms) accounting for 30%
Spain	Medium	Biggest CPOs are utilities Endesa X and Iberdrola that have 40% of the market, many small players command the remainder
Slovenia	Medium	Many sizeable CPOs including Elektro Ljubljana (utility), Petrol (O&G), MOL group (O&G), Plan-net PP (pure player)
Hungary	Medium	Several CPOs incl. e-Mobi. (owned by utility MVM) with 30% market share, also Mobility (owned by utility Innogy) are present
Greece	Medium	Nascent market of <1k recharge points operated by EVziin (pure player), Eneres (pure player), NRG (utility) and Protergia (utility)
Poland	Medium	Orlen (O&G) and Energa (utility) partnership makes up 30% of the market. Enea (utility) accounts for an additional 16%
Luxembourg	High	State owned Chargy (pure player) has 90% share and is operated by single CPO (plans to privatise/re-distribute ongoing <sup>44</sup> )

<sup>41</sup> CPO concentration is based on public information. When EV recharging shares were not available, the classification was reached using qualitative data building upon the summaries in Appendix A and is therefore indicative (the level of detail varies per country). Moreover, new entrants and investments are accelerating across the EU27 + the UK, and this October 2022 picture is rapidly evolving.

<sup>42</sup> As an indicative rule, we have classified as "low concentration" countries with a clearly fragmented market with no indication from available public information that any single player has a share of public recharging points above 25%, and as "high concentration" countries for which available data point to a single player with a share higher than 40%, with remaining countries classified as medium. We note that such categorisations are inevitably subjective especially as data across countries is not perfectly comparable in terms of accuracy whereas the fast pace of change in EV markets may soon render these results outdated.

<sup>43</sup> For the purposes of this report, EVBox identifies itself not as a CPO under the AFIR definition, but instead as a charging management services provider.

<sup>44</sup> See European Commission decision in case SA.62131 for the privatisation of the sector. The measures assessed in that decision include the adaptation of the financing system of public recharging infrastructure in Luxembourg and measures to facilitate the transfer of public recharging infrastructure, currently owned by electricity distribution system operators, to a third party, which will be selected through a tendering procedure. European Commission, "SA.62131 RRF - Luxembourg - Aid scheme for the deployment of charging infrastructures", February 2021

Country	Level of CPO concentration	Description (details available in country summaries in Appendix A)
Bulgaria	High	Eldrive (pure play) is the largest CPO in the country and operates more than 450 recharging points (50% market share)
Italy	High	Enel X (utility) accounts for over 50%, with other key players incl. Be Charge (O&G), Tesla (OEM), Duferco (utility), A2A (utility)
Denmark	High	E. ON (utility) and Clever (pure player) command almost 90% of the market
Ireland	High	ESB e-cars (utility) controls more than 50% of the sector with EasyGo (pure player) also having significant share (almost 30%)
Malta	High	Currently very high share of government installations. New legislation is expected to bring in significant private investment
Estonia	High	Enefit VOLT (owned by utility Eesti Energia) is the largest CPO and operates most stations across the country
Lithuania	High	Nascent market with 200 rechargers operated by Ignitis.ON (state owned utility), Inbalance and Elinita (pure players)
Latvia	High	Biggest player is CSDD (state-owned pure player), second largest player is Latvenergo (utility)
Czechia	High	CEZ (state owned utility) is the major CPO, with new players incl. Pražská energetika (utility) and E. ON (utility) entering
Cyprus	High	Less than 100 public recharging stations, the Electricity Authority of Cyprus (state owned pure player) has a clear majority of these

While countries with high CPO concentration are often led by state-owned entities which employ a standalone CPO model and have the incentive to connect to as many eMSPs as possible, there are instances where private players have established high shares.

As a second step we conduct an analysis of whether EV recharging has features that lend it towards “tipping” (e.g., strong network and density effects). We conclude that, while density effects are clearly present, there are other factors which may mediate against tipping including regulation that is likely to preserve interoperability across networks and the scope for entry to occur on a local level.

In light of this, our third step is to investigate the extent to which high levels of concentration are most prevalent in Member States with lower levels of EV penetration. While the picture is mixed, we note that these high levels of concentration may simply reflect the nascency of these sectors and hence be likely to erode as they mature.

As a fourth step, we consider the scope for unilateral conducts which might contribute towards the persistency of market power. Based on our review we identify the role of land grabbing and exclusivities, closed recharging networks, high recharging prices for out of network recharging, and geographic bundling. High-level data does not indicate prima facie competition concerns, but such concerns could manifest particularly in sectors with a strong incumbent CPO.

In light of the issues above we highlight the key competition themes that would likely feature in an assessment of such conduct, noting that exclusionary exclusive dealing may lend itself to enforcement under Article 101/102 Treaty on the Functioning of the European Union (TFEU). We also note that some of the pro-competitive policies around public procurement could address the potential for exclusionary conducts. For example, if public tenders are designed to ensure multiple operators are active in offering recharge points on public land, this will likely make it harder for exclusionary conducts involving exclusivities with private land holders to succeed.

Additionally, we assess the potential competition concerns due to non-horizontal linkages within the value chain and behaviours (e.g., exclusivities, bundled discounts), and whether prima-facie data indicates that these could raise competition concerns. We lay out the potential competition concerns due to these different “linkages” among players active in different layers of the vertical chain, and use concentration levels at different layers of the value chain to “screen” for potential concerns:

- **exclusionary conduct involving integrated CPOs/eMSPs.** Integrated CPO/eMSPs that are dominant in the CPO segment may have the incentive to foreclose rival eMSPs by restricting access to their CPO network completely (e.g., refusing to sign bilateral access agreements, or by offering access at significantly worse terms than those enjoyed by their integrated eMSP). Although bilateral agreements offer scope for price/terms differentiation, there is limited data availability due to the nascent state of the market and we have not found evidence of such practices;
- **exclusionary conduct involving the DSO.** When the DSO also owns a CPO, they may have the incentive to undermine access of rival CPOs to the grid or otherwise obstruct the installation of new recharging points. Although there are regulations governing DSO conduct, we present prima facie evidence validating such concerns and indicating that they should be an area of focus for competition authorities;<sup>45</sup>
- **exclusionary conduct involving ICE fuel retailers.** CPOs can own or sign exclusive agreements with ICE fuel retailers for exclusive access to key recharging locations;
- **exclusionary conduct involving local authorities.** When local authorities are also present as a local CPO, they may have the incentive to prevent rival CPOs from installing recharging points in public land. We present evidence that this is a real concern in many locations throughout Europe hence intervention, such as in the form of best practice guidance on tendering processes, is likely required to ensure these are open and competitive; and
- **exclusionary conduct involving EV OEMs.** OEMs who have built branded recharging networks may have the incentive to operate them as closed networks. However, on current trajectories, competition in the EV and recharging space is likely to preclude competition concerns around OEM's operating proprietary networks, and there is evidence that previously closed networks are opening up.

**Horizontal agreements and coordinated conduct.** Joint ventures between CPOs for the expansion of their networks present some parallels with network sharing arrangements seen in other sectors such as telecoms and ATMs. These arrangements can facilitate investment and network density in "hard to reach" areas, but they can also lead to unilateral effects, vertical effects or coordination risks through information sharing. An appropriate competitive assessment should take place on a case-by-case basis, with increased scrutiny in more developed sectors that would be more likely to support investment in the counterfactual. In addition, vertical access agreements between CPOs and eMSPs can present horizontal agreement type of concerns when they are signed between integrated CPO/eMSP players. Depending on whether CPO networks are overlapping or not, concerns around price collusion or geographic market allocation can arise. Coordination risks can also arise through information sharing with third parties that can act as a "hub" for "hub and spoke" type collusion.

**Considerations around public funding and potential distortions or crowding out of private investment.** The key questions are whether public funding is necessary to accelerate the pace of the EV roll out, and whether it may have negative effects by distorting competition or crowding out private investment.

To evaluate this question, we assessed EV penetration across the EU27 + the UK and how this correlates with use of public funds either through EU or national programs. We recognise that high-level correlations cannot provide definitive conclusions, especially

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<sup>45</sup> Official Journal of the European Union, "Directive (EU) 2019/944 of the European Parliament and of the Council of 5 June 2019 on common rules for the internal market for electricity and amending Directive 2012/27/EU", June 2019, article 33

when data is not available to precisely measure the cash value of public support across different countries. Still, some tentative conclusions can be drawn.

First, while there is heterogeneity in outcomes across countries, these correlations support that some measure of public support may be necessary for a rapid roll out of EV recharging infrastructure. The countries with the highest level of sector maturity have all experienced some degree of public support. However, the countries with the most rapid roll out are not uniform in other respects with, for example, some countries featuring a state-owned CPO and others are not.

Second, the data does not permit any firm conclusions about the role of state-owned CPOs in supporting an effective roll out. There are examples of “success stories” like France and Austria where a state-controlled CPO was an early mover but has since seen its position has eroded by expansion of private operators.

Overall, we can observe that Member States have achieved a similarly successful sector status through different avenues, and that there appears to be some substitutability between national and EU public support. Although kickstarting the sector with a state-owned CPO is not necessary for success, we see that it is one paradigm that can work, and that the existence of a state-sponsored CPO need not preclude subsequent competition. This indicates that the assessment of the impact of state support needs to be more fine-grained to identify instances where it facilitates crowding in of private investment vs. crowding out.

Based on the above we suggest as key themes in a competition assessment of public support in each country’s EV public recharging sector to be whether there is evidence of public funds disproportionately flowing to market leaders or state-owned operators, whether sectors appear to display persistent concentration levels, benchmarking performance comparisons across Member States, and ensuring that public support, once onboarding obstacles have been surpassed, is focused on applications that are most likely to generate positive externalities such as continuous technological innovation.

A final key implication of our analysis summarised above is that optimal competition policy is likely to differ according to the state of maturity of the EV industry in a given Member State. In the early stages, the focus should be on promoting investment incentives, allowing first movers to exert short-term market power may be a necessary cost of building a dense network. As markets develop there is a stronger case for facilitating market contestability and interoperability.



### 3. Regulatory and policy analysis across EU27 + the UK

The eMobility industry remains in its early stages of evolution, with varying levels of EV uptake, regulatory maturity, and competition across different Member States and the UK.

The following section explores and assesses the level of regulation and support across all Member States and the UK to gauge how these country differences can inform competition concerns. Firstly, an assessment of EU level regulation and financial support has been constructed to set the baseline for all geographic markets. Next, to assess each of the geographic markets individually, a country summary has been developed within Appendix A that outlines the major sector policies and regulations, describes the level of financial support, and highlights the competitive dynamics within the market among CPOs and eMSPs.

#### 3.1. EU Regulatory overview

In recent years the EU has been increasingly focused on decarbonising its transport sector, which is the main source of pollution in the Union representing roughly a fourth of its total GHG emissions.<sup>46, 47</sup> This issue gained momentum after the European Green Deal was launched in December 2019, setting the overall objective of achieving carbon neutrality by 2050, requiring a 90% reduction in emissions from the transport sector by mid-century.<sup>48</sup> In 2020 the European Commission released the Sustainable and Smart Mobility Strategy, which aimed at achieving 30 million zero-emissions vehicles on the roads of Europe by 2030, with the goal of reaching the entire EU fleet of vehicles by 2050.

The strategy sets the indicative goal of 1 million public recharging points installed by 2025 and 3 million by 2030. The Strategy delegated the definition of more precise targets to the revision of Directive 2014/94/EU on Alternative Fuels Infrastructure.<sup>49</sup> An Action Plan was also included, that defined a series of legislative steps to be taken in order to realise the ambition set out in the Strategy. With reference to EV recharging, the Action Plan called for the revision of both Directive 2014/94/EU on Alternative Fuels Infrastructure<sup>50</sup> and Directive 2018/844/EU on the Energy Performance of Buildings<sup>51</sup> to take place by 2021. Similarly, the revision of Regulation 2019/631 on strengthening the CO<sub>2</sub> emission performance standards for new passenger cars and new light commercial vehicles was planned to take place between 2021 and 2022.<sup>52</sup> The European Commission presented proposals for the revision of all these acts, which are currently undergoing the legislative approval process. A summary timeline is presented below in Figure 8.

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<sup>46</sup> European Investment Bank, "Sustainable Transport Overview", June 2022

<sup>47</sup> European Commission, "Transport and the Green Deal", 2022

<sup>48</sup> European Commission, "A European Green Deal"

<sup>49</sup> European Commission, "Communication from the European Commission the European Parliament, the European Council, the council, the European Economic and Social Committee and the Committee of the Regions RePowerEU plan", May 2022

<sup>50</sup> European Commission, "Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on the deployment of alternative fuels infrastructure, and repealing Directive 2014/94/EU of the European Parliament and of the Council", July 2021

<sup>51</sup> European Commission, "Proposal for a DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on the energy performance of buildings (recast)", December 2021

<sup>52</sup> European Commission, "Communication from the European Commission the European Parliament, the Council, the European Economic and Social committee and the Committee of the Regions - Sustainable and Smart Mobility Strategy – putting European transport on track for the future", December 2020



**Figure 8: Major EU policy regulation on alternative fuels infrastructure (non-exhaustive)<sup>53</sup>**

The Smart Mobility Strategy Action Plan has been updated to align with the EU's renewed climate ambitions. In 2021, the European Commission further enhanced its environmental action, pledging to cut 55% of the EU GHG emissions by 2030 compared to 1990 levels, and developed a *Fit for 55* package aimed at achieving this target. The package includes a series of legislative proposals that cover a wide range of topics, from energy efficiency to the Carbon Border Adjustment Mechanism, energy performance of buildings as well as alternative fuels infrastructure.<sup>54</sup> The proposals in the *Fit for 55* package come in addition to the legislative revisions and updates envisaged by the Sustainable and Smart Mobility Strategy Action Plan. eMobility, in general, and EV recharging in particular, are primarily governed by the Alternative Fuels Infrastructure Directive. However, both the Vehicle Emissions Standards Regulation and the Energy Performance of Buildings Directive are also relevant for EV recharging, as they aim to help shape the sector going forward. The proposals advanced by the European Commission since 2021, some of which have already been adopted, complement existing legislations such as Directive 2019/944/EU on Electricity Markets, in regulating the EV recharging sector. The key pieces of EU regulation are described in depth in Appendix D.

### 3.1.1. Financial support measures from EU sources

European institutions support the deployment of recharging infrastructure via different programmes. The largest share of financial support comes from the Connecting Europe Facility (CEF), mainly in the form of grants, and the European Investment Bank (EIB), which offers debt financing. In addition, other initiatives such as the European Regional Development Fund (ERDF), Interreg Europe and the Recovery and Resilience Facility (RRF), also provide funding for eMobility, albeit that not being their primary focus. However, the deployment of recharging points has been uneven across, and within,

<sup>53</sup> The policies and regulations depicted in the figure are discussed in detail in Appendix D

<sup>54</sup> European Commission, "Communication From The Commission To The European Parliament, The Council, The European Economic And Social Committee And The Committee Of The Regions 'Fit For 55': delivering the EU's 2030 Climate Target on the way to climate neutrality", July 2021

Member States. According to the European Court of Auditors, the non-homogeneous geographical distribution of recharging points is partially a consequence of a lack of ex-ante infrastructure gap analysis, especially in the financing of projects under the CEF; within Member States, regional disparities are in part given by the fact that CEF funding applications do not specify the exact location of recharging points, and are limited instead to setting a state-wide target only.<sup>55</sup> As mentioned, recharging infrastructure development is also supported through the ERDF, often in cooperation with local authorities with the aim of deploying recharging points away from the main urban centres.

As described in detail in Appendix D, the financial support measures from an EU level offer public support to projects in the EU27 + the UK. The different entities, as described above, are designed to support Member States in a multitude of ways.

As can be seen in Table 4 below (and in detail in Appendix D), from 2016 to 2022, the EIB provided €358m in loans for the EV recharging sector.<sup>56</sup> These figures refer to loans for projects explicitly aimed at EV recharging and do not cover more general initiatives regarding sustainable development that often indirectly support EV recharging.<sup>57</sup> However, some of the projects identified do not exclusively focus on EV recharging, but rather cover the broader spectrum of alternative fuels infrastructure. In the period under consideration, the data available on the EIB platform shows that projects in eight Member States received loans from the EIB for EV recharging, with amounts provided ranging from €1m for projects in Czechia, to €87.5m for projects in France.

Regarding CEF grants, the values below were extracted from the transport stream projects highlighted on the European Commission website that have been providing support to EV recharging projects during the period from 2014 to 2020.<sup>58</sup> The total amount provided via grants to these projects was €272.2m. Disbursed amounts vary considerably, going from €33.2m for projects in Italy down to €2.7m for projects in Lithuania. In some cases, CEF projects span across multiple countries and do not specify the amount granted per country, in which cases for the purposes of our assessment we have assumed that the grant is spread uniformly between the Member States relevant to a project.

Interreg funding is different in principle from the other public support sources at the EU level. In fact, Interreg's primary goal lies in policy improvement at the local level rather than in supporting the sector's growth or the rollout of infrastructure on a large scale. Thus, recharging points are often installed as pilot projects to support policy improvement efforts. Consequently, Interreg projects tend to be smaller in scale, thus explaining the programme's total funding of €15.5m for the 2014 to 2020 period when compared to other initiatives. As above, these figures refer to grants for projects explicitly aimed at EV recharging and do not cover more general initiatives regarding sustainable development that often indirectly support EV recharging.<sup>59</sup> It should also be noted that Interreg projects are commonly co-funded by other EU funding sources. In some cases, Interreg projects span across multiple countries and do not specify the amount granted per country, so these are once more assessed as if the grant were spread uniformly between the Member States relevant to a project.

<sup>55</sup> European Court of Auditors, "Infrastructure for charging electric vehicles: more charging stations but uneven deployment makes travel across the EU complicated", May 2021

<sup>56</sup> Extracted directly from the EIB database. Additional funds may also have been committed.

<sup>57</sup> EIB projects were identified by filtering the direct extract from the EIB and by then applying search terms "recharging", "charging", "EV", "charger" and "recharger".

<sup>58</sup> Innovation and Networks Executive Agency, "CEF Transport"

<sup>59</sup> Interreg projects were identified by filtering the direct extract from the Keep.eu portal, filtering for Interreg and by then applying search terms "recharging", "charging", "EV", "charger" and "recharger".

Funding from the ERDF however is not broken down to a level granular enough to state which projects were solely aimed at EV recharging.<sup>60</sup> Therefore, this source of funding has been excluded from the data in order not to account in the overall summary of EU EV recharging project funding that were absorbed by non-EV recharging projects.

Similar to ERDF, the RRF cannot be broken down at a project per Member State level due to the infancy of the facility (initiated in February 2021) meaning that all allocations and summaries are at an aggregate level under 'Green transition', which covers topics broader than just EV recharging.<sup>61</sup> RRF has therefore also been excluded from the below summary.

**Table 4: EU funding sources summary for EV public recharging projects**

Source	Funding dispersed	Total recipients	Member States yet to receive support for a project	Description
CEF <sup>57</sup>	€272m	24/28	Bulgaria, Cyprus, Greece, Malta	Grants for alternative fuels infrastructure
EIB <sup>62</sup>	€358m	8/28	Austria, Belgium, Bulgaria, Croatia, Cyprus, Denmark, Estonia, Finland, Germany, Greece, Hungary, Ireland, Latvia, Lithuania, Luxembourg, Malta, Romania, Slovenia, Sweden, UK	Low interest loan facility for alternative fuels infrastructure
Interreg <sup>63</sup>	€15.5m	19/28	Cyprus, Estonia, Finland, France, Latvia, Luxembourg, Malta, Portugal, Spain	Grants for public authorities and business support organisations, including development agencies for a broad range of development topics
ERDF <sup>64</sup>	Data granularity does not allow for aggregation at an EV recharging project level			Funding via grants, loans, guarantees and equity investments for a broad range of development topics
RRF <sup>65</sup>	With the RRF in its initial stages (initiated February 2021), there is very limited granular Member State details regarding funding allocated for EV recharging			Combination of grants and loans to support financial recovery from the Covid-19 pandemic across a broad range of development topics

<sup>60</sup> European Commission, "ESIF 2014-2020 Finances Planned Details", December 2022

<sup>61</sup> European Commission, "Recovery and Resilience Facility"

<sup>62</sup> European Investment Bank, "Financed Projects"

<sup>63</sup> Keep.eu, "Projects and documents"

<sup>64</sup> European Commission, "Cohesion Open Data Platform, European Regional Development Fund"

<sup>65</sup> European Commission, "Recovery and Resilience Facility"

As shown in Table 4, significant funding (grants and loans) has already been committed from EU sources in the early stages of the EV recharging industry. The projects have typically helped markets both at a local level and by ensuring that the core roadway networks within the EU are supported with adequate EV recharging infrastructure.

The funding from each of these public support mechanisms (excluding RRF and ERDF due to data availability) has been summarised in Appendix D on a per country basis. It should be noted that these amounts do not go directly to the countries, but rather flow to specific projects within the countries.

### ***Relative scale of EU support***

When considering the totality of EU support for the sector from all alternative sources, there has been a significant volume of funding allocated across jurisdictions. Although funding sources are different in type and cannot always be aggregated in an informative manner, a rough sum of all funds allows for a broad comparison of scale with the total investment requirements for the sector.

Overall, Table 4 documents that at least €650 million have been spent or allocated for spending across the EU27 + the UK whereas we estimate the level of investments deployed by ecosystem participants (i.e., public recharging points, grid upgrades, site leases, digital platforms, etc.) to be in the order of at least €15 billion to date (see Table 16). Therefore, the aggregated sum of EU funding across all types would make up less than 5% of the total sector investments to date.<sup>66</sup>

## **3.2. Macro level analysis across the EU27 + the UK**

The fundamental eMobility sector guidance and regulation adopted by the EU in recent years have assisted several Member States with nascent EV industries to determine the trajectory of their EV sector and develop appropriate recharging infrastructure. The EU's efforts aim at creating an interoperable network, both from a technical hardware and billing perspective, that allows EV owners to easily plug in, recharge and pay in a uniform manner across different Member States. This objective is supported by key policies such as Directive 2014/94/EU that regulates the rollout of EV recharging infrastructure, including standards, ad hoc mandate, and transparency of pricing. It is also facilitated by financial mechanisms that allow Member States to access funding that can help expedite the adoption of EVs and lessen the financial burden of rolling out a densely populated recharging network.

However, some Member States have already developed their own path to eMobility, and the EU's guidance and regulation have been less critical in their maturity journey. Based on this, we observe some clear trends between countries when it comes to the direction and overall maturity of the individual countries. Generally, the Member States vary between those that can be classified as being in a nascent state (i.e., low EV adoption, and limited recharging infrastructure, such as Croatia, Latvia or Greece), an in-development state (i.e., increasing EV adoption and a growing recharging network such as Italy, Slovenia or Portugal) and a developed state (i.e., high EV adoption and a dense recharging network, such as Austria, the Netherlands or the United Kingdom). Nonetheless, there is a broad level of consistency across all countries with their regulation design steered by the European Commission as they try to foster an eMobility sector that is mutually beneficial to all ecosystem participants.

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<sup>66</sup> Calculation based on the number of installed rechargers in the EU27 + the UK multiplied by the cost per kW derived from an Ireland case study that considers all installation costs, this analysis therefore assumes that Irish costs are similar to other Member States. CCMA EV Working Group, "Local Authority Electrification of Fleet and EV Charging Guidance Document", August 2021

Each of the EU27 + the UK countries has been analysed in detail, with a country summary available in Appendix A. These summaries outline the relevant policies and regulations, describe the level of state-led financial support, and highlight the competitive dynamics within the country among CPOs and eMSPs. Each Member State has a unique approach to eMobility, driven by the point at which it started to focus on this sector. The major differentiating factors between the 28 countries are the levels of financial support available, and the overall maturity of the market with respect to the development of their own regulatory approach and focus on EV recharging infrastructure. As EV markets mature, the driving force behind regulation changes shifts from an emphasis on EU rules to a national strategy and then to a local strategy.

Typically, the varying approaches are driven by each country's goals for the eMobility segment, such as whether they are trying to develop an industry that caters to the needs of consumers regarding interoperability, dynamic pricing, and user experience, or whether the regulation is geared solely towards target achievement (i.e., number of EVs on the roads, and rechargers available). These approach variations can have consequences on the competitive landscape within a country. Specifically, some types of support can favour certain players giving them an unfair advantage. Nevertheless, depending on the state of sector maturity, varying levels of public support are needed because private investment will vary when the sector is not fruitful enough for private companies to participate (i.e., low recharging point utilisation).

### **3.2.1. Financial support**

The use of public funding to support the development of the EV industry is consistent across all Member States, with most countries (apart from Bulgaria, Greece, Latvia, Malta, Portugal and Slovakia) having more refined support directly focussed on developing the EV recharging sector.

The source of funding is typically a combination of the EU, the national, regional or local budget. As the market becomes more developed, public institutions tend to develop and refine the way they provide financial support to gear it more specifically to the needs of their sector, such as targeting specific services that need developing (i.e., on-street, on-route or destination recharging). This is the case for example in the Netherlands and Austria (among several other Member States), as discussed in Appendix A. While State aid can be provided under different EU rules as discussed in Appendix D, EU rules apply when it comes to competitive tendering requirements for the provision of aid. Whether Member States have to abide by EU or national rules on tendering depends on the amounts involved. Above certain thresholds (scoping from €140k to €5m depending on the sector) Member States must abide by EU regulations ensuring public competitive tenders for the awarding of State aid are conducted. Below these thresholds, only national public procurement rules apply, while the general EU principles of transparency and equal treatment should still be observed.<sup>67</sup> It is also typical for most Member States to leverage EU financial support (i.e., in addition to national/regional/local public funding which may or may not have been deployed) to ignite their recharging market (or their EV market) as there are limited private players to stimulate development when addressing the typical conundrum of EV first, or recharger first. A relevant example is the NEXT-E project funded through the CEF, an initiative financing the rollout of 222 fast recharging points and 30 ultra-fast recharging ones across 6 Eastern European geographic markets, namely Croatia, Czechia, Hungary, Romania, Slovakia, Slovenia.

In practice, as we will further develop in Section 5.6.2., most countries that have a significant number of EVs in their fleet and a more developed publicly accessible recharging network, have relied on a combination of funding sources, with a variable

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<sup>67</sup> Your Europe, "Public Tendering Rules", October 2022

mix of EU and national/local level funding used to develop recharging infrastructure at the nascent market stage. While public funding is often the primary source of funding to get the market moving, as EV penetration accelerates a more tailored, highly dense infrastructure is required. At the same time, high EV penetration increases recharging point utilisation and dwell times and creates demand for more recharging stations that can sustain a competitive EV recharging sector and hence attract more private investment. Industry participants in certain countries substantiate this logic, specifically the Dutch fast and ultra-fast recharging operator Fastned, which claimed that with 50k to 100k (only 1% of the Dutch vehicle fleet) BEVs on the roads in Netherlands they would already be profitable.<sup>68</sup> The same study cited that in Norway profitability would come when 115k BEVs hit the roads (3% of their car fleet). In turn, company profitability can act as a first signal for public subsidies being less critical, but the phase out is also dependant on factors such as car density, or ratio of households with off-street parking etc. Some literature suggests that when EVs reach a 2% share of a market's fleet, CPOs will no longer require public support.<sup>69</sup> This being said, the profitability of recharging infrastructure in the early years of the industry has been challenging given installation costs are high (as high as approximately €160k for hardware procurement and installation of a small DC ultra-fast recharging station according to Google market place), demand charges (about five to 20 cents per kilowatt-hour), and underutilisation (averaging less than 8 percent across their entire network), with underutilisation being the highest risk to attaining profitability.<sup>70</sup> This has meant that private investment has not been as forthcoming as the sector will start to demand, and reinforces why a moderate level of additional support may still be required. Each country can typically deploy incentives that support EV recharging directly, but also indirect measures that support the adoption of EVs. Both areas can also be subject to direct purchase incentives, and other incentives such as tax breaks.

### ***Direct recharging purchase incentives***

The most direct way in which Member States are supporting the development of dense public recharging networks is by direct recharging purchase incentives. In most cases, these are constructed at a national level with a defined contribution, such as the On-street Residential Recharging Scheme (ORCS) in the UK that offers 60% of capital costs to the project undertaker (usually a local authority) for a project that increases the availability of on-street recharging points.<sup>71</sup> Regularly, the local authority will look to secure third party finance for the remaining capital expenditure (CAPEX) burden not covered by the grant. For example, Dorset council in the UK who worked with Grønn Kontakt to co-finance the installation of recharging points in 17 public car parks across the county.<sup>72</sup> These types of co-financed projects allow local authorities to improve their recharging network with zero capital cost and allow the investors to recoup their costs and over time achieve financial upside. In contrast to the on-street, local level grant, some schemes are geared towards recharging at a national level, such as the Climate Action Fund in the Irish market which committed €10m towards all levels of recharging points by 2023, and the €10m was matched by the state-owned energy provider ESB.<sup>73</sup>

It should also be noted that each Member State has (or previously had) separate grants and incentives for private infrastructure deployment tailored towards the EV owners

<sup>68</sup> Transport & Environment, "Roll-out of public EV charging infrastructure in the EU, is the chicken and egg dilemma resolved?", September 2018

<sup>69</sup> Transport & Environment, "Roll-out of public EV charging infrastructure in the EU", September 2018

<sup>70</sup> McKinsey & Company, "EV fast charging: How to build and sustain competitive differentiation", June 2021

<sup>71</sup> UK Government Office for Zero Emissions Vehicles, "On-Street Residential Chargepoint Scheme guidance for local authorities", April 2022

<sup>72</sup> Jojusolar, "Dorset council's greener travel at zero capital cost", 2021

<sup>73</sup> ESB, "ESB welcomes Climate Action Fund support to develop a national high power EV charging network"



directly. Although this does not directly support the public infrastructure build out, it will help with overarching EV adoption, and in turn provide higher utilisation at public recharging points. A table summarising key State aid measures relevant to EV recharging infrastructure is available in Appendix D with more detail provided in each country summary.

### ***Other recharging incentives***

In addition to the direct recharging purchase incentives, other savings can be achieved in the form of tax breaks on the installation of recharging infrastructure. For example, in Italy individuals, companies, and condominiums can apply for a tax credit worth up to €3k (capped at 50% of the installation and purchase cost of recharge points), and an additional 'super bonus', allowing 110% tax deduction (2022-2023), 70% (2024) and 65% (2025).<sup>74</sup> In addition, the Netherlands authorities previously set up a reduced energy tax rate for electricity in public recharging stations between 2017 and 2020, aimed to reduce the operational costs for CPOs and increase overall profitability.<sup>75</sup> Malta has also made recharging more attractive through cheaper procurement of electricity for CPOs through a regulated tariff which has been considered among the most competitive in Europe.<sup>76</sup>

### ***EV purchase incentives***

Aside from measures to directly influence the build out of public recharging networks, most Member States have (or previously had) incentives geared towards the purchase of EVs. Across the Member States these incentives have been successful in stimulating consumer EV car purchases, notably so in Croatia where the total incentives budget was used up within a matter of minutes. In turn, a higher amount of EVs in the market creates further demand for public recharging services making a more attractive proposition for private investors to finance public infrastructure due to higher utilisation.

In 2022, 21 Member States and the UK offered incentives towards the purchase of EVs.<sup>77</sup> These incentives varied between Member States in their specificity, such as Croatia offering €9.3k for BEVs and €5.3k for PHEVs, whereas Germany offers €9k to purchasers of a BEV costing less than €40k, and €7.5k for BEVs costing more than €40k, with similar thresholds also applied to PHEVs. A summary of EV purchase incentives across the EU27 + the UK is available in Appendix D.

### ***Other EV purchase incentives***

In addition to the direct EV purchase incentives, most Member States also offer other fiscal stimuli in the form of acquisition and ownership tax benefits which will help in softening the financial undertaking of owning an EV (Estonia is the only Member State to offer no tax benefits at all). The presence of tax benefits may increase EV penetration throughout the EU, which in turn will drive more attractive utilisation opportunities at recharge points.

Many Member States have attractive schemes when it comes to the taxes on acquiring a car, for instance in Czechia, BEVs (and PHEVs emitting less than 50g CO<sub>2</sub>/km) are exempt from registration taxes, or in Luxembourg, the buyer pays half the tax of an equivalent value ICE vehicle. Six of the EU27 + the UK Member States do not have acquisition tax benefits (Bulgaria, Estonia, Germany, Italy, Romania, and Sweden).

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<sup>74</sup> Fiscomania, "Recharging stations: 80% grants on purchase cost", October 2022

<sup>75</sup> UK Ministry of Economic Affairs, "Vision on the charging infrastructure for electric transport", April 2017

<sup>76</sup> Miriam Dalli, "Shaping the island's charging EV infrastructure", May 2022

<sup>77</sup> Acea, "Overview – Electric vehicles: tax benefits & purchase incentives in the European Union (2022)", September 2022

The ownership tax benefits offer varied potential total savings and can also vary between jurisdictions within the same market. For instance, the Netherlands provides a full ownership tax exemption to BEVs and a 50% tariff to PHEVs, whereas Italy applies a five-year tax exemption for BEVs and PHEVs from the initial registration date, and then reduces the benefit to a 75% tax reduction following the five-year period. Conversely, these benefits are applied at the national level covering all jurisdictions within both the Netherlands and Italy. In contrast, Belgium takes a different approach, with its three independent regions governing the benefits separately, namely in Brussels and Wallonia the minimum rate is applied to BEVs and PHEVs, and in Flanders BEVs and PHEVs are exempt from ownership tax altogether. Five of the EU27 + the UK Member States do not have ownership tax benefits (Estonia, Finland, France, Lithuania, and Slovenia). A complete summary of EV tax benefits across the EU27 + the UK is available in Appendix D.

### ***Loans and access to capital***

Aside from direct incentives to reduce the direct capital or operational costs, many Member States are also offering competitive, or zero-interest loans from national banks to support the development of recharging infrastructure, similar to what is offered by the EIB at EU level. For instance, in Malta companies can apply for a zero-interest loan with the Malta Development Bank.<sup>78</sup> Also, in Spain companies can receive a low interest green loan from the Spanish Official Credit Institute (ICO), something that Iberdrola leveraged in 2020 to secure a loan facility of €59.4m to expedite their infrastructure roll-out plan to deliver 150k recharging points (private, fleet, and public) by 2025.<sup>79</sup>

### **3.2.2. Regulatory market maturity**

Based on the analysis of each EU27 + the UK market within Appendix A, it is evident that each country has its own unique design and approach to the development of publicly accessible recharging infrastructure. However, some comparisons can be drawn against the EU guidance and regulations highlighted in Section 3.1, and some overarching developments give an indication of a country's regulatory maturity (i.e., we broadly observe that the more refined the national approach is, the more mature their regulation is).

EU guidance and regulation has played a key role in shaping the eMobility sector across the EU, and for many countries such as Cyprus and Czechia, it remains a key strategy. However, as Member States evolve, they adopt a more nationally-focussed strategy that is tailored to their specific dynamics and needs. In some cases, these geographic markets have gone beyond the EU law and defined new regulations. Some examples include the following:

- In 2020, the Netherlands mandated open protocols and price transparency to give rise to consumer centric roaming platforms that allow EV drivers to seamlessly recharge on all recharge points without the need for an exclusive eMSP membership.<sup>80</sup> Relatedly, the price transparency requirement was introduced in the Alternative Fuels Directive 2014/94/EU, and further strengthened by the recent

<sup>78</sup> Miriam Dalli, "Shaping the island's charging EV infrastructure", April 2022

<sup>79</sup> Iberdrola, "Iberdrola ramps up its sustainable mobility strategy and signs green loan with ICO to finance the installation of 2,500 public charging points in Spain and Portugal", September 2020

<sup>80</sup> Netherlands Government, "The National Charging Infrastructure Agenda", April 2020



proposal for Regulation of Alternative Fuels repealing 2014/94/EU Directive, by mandating CPOs to display unit price per session, per minute and per kWh.<sup>81,82</sup>

- Secondly, the use of ad hoc recharging via contactless card payment has become mandated in countries including Austria and Malta.<sup>83</sup> The EU has also been promoting ad hoc recharging, outlining it as a key focus in the proposed Regulation repealing Directive 2014/94/EU.<sup>84</sup>
- Additionally, the growth of the smart recharging segment and the value of harnessing EVs surplus capacity through vehicle-to-grid (V2G) has quickly become of high importance for the energy transition. The UK has now enacted the requirement for all new recharging points to have smart recharging functionality (exceptions exist),<sup>85</sup> and the EU has recently proposed the Regulation repealing Directive 2014/94/EU making it mandatory for all recharging points to have smart recharging functionalities and to be digitally connected.<sup>86</sup>

The presence of these regulatory innovations indicates the maturity of markets and their ability to go beyond the minimum requirements set forth by EU guidance and regulations.

The presence of EV recharging infrastructure (and direct EV) targets among EU Member States has helped to define their direction and to size their infrastructure accordingly. At an EU level, these targets have been driven by the European Commission through the mandatory National Policy Framework (NPF) and more recently within the National Implementation Reports (NIR).<sup>87</sup> This is another area where disparity is observed between Member States, with some setting ambitious targets within the NIR while others having opted for more conservative goals. The targets vary drastically between countries, with some countries such as Germany targeting a more than 20 times increase in recharge points by 2030, compared to Latvia that submitted the same target of 466 rechargers for 2025 and 2030, a target that falls far short of the recommended 1:10 recharger to EV ratio.<sup>88</sup> A summary of all NIR targets by country is available in Appendix C. Beyond the EU mandated targets, some countries have also set their own legally binding recharger targets as outlined in the country summaries in Appendix A.

### 3.2.3. Overview of regulation by Member State

Whilst the above sections give an overview of the dynamics across the EU27 + the UK, these countries remain unique in their particular situation and state of regulatory development. Table 5 below summarises their regulatory dynamics with respect to their position regarding the EV rollout and subsequent recharger penetration ratio. Detailed summaries are also available in Appendix A.

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<sup>81</sup> European Parliament, "DIRECTIVE 2014/94/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 22 October 2014 on the deployment of alternative fuels infrastructure", October 2014

<sup>82</sup> European Commission, "Proposal for a Regulation of the European Parliament and of the council on the deployment of alternative fuels infrastructure, and repealing Directive 2014/94/EU of the European Parliament and of the Council", July 2021

<sup>83</sup> Telematics Wire, "Austria: Regulatory framework for charging infrastructure", May 2020

<sup>84</sup> European Commission, "Proposal for a Regulation of the European Parliament and of the council on the deployment of alternative fuels infrastructure, and repealing Directive 2014/94/EU of the European Parliament and of the Council", July 2021

<sup>85</sup> Department for Business, Energy & Industrial Strategy, "Regulations: electric vehicle smart charge points", February 2022

<sup>86</sup> European Commission, "Proposal for a Regulation of the European Parliament and of the council on the deployment of alternative fuels infrastructure, and repealing Directive 2014/94/EU of the European Parliament and of the Council", July 2021

<sup>87</sup> EurLex, "Commission Staff Working Document, Detailed Assessment of the Member States Implementation Reports on the National Policy Frameworks", March 2021

<sup>88</sup> Ibid.

**Table 5: High level recharging market overview and regulatory summary<sup>89</sup>**

Market (EU27 + the UK)	Regulatory Summary	EVs as % of fleet <sup>90</sup>	EVs as % of fleet <sup>91</sup>	EVs per re- charger <sup>92</sup>
Austria	Regulation beyond the EU, supported by strong incentives across the EV and recharging sectors	2.1%	2.0%	5.8
Belgium	Regulation and incentives beyond the EU, with significant variations between the 3 regions	3.4%	2.8%	11.4
Bulgaria	Limited regulatory oversight for the sector until recently, with legislative updates expected in 2022	0.1%	0.1%	4.0
Croatia	Currently led by EU guidance, national strategy in-train through recently conceived EV association	0.2%	0.2%	3.7
Cyprus	EU directives currently steer the sector, national framework is under development	0.2%	0.1%	11.7
Czechia	Market defined by EU regulation, however a national recharging strategy is in place through to 2030	0.2%	0.2%	6.3
Denmark	Tailored regulation and incentives based on independent local EV recharging strategies	4.5%	4.4%	13.4
Estonia	Government support since 2010, but limited initiatives have gone beyond the EU guidance since	0.3%	0.3%	11.0
Finland	Well-developed regulation going beyond the EU, underpinned by comprehensive incentives	3.6%	3.2%	18.6
France	Robust national public EV recharging mandates supported by wide-ranging financial incentives	2.3%	1.8%	12.0
Germany	National strategy focused on stimulating deployment of rechargers through substantial financial support	2.6%	2.6%	17.0
Greece	Fragmented legislative framework, now focusing on individual municipalities' role in the sector	0.2%	0.2%	15.6
Hungary	Regulation beyond the EU focused on stimulating growth in specific parts of the sector	0.5%	0.5%	6.6
Ireland	Maturing and public-led market developing a regulatory strategy to complement EU guidance	2.1%	1.7%	27.2
Italy	High level of financial support and well-developed national strategy (focus on interoperability)	0.7%	0.6%	8.8

<sup>89</sup> Both columns on the right-hand side derive from CRA Analysis using EAFO as of October 2022 (passenger cars only)

<sup>90</sup> Derived from CRA Analysis using EAFO as of October 2022 (passenger cars only)

<sup>91</sup> Derived from CRA Analysis using EAFO as of December 2021 (passenger cars + light commercial vehicles)

<sup>92</sup> Derived from CRA Analysis using EAFO as of October 2022 (passenger cars only)

Market (EU27 + the UK)	Regulatory Summary	EVs as % of fleet <sup>90</sup>	EVs as % of fleet <sup>91</sup>	EVs per re- charger <sup>92</sup>
Latvia	Minimal regulatory oversight and funding on top of EU wide EV recharging initiatives	0.2%	0.2%	3.3
Lithuania	EV recharging strategy steered by EU regulation, with direct and indirect funding provided	0.5%	0.3%	28.4
Luxembourg	Nationally led regulatory framework and incentives supporting the privatisation of the sector	4.2%	3.9%	10.8
Malta	New national strategy designed for sector liberalisation and seamless integration with the EU	0.9%	0.8%	29.2
Netherlands	Pioneering regulation and open market conducive to private investment and interoperability	4.4%	3.9%	4.1
Poland	No evidence of a strategy beyond EU directives, but recent provisions of financial support is promising	0.1%	0.1%	12.2
Portugal	Market steered by the central government, with limited support available for non-state players	1.7%	1.4%	18.0
Romania	Limited regulatory oversight to complement and expand upon EU wide mandates and directives	0.3%	0.2%	13.0
Slovakia	EU directives and regulation remain the major legislative references guiding the sector	0.2%	0.2%	3.2
Slovenia	Recently liberalised market with increased national emphasis and guidance underway	0.6%	0.5%	4.6
Spain	Developed regulation varying across regions and supported by large incentives	0.7%	0.6%	10.5
Sweden	National recharging infrastructure plan being finalised, with incentives dating back to 2015	6.4%	5.9%	16.7
UK	Forward-thinking policies focused on local involvement and consumer experience	2.1%	1.9%	16.4

*\*Recharger rollout performance (EVs per recharger) may appear higher for countries with a low number of EVs*

## 4. Business model evaluation across countries

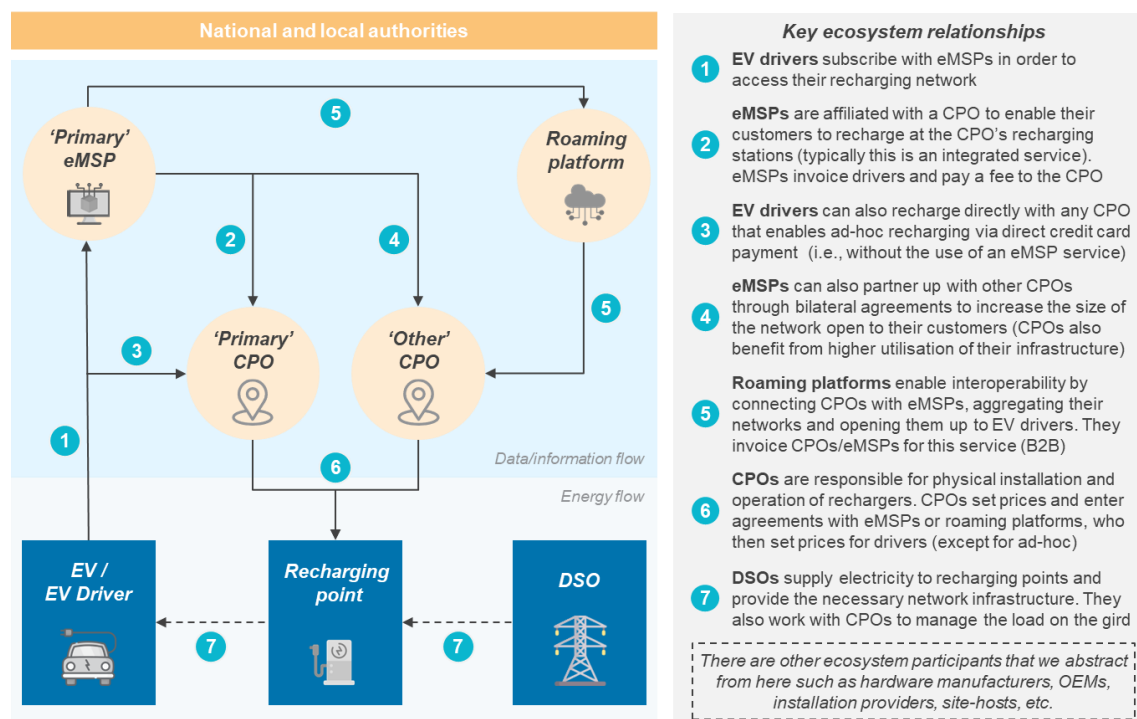
To identify potential competition concerns it is useful to describe the EV recharging value chain and key business models that exist across the EU27 + the UK. This section describes the structure and dynamics of the ecosystem and major players (with a focus on CPOs and eMSPs) based on a three-step approach:

- a top-down analysis mapping out the various members of the ecosystem and the linkages between them to define the dynamics and level of vertical integration within the EV recharging infrastructure sector;
- a bottom-up assessment of key players identified through the regulatory and competitive overviews (See Appendix A for further details). This provides a more detailed picture of economics (i.e., revenue models, profitability, existence of economies of scale, complementary activities), ownership structures, business relationships, and competitive dynamics emerging across the EU27 + the UK; and
- the above research is supplemented with insights from interviews with expert stakeholders from across the value chain and countries.

### 4.1. EV recharging ecosystem: horizontal and vertical integration

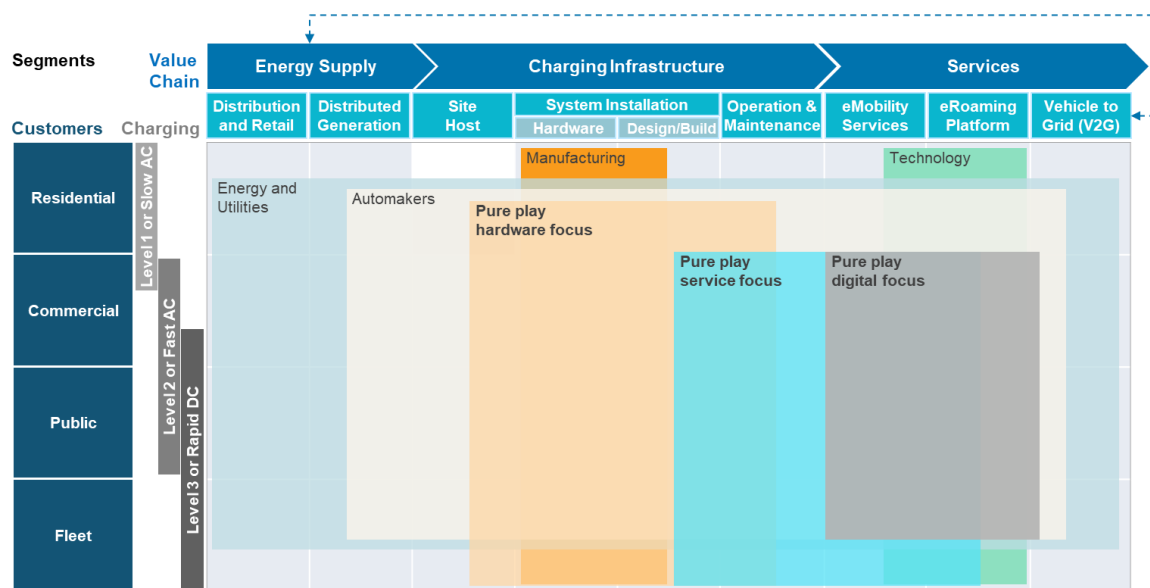
The extent of integration across the value chain is of key importance for the competitive assessment. While vertical integration can generate efficiencies, it can also lead to conflicts of interest and the potential for anti-competitive practices such as foreclosure. In this section we will document the various levels of integration scenarios across the EU27 + the UK as the sector continues to develop. To support the ensuing analysis, the following schematic builds upon Figure 7 and highlights some of the major vertical links between ecosystem participants.

**Figure 9: EV recharging ecosystem – Communication flows, key roles, and responsibilities of market participants**



The EV recharging ecosystem is an emerging and still evolving sector, and new entry is observed by a variety of players, including energy suppliers, recharging infrastructure providers, and related services companies. These companies can be broadly classified as pure play start-ups, focused solely on EV recharging services, and established players from adjacent sectors such as oil and gas, technology, equipment manufacturing, utilities, and automotive OEMs. Figure 10 illustrates the dynamics of these players and highlights the significant level of integration within the EV recharging sector.

**Figure 10: EV recharging competitive landscape**



Pure play companies tend to start by focusing on a single segment of the EV recharging value chain and then expand along the vertical value chain as they grow and raise more capital. For example, they may begin as a hardware manufacturer and eventually become a fully integrated CPO and eMSP. Moreover, they can also expand in adjacent sectors, for instance setting up a recharging station and later on moving into providing services to EV drivers as they wait for their vehicle to recharge (e.g., opening up a coffee shop). Given their size and funding limitations, these pure play companies initially often focus on specific regional and/or national markets. Nevertheless, over the last few years some of these companies have experienced significant growth, both in terms of valuation and market presence. Several pure players have even reached unicorn status.<sup>93</sup> For instance, Allego, a leading European public EV recharging network, has deployed over 34k recharge points across 15 EU countries and recently reached a market capitalisation in the range of \$0.8B to \$1B (depending on stock market movements).<sup>94</sup> The EV recharging sector is also attractive to asset management and investment banks that provide equity injections to emerging companies in the sector, such as the asset manager BlackRock, which backed the on-route provider IONITY.<sup>95</sup>

Instead, players entering from adjacent sectors, especially energy companies like oil & gas majors and utilities/DSOs, have favoured growth through mergers and acquisitions as they expanded across the vertical value chain. For example, Shell Recharge, which was set up in 2017, quickly became one of the largest integrated recharging providers

<sup>93</sup> The term unicorn refers to a company that has reached a valuation of over \$1 billion

<sup>94</sup> Allego, "Enabling green electric mobility", October 2022

<sup>95</sup> IONITY, "IONITY announces €700 million investment to enable rapid EV charging network expansion and accelerated growth across Europe", November 2021

across Europe by not only leveraging their existing suite of refuelling forecourt locations, but also by acquiring existing EV recharging companies like New Motion in 2017, Greenlots in 2019 and Ubitricity in 2021.<sup>96</sup> For oil & gas companies, this means a shift away from providing retail services as many recharging points in on-street or destination locations will not have opportunities for additional retail sales. Similarly, for electric utilities undertaking M&A activity, they will face a significant shift in their overall strategy, moving partially away from providing services only to the energy supply segment (such as distribution and retail) to ensuring they can access the larger and emerging value pools within the EV recharging sector. Additionally, these players have the advantage of a large customer base, existing customer relationships and presence along the value chain, and can leverage these to accelerate growth and form new partnerships with other non-energy sector companies. Examples include Shell Recharge's partnership with Tesco in the UK and Hungary, where food retailers with valuable EV recharging sites will be able to offer their customers the convenience of recharging their EVs while shopping.<sup>97</sup> Moreover, OEMs are starting to play a larger role in the industry, mainly to drive sales of their own electric vehicles. For example, following in Tesla's footsteps, Mercedes has announced plans to build its own ultra-fast recharging network, aiming to roll-out 10k recharging stations by 2030 (open to all cars but with the provision that Mercedes drivers will be able to pre-book and will enjoy preferential pricing).<sup>98</sup>

Another group of players are the state-owned and run suppliers. These can be either pure players or companies with significant vertical integration. They tend to be prevalent in the early years of the market and concentrate in supporting recharging rollouts, acting as a catalyst for future private investment. Several Member States have initially invested in the sector through state-owned CPOs but private investment is rapidly growing. For example, in Malta, public recharging has been dominated by government installations but now that the sector has reached a certain level of maturity, regulation is being introduced to actively promote entry by new private suppliers.<sup>99</sup> Similarly, in Estonia the state had a market share above 50% in the early years, however, several new suppliers have now entered (led by Enefit VOLT) as demand for recharging services has been increasing. While this trend has emerged in several Member States, concerns can arise i.e., that state-owned utilities may expand their services and in doing so crowd out private investment, especially in instances where they may enjoy preferential treatment in sites access. We discuss such concerns in more detail in Section 5, however our research has not shown this to be a recurring trend.

## 4.2. CPO and eMSP business model framework

Figure 11 below, shows that three types of companies tend to act as CPOs and eMSPs: pure players, larger players entering from adjacent sectors, and state-owned suppliers. The goals of these companies can vary, but their strategies often align with the ultimate goal of achieving scale within their chosen segment by securing the best locations for their recharging points. Companies expanding from adjacent sectors, like ICE fuel retailers, have an advantage by leveraging their existing locations as a starting point. Securing the most profitable and low-risk locations, such as strategic motorway stations, urban areas with a lack of off-street parking, and high footfall retail centres will be particularly important over the next few years as the best locations will be taken first.<sup>100</sup>

<sup>96</sup> Shell Recharge, "Charging at Shell"

<sup>97</sup> Nora Manthey, "Shell and Tesco team up for EV charging in Hungary", September 2022

<sup>98</sup> Andrew English, "Mercedes-Benz is launching its own electric car charging network", 2023

<sup>99</sup> Ministry for Energy, Enterprise and Sustainable Development of Malta, "National Policy for Electric Vehicle Public Charging Infrastructure", August 2021

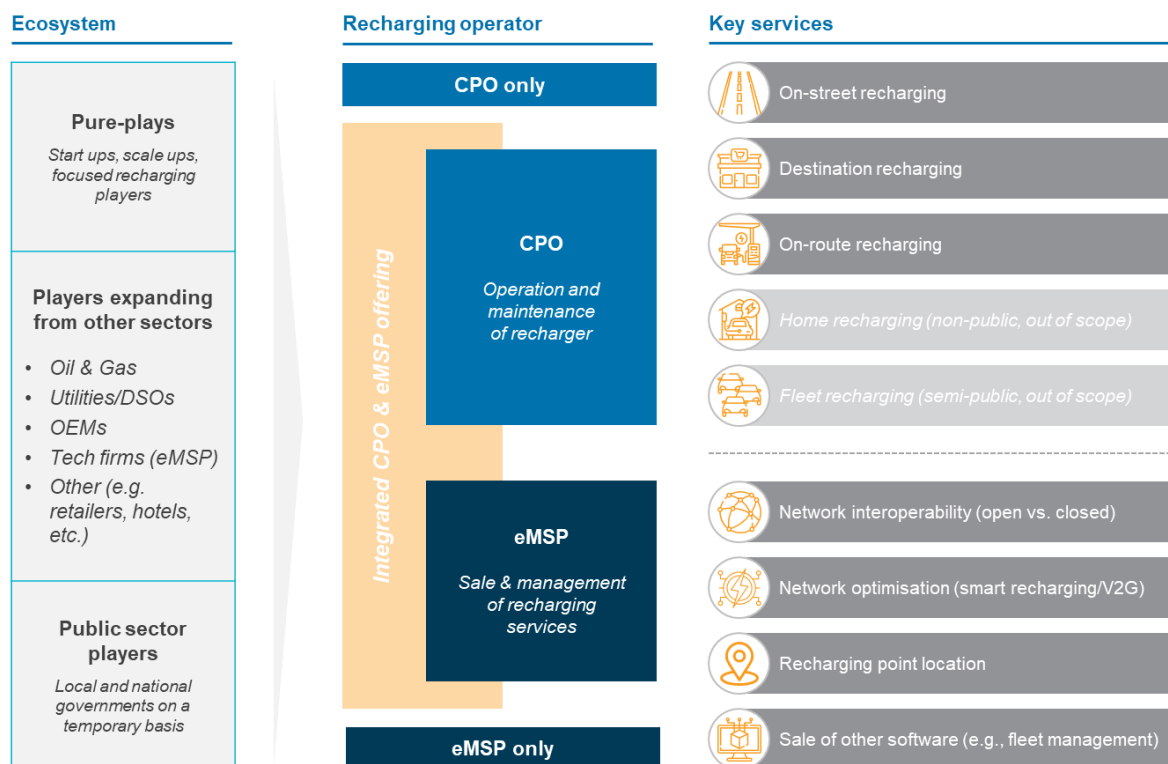
<sup>100</sup> Baptiste Maisonnier, Tim Longstaff and Juan Luis Vilchez, "What will it take to win the EV charging race?", September 2022



It should also be highlighted that some companies participating in this ecosystem provide the services on behalf of a partner (i.e., providing a Recharging-as-a-Service solution for companies that would rather outsource the CPO or eMSP services). Whilst they might operate on behalf of the partner, in most instances they are the company providing the CPO and eMSP services to customers. In practical terms this would mean maintaining and operating (and even sometimes manufacturing) the recharging points and designing and operating the eMSP software solutions. Within this assessment, these 'as-a-service' companies are considered as a direct CPO or eMSP (or both) given they have a key role in operation of recharging points in their relevant markets both physically and digitally. Additionally, the charge points that they operate themselves or on behalf of a partner, typically all appear on their own network recharging point location map so the customer can receive a more unified recharging experience. This model also allows for a faster roll out of recharging points as multiple partners can invest in charging locations without having to develop bespoke solutions themselves, rather leveraging the experience and capabilities of the Recharging-as-a-Service company.

Figure 11 shows that the ecosystem players on the left can expand across the vertical chain and supply several of the services depicted on the right, depending on their internal capabilities and strategy.

**Figure 11: EV recharging ecosystem – participant business model framework**



In terms of degree of vertical integration, the prevalent emerging model for all these different types of players is to act as an integrated CPO and eMSP (see Section 4.4.3). However, some companies specialising in either segment exist across the EU27 + the UK as is described in Section 4.4. Both integrated and non-integrated players typically expand their geographic footprint through CPO-eMSP bilateral agreements and roaming

agreements.<sup>101</sup> The impact on competition of these business models and their likely evolution is considered in more detail in the following sections of this study. Prior to diving into them, and in order to provide the necessary context, the process a CPO must go through to build EV infrastructure is described below.

### 4.3. What is involved in installing a recharging point?

Before a potential CPO starts the installation process of EV recharging infrastructure, they will first consider their overarching business strategy. This includes choosing a segment to focus on within the public EV recharging market, such as on-route, destination, or on-street recharging and considering the potential revenues and costs associated with these options. They must also consider the footprint size of their network and whether they decide to focus on a specific region with a dense network of rechargers, or have higher national, or international coverage with less density. The coverage paradigm can partially be overcome through interoperability agreements via roaming or bilateral agreements.

When the strategy is developed, the company will then work through the steps described below to physically install their network of rechargers. However, the strategy should also consider how they plan to operate and service the network to ensure the provision of recharging services is possible, reliable and profitable.

Understanding the whole process from the installation of a recharging point to the provision of services is crucial as it could raise barriers to entry and expansion or deliberately forestall entry to soften competition, if any business has control over where, when, or how a recharging point can be installed. These topics are discussed in more detail in Section 5.

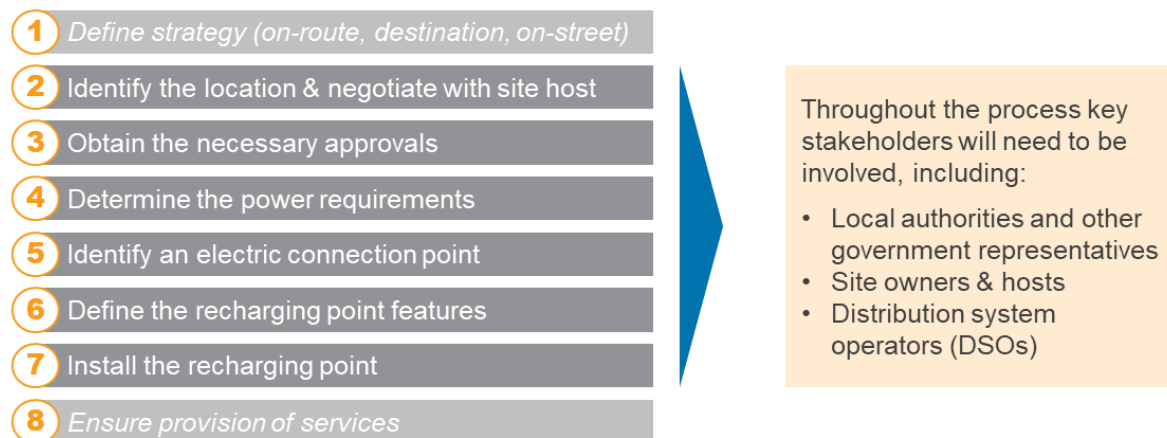
Before a recharging point goes live, CPOs need to consider several different factors to minimise future risks and to optimise the set-up. While this can vary significantly depending on the market and segment pursued (e.g., on-street vs. destination recharging), the steps outlined in Figure 12 tend to be relevant in all cases, such as identifying the location, assessing the technical requirements, and obtaining the necessary permits and approvals.

Overall, one of the most common bottlenecks for CPOs remains receiving the necessary permits and grid connection approvals and, although exact times vary across Member States, DSOs, and recharging types, this remains a major challenge for the sector (e.g., in Poland, it can take up to three years to connect a DC recharging station to the local grid).<sup>102</sup> Moreover, a lack of clarity on the process and timelines (from the point of view of both CPOs and LAs/DSOs) increases complexities and creates additional obstacles for the advancement of the sector. These dynamics and the potential associated competition implications, where for example a LA or DSO may exploit its power delaying recharging deployment due to a conflict of interest, are explored in more detail within Section 5.4.

<sup>101</sup> These are discussed in detail in Section 4.4.2, but in essence a bilateral agreement refers to instances where CPOs/eMSPs enter a contract to give their respective customers access to each other's EV recharging infrastructure at agreed terms and conditions. A roaming partnership instead involves a 3<sup>rd</sup> party (roaming providers) who acts as an aggregator by working with as many CPOs/eMSPs as possible.

<sup>102</sup> ChargeUp Europe, "State of the Industry – Insights into the Electric Vehicle Charging Infrastructure Ecosystem", 2022



**Figure 12: Indicative process required to install a public recharging point**

**Identifying the location.** The first step involves significant planning to find a suitable location. CPOs must consider availability of power supply, parking convenience, and present and future utilisation to build a sustainable business model. This includes assessing the best type of recharging point technology (wall-mounted or ground-mounted), verifying the length of cables required to supply electricity, and determining if grid capacity upgrades are needed. Moreover, CPOs must engage with the site owner or local authorities to obtain the necessary planning permission and licenses for the installation of the recharger, especially if it is on public land. When exploring options on private land (e.g., in the parking lot of a retail store), the process is likely to be quite different and more focused on the economic case.

**Determining the power requirements.** Next, CPOs must establish what power level is best suited for the desired location by modelling expected demand and understanding EV driver dynamics. For example, a high-capacity (ultra-fast) recharging point may not make economic sense in an on-street location where recharging can take place overnight. Conversely, a slow recharging point would not be suitable for an on-route motorway services location where drivers typically want to get back on the road within minutes. This decision will also be highly dependent on the local network capacity, as cost and time to upgrade the grid may significantly impact the business case.

**Identifying an electric connection point.** Once the power requirements have been defined, CPOs must identify where and how to connect the recharging point to the grid. In the case of on-street, low-capacity (slow) recharging this may be as simple as plugging into existing infrastructure (e.g., a lamp post). In other cases, additional analysis may be required. For example, in Ireland an analysis of the site's Maximum Import Capacity is required to ensure the demand on the network system is not exceeded.<sup>103</sup> This is the step where the CPO must engage with the local DSO to seek authorisation for the capacity requirements and where there might hypothetically be room for a DSO to distort competition downstream (e.g., through changes to its charges or the time taken to provide the necessary approvals).

**Defining the recharging point features.** After determining the location and addressing power concerns, the details behind the recharging point must be finalised. This includes, but is not limited to, adhering to open communication standards, interoperability with other eMSPs, payment functionalities (i.e., ad hoc recharging), smart recharging, and so on. It is crucial at this point to future-proof the business, as new technologies and capabilities are becoming increasingly mandated by regulators.

<sup>103</sup> Electric Ireland, "What is the Maximum Import Capacity (MIC)", 2022

For example, smart recharging and ad hoc functionalities are now becoming the norm (and will be required in the future across the EU27 + the UK). Additionally, CPOs must ensure rechargers are equipped with sufficient electrical protection in accordance with the latest electrical installation regulations.

**Installing the recharging point.** Finally, after the due diligence has been conducted and all the necessary approvals are in place, it is time to install the recharging point. This step will require close collaboration with the DSO and local government. First, cables must be routed to the location either by building an underground passage or by opting to use an overground cable. Each option comes with their own complexities and cost, which should have been already considered as part of the earlier steps delineated. Next, the DSO will connect the recharging point to the grid, and operation can start. This final step can however be one of the key barriers in the industry, with market participants in Italy and Croatia citing it as the biggest obstacle to the deployment of EV infrastructure.<sup>104</sup>

#### 4.3.1. The role of local authorities

The state local authorities<sup>105</sup> (LAs) are a key actor for the deployment of EV infrastructure within their jurisdiction. Typically, local authorities are not heavily involved with installation, operation, or maintenance due to a lack of experience, skills, and resources on the topic, however, they do play a key role in siting and permitting hence ultimately selecting operators who wish to install rechargers on public land.

The LA approval process to install a recharging station can vary depending on the country and region. In general, it usually involves submitting an application to the LA and providing information such as the proposed location of the recharging station, its technical specifications, and how it will be financed and operated. The local authority will then review the application and assess whether it meets its regulations, requirements and policies. The review may include a site visit, impact analysis on the environment and local community, traffic and parking analysis, compliance with the local building codes, zoning laws and fire safety regulations, and connection to the grid. Once the application has been reviewed and approved, the LA will issue the necessary permits and approvals for the installation of the recharging station. The process can take several weeks or months, depending on the complexity of the application and the local regulations, and has been cited by ecosystem participants as a major bottleneck to EV infrastructure deployment.<sup>106</sup>

While local authorities play a major role in deploying recharging infrastructure from a regulatory perspective, in select cases they can also actively participate in the market as the CPO or eMSP. This can give rise to a conflict of interest, and while we have not found evidence on local authorities discriminating against competitors in their jurisdictions, it is an important factor to consider as the market matures. Presently, as depicted in Table 6, several business models have been adopted by LAs, each with different implications for competition in the sector.

<sup>104</sup> Study interviews, November 2022

<sup>105</sup> For the purpose of this report local authorities refer to any administrative body in local government (i.e., these could be municipal authorities but also regional and state institutions, which is the case for example in Germany)

<sup>106</sup> ChargeUp Europe, "State of the Industry – Insights into the Electric Vehicle Charging Infrastructure Ecosystem", 2022

**Table 6: Typical policies by local authorities to deploy EV infrastructure**

Typical business models	Description	Typical contractual duration	Funding
LAs own, install, manage services and maintain recharging points <sup>107</sup>	LAs install civil & electrical infrastructure, recharge point units, provide ongoing management of services, maintenance and EV recharging services	N/A	LAs + Government Funding (potentially the highest proportion of public funding)
Concession model - local authorities & private partnership	LAs may be involved in elements of installation while all ongoing management & maintenance would be subcontracted to a private partner - involves a procurement process	5 to 10 years	LAs + Government + private funding (medium public funding element)
Leasing model – local authorities & private partnership	LAs procure a partner who would provide an all-in package to install, manage and maintain rechargers – involves a procurement process	15 to 25 years	LAs + Government + private funding (potentially the lowest proportion of public funding)
Approval model – local authorities approve applications	LAs work with CPOs to authorise planning applications	N/A	No funding

#### 4.3.2. The role of the DSO

The DSOs are responsible for maintaining and operating the transformers, substations, overhead lines and underground cables that distribute electricity to end-users, as well as planning for future grid expansions and modernisations to ensure the integration of smart recharging and vehicle-to-grid (V2G). However, as the eMobility transition accelerates DSOs are also tasked with evaluating where to invest, optimising costs and minimising the risk of stranded assets. This includes identifying areas of current and future congestion by working with CPOs to assess the impact of EV recharging on electricity demand.

Given DSOs are present across the EV recharging value chain, some conflicts of interest may arise. Specifically, if the DSO is also the owner of the recharging infrastructure, they might have an incentive to charge high prices for the service, which could make it less attractive to EV owners and limit the adoption of electric vehicles. Furthermore, if the DSO is the only provider of recharging infrastructure in the area, it might discourage competition and limit the choice for EV owners. Lastly, they can impact competitors entering the market by delaying grid connections or making the process more complex than it needs to be (no evidence has been identified of such conduct but these dynamics must continue to be assessed as the sector matures).

It is crucial to involve DSOs early on in the planning process<sup>108</sup> to assess capacity and determine if network reinforcements are necessary. When network reinforcements are needed, in some countries it can take a significant amount of time to get the recharging station operating (e.g., in Italy, network connection for high-capacity (ultra-fast)

<sup>107</sup> A model whereby the local electricity utility is owned by the LA and undertakes the investment and provides the services is also implemented in select cases across the EU27 + the UK

<sup>108</sup> In some markets, lower capacity rechargers which do not require network reinforcements can be installed without consulting the DSO.

recharging stations can take close to 2 years and was cited as one of the major barriers for the sector).<sup>109</sup> In general, across the EU27 + the UK concerns have also emerged around DSO bureaucracy slowing down deployment even for low-capacity (slow) recharging stations. In Croatia and some areas of Belgium (e.g., Wallonia) market participants have expressed this concern, specifically complaining that the local DSO is intentionally delaying approvals for some CPOs or is simply unable to keep up with demand.<sup>110</sup> Moreover, it can be complex for smaller players to request upgrades and navigate the current processes set-up, reducing their ability to compete. In some cases, the DSOs such as Fluvius in Belgium have a more active role, running the tendering process by writing technical requirements and awarding 10-year concessions to build and operate recharging points.

## 4.4. Key services provided by CPOs and eMSPs

### 4.4.1. CPOs

Unlike traditional ICE refuelling, EVs can be charged in several additional locations (e.g., at home, at work, at the gym/shops) each requiring a slightly different CPO business model. Based on a detailed assessment of the EV recharging market across the EU27 + the UK, the EV recharging services can be grouped into on-street recharging, destination recharging, on-route recharging, home recharging, and fleet recharging (Table 7). Most EV recharging presently happens at home on private recharging points<sup>111</sup>, but there is growing focus on other segments to reduce range anxiety and provide options for those without the ability to install a home recharger.

As a result, two types of CPOs have emerged: full offer CPO vs. specialised players. A full offer CPO operates in multiple segments, offering both CPO and eMSP services, aiming to maximise revenue. In Italy, Enel X is an example of the latter, offering solutions for commercial recharging, workplace recharging, on-street recharging, fleet recharging, and residential recharging (turning into a leader in several of those spaces). In contrast, a specialised CPO focusses on one recharging segment, developing the necessary technical capabilities and relationships to cater for niche consumers. For example, Ubitricity has decided to specialise on the on-street recharging segment in Germany and the UK, offering a product that can be integrated into existing street infrastructure (i.e., a lamp-post smart recharger). However, not all operators will fit into these two categories, and a combination of the two can be seen across the EU27 + the UK. Moreover, due to the rapidly changing nature of the sector, new strategies may emerge in the future which can also impact the type of location a CPO looks to serve (especially as the level of financial support and regulatory oversight changes).

In general, existing business models in the sector vary depending on the type of recharging services CPOs offer. The remainder of this section will focus on key risks and opportunities for each of the five recharging segments discussed in Table 7 below. Nevertheless, some universal trends and factors relevant across the value chain and for all players in the public recharging sector include:

- revenue stacking – The costs of installing and operating a recharging station remains high, with a payback period of over 10 years.<sup>112</sup> To increase profitability and mitigate utilisation risks, CPOs have an incentive to seek alternative revenue streams such as advertising on their recharge points, grid flexibility services or retail sales;

<sup>109</sup> Study interview, Italian regulator, November 2022.

<sup>110</sup> Study interview, Belgian and Croatian CPOs, November 2022

<sup>111</sup> John Voelcker, "JD Power Study: Electric Vehicle Owners Prefer Dedicated Home Charging Stations", February 2021

<sup>112</sup> Thierry Mortier, Marc Coltelli, "How to make EV charging pay", December 2020

- network size – The bigger the network, the more CPOs can access secondary revenue streams and increase their revenues (this is particularly important in countries with limited roaming and interoperability such as Spain). For example, an extensive network can provide ancillary flexibility services to the grid making it a significant part of their business model. Additionally, the more rechargers CPOs manage, the greater the potential to leverage supply side economies of density to reduce costs and improve margins;
- land grabbing – CPOs are currently installing recharging points in the most lucrative locations (e.g., high-footfall sites such as workplaces, motorway service stations, residential areas with no access to off-street parking) even if it means sacrificing short-term returns or over-paying site owners; and
- consumer experience – consumers demand simple and reliable services and the overall experience must extend beyond traditional refuelling due to the longer recharging times. CPOs offer amenities such as restaurants, playgrounds, shopping and work locations to enhance user experience.

**Table 7: CPOs key segments and services**

Segment or services	Description	Outlook
On-street recharging <i>typically low capacity and long duration</i>	<ul style="list-style-type: none"> <li>▪ Recharging on public streets</li> <li>▪ Land grabbing to secure the best sites is a focus (e.g., residential areas with limited private parking)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Profitability depends on utilisation</li> <li>▪ Limited revenue stacking opportunities</li> </ul>
Destination recharging <i>typically medium capacity and medium duration</i>	<ul style="list-style-type: none"> <li>▪ Recharging at typical destinations (e.g., supermarkets, hotels, gyms, car parks, work), partnering with certain venues will increase utilisation (equivalent of land grabbing)</li> <li>▪ Offer recharging as an additional service to existing customers</li> </ul>	<ul style="list-style-type: none"> <li>▪ Potential for alternative revenue streams (partially contingent on future retail trends)</li> <li>▪ Convenient option for EV drivers, thus significant growth is expected</li> </ul>
On-route recharging <i>typically high capacity and short duration</i>	<ul style="list-style-type: none"> <li>▪ Akin to current fuel retailers, with a focus on fast &amp; ultra-fast recharging</li> <li>▪ Land grabbing to secure the best sites is a focus (e.g., highway service stations, recharging hubs)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Remains high-cost model, with profitability depending on utilisation</li> <li>▪ Secondary revenue streams through convenience stores</li> </ul>
Fleet recharging <i>(semi-public, out of scope)</i>	<ul style="list-style-type: none"> <li>▪ Provides recharging for large fleets of EVs</li> <li>▪ Recharging as a Service model is prevalent</li> </ul>	<ul style="list-style-type: none"> <li>▪ Expected to become more 'open' and 'public' in the future</li> <li>▪ High potential to provide grid management services</li> </ul>
Home recharging <i>(non-public, out of scope)</i>	<ul style="list-style-type: none"> <li>▪ Lower capacity/slow recharging</li> <li>▪ Typically, 70 to 90% of recharging occurs at home</li> </ul>	<ul style="list-style-type: none"> <li>▪ Low-cost model with potential to scale and bundle products</li> <li>▪ When possible, recharging will happen at home</li> </ul>

### On-street recharging

On-street recharging covers recharging points situated on public streets in cities or high-density urban areas, which is crucial for enabling EV adoption for people without access to private off-street recharging. This type of recharging typically requires a CPO to obtain rights to develop and manage a recharging point through a concession from national or local authorities.<sup>113</sup>

<sup>113</sup> Climate Change Committee, "Costs and impacts of on-street charging (Ricardo Energy & Environment)", June 2022

Different capacity level recharging points are installed on public roads, each demanding a slightly different business model. The lower capacity (slow) rechargers (<7 kW), often integrated into existing lampposts, are similar in quality of service to home recharging where EV drivers plug in overnight for an extended period of time. This is a low-cost model, where the CPO recovers their limited investment by making a small margin on the electricity supplied. Faster, but still considered slow (7 to 22 kW) on-street recharging instead requires a larger investment by both the CPO and local institutions (e.g., grid upgrades and connection, civil works), thus commanding a higher premium for their services. In both instances, CPOs develop and manage recharging points through concessions granted by local authorities (contracts typically last around 10 years). Ubitricity, an integrated CPO operating in Germany and the UK (recently acquired by Shell), specialises in on-street recharging and employs such business models.<sup>114</sup> However, on-street recharging prospects for revenue stacking are limited, thus their profitability is highly dependent on future demand for recharging. The current focus is on land grabbing, with CPOs trying to sign long-term agreements (10+ years) with local authorities in areas where demand is the highest, which may have an undesirable impact on competition, and ultimately the consumer.

Several challenges are emerging within the on-street recharging segment. Most on-street recharging points are currently underutilised, requiring significant government subsidies.<sup>115</sup> Furthermore, conflicting transport policies at the local, national, and European level have made it hard to develop an effective business model in some countries, with unclear requirements for installing infrastructure on public streets and lack of clarity in terms of property rights. Lastly, demand for on-street recharging points is often limited to a small geographical area (with consumers needing to recharge close to their home and thus being forced to subscribe with nearby CPOs), making the segment prone to the emergence of local concentration (as of 2021, Ubitricity controlled approximately 50% of the UK on-street recharging market).<sup>113</sup> This issue of local market power is particularly prevalent in less densely populated locations which may have insufficient demand to support multiple competing operators. These dynamics can be seen outside of London for example, where there are just over 1k on-street recharging points, leading to 90% of households without off-street parking being more than 5 minutes away from a public recharging point. Nevertheless, this may be due to the nascent nature of these services and as EV adoption increases, new entrants are expected (increasing both service levels and competition). Countries with more developed EV recharging sectors, like the Netherlands and Belgium, have shifted to a demand-driven approach, whereby they set-up public recharging points based on citizen requests to ensure efficient coverage and to minimise commercial risks (this is typically done through an online portal set up by the local governing body).<sup>116</sup>

### ***Destination recharging***

In simple terms, destination recharging refers to recharging points located in places where consumers typically drive to for a variety of reasons (e.g., shopping malls, supermarkets, hotels, gyms, airports, work), in turn providing a convenient and easily accessible way to recharge their cars while undertaking another activity. This is becoming a channel of choice for both EV drivers, who get to recharge without having to go out of their way, and operators, who often enjoy higher utilisation rates and have access to alternative revenue streams (e.g., targeted advertising). Site owners are also incentivised to install rechargers, as it has the potential to attract new guests to their

<sup>114</sup> Ubitricity, "Ubitricity website"

<sup>115</sup> Competition Market Authority, "Summary: Building a comprehensive and competitive electric vehicle charging sector that works for all drivers", July 2021

<sup>116</sup> Guidehouse, "Lessons from the Dutch EV charging approach", November 2021



establishments while increasing dwell times. Moreover, some Member States have promoted destination recharging. For instance, in Hungary, a significant portion of the sector is being developed at supermarkets given the statutory requirement for them to install recharging points in their parking lots.<sup>117</sup> Similarly, France is providing guidance for retailers to contribute significantly to the sector, many parking spaces now having to provide recharging infrastructure.

For a CPO investing in destination recharging, site-selection and configuration will be critical as the business model is ultimately based on controlling high footfall locations to maximise utilisation. Therefore, major players focusing on this segment are rapidly trying to gain control of the most lucrative locations, often by entering contracts with major retailers or brands. If these contracts are long term or exclusive there may be implications on competition, especially when locations are limited. CPOs can take on various roles, such as owning, installing, and operating the recharging point (paying a fee to utilise the site) or a set-up where the retailer owns the asset and only contracts the CPO to operate it.

The expected utilisation is not the only parameter driving the investment. Instead, EV recharging is often seen as an added value service to consumers of the retailing activity, which can help differentiate business establishments in the short-term, and that will become a requirement to succeed in the long-term (EVC solutions estimates that 90% of EV drivers will look for destinations that have recharging points over those that do not).<sup>118</sup> Some major retailers, for example, have opted to offer free recharging to increase customer traffic. This is a widespread model in Scotland, where close to 1.5k devices located at supermarkets, car parks and dealerships are free to use for consumers.<sup>119</sup> Likewise, in Italy several stores have offered free recharging in the past such as ALDI, LIDL, Esselunga, Decathlon, and Leroy Merlin.<sup>120</sup> Porsche also employs this strategy at their various dealerships across the EU, offering free recharging as an extra service to their customers.<sup>121</sup>

Over the years, the 'free' recharging business model has also been implemented by public authorities willing to subsidise the service to promote EV adoption (something only financially sustainable in the early years of the industry). In general, state-owned CPOs providing free recharging is expected to be less prevalent as the market matures and competition increases. For example, in Croatia, the main recharging network used to be free, but with increased adoption they have started introducing fees to protect the electricity system from overload and to avoid creating unsustainable customer expectations.<sup>122</sup> The same is true in Ireland, where ESB eCars stopped offering free recharging across the country in August 2020. Likewise, while retailers have the incentive to offer recharging as an added service similar to free parking, this is also becoming less widespread. For example, Tesco (and other major retailers in the UK) halted all free recharging in the country as of November 2022.<sup>123</sup>

Like the on-route segment, speed of recharging is an important strategic variable for destination recharging. The ultra-fast recharging model might not keep customers in the shop for a long enough period of time. In contrast, slow recharging may not be fast enough to have a significant impact on battery levels and would therefore not provide enough of an incentive for consumers. Hence, finding the right balance between the two

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<sup>117</sup> Ministry of Foreign Affairs of the Netherlands, "Smart and sustainable mobility market in Hungary", March 2021

<sup>118</sup> EVC, "Destination EV charging"

<sup>119</sup> Zap Map, "Free EV charging points: Where are they all?", June 2022

<sup>120</sup> Chargeguro, "Punti di ricarica gratuita per auto elettriche: dove e come trovarli?", 2022

<sup>121</sup> Porsche, "Porsche Destination Charging"

<sup>122</sup> Annie Tsoneva, "Croatia's HEP introduces fees for charging EVs at 31 stations on motorways", January 2022

<sup>123</sup> Electrive, "Tesco halts free-charging offer at store car parks", November 2022

will be the key for success (overall, the objective is to keep customers in the store as long as possible). A combination of free and pay-as-you use models has also been applied in the past, similar to how parking in commercial centres has worked for years (where you can either pay for the service or receive a voucher exempting you if you shopped at a contributing store). Lastly, retailers, hotels, gyms, and other locations where destination recharging is becoming prevalent can also benefit by meeting and promoting their sustainability efforts.

In the future, the destination recharging business model may shift significantly. Once smart recharging is enabled, parts of this segment are well set-up to provide flexibility services to the grid with the help of the respective eMSP. For example, hotels or airport parking lots will be able to forecast exactly how many batteries they have connected, enabling them to shift loads to times of low consumption (or even supply energy to the network through vehicle-to-grid technologies). Moreover, future retail trends may impact traffic at what was once considered a high footfall location. Specifically, as online shopping continues to grow, people are less likely to go to shopping centres on a weekly basis. Therefore, CPOs need to assess both current and future consumer behaviours to develop a sustainable and long-term business model.

### **On-route recharging**

On-route recharging refers to EV recharging conducted during a longer trip, often along major roads, highways, or other strategic locations. It requires high-capacity fast rechargers (22-350kW) since consumers need to get back on the road as quickly as possible to continue their journey. It is therefore a high-cost model, with a 50-kW recharger costing approximately €30k (compared to a 7kW home recharger which can be bought for about €1k).<sup>124</sup> Furthermore, many on-route recharging options are now in the range of 150 kW or more (costing upwards of €50k), increasing indirect costs needed to reinforce the local distribution network and to set up the site (also, 250 kW+ recharger total costs could reach €100k+).<sup>125</sup> The additional grid capacity needed is particularly impactful on the business model, not only due to the increased upfront capital cost required, but also due to the lengthy, complicated, and expensive processes around getting DSOs to make the necessary upgrades (especially in remote areas with traditionally small loads), potentially a segment challenge that will be overcome through the use of battery storage alongside EV rechargers. If an EV driver plugs their vehicle into a 350kW recharger, it does not necessarily follow that he or she can recharge at 350kWh as the recharge rate is dependent on the vehicle's nameplate intake capacity. For instance, a Mercedes EQC is capable of 110kW intake, and often will recharge at a lower rate if the battery is not pre-conditioned for recharging or the battery's state of charge is less than 20% or more than 60%. In essence, a 100kW, 150kW and 350kW recharger may all pull from the grid at the same rate due to the vehicle limitations. This may make it difficult to justify the additional capital requirements for ultra-fast recharging.

While the investment needed is significantly higher than in other EV recharging segments, on-route fast and ultra-fast recharging reduces range anxiety and improves overall customer experience (as long as it is operating at the stated power levels). Therefore, consumers value the ability to recharge their cars quickly on a longer trip, enabling CPOs to charge a significant premium for this service – often more than double the price paid for home recharging (e.g., in Italy, as of March 2022, IONITY's 150-350 kW rechargers charged 0.79 €/kWh, compared to an average of 0.20 €/kWh for home recharging).<sup>126</sup> However, even with this premium, CPOs are unlikely to recover their

<sup>124</sup> PwC, "Powering ahead! Making sense of business models in electric vehicle charging", October 2018

<sup>125</sup> Chargingshop, "EV charging solutions both for home and businesses"

<sup>126</sup> PodPoint, "Cost of Charging an Electric Car", September 2022



investment costs in a short period of time only relying on pay-per-recharge revenues. Business models will therefore seek to add alternative revenue streams (e.g., advertising, convenience store sales) to supplement their recharging income. An interesting business model and opportunity consists in combining ultra-fast recharging points with energy storage, thus reducing the impact on the local grid infrastructure and allowing CPOs to take advantage of off-peak pricing. Numbat, a German battery storage-integrated EV recharging company, has been able to install ultra-fast stations (75-150 kW) in urban areas where previously the grid could only provide a maximum of 11 kW.<sup>127</sup> Moreover, energy storage can create further revenue opportunities for CPOs such as providing ancillary services to the grid (e.g., frequency response, load shifting). This will become increasingly common, with both EU regulation and specific Member States starting to stipulate smart recharging requirements.

On-route recharging has been the segment of choice for ICE fuel retailers (being the obvious replacement of ICE refuelling), as they previously invested in service stations in strategic locations and, therefore, saw this as an opportunity to future proof their current operations. Moreover, they already provide additional services (e.g., coffee shops, restaurants), enabling them to diversify their income with minimal additional costs. This shift can be seen in Total's current strategy, who for example allocated over €200m in 2021 to install high-capacity recharge points at more than 150 of its motorway service stations in France.<sup>128</sup> In general, these players remain focused on rapid expansion, leveraging their position in oil and gas business to invest in EV recharging infrastructure. BP also recently declared that their fast and ultra-fast recharging network is on the cusp of surpassing its petrol refuelling arm on a per-unit margin basis (although the division is not expected to recoup investment costs, but have positive operating margins, until 2025 due to lack of demand currently).<sup>129</sup> While ICE fuel retailers are well placed to develop the on-route recharging networks new entrants are also focusing on fast and ultra-fast recharging (e.g., IONITY, Fastned, Mercedes, Tesla and other players are investing in this segment both by gaining access to existing ICE refuelling stations and by creating their own recharging centres). An interesting case-study is Tesla, who as an OEM decided to build up its own fast and ultra-fast recharging network rather than relying on other companies.<sup>130</sup> In the early years this was done to increase sales of its EVs (accepting lower utilisation rates and profits), while only recently did it open to non-Tesla drivers thereby making it one of the largest public 150 kW+ networks in the EU (along with IONITY).<sup>131</sup>

#### **4.4.2. eMSPs**

eMSPs are primarily concerned with the provision of recharging services directly to the EV driver. Typically, the main value proposition of an eMSP is centred around its network size and pricing, as well as in the quality of the customer experience provided. The size of network opportunity varies considerably, with some eMSPs focusing on the national level, such as XXImo<sup>132</sup> in the Netherlands, while others, such as ChargeMap,<sup>133</sup> operating internationally. When it comes to customer experience, core services, such as accepted payment methods and billing processes, are uniform across the industry, with most players allowing payments via application or branded Radio Frequency

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<sup>127</sup> Cameron Murray, "Energy storage-integrated EV charging comes of age in Germany", July 2022

<sup>128</sup> TotalEnergies, "France : TotalEnergies Allocates €200 Million to Equip its Highway Service Stations with High-Power EV Charge Points", October 2021

<sup>129</sup> Ron Bousso, "For BP, car rechargers to overtake pumps in profitability race", January 2022

<sup>130</sup> Mobility Academy, "Charging infrastructure for electric vehicles: What kind? Where? How?"

<sup>131</sup> Fred Lambert, "Tesla flipped a switch, and its Supercharger network became the 'largest public 150 kW+ fast-charging network'", May 2022

<sup>132</sup> XXImo, "Electric charging Carefree electric charging, wherever you are"

<sup>133</sup> Chargemap, "Chargemap website"

Identification technology (RFID) card, and some firms also accepting payment badges and fidelity cards. As mentioned though, the additional services offered can differentiate players' offerings, which allows categorisation of different business models. Table 8 below outlines some of the key services provided by eMSPs, each described in more detail in the text beneath it.

**Table 8: eMSP key segments and services**

Segment or services	Description	Outlook
Network interoperability (open vs. closed)	<ul style="list-style-type: none"> <li>▪ Closed network provides exclusivity of access to clients (these are not the norm, and very few remain in place)</li> <li>▪ Open networks allow interoperability either via bilateral agreements or roaming platforms</li> </ul>	<ul style="list-style-type: none"> <li>▪ Closed network increasingly rare as international access to recharging becomes more and more important to EV drivers</li> <li>▪ Diffusion of ad hoc payment might make roaming less relevant for consumers</li> </ul>
Recharging point mapping	<ul style="list-style-type: none"> <li>▪ Mobile apps and/or online tools allowing to see accessible recharging points' position and key parameters (e.g., status, capacity)</li> <li>▪ Typically, if they are also a CPO or have links to a CPO, these recharge points will be more prominent</li> </ul>	<ul style="list-style-type: none"> <li>▪ Overabundance of available apps, usually one per eMSP, might give space to market consolidation</li> <li>▪ Software navigation players (e.g., Google Maps, Waze) increasingly relevant in the market</li> </ul>
Sale of eMobility software (e.g., fleet management)	<ul style="list-style-type: none"> <li>▪ Offering of recharging point management tools to CPOs or white-labelled turnkey solutions</li> <li>▪ Leveraging software experience for alternative eMobility software as fleet management</li> </ul>	<ul style="list-style-type: none"> <li>▪ Potential for growth in corporate segment due to fleet electrification</li> </ul>
Network optimisation (emerging segment)	<ul style="list-style-type: none"> <li>▪ Allowing EV driver to enable future fast recharging and V2G, accessing also potential savings' data</li> </ul>	<ul style="list-style-type: none"> <li>▪ Increasing government support</li> <li>▪ Increasing potential for grid balancing due to electrification of the capacity mix</li> </ul>

### **Network interoperability**

The EV recharging market exhibits strong network effects and, at the same time, suffers from "chicken & egg" issues.<sup>134</sup> Namely, EV demand will be low as long as EV recharging infrastructure is not well established but, at the same time, the absence of guaranteed demand limits private incentives to invest in the setting up of the required EV recharging network infrastructure. Although in such a setup the literature predicts that network interoperability is important as it can prevent anticompetitive effects and the emergence of market power discouraging adoption, there is also the potential for interoperability to soften investment incentives.

It has been observed that the level of interoperability can vary considerably depending on the CPO/eMSP. Different levels of interoperability can be distinguished as follows, based on the type and extent of agreements entered into by the CPO/eMSP. The impact on pricing is discussed in Section 4.6.

- **Closed networks:** some recharging networks have traditionally been closed, allowing access only to their subscribers. Until recently, that has been the case for

<sup>134</sup> See more on the definition of the "chicken & egg problem" in the context of all two-sided platforms: Jean-Charles Rochet, Jean Tirole, Platform Competition in Two-Sided Markets, Journal of the European Economic Association, Volume 1, Issue 4, 1 June 2003, Pages 990–1029.

the Tesla super-recharging network, although it is currently undergoing a pilot project allowing third-party access in 13 European countries.<sup>135</sup> It should however be noted that the Tesla network of recharging points was one of the first entrants and, therefore, had an incentive to create a recharging network to support its EV sales while preventing its OEM competitors from free riding on their investment.

- **Bilateral agreements:** there are broadly two forms of bilateral agreements that can be observed in the sector: (i) Joint ventures between CPOs that amount to horizontal agreements for the expansion and sharing of their recharging networks, and (ii) Bilateral agreements between CPOs and eMSPs, giving the eMSP access to the CPO's recharging points network. Although these are in principle vertical agreements, due to the fact that CPOs are most often integrated with an eMSP, bilateral agreements between integrated CPOs/eMSPs can assume a horizontal dimension.<sup>136</sup> For example, two independent vertical agreements between the eMSP and CPO arms of two integrated CPO/eMSPs can be viewed as equivalent to a horizontal reciprocal agreement.

Bilateral access agreements give EV drivers access to a more extensive network of CPOs than the CPO that is integrated with the eMSP they are subscribed to, increasing the number of recharging points available to the average consumer.<sup>137</sup> Overall, these agreements are common in the EU27 + the UK, as many firms establish high numbers of partnerships to widen their geographic footprint. TotalEnergies, for instance, has agreements in place allowing access into its recharging network to clients of 71 different eMSPs (covering France, Germany, Belgium, Luxemburg, and the Netherlands).<sup>138</sup> Similarly, Dutch CPO and eMSP Allego has partnered with more than 280 eMSPs, giving them access to their network.<sup>139</sup> It should also be noted that bilateral agreements, even if they amount to horizontal network sharing agreements, are not as clear-cut as in the case of mobile networks as their assessment may differ based on the extent the CPO networks overlap.

- **Roaming platform agreements:** Roaming platforms are privately operated firms such as Hubeject, Gireve and e-Clearing that aggregate a multitude of members by signing agreements with multiple CPOs and then with multiple eMSPs providing them access to the CPO network (i.e., operating a B2B business model, with the CPO/eMSP paying to be a part of the platform). These platforms look to partner with as many CPOs and eMSPs as possible, providing access to a far reaching, diverse network of recharging points across the EU27 + the UK. Although the existence of a third party in between integrated CPOs/eMSPs makes coordination less likely, the roaming platform still has in principle access to pricing and other information and could hence act as a "hub" facilitating hub and spoke collusion.

Overall, closed networks are rare as interoperability is becoming more and more frequent, both nationally and across countries. While interoperability (both through bilateral and roaming agreements) is increasingly common, the diffusion of ad hoc

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<sup>135</sup> Tesla, "Non-Tesla Supercharger Pilot", November 2021

<sup>136</sup> Virta, "Why roaming is the buzzword in electric vehicle charging", September 2022

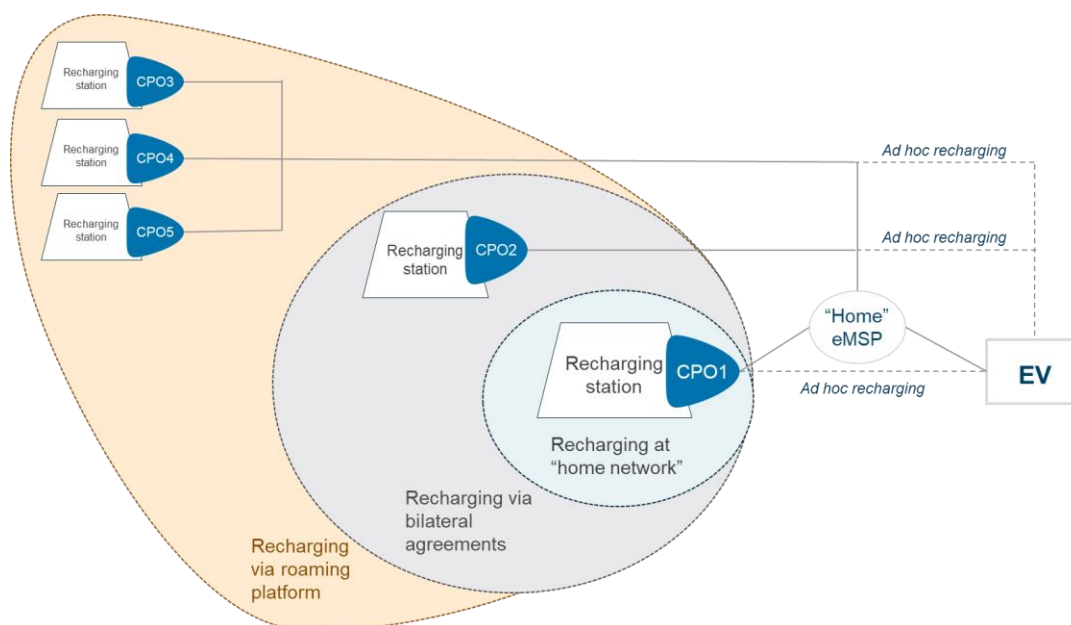
<sup>137</sup> Occasionally multi-lateral agreements can be established between more than two parties. These maintain the same structure, just increasing the number of parties involved (e.g., in between Dutch firm Fastned and four other CPO/eMSPs from different Member States and Switzerland which entered a multi-lateral agreement) Fastned, "European electric travel made easier", February 2017

<sup>138</sup> TotalEnergies, "Cards accepted by the TotalEnergies network"

<sup>139</sup> Study interview, Belgium CPO, December 2022

payment is also developing quickly in parallel.<sup>140</sup> Figure 13 below illustrates these various levels of interoperability, ultimately highlighting how EV drivers can recharge their car.

**Figure 13: Interoperability dynamics in the EV recharging ecosystem**



Overall, interoperability is widespread in the EU27 + the UK, both via bilateral agreements or through roaming platforms. While there is limited visibility on the exact number of bilateral agreements in place, almost all of the main players have opted into them (e.g., CPO/eMSP Allego in Belgium, CPO/eMSP Enel X in Italy and CPO/eMSP Izivia in France).<sup>141,142</sup> Furthermore, roaming platforms like Hubject and Gireve provide EV drivers access to the majority of recharging points, each having close to 1k CPOs/eMSPs partnered with them.<sup>143,144,145</sup> Through these interoperability agreements EV drivers can access the majority of recharging points in the EU27 + the UK, however multi-homing (where consumers enter a contract with and subscribe to more than a single eMSP) remains common practice within the industry. As a result, the majority of payments on publicly accessible rechargers are still presently made via subscriptions.<sup>146</sup>

Overall, a strong push towards enhanced interoperability is underway, with key market participants across the EU27 + the UK collaborating to address barriers for EV drivers. For example, partners from Austria, Denmark, Germany, and the Netherlands have

<sup>140</sup> Ad hoc recharging was defined by Directive 2014/94/EU as the possibility for the EV driver to recharge its vehicle “without entering into a contract with the electricity supplier or operator concerned”. While Directive 2014/94/EU has mandated ad hoc recharging across the EU, the European Court of Auditors pointed out that the norm’s implementation has been diverse across countries. Being a Directive rather than a Regulation, the AFID does in fact not specify how ad hoc recharging should be conducted. Therefore, often CPOs propose pay-as-you-go solutions, which do not require the EV driver to enter a contract but rather to create an account on the provider’s platform for free, as a mean for ad hoc recharging. That is the case mainly for integrated market players as CPOs need a software platform providing eMSP services to enhance pay-as-you-go payments. As discussed in Section 7.4, integrated player Blue Corner operating in Belgium is an example of that. To clarify the method to be used for ad hoc recharging, the Regulation repealing Directive 2014/94/EU proposed by the European Commission in 2021 introduces for CPOs the mandate to permit ad hoc recharging via direct credit/debit card payment.

<sup>141</sup> Allego, “Allego and Enel X join forces to offer EV drivers seamless charging across Europe”, June 2020 Allego, “Allego and Enel X join forces to offer EV drivers seamless charging across Europe”, June 2020

<sup>142</sup> José De Oliveira, “Pass Izivia: 700 more recharging points on the network”, June 2021

<sup>143</sup> Hubject, “More than 1000+ partners already make up our open Intercharge network”

<sup>144</sup> Gireve, “Connecting mobility towards global energy transition”

<sup>145</sup> Study Interview, CPO eMSP expert, November 2022

<sup>146</sup> ChargeUp Europe, “State of the Industry – Insights into the Electric Vehicle Charging Infrastructure Ecosystem”, 2022

joined forces through the evRoaming4EU alliance to facilitate roaming services and to provide transparent information to consumers about recharging point location and prices by leveraging the Open Charge Point Interface protocol. The project also aims to break cross-border barriers and create an EU wide network where consumers can enjoy an affordable, reliable, and convenient service.<sup>147</sup>

### **Recharging point mapping**

Another service that has emerged and is widely provided by the eMSPs is recharging point location. Usually offered via either mobile applications, online services, car infotainment systems or all, recharging points are commonly displayed over maps which, besides their location, also disclose information such as the state of the recharging point (whether it is in use, available or non-functioning), the connector sockets available, the capacity delivery level options and in some cases the indicative per kWh pricing details of the recharger. The vast majority of eMSPs offer a proprietary recharging point location service, with the main distinction being the size of the accessible network (which includes both proprietary recharging points as well as those made available via bilateral and roaming agreements). For instance, both the integrated player Enel X<sup>148</sup> and the independent eMSP Plugsurfing<sup>149</sup> offer recharging point location maps.

Overall, it emerged that there is an abundance of recharging point location map offerings which has resulted in an overlap of similar services and perhaps creates some confusion among EV users. Furthermore, aside from eMSPs, other independent software companies also offer comparable tools. On one hand, firms such as ChargeFinder, specialise in the provision of recharging maps to customers.<sup>150</sup> On the other hand, some companies that have traditionally focused on software for navigation are integrating recharging points information in their maps, such as Google Maps and Waze. However, information granularity varies considerably among providers. That can depend on different factors: first, some eMSP might display only recharging points accessible for their users, either directly or via roaming, while others, as in the case of Octopus Electric Universe's map,<sup>151</sup> also display recharging points outside of their network.<sup>152</sup> On top of that, data granularity largely depends on information collection methods. Many eMSPs update the information on their maps based on real time Application Programming Interface (API) collecting live data from CPOs. That is not always the case though; Google Maps for instance extracts information from imagery processing, as well as via cooperation with business, through access to national data sources and, most importantly, thanks to user signals.<sup>153</sup> Also noteworthy is that when an EV driver uses the native navigation system within their vehicle (i.e., not Google Maps or Waze), the mapping system can start to pre-condition the battery when directed to a recharging station which can lead to faster recharging speeds when the recharging starts.

#### **4.4.3. Integrated vs. non-integrated players**

The prior sections delineated the key business models that emerged from a bottom-up analysis of the competitive landscape across the EU27 + the UK; however, in reality these services tend to be offered by an integrated CPO and eMSP (with the overarching strategy remaining the same as what is outlined above). In particular, almost all CPOs

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<sup>147</sup> evRoaming4EU, "About the project", 2022

<sup>148</sup> Enel X, "Our Network, One App"

<sup>149</sup> Plugsurfing, "On-the-go EV charging just got easier"

<sup>150</sup> Chargefinder, "Find charging stations on the map"

<sup>151</sup> Octopus Energy, "Electric Universe Map"

<sup>152</sup> This may introduce scope for discrimination as discussed in Section 5.4.1

<sup>153</sup> Ethan Russell, "9 things to know about Google's maps data: Beyond the Map", October 2019

act as their own eMSP to provide an end-to-end service, combining energy supply with a one-stop application that covers all necessary features (e.g., payment, reservations, tariffs, routing, etc.). As depicted in Figure 14, this trend is noticeable in the major EV recharging players across the EU27 + the UK, who have all invested in both the hardware and software sides of the business.

**Figure 14: Major integrated CPO / eMSP players across EU27 + the UK (non-exhaustive list)**



The integrated CPO and eMSP business model is set to become even more prevalent in the future, with these types of players already experiencing higher growth. Nevertheless, some players have decided to only focus on one side of the EV recharging operation. This is mostly the case for eMSPs, given the lower investment needed to operate solely as a software company (thus allowing for smaller, more specialised players to emerge and play a key role in the industry). ChargeMap and Plugsurfing are examples of pure eMSPs who have been able to expand, each providing an international network of around 300k recharging points to their customers and suggesting non-integrated eMSPs are able to compete in the market (albeit typically as specialised players).<sup>154</sup>

Another set of eMSPs who have succeeded without being vertically integrated with a CPO are those integrated with OEMs. The large majority of EV models come with their own eMSP service, which they advertise as the most convenient way to recharge. These in-house eMSPs then give access to recharging networks through a series of bilateral and roaming agreements, for instance several well-known manufacturers (e.g., Audi, BMW, Ford, Hyundai, Kia, Porsche, etc.) have integrated IONITY into their network (in some cases given they have a partial ownership interest in IONITY). CPOs who do not offer eMSP services are less common. Typically, this tends to be the case for government networks being developed at the infancy of the sector, as they do not necessarily want to invest in the capabilities needed to develop a user-friendly and reliable platform (which will become somewhat obsolete once increased competition emerges). For example, in Croatia the Elen brand (created on behalf of state-owned electricity utility HEP Group) initially opted to deploy rechargers without an eMSP or app attached to them, offering recharging for free as it did not have the in-house digital capabilities required to set up and run the service.<sup>155</sup>

<sup>154</sup> Chargemap, "Chargemap website"

<sup>155</sup> Balkan Green Energy News, "First ELEN charger for electric vehicles installed in Rijeka", February 2017



## 4.5. Evolution of business models

The public recharging market is still at a relatively early stage, with historical business models not necessarily set up to navigate changing consumer demands, increased interoperability, value chain integration, and the emergence of new technologies. Many factors are likely to influence the evolution of EV recharging business models.

Regulators are now requiring companies to allow EV drivers to use their service without entering into a contract (e.g., Directive 2014/94/EU push for ad hoc recharging). Private companies are also recognising the value in interoperability (e.g., Tesla's super-recharging pilot program). For CPOs, interoperability increases the utilisation of infrastructure, helps them attract new customers, and provides a new revenue stream. For eMSPs, it creates stronger brand loyalty and enables them to provide an improved service to their customers. This shift to a highly interoperable EV recharging network is noticeable across Europe, with speakers at the 2022 Intercharge Networks Conference (ICNC) in Berlin highlighting that approximately 80% of EU public recharging points now enable roaming.<sup>156</sup>

EV drivers are also beginning to favour higher capacity (fast and ultra-fast) public networks as they place increased value on the speed of recharging, potentially making many of the original slow recharging points obsolete (disregarding the on-street recharging model which is akin to home-recharging where low-cost slow rechargers are more fit for purpose). Moreover, these traditional recharging points typically do not support fast (and ultra-fast) recharging and smart recharging<sup>157</sup>, creating problems for global distribution networks as the energy and mobility industries converge. While this transition to new technologies is disrupting conventional rechargers, it is also creating new opportunities and it is giving rise to new business models.

Presently, the highest short-term potential for smart recharging and V2G sits within the private and fleet recharging segments (and the associated CPOs and eMSPs), given that EVs will be connected for a long duration, allowing the energy aggregator the largest possible window to take advantage of demand side response.<sup>158</sup> Fleet recharging is a particularly attractive area for CPOs and eMSPs to generate new revenue streams by providing ancillary services to the grid, as multiple EVs with large batteries are connected at each depot, allowing them to create concentrated pockets of power capacity (potentially making a significant impact on peak loads). In simple terms, this means they can act as an energy source during peak-times, injecting electricity into the grid, while recharging during period of low demand (off-peak). Moreover, Smart Recharging Service Providers might emerge to provide coordination between recharging points, DSOs, and transmission system operator (TSOs). Firms with strong IT platforms, data aggregation and customer reach capabilities will be best positioned – this could include large tech (e.g., Google, Amazon, Apple) or focused V2G technology players (e.g., Greenflux and Jedlix who already specialise in software solutions for the management of smart recharging).<sup>159,160</sup>

Due to the continued advancement of technology, and the associated uncertainty in what will be the solution of choice in the future, the recharging-as-a-service models are

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<sup>156</sup> ICNC22, "Intercharge Network Conference 2022"

<sup>157</sup> Smart recharging encompasses both load management, where electricity consumption is shifted to periods of lower demand, and V2G, where electricity is supplied to the grid through bi-directional energy flow

<sup>158</sup> Glotzer, Stocker, Caputo, et al., "Introduction to V2G: A critical technology to enable the energy transition", September 2022

<sup>159</sup> Greenflux, "Smartest in EV charging solutions"

<sup>160</sup> Jedlix, "Business Solutions"

becoming more prevalent.<sup>161</sup> This allows site owners and developers to enjoy EV recharging with limited upfront costs, reducing the inherent risk, and providing greater accessibility of EV recharging infrastructure. This is a great option for the destination recharging segment, with retailers and other business establishments being able to provide added value to their customers without the burden of ownership and maintenance. Moreover, this business model is likely to succeed, if it offers a complete solution covering the various eMSP services described in Section 4.4.2 (along with additional tailored support). In the EU27 + the UK, Virta is one of the major players focusing on recharging as a service, turning into the fastest-growing EV recharging platform in the EU and now operating in over 30 countries (500k+ active users, 1k+ B2B customers, 200k+ recharge points available via roaming).<sup>162</sup>

## 4.6. Pricing models

Here we summarise the current pricing practices in EV recharging in the EU27 + the UK. Pricing structures are potentially important because they reflect the degree to which operators can set prices given the local competitive conditions and the scope for potentially exclusionary pricing practices such as bundled pricing.

EV recharging pricing models vary along two main dimensions. First, eMSPs and CPOs offer different pricing solutions based on the underlying relationship between the driver and recharging point depicted in Figure 13. Second, prices vary based on the power level of the recharging point, with high-capacity fast and ultra-fast chargers often being accompanied by a significant price premium. The overall pricing structures prominent across the EU27 + the UK, and the underlying dynamics based on network interoperability and accessibility, are discussed below.

### 4.6.1. Pricing dynamics

Pricing for EV recharging depends on several factors, including network accessibility (i.e., on the contractual relationship between an EV driver, the eMSP and the CPO of a specific recharging point). At a high-level we distinguished four distinct scenarios:

1. the EV driver subscribes to the eMSP and recharges at:
  - a. the recharging point belonging to the 'home' eMSP (on-net use);
  - b. a recharging point with which the 'home' eMSP has a bilateral agreement (off-net use);
  - c. a recharging point which is part of the same roaming platform as the 'home' eMSP; and
2. the EV driver uses a recharging point relying on ad hoc recharging, paying directly to the CPO.

While intuitively one would imagine options 1b and 1c would be accompanied by a price premium compared to 1a (as there is at least one more player involved), this is not always true in practice. Rather, based on when the bilateral or roaming agreements were set-up, how they were negotiated, and the nature of the two companies there are several cases where recharging outside of one's 'home' network can have a lower price. Likewise, ad hoc recharging can be both cheaper or more expensive than the other options available. Nevertheless, while it is difficult to make a conclusion across the EU27 + the UK which is relevant to all players, typically recharging costs increase as EV drivers

<sup>161</sup> Recharging as a Service is a subscription-based package that provides turnkey EV recharging solutions with minimal upfront purchasing costs. You pay a monthly subscription fee over a fixed term instead of all upfront costs at once while also removing the burden of ownership and maintenance from the recharging host

<sup>162</sup> Virta, "Become part of the ecosystem"



diverge from on-net use. For example, Mer (a major European player operating across Scandinavia and the UK) has rewarded registered users with a cheaper tariff than EV drivers who use the service through bilateral agreements, roaming, or ad-hoc functionalities (for a recharging point >50kW, subscribers pay approximately £0.69/kWh while others pay approximately £0.72/kWh).<sup>163</sup> Likewise, in Belgium, Blue Corner subscribers pay between €0.36/kWh to €0.43/kWh depending on their plan, significantly less than the €0.53/kWh charged to EV drivers who are roaming (AC recharging).<sup>164,165</sup> Moreover, some providers offer volume discounts through their subscriptions, such as Enel X in Italy that charge EV drivers € 25.00 / month for a total energy consumption of 70 kWh, or € 45.00 / month (VAT and taxes included) for a total energy consumption of 145 kWh.<sup>166</sup> Although this is not a constraint for market competition, this provides an incentive for subscribers to use the on-net recharging points and hence be loyal to the eMSP they have subscribed. As this in turn reduces multi-homing incentives, it may make the market more prone to tipping.

These pricing dynamics, and their competitive implications, are discussed in more detail in the competitive assessment but overall, the picture is not definitive, due in part to the nascent state of the sector and limitations in price transparency/comparability. Nevertheless, the current picture is that EV drivers do not typically focus on the price difference between different eMSP networks as much as on the service provided (i.e., the power level of the chosen recharging point), and this is where the major differences in prices tend to emerge with consumers willing to pay more for speed/convenience.

#### 4.6.2. Pricing structures

Most eMSPs offer subscription solutions to EV drivers. Often, subscriptions come with an eMSP-specific RFID card to be used to access the recharging stations which, depending on the provider, might be given free of charge or could require a one-time activation fee.<sup>167</sup> Moreover, the ways recharging is priced varies. In many cases recharging is billed on a "per kWh" basis, making total cost dependent on the amount of electricity consumed. Some providers, instead offer a flat-rate price per recharging session, making the cost independent from the electricity consumed.<sup>168</sup> In other cases, for example E.ON Drive in Germany, price is time-based, billing per minute for the time an EV occupies the recharging point.<sup>169</sup> Some eMSPs also offer monthly flat rates. That is for instance the case of the Enel X in Italy, which allows its clients to pay a fixed amount per month that in turn gives them access to unlimited recharging sessions up to a certain amount of electricity consumed.<sup>170</sup> Similarly, OEM eMSPs such as Mercedes Me offer their drivers different packages with fixed fees that provide a reduction in recharging costs at any of the recharging points within their network, including IONITY and BP Pulse rechargers.<sup>171</sup> Whilst the OEM brands do not advertise promotions about their recharging services online, it is understood that EV drivers sometimes negotiate a free introductory subscription for a limited time to these services.<sup>166</sup> These non-linear pricing mechanisms are set-up to create a more consistent revenue stream for CPOs, while rewarding customer loyalty by offering what is often a cheaper per unit price.

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<sup>163</sup> Mer, "Pricing: How Much Does Electric Vehicle Charging Cost?"

<sup>164</sup> Blue Corner, "Charging Services – Apply for a charging card"

<sup>165</sup> EVBox, "What are the charging fees of EVBox roaming partners", January 2023

<sup>166</sup> Enel X Way, "Charging FAQs: What fees are available for the public charging service?"

<sup>167</sup> European Regional Development Fund, Emobility, "Report on EV charging pricing, regulatory framework and DSO role in the e-mobility development", August 2021

<sup>168</sup> Ibid.

<sup>169</sup> E.ON, "Charging Solutions for on The Go"

<sup>170</sup> Enel X Way, "Charging FAQs: What fees are available for the public charging service?"

<sup>171</sup> Mercedes Me, "Use the tariff that suits you"

In general, the price structures consist of several components. Some are fixed and designed for example to recover the purchase and installation costs of the recharging station or the eMSP fee, and others are variable, fluctuating for instance with the price of electricity when recharging during peak or off-peak hours. Nevertheless, drivers who rely on public recharging can rarely access these cheaper off-peak or dynamic electricity rates, as these rates are often not available to them and tend to be tailored to home recharging. This can lead to public recharging being less attractive, negatively impacting EV affordability for users who rely on on-street recharging. For example, in Ireland off-peak home recharging rates are almost four times lower than average public recharging rates. In contrast, Portugal has a well-developed public smart recharging system with a market design that encourages off-peak recharging (on average, Portuguese EV drivers can save €0.06/kWh by recharging during cheaper times at public stations).<sup>172</sup>

In most cases, pricing also depends on the capacity of the recharging station used and the power delivery required by the customer. In fact, ultra-fast recharging (capacity over 150 kW) usually comes with a premium compared to slow recharging speed (up to 22kW), which is largely driven by the high investment cost for fast recharging and the subsequent link to the time to generate a return on investment. This difference is normally reflected both in the per unit tariffs as well as in the flat-rate ones. Similar to recharging speed, recharging station location can also impact pricing. Lastly, some firms also charge a price per unit of time once the recharging is completed to disincentive long occupations of recharging points (this model is not conducive to smart recharging however).<sup>173</sup>

In addition to the costs incurred when recharging the EV, there is also commonly a per minute fee incurred for being parked in the recharging bay after the recharging session has completed, this is known as an idle fee. More common at recharging points that are in high demand, such as the on-route recharge points at a motorway service station, users will be charged a fee of up to €8 at an ESB eCars station if the EV driver is still parked there after 45 minutes after their session has finished, or Tesla charge €1.00/minute after the session has completed if the station is 100% occupied.<sup>174, 175</sup>

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<sup>172</sup> Julia Hildermeier et al., "A Review of Tariffs and Services for Smart Charging of Electric Vehicles in Europe", November 2022

<sup>173</sup> Hubject, "Pricing Strategies for Electric Mobility Providers", August 2019

<sup>174</sup> ESB, "Price Plans", December 2022

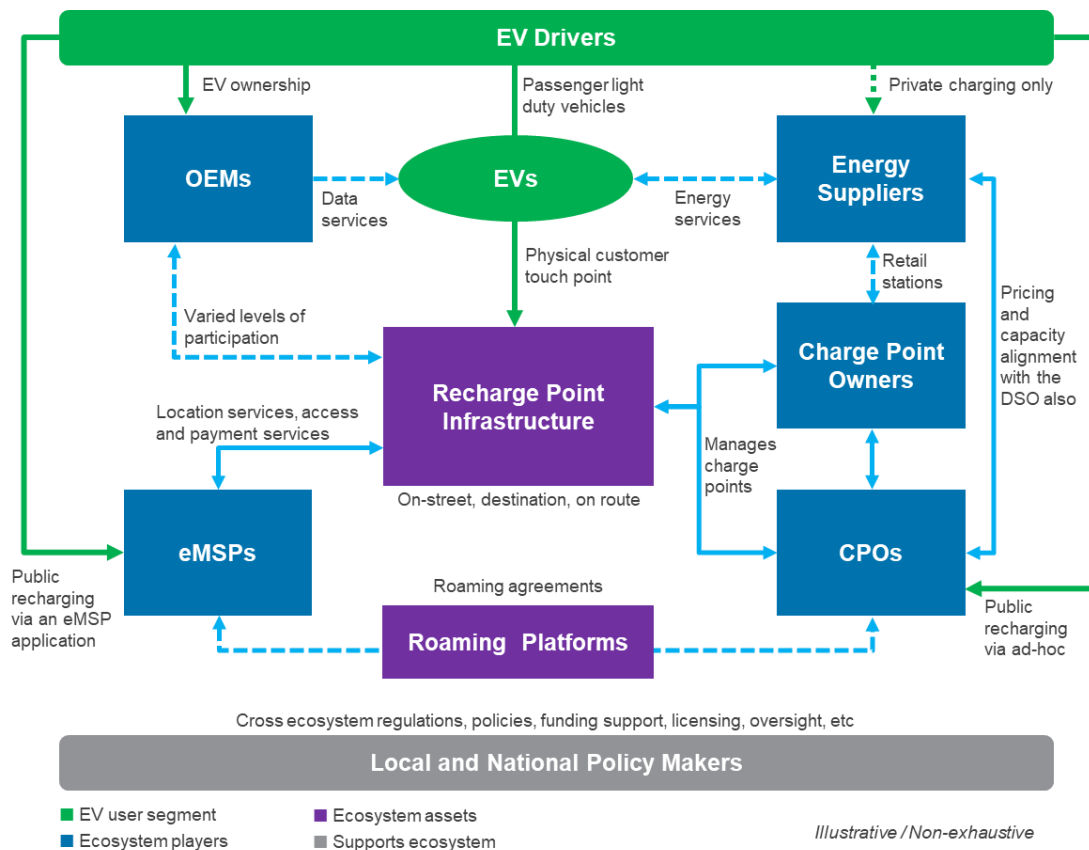
<sup>175</sup> Tesla, "Supercharger Idle Fee"

## 5. Competition law analysis and implications based on data from the EU27 + the UK

Having set out the required background on the value chain, supplier business models, and the regulatory framework, this section provides a taxonomy of potential competition concerns drawing from examples and experiences across the EU27 + the UK. Within this taxonomy we analyse the extent to which these concerns are likely to manifest based on the available data and set out the key competition themes that would likely feature in an assessment of these concerns going forward.

The taxonomy of concerns is closely linked to the discussion of the eMobility value chain and “ecosystem” in Section 2.4. Figure 15 below summarises our overview of this value chain.

**Figure 15: Indicative eMobility ecosystem participation and linkages**



Taking this value chain as a starting point we work through the following topics.

- **The link between competition in EV recharging and broader social objectives (Section 5.1).** Given the link between the promotion of EV recharging and broader policy objectives (e.g., Net Zero targets) we begin with a formalisation of the extent to which competition can contribute to these goals. We explain how, in sectors characterised by positive externalities, ineffective competition is likely to be doubly harmful because reductions in output due to market power do not just cause the “traditional” harm to consumer welfare but are also likely to undermine broader objectives. This indicates that, even if competition policy alone cannot deliver the socially optimal outcome, it is particularly important that competition works well in such sectors.

- **Taxonomy and preliminary assessment of unilateral competition concerns (Section 5.2 and Section 5.3).** We next consider unilateral competition concerns. We distinguish between factors leading to the existence and exploitation of market power at the local level, before turning to the conditions under which EV recharging may lend itself to “winner takes all” outcomes due to a combination of demand side network and/or supply side density effects and/or unilateral conducts such as exclusive dealing, land banking or bundled discounts.

On the former, we find that evidence from the EU27 + the UK supports the likelihood of local “pockets” of market power analogous to those held in traditional industries like ICE retailing. This is particularly likely in the case of less dense locations which may lend themselves to “natural monopoly” style conditions but may also be exacerbated by regulatory barriers. We discuss how policy initiatives can resolve the latter concerns by, for example, ensuring that local regulatory set ups encourage competitive tendering and limit use of exclusive concessions, and note examples of such practices in several EU countries. However, future competitive assessments should play close attention to the extent of regulatory barriers to entry and expansion.

On the latter, we analyse EV recharging within an economic framework to assess the likelihood of the sector “tipping” towards a dominant incumbent. Our review of the available data indicates that, at least currently, EU markets likely remain contestable. While there are instances of countries with high levels of concentration at the national level, there is evidence that these may reflect the outcomes of a transient first mover advantage rather than persistent market power. We discuss, however, how competition policy should monitor the potential for market “tipping” and conducts which, under certain conditions, could make this outcome more likely. When doing so, however, we note potential trade-offs in relation to policies which might facilitate entry (e.g., access arrangements) but also discourage ex-ante investment incentives.

- **Potential competition concerns due to non-horizontal linkages within the value chain and whether prima-facie data and evidence indicates that these could raise competition concerns (Section 5.4).** We discussed in Section 4 how CPOs are seeking to add additional services alongside recharging to differentiate themselves and how multiple actors in adjacent parts of the value chain (e.g., energy suppliers, EV OEMs) are becoming involved in the EV recharging sector. We lay out the potential competition concerns due to these different “linkages” among players active in different layers of the vertical chain, and use concentration levels at different layers of the value chain to “screen” for potential concerns.
- **Exclusionary conduct involving integrated CPOs/eMSPs.** Integrated CPO/eMSPs that are dominant in the CPO segment may have the incentive to foreclose rival eMSPs by restricting access to their CPO network completely (e.g., refusing to sign bilateral access agreements) or partially (i.e., offering access at significantly worse terms than to their integrated eMSP). Although there is limited data availability due to the nascent state of the market and bilateral agreements offer scope for price/terms differentiation, we have not found evidence of such practices being widespread. eMSPs may also provide preferential treatment to their integrated CPO’s recharging points in their location/navigation maps taking advantage of the fact that consumers’ choices can be influenced by small changes in presentation.
- **Exclusionary conduct involving energy providers.** When the DSO also owns a CPO, they may have the incentive to undermine access of rival CPOs to the grid or

otherwise obstruct the installation of new recharging points.<sup>176</sup> Although there are regulations governing DSO conduct, we present prima facie evidence validating such concerns and indicating that they should be an area of focus for competition authorities;

- **Exclusionary conduct involving ICE fuel retailers.** CPOs can own or sign exclusive agreements with ICE fuel retailers for exclusive access to key recharging locations such as along motorways;
- **Exclusionary conduct involving local authorities.** When local authorities, which are entitled to grant concessions for EV recharging sites, are also present as a local CPO, they may have the incentive to prevent rival CPOs from installing recharging points in public land. We present evidence that this is a real concern in many locations throughout Europe. Hence, intervention, perhaps in the form of best practice guidance on tendering processes, is likely required to ensure there are open and competitive tendering processes;
- **Exclusionary conduct involving EV OEMs.** OEMs who have built branded recharging networks may have the incentive to operate them as a closed networks. However, on current trajectories, competition in the EV and recharging space is unlikely to lead to competition concerns around OEM's operating proprietary networks, and there is evidence that previously closed networks are opening up;
- **Horizontal agreements and coordinated conduct (Section 5.5).** We noted in the previous section how several recharging networks engage in joint ventures for the expansion and sharing of their recharging networks. We discuss how such arrangements can be evaluated through a similar lens as network sharing agreements (NSAs) in telecommunications and other sectors with an acknowledgment that network sharing can facilitate investment and network density in "hard to reach" areas, but also potentially lead to softened competition and collusion through information sharing. This framework would point towards differential treatment of agreements between non-overlapping (and hence complementary) networks vs. ones with a material overlap in footprint. In addition, bilateral agreements between CPOs and eMSPs, although vertical in nature, may present coordination concerns akin to those from horizontal agreements when they are formed between integrated CPO/eMSPs. Even vertical agreements with third parties such as roaming platforms may present risks for "hub and spoke" collusion; and
- **Public funding considerations and concerns (Section 5.6).** The provision of public funding through national or EU funds is common for the EV sector. We document this and discuss how this can be justified by the positive externalities present due to the wider societal benefits a developed EV sector would offer in terms of environmental goals, but also due to the particular features of the market, namely, the "chicken & egg" problem<sup>177</sup> and its dynamic demand. However, public support comes with risks regarding the crowding-out of private investment incentives, favouritism towards state-controlled firms, and public policies and support more generally that favour the first-mover or established larger incumbents

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<sup>176</sup> As detailed in Appendix D, Directive 2019/944/EU prevents DSOs from directly owning and operating recharging points, unless exceptional circumstances apply. Nevertheless, DSOs are allowed to operate as CPOs via fully independent subsidiary firms. As an example of that, in Italy, both the DSO E-Distribuzione and the CPO Enel X are subsidiary firms of Enel.

<sup>177</sup> The "chicken and egg" problem or paradox refers to the situation where in markets with network externalities, in order to succeed, firms must get both sides of the market on board. Here CPOs find it profitable to enter/expand as long as there is sufficient EV car demand, but EV car demand will be limited as long as there is not adequate recharging infrastructure. See more on the definition of this problem in the context of all two-sided platforms: Jean-Charles Rochet, Jean Tirole, Platform Competition in Two-Sided Markets, Journal of the European Economic Association, Volume 1, Issue 4, 1 June 2003, Pages 990–1029.

restricting new entry and dynamic competition, or even risking tipping the market. We present comparative tables and examine whether the available data support any correlation between level of market maturity and CPO state-ownership and/or volume and type of public support.

An overarching theme from our analysis is that effective competition regulation will require market specific analysis and that any intervention needs to consider carefully the extent of market maturity and the trade-off between static competition and the dynamic incentives of private firms to invest. While risks of “tipping” should be taken seriously, there is evidence also consistent with concentration being self-correcting and initial positions of first mover advantage may erode over time.

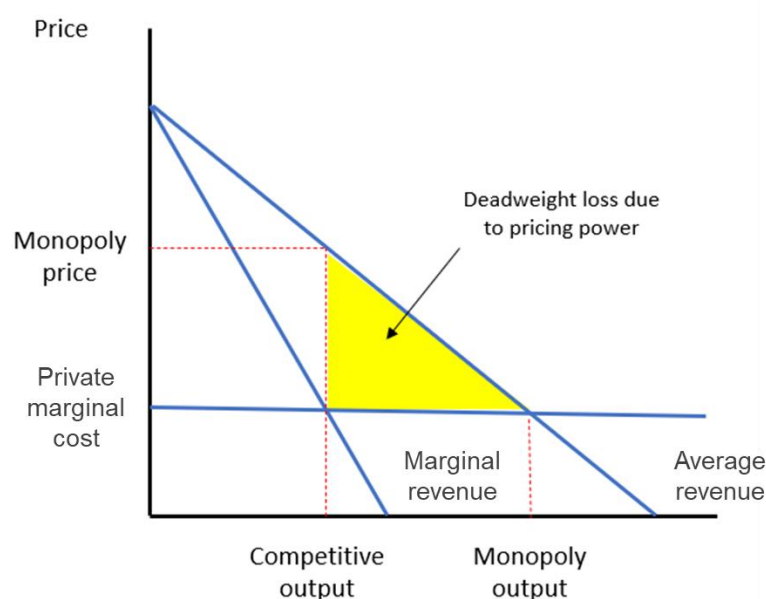
Having presented this high-level framework we then return to these considerations in Sections 6, 7 and 8 when we conduct an in-depth assessment of competition in Ireland, Italy, Croatia and Belgium.

### 5.1. Social externalities from EV recharging imply a larger pay off from effective competition

We discussed the transportation sector’s role in achieving Net Zero targets and the contribution of EVs to this in Section 2.3.1. These developments imply that investment in EV recharging infrastructure has the potential to generate positive externalities. In this sub-section, we comment on how the presence of such externalities increases the potential benefits from effective competition in EV recharging.

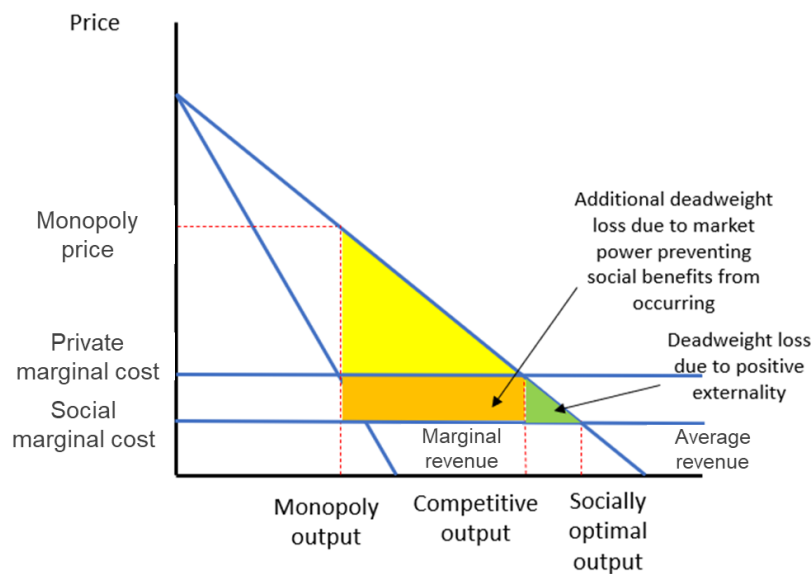
The traditional concern about lack of competition, in any market, is that it results in an inefficient reduction in economic output. If market power allows prices to be inflated above marginal cost then there will be a loss of “allocative efficiency” as a result of socially desirable transactions not taking place. Concretely, there will be instances where the consumer surplus from additional EV recharging capacity exceeds the cost of provision, but this capacity is not installed because it is in the interest of a firm with market power to reduce capacity below the competitive level to increase prices and profits. This is illustrated in the yellow area of Figure 16 (the classical monopoly diagram).

**Figure 16: Deadweight loss from monopoly in the standard case**



The distinction with EV recharging compared to the canonical example is that there are broader social benefits from an expansion of EV recharging capacity: this capacity is necessary for the EV transition to occur and for climate and for other environmental goals to be achieved. In economic terms, there are positive externalities from EV recharging capacity which mean that the “true” social cost of installing EV recharging capacity is less than the private cost borne by suppliers. This means that even perfect competition will not achieve the optimal level of output (illustrated in the green triangle below in Figure 17) and that reductions in outcome below the competitive level will not just create the “traditional” deadweight loss<sup>178</sup> in the yellow shaded triangle, but also the additional harm in the orange area below.

**Figure 17: Deadweight loss from monopoly with positive externalities**



The takeaways for competition policy are two-fold. First, the presence of these social benefits means that the impact of market power in EV recharging is likely to be more harmful because reduced competition does not just cause the normal allocative inefficiency due to market power but also undermines the pursuit of broader social objectives (up to the competitive output). Second, there is a limit to what can be achieved by competition policy alone. Even perfect competition will tend to be insufficient to deliver on social objectives and additional tools/policies may be needed to reach the social optimum, which should be larger than the competitive output.

In the rest of this section, we consider whether there is prima facie evidence from the EU27 + the UK of competition issues in the sector and, in each case, the key competition themes that would likely feature in an assessment of these issues.

## 5.2. Anti-competitive concerns around the exercise of local market power

We begin by considering competition concerns around horizontal unilateral conduct. We consider scope for local market power, the potential for EV recharging to “tip” towards a small number of players, and whether there are conducts (e.g., “land grabbing”,

<sup>178</sup> The “Deadweight (welfare) loss” (DWL) is a measure of the monetary value of consumers' surplus lost (but not transferred to producers) as a consequence of a price increase. In this context, it is a measure of lost economic efficiency when the socially optimal quantity of the good is not produced due to the combined effect of monopoly pricing and the presence of a positive externality. MR and AR in the Figure refer to the Marginal Revenue and Average Revenue and MC to the Marginal Cost of the monopolist.



bundled discounts, exclusive contracts, or procurement practices by local governments) which could contribute towards increasing or perpetuating market power. In each case we present an assessment of the current evidence and the key competition themes that would likely feature in a horizontal assessment.

Because of the evidence (set out in Section 4) that there is convergence in the CPO/eMSP business model such that all major CPOs are likely to offer consumer-facing eMSP services, we consider these horizontal issues holistically and without distinguishing between the CPO and eMSP layer. When the distinction between the CPO/eMSP layer becomes competitively relevant later in the section (e.g., when considering the role of eMSPs that are not integrated with a CPO and operate exclusively through agreements), we discuss the implications in more detail.

### 5.2.1. Concerns around local market power

Consumer preferences over EV recharging have a local component. All else equal, consumers will prefer to use recharging points, which are more conveniently located. In this sub-section we consider the evidence for the existence of local pockets of market power and the factors contributing to this.

**Evidence on consumer preferences and willingness to trade off price and distance.** The potential for local market power relies on consumers having strong preferences for geographic convenience. Our research has not revealed precise information on the extent to which consumers are willing to trade off price and convenience (e.g., by travelling to and using a recharging point that is lower-priced but somewhat further from their home or place of work). However, there will be a limit on how far consumers are willing to travel further away to avoid a small but significant increase in prices of local suppliers, hence introducing a geographic component to competition.

The scope of geographic markets can further be expected to differ across different categories of recharging points. As explained in Section 4.3, around 20% of EV recharging today occurs away from home including a combination of on-street, destination, and on-route recharging. Although this may appear small, it can be expected to increase as the density of recharging networks increases, recharging times decline and as people without possibility of home recharging (e.g., those living in apartment buildings) start buying EVs en masse.

For on-route recharging the relevant competitive constraints are likely to be between different stop-off points on a route (e.g., instead of recharging in traditional recharging stations alongside the motorway, a driver might come off the highway and use a recharging point in an adjacent town or try and plan their journey to use a lower-priced recharging point at a later service station). For destination-based recharging (e.g., near an office, gym, or supermarket) the substitution would presumably be to recharging at a point in walking distance of the destination, at another destination or altering one's schedule to recharge elsewhere (e.g., by recharging at another destination or at home). For on-street parking, we would expect many users to prefer to recharge as close as possible to their house or where they park their vehicle, but they may perhaps be willing to travel further afield to a faster recharging point in response to a significant local price increase. Overall, while for standard fuel recharging price and distance are the main differentiators, the picture for EV recharging is more complicated as, although there are more opportunities to recharge, not all are equivalent in terms of the opportunity cost of time to recharge an EV using each different recharging method.

Experience from analogous markets is that geographic markets are likely to be relatively narrowly defined. For example, in petrol retailing, markets have been defined based on



drive times of around 10 minutes.<sup>179</sup> While one would expect markets to be less narrow than in ICE equivalents (e.g., because filling up an ICE vehicle is a faster process than recharging an EV and because the prospect for many EV users of recharging at home or at different destinations creates a new dynamic), there is still potential for relatively narrow geographic markets from a consumers' perspective.<sup>180</sup>

On this view, one might expect EV recharging locations which are geographically isolated from competition to charge higher prices in the same way that remote ICE fuel stations can charge higher prices today. On the other hand, it is possible that the existence of home recharging, and the inability of recharging stations to price discriminate based on whether a customer lives nearby could generate an additional competitive constraint.<sup>181</sup> Further, the installation cost of an EV recharging point is significantly less than for an ICE refuelling station such that the scope for positions of local market power may be more limited than with incumbent technologies.

**Do prices vary locally in a way that could permit exploitation of local market power?** One could envisage local market power emerging through higher prices in two ways. Either CPOs might charge higher access prices to eMSPs for less competitive locations, or eMSPs might charge higher end prices to consumers at locations with less competition, either because they have coverage that cannot be matched by rivals and which they wish to exploit or because they pass through higher access costs charged by CPOs.

Although we have not been able to collect sufficient evidence to conclude that prices currently systematically vary based on geography and according to the degree of local competition, our review indicates that there is at least some scope for CPOs/eMSPs to "flex" prices to reflect local competitive dynamics. This might be done implicitly (e.g., by charging different prices for fast and slow recharging points and then installing fast recharging points at more competitively isolated locations<sup>182</sup>) or explicitly (e.g., in the Netherlands and Ireland it is commonplace for prices per kWh to vary at a local level).<sup>183</sup>

Although we have not retrieved evidence of systematic price variation, there remains variation in pricing structure and levels. This can be observed on the eMSP pricing aggregation service, ChargePrice,<sup>184</sup> and is discussed in Section 4.6.

**How much variation is there in market positions on narrower geographies within countries?** A review of data from Electerverse, Octopus Energy's EV roaming service map, illustrates why national shares in recharging points may mask positions of local market power. Figure 18 below, based on downtown Amsterdam, illustrates this point. While the zoomed-out the picture suggests a market with many competing suppliers, as we zoom in there are indeed pockets that look more problematic with only a few suppliers and, if one takes the narrowest lens, only a single operator.

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<sup>179</sup> For example, the UK Competition and Markets Authority defined markets for petrol retailing based on 10 minute drive times in its decision in the Sainsbury's/ASDA merger. (Competition and Markets Authority, "Anticipated merger between J Sainsbury PLC and Asda Group Ltd", April 2019)

<sup>180</sup> Competitive dynamics can also be anticipated to differ as between plug-in hybrids and battery electric vehicles because the option of refuelling is retained. Over the long-term, however, the latter segment will be most relevant particularly as sales of new hybrids will be curtailed by the 2035 ban on sale of ICE vehicles.

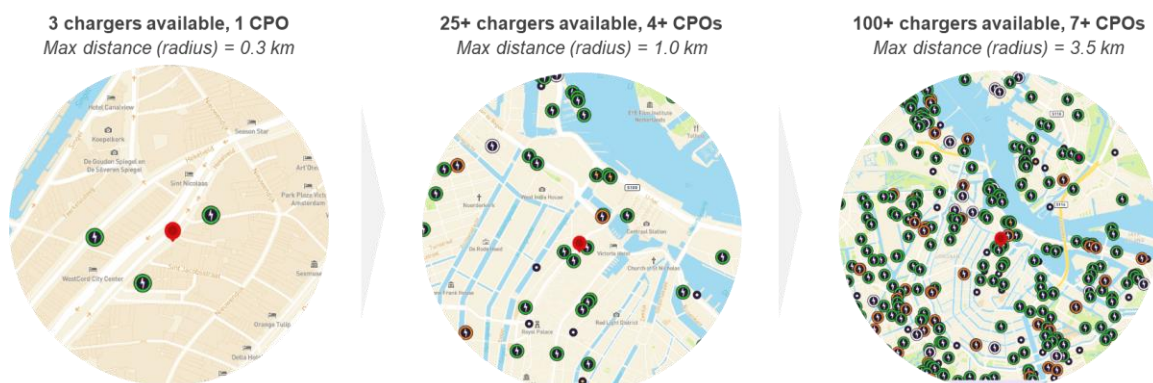
<sup>181</sup> However, in the integrated CPO/eMSP business model, the eMSP could have access to home location information raising the potential for price discrimination in a way not feasible for an ICE fuel station.

<sup>182</sup> We, however, note that prices between slow and fast recharging services also reflect differences in demand and in the cost of provisions, so margins would need to be compared to see if indeed fast recharging margins are higher giving incentives for such conduct.

<sup>183</sup> European Regional Development Fund, Emobility, "Report on EV charging pricing, regulatory framework and DSO role in the e-mobility development", August 2021

<sup>184</sup> ChargePrice, "ChargePrice map", 2022

**Figure 18: CPO competition density expanding the search area in central Amsterdam<sup>185</sup>**



**Barriers to entry.** Issues of local market power are only likely to persist if there are significant barriers to entry and competition policy should focus on instances where such barriers are present. Our research has identified three main categories of entry barriers.

First, there are potential regulatory barriers, for example because of local governmental bodies awarding concessions on an exclusive basis. This might occur because of financial pressures: allocating exclusive rights to the highest bidder is likely to facilitate maximal revenue generation, but this privately optimal decision of local authorities would fail to take account of the broader social benefits of promoting competitively-priced and high quality EV recharging. Local authorities may also have in-house operations in the form of a local utility company owned and run by the local authority that they choose to favour over a more competitive set up. This may also have similar implications as it may contribute to the LAs' finances.

Consistent with this, a study by the German Federal Cartel Office found that little use was made of public tender procedures (particularly to enhance competition in the market) on the municipal level and that concessions were often "awarded fully or for the most part to one and the same operator"<sup>186</sup>, leading to municipal areas often being served by a single recharging company, which is often the municipal utility. We further discuss this and other examples in the context of foreclosure concerns in Section 5.4.4.

Overall, monopoly positions at the regional level can arise either through local authorities exploiting their position to create a revenue stream by favouring the CPOs they control. However, even in the absence of such incentives, the lack of expertise around tendering could lead a local authority to inadvertently favour large incumbents limiting competition.

These potential concerns have been reflected by policies adopted in the EU27 + the UK aiding local authorities to tender with an explicit objective to promote/protect competition. For example, Italy has integrated the tender process on motorways into their Annual Law for Competition (Article 12, 2021) that mandates that the licence award needs to happen through an open, competitive, transparent and non-discriminatory process.<sup>187</sup> The Flanders area of Belgium also followed a similar approach and works closely with CPOs in the market to ensure no monopolistic position emerges,

<sup>185</sup> Octopus, "Electroverse charging map". Red dots indicate the central point from which the radius is determined.

<sup>186</sup> Federal Competition Authority, "Sector inquiry into EV charging infrastructure: AFCA launches comprehensive market inquiry", May 2022

<sup>187</sup> Italian Senate, "Annual law for market and competition 2021", February 2022

to that avail Engie, Allego and TotalEnergies have each won tenders in recent years.<sup>188</sup> Similarly, the UK CMA raised questions around whether local authorities had the right commercial skills and support needed to run an effective tendering process (giving rise to significant regional disparity in the EV infrastructure roll-out).<sup>189</sup> To support them, a Local Authority Toolkit was recently published, and practical guidelines are under development covering the entire process, from procurement to operation.<sup>190</sup>

Second, is the potential for technical barriers such as limited support from network operators in providing connectivity to the grid. We describe the full process of civil works/installation of a recharging point in Section 4.3, including the role of the DSO. While a DSO cannot refuse to provide connectivity, there may be concerns that a DSO that is vertically integrated and also operates as a CPO may leverage their control of the grid to disadvantage and increase the costs of competitors by e.g., creating obstacles in the connection process that increase the time required, or by offering a lower quality of maintenance services. Additionally, a DSO may both need to agree on all installation and at the same time also provide installation services in competition with third party suppliers of installations. As such, the DSO may have an incentive to favour its own branch.

Third, is a possible lack of access to real estate in some locations. This can be due to land grabbing/hoarding practices of some CPO to make it more difficult for rivals to enter locally, which we cover in 5.3.3. In addition, it can be due to conflicts of interest with local authorities that are also acting as a local CPO, which we cover in Section 5.4.4. We discuss the process of land acquisition and the role of local authorities in Section 4.3.

Fourth, is the potential for local “natural monopolies”. This issue of local market power is likely to be particularly acute in less densely populated locations which may have insufficient demand to support multiple competing operators. Such locations may have characteristics akin to a natural monopoly (if the market was narrowly defined to only include public recharging and excluding home recharging).<sup>191</sup> Consistent with this, reviewing a map of EV recharging points anywhere across Europe (e.g., the map of Southern France and Northern Spain and Portugal below) shows how EV recharging points are most heavily clustered in densely populated areas as well as on main inter-city routes. Rural areas are naturally less well served.<sup>192</sup> Even for more densely populated areas, using a small enough lens can lead to a similar picture as shown in Figure 19.

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<sup>188</sup> Study interview, Belgium DSO, November 2022. However, there appears to be no rule limiting incumbents from joining new tenders. and, according to one of the Study interviews, Allego won most tenders before 2020 in Flanders.

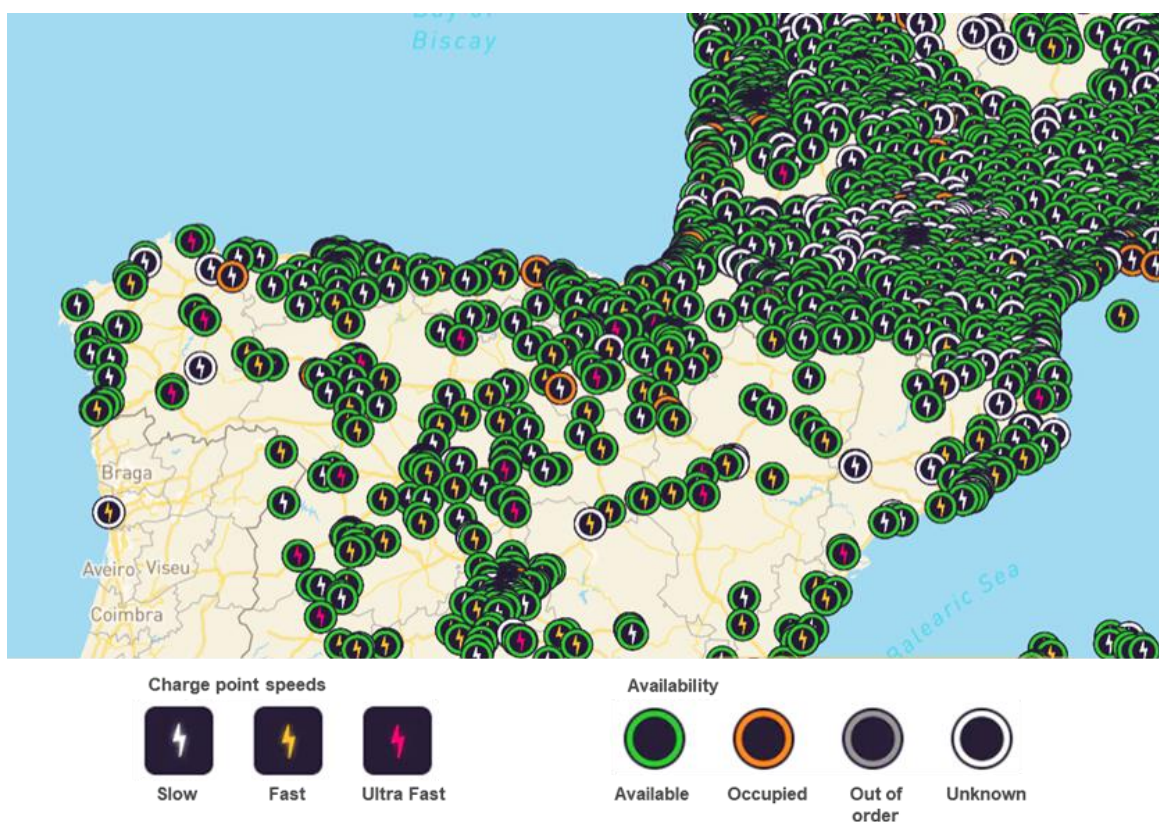
<sup>189</sup> Local Government Association, “[Scoping the role of local authorities in the provision of electric vehicle charging infrastructure](#)”, July 2021

<sup>190</sup> In Italy, the body “Consip” plays a similar role in providing resources to local government to optimize procurement.

<sup>191</sup> One can also envisage technological solutions to this issue. For example if an eMSP was to permit consumers to make use of each other’s home recharging points when they were available to add capacity in otherwise underserved areas. This is called peer-to-peer charging and this segment is expected to grow at 20.1% CAGR in Europe from 2022-2028 (Global News Wire, “[Europe Peer-To-Peer Electric Vehicle Charging Market Report 2022-2028: Prioritisation of Vehicle and Energy Storage Systems to Fuel Growth](#)”, July 2022). In the UK, JustCharge (an all-in-one platform, which provides you with complete set-up and management of your EV charging infrastructure and its billing system) and ZapMap have partnered to provide 1,600 residential EV chargers. The company found that one in five Britons with EVs in the household are willing to share their home chargers with others and it allows hosts to set their own prices and schedules (Auto Week, “[Is P2P Charging the Cure for Range Anxiety?](#)”, November 2022). Share&Charge is another platform who offers this service in Germany (Green Car Congress, “[eMotorWerks and Share&Charge deliver peer-to-peer EV charging network with blockchain payments in California](#)”, July 2017).

<sup>192</sup> Electroverse, Octopus Energy’s EV roaming service map, was used to highlight these dynamics. However, it is important to note it does not have full coverage of recharging points. Hence the reason for considering several data sources for the analysis of Member State in-depth assessments as discussed in Appendix F.

**Figure 19: The “density” of recharging points differs substantially between urban and rural locations<sup>193</sup>**



*NB: The Available, Occupied, Out of order or Unknown mark refers to the status of the recharging point for a user at the time and, as such, is not relevant for the analysis.*

The precise extent of this natural monopoly problem over the longer-term is uncertain, however. As the overall stock of EVs grows over time one might expect demand levels to increase in such a way that competition becomes more viable in a broader range of geographic locations. As such, the volume of areas which are true natural monopolies may dwindle over time even if the experience from petrol retailing indicates that some areas of local concentration are inevitable. As above, we note that the cost of installing a recharger is significantly less than an ICE refuelling station and that there is the possibility of home recharging, such that one would anticipate the natural monopoly issue to be less acute for EVs than for incumbent ICE technologies.

### 5.2.2. Key competition themes in an assessment of positions of local market power

In light of the above we consider two frameworks for competition remedies targeted at positions of local market power: direct restrictions on the exploitation of local market power (or related regulatory intervention such as price caps); and actions targeted at reducing barriers to entry at the local level.

**Direct restrictions on the exertion of local market power.** In principle one could envisage direct regulation of prices in areas with limited competition or antitrust enforcement. However, while it might be attractive to attempt to deal with instances of local monopoly power directly via price regulation, doing so is not straightforward.

<sup>193</sup> Octopus, “Electric Universe, Electroverse Charge Point Map”



First, attempts to reduce ex-post CPO/eMSP pricing, even if successful, may reduce ex-ante incentives of CPOs to build recharging infrastructure in the first place, resulting in so-called “recharging deserts”. This can in turn deter EV take-up, further increasing the risk that the area remains a recharging desert in the long run.<sup>194</sup>

Second, in a fast-growing industry it may be difficult to foresee which locations will remain as natural monopolies over the longer run as it may be that, as demand increases, it becomes possible for new entry to occur. While there is the risk that some locations may remain local monopolies in the longer run, regulating prices might result in a regulated monopoly when the counterfactual over the longer run would have been further entry and effective competition.

Third, there is a question mark as to what price should be regulated: the price charged by eMSPs to consumers, or the access prices charged by CPO to eMSPs? If the market power lies with the CPO then the natural target would be the CPO access price.<sup>195</sup> In this case, however, there is no guarantee that lower prices would indeed be passed-on to consumers rather than absorbed in eMSP margin as demand may be insufficient to cover the overall costs.

Fourth, a suitable pricing benchmark would need to be chosen. The most natural solutions would be a “cost-plus” or rate of return approach or to benchmark prices in natural monopoly locations to those in more competitive ones. None of these solutions is straightforward however and the appropriate price would need to consider the impact on ex-ante investment incentives.

Fifth, regulating the price consumers pay to their eMSPs is not straightforward as there is a plethora of eMSPs using different pricing models such as subscription pricing, per unit pricing, discounts/incentives etc. so price transparency and comparability is a real issue.<sup>196</sup> Due to this lack of transparency/comparability even if several eMSPs were available in a CPO desert, competition between eMSPs would not necessarily address the issue, while the eMSP that is integrated with the local monopoly CPO will have a competitive advantage. We turn to vertical foreclosure concerns in more detail in Section 5.4.

Finally, we note that the policy approach in petrol retailing has been to accept some degree of local market power and it is unclear why the policy approach to EV recharging should seek to entirely eliminate local market power.

**Actions targeted at reducing regulatory barriers to entry.** A more promising avenue is to take steps to reduce barriers to entry at the local level.<sup>197</sup> If competition is found not to be operating well in a locality, potential remedies could include unwinding monopoly concessions or removing conducts which make entry by rivals less straightforward.

As well as remedies through enforcement action, interventions could also be achieved through other channels including regulatory action such as enforcement by national energy regulators. A first intervention would be to ensure competition objectives are considered when regulatory decisions are made which impact local competitive conditions. For example, if on-street parking needs to be licensed by local government it would be preferable for these licences to be allocated through competitive tendering

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<sup>194</sup> Competition Market Authority, “Summary: Building a comprehensive and competitive electric vehicle charging sector that works for all drivers”, July 2021

<sup>195</sup> As mentioned before, although CPOs are forced to introduce electronic payments (including contactless card payments) directly from the consumer on an ad hoc basis without the use of an eMSP app, this is not yet an established paradigm.

<sup>196</sup> This was flagged as a priority recommendation for competition by the Austrian Competition Authority following its sector inquiry into EV recharging ([Link](#)).

<sup>197</sup> *Ibid*. The Austrian Competition Authority included several priority recommendations for competitions that evolved around promotion of local competition, the choice of providers by municipalities and avoiding regional concentration.

processes and under an explicit objective to promote competition. This may require collaboration between local and national authorities to ensure “good practices” are agreed and enforced in local tendering processes. In essence, although the local authorities have good knowledge of local dynamics, the negative externalities explained above and/or their lack of the capacity, know-how and funding necessary to design competitive tendering processes that efficiently deploy recharging points in the right locations, make it necessary that national and local authorities act together. In France for example, a group of public entities including the Organisation for Intercommunal Cooperation and the Authority for Mobility developed schemes to support local authorities in the definition of strategies for the rollout of recharging infrastructure.<sup>988</sup>

We discussed above that such initiatives are already in place in several EU Member States and developing a pro-competitive framework for allocating local licenses is a potentially powerful tool to ensure contestability. Some key considerations in these processes would be:

- Should the license be allocated purely based on the higher bidder (i.e., with the goal to maximise revenue for the local authority)?
- Should it be allocated on an entirely exclusive basis or should the local authority e.g., assign concessions to several CPOs to ensure a sufficient degree of choice for consumers, i.e., prescribing that no more than a certain share of recharging points should be assigned to any one supplier within a km<sup>2</sup>?
- What extra guidelines should be followed if the local authority has its own CPO (or there is a state-owned CPO) to ensure there is no favouritism?<sup>198</sup>
- What should be the duration of the concession agreement?
- Should licensed operators be required to set prices within certain bounds (e.g., a fixed CPO price to be mandated) and agree on operation conditions in the concession agreement such as access requirements for competing eMSPs?
- Should there be provisions for investment in maintenance and innovation/upgrades in the concession agreements?
- What should be the approach to establishing new grid connections and who should absorb the capital costs of reinforcements?
- Should a Local Authority CPOs be obliged to ensure that recharging deserts do not emerge by investing also in lower utilised areas?
- Should the CPO be required to act to ensure customers have public recharging facilities within a specified distance of their home?

This is consistent with the FCO study cited above which suggests the introduction of a legal requirement for the non-discriminatory award of these areas (e.g., by way of a tender procedure) could help to improve conditions for the emergence of competitive market structures in the area of public recharging infrastructure for electric vehicles.<sup>1013</sup> This is particularly important in countries with high regional concentration by a state-owned CPO or in countries like Denmark where, although there is no state-owned sector leader, the two largest privately owned players still account for close to 90% of the sector with no other player contesting their leading position at this point.

**Framework to identify and resolve other types of entry barriers.** Further entry barriers can exist in the form of lack of support from the DSO to the CPO entrant, excessively cumbersome, time consuming or complex procedures for receiving the

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<sup>198</sup> For instance Ireland (ESB eCars), Portugal (MOBI.E) and Cyprus (E-Charge) each have a CPO that has high market share and is state-owned. Further detail on local authorities that are acting as CPOs can be found in Section 5.4.4.

relevant permits<sup>199</sup> or lack of entrant access to land. Intervention may need to be triggered when there is evidence of electricity suppliers locking up all available supply, or in the presence of conflicts of interest between the entrant and the network operator. We discuss these cases in more detail in Section 5.4.2.

### 5.3. Concerns around national concentration and potential for “tipping” of national or regional markets

While a degree of local market power may be inevitable, a broader competition concern would be whether conditions in EV recharging (e.g., the presence of strong density or network effects) could contribute towards the market “tipping” to one or a handful of CPO/eMSPs. This would be a competition concern, if there were particular business practices (e.g., exclusive contracts) and/or government policies which could contribute to making this less competitive outcome more likely.

This sub-section provides an overview of the existing evidence at national level and trends in concentration and on potentially concerning practices before suggesting the key competition themes that would likely feature in an assessment of such practices.

#### 5.3.1. What are the current levels of concentration at an overall national level and what is driving high levels of concentration?

As a starting point, it is informative to get a preliminary view on the level of concentration among CPOs in the EU27 + the UK. While national concentration is only ever a proxy for market power, may be misleading in various circumstances, and fails to capture regional market power that could be conducive to tipping, it provides a useful first screen.

The challenge is that the available data to compute consistent concentration levels across countries is limited, especially as various CPOs have different definitions of what they consider public recharging (some including semi-public recharging points within their totals). Our approach has been to gather multiple available data sources on concentration and categorise countries into three categories (low, medium and high) as shown in Table 9 below. As a broad rule, we have classified as “low concentration” countries with a clearly fragmented market with no indication from available public information that any single player has a share of public recharging points above 25%, and as “high concentration” countries for which available data point to a single player with a share higher than 40%, with remaining countries classified as medium. We note that such categorisations are inevitably subjective especially as data across countries is not perfectly comparable in terms of accuracy whereas the fast pace of change in EV markets may soon render these results outdated. Full details on the available information in each country is provided in Appendix A.

**Table 9: Overview of national concentration levels<sup>200</sup>**

Country	Level of CPO concentration	Description (details available in country summaries in Appendix A)
Netherlands	Low	Highly fragmented market. Players include Vattenfall (utility), Shell (O&G), Allego, Greenflux, Last Mile Solutions (pure player)
Germany	Low	40+ CPOs in the market, including global players such as Shell (O&G), Tesla (OEM) and Allego (pure player)

<sup>199</sup> See ChargeUp Europe, “State of the Industry – Insights into the Electric Vehicle Charging Infrastructure Ecosystem”, 2022

<sup>200</sup> CPO concentration is based on public information. When EV recharging shares were not available, the classification was reached using qualitative data building upon the summaries in Appendix A and is therefore indicative (the level of detail varies per country). Moreover, new entrants and investments are accelerating across the EU27 + the UK, and this October 2022 picture is rapidly evolving.



Country	Level of CPO concentration	Description (details available in country summaries in Appendix A)
Austria	Low	250+ CPOs, with a 12-player association accounting for 40% market share (regional utilities and OEMs incl. ABB & Siemens)
France	Low	20+ CPOs with limited market share. Izivia (utility, EDF) is the largest, TotalEnergies (O&G) and Shell (O&G) are also present
United Kingdom	Low	50 CPOs, with no player controlling more than 17% market share and numbers rapidly changing (e.g., Ubitricity)
Portugal	Low	Highly fragmented market with 76 active CPOs including MOBI.E (pure player), Engie (utility) and Repsol (O&G)
Slovakia	Low	GreenWay (pure player) has 20% share, followed by ZSE (utility, E. ON) with 10%, MOL (O&G) and Tesla (OEM) are also present
Romania	Low	Small market with 10+ CPOs incl. Renovatio (pure player) and Enel x (utility), MOL (O&G), E.ON (Utility), EV-mag (pure player)
Sweden	Medium	4 key CPOs: Recharge Infra (owned by utility Fortum), Vattenfall InCharge (utility), E. ON (utility), and Mer (state utility Statkraft)
Finland	Medium	Virta (part owned by utility E.ON) and Fortum Charge & Drive (utility) are the 2 main CPOs, other smaller providers are present
Belgium	Medium	EVBox (pure player), Allego (pure player), TotalEnergies (O&G), and Blue Corner (pure player) have 85% share
Croatia	Medium	Top 3 players account for 70% market share, with Hrvatski Telekom (telecoms) accounting for 30%
Spain	Medium	Biggest CPOs are utilities Endesa X and Iberdrola that have 40% of the market, many small players command the remainder
Slovenia	Medium	Many sizeable CPOs including Elektro Ljubljana (utility), Petrol (O&G), MOL group (O&G), Plan-net PP (pure player)
Hungary	Medium	Several CPOs incl. e-Mobi. (owned by utility MVM) with 30% market share, also Mobility (owned by utility Innogy) are present
Greece	Medium	Nascent market of <1k recharge points operated by EVziin (pure player), Eneres (pure player), NRG (utility) and Protergia (utility)
Poland	Medium	Orlen (O&G) and Energa (utility) partnership makes up 30% of the market. Enea (utility) accounts for an additional 16%
Luxembourg	High	State owned Chargy (pure player) has 90% share and is operated by single CPO (plans to privatise/re-distribute ongoing <sup>201</sup> )
Bulgaria	High	Eldrive (pure play) is the largest CPO in the country and operates more than 450 recharging points (50% market share)
Italy	High	Enel X (utility) accounts for over 50%, with other key players incl. Be Charge (O&G), Tesla (OEM), Duferco (utility), A2A (utility)
Denmark	High	E. ON (utility) and Clever (pure player) command almost 90% of the market
Ireland	High	ESB e-cars (utility) controls more than 50% of the sector with EasyGo (pure player) also having significant share (almost 30%)
Malta	High	Currently very high share of government installations. New legislation is expected to bring in significant private investment
Estonia	High	Enefit VOLT (owned by utility Eesti Energia) is the largest CPO and operates most stations across the country
Lithuania	High	Nascent market with 200 rechargers operated by Ignitis.ON (state owned utility), Inbalance and Elinita (pure players)
Latvia	High	Biggest player is CSDD (state-owned pure player), second largest player is Latvenergo (utility)
Czechia	High	CEZ (state owned utility) is the major CPO, with new players incl. Pražská energetika (utility) and E. ON (utility) entering
Cyprus	High	Less than 100 public recharging stations, the Electricity Authority of Cyprus (state owned pure player) has a clear majority of these

<sup>201</sup> See European Commission decision in case SA.62131 for the privatisation of the sector. The measures assessed in that decision include the adaptation of the financing system of public recharging infrastructure in Luxembourg and measures to facilitate the transfer of public recharging infrastructure, currently owned by electricity distribution system operators, to a third party, which will be selected through a tendering procedure. European Commission, "SA.62131 RRF - Luxembourg - Aid scheme for the deployment of charging infrastructures", February 2021

There is substantial variation in national concentration. Some countries (e.g., the Netherlands, Germany and the UK) exhibit dozens or even hundreds of CPO/eMSPs, while others (e.g., Denmark or Cyprus) exhibit much more concentrated set ups.

Concentration can also vary regionally. In Ireland, County Dublin, home to the City of Dublin and the area with most EVs, has high concentration with the top two CPOs having 90% share between them. In County Tipperary, a more rural region, the top two CPOs have 71% market share.<sup>202</sup> These trends can also be correlated with CPO presence and how they serve different regions. For instance, in Croatia, in Varazdin County, Elen has 44% of the regional market, whereas in Virovitica-Podravina County, Hrvatski Telekom 52% market share and Elen has only 14%.<sup>203</sup> The correlation between national and regional concentration is described in more detail in Sections 6, 7 and 8 of this report, the Member State in-depth analysis.

While countries with high CPO concentration are often led by state-owned entities which may employ a standalone CPO model (and hence are likely to have the incentive to roam to as many eMSPs as possible), there are instances where a private player has established high shares. For example, in Denmark, E. ON and Clever (neither of which are state owned) account for close to 90% of the sector with no other player is contesting their leading position at this point. Tesla and IONITY have business models focusing on the fast recharging segment, typically at on-route locations like motorways. E. ON and Clever have also partnered, receiving the final approval from the European Commission in 2019 for their joint venture to develop and operate ultra-fast recharging stations for electric vehicles in Norway, Sweden and Denmark.<sup>204</sup>

A further observation based on Table 9 above is that, typically, smaller MS tend to have fewer CPOs. As discussed below, there are also some indications that countries with less developed EV segments tend to be more concentrated, suggesting that high concentrations may have more to do with temporary first mover advantage rather than durable positions of market power.

That said, there are notable counter-examples such as Denmark that has one of the highest levels of market penetration rates of EVs in the EU but where still the level of CPO concentration is high.<sup>205</sup> This stresses the need for a detailed competitive assessment of the EV recharging market in each state in EU27 + the UK, which is the focus of the in-depth Member State analysis section of this report.

### **5.3.2. What is the extent of network and density effects? Are EV markets prone to tipping?**

Economic theory predicts that market “tipping” is most likely in the context of strong density and network effects, limited product differentiation, limited interoperability between networks, low levels of consumer-multi-homing, and high barriers to entry.<sup>206</sup> We hereby explore how EV recharging performs on these metrics.<sup>207</sup>

**What is the extent of density and network effects?** In the case of EV recharging, network effects are not direct in the sense that a larger user base does not directly

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<sup>202</sup> CRA Analysis, Ireland data, November 2022

<sup>203</sup> CRA Analysis, Croatia data, November 2022

<sup>204</sup> Energy Live, "European Commission announced that it has decided under Article 6(1)(b) of the EU Merger Regulation to approve the proposed creation of a joint venture between E.ON SE and Clever A/S", November 2018

<sup>205</sup> Noting, however, that the extent of market concentration may also in part be driven by the size of the country and hence the size of demand (natural oligopoly).

<sup>206</sup> Michael Katz, Carl Shapiro, "Systems Competition and Network Effects", 1994

<sup>207</sup> Given the convergence of business models whereby the bulk of CPOs now are active in the eMSP layer we focus our discussion on potential tipping in a combined CPO/eMSP segment.

increase user benefit (indeed scale of network and all else equal, further users may actually increase congestion at recharging points and reduce the value of the network). However, there are economies of density and indirect network effects at play for integrated CPO/eMSPs. In terms of positive density effects, these arise on both the demand and supply side.

On the demand side, a denser (or more geographically extended) network will be more attractive to users as it is more likely to offer recharging points in convenient locations and will allow users to concentrate their recharging on a single service (something which they may have a preference to do if they are most familiar with one particular app or user interface or if they have financial or pricing incentives to do so).

On the supply side, having more users can increase throughput and utilisation of an operators' recharging points, hence lowering effective operating costs as long as it does not lead to congestion.<sup>208</sup> Moreover, a denser userbase can also increase the number of locations which are financially viable.

Similarly, the lower costs associated with greater density may allow larger CPO/eMSPs to secure the most attractive locations as they will have the highest willingness to pay for choice locations or consumer incentives. To illustrate, assume that a CPO/eMSP aims to recoup €100k of fixed investment within one year. Then the price charged will be a function of the number of users using its network. A network of 100k users would mean a charge of €1 per user to recoup the investment whereas a network of 200k users would allow for a price drop of €0.50 as the fixed costs are spread among more users. The existence of a decreasing average cost curve, therefore, leads to a higher willingness to pay for concessions as the size of the CPO's subscriber or user base increases. Overall, this leads to positive indirect network effects as a positive feedback loop is created where network users end up benefiting indirectly from the increased userbase by enjoying a denser network of recharging points which include the most desirable locations, as well as increased quality of services. This occurs up to the point where congestion may reduce the value to subscribers or users.

**What is the extent of differentiation?** Product differentiation in terms of the core product (recharging services) may be considered low among CPOs of the same category (i.e., offering residential, commercial, public or fleet recharging services). Apart from the core elements of price, location and speed, however, there are still some elements of differentiation between CPO/eMSPs. Most notably, CPOs/eMSPs may be differentiated in terms of geographic coverage, particularly as consumers will differ in their views on which recharging points are most attractive from their perspective. Differentiation may also arise in the form of branding, eMSP's range of services, or due to the offer of adjacent services (e.g., the existence of restaurants/shopping centres at recharging points etc). Overall, the existence of these dimensions for differentiation on top of price/location/speed may not on its own be enough to mediate against market tipping if the market is otherwise prone to it.

**What is the extent of interoperability?** As discussed in Section 4.4.3, most CPOs are integrated with an eMSP, and examples of standalone CPOs are limited mostly to the case of state-owned CPOs, which have the incentive to cooperate with as many eMSPs as possible to broaden the consumer network they serve. However, there are examples of standalone eMSPs (e.g., Chargemap and Plugsurfing) which often focus on offering an international network of recharging points.

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<sup>208</sup> Moreover, the larger a network becomes the more CPOs and eMSPs can leverage alternative revenue streams. For instance, if significant recharging capacity is controlled by one player they can provide demand-side response services to the grid.

Therefore, eMSP interoperability is not a given.<sup>209</sup> If a consumer was single-homing on their eMSP then their ability to recharge at a CPO that is integrated with an eMSP different than their own would depend on whether there is a bilateral or roaming agreement in place. In the absence of such agreements, EV recharging will be likely prone to tipping. In practice, although such agreements do exist they do not offer full network coverage due to the fact that an integrated CPO/eMSP, as discussed in Section 4.4.2, may have an incentive to keep their recharging point network closed to competitors by not being eMSP interoperable. Moreover, even in a world where extensive agreements allowed for wide network coverage, a string differential between on- and off-net charging prices may still lead to consumers preference for denser or more extensive networks.

On the face of this, the European Commission has proposed open access regulation repealing Directive 2014/94/EU which mandates all recharging points with a capacity greater than 50 kW be equipped with ad hoc payment methods by 2027, as well as all newly installed recharging points with a capacity less than 50kW to also be ad hoc ready. This will, therefore, move the sector from exhibiting features of a closed network to an open network for consumers with full access to any recharging point on an ad hoc basis, regardless of their eMSP provider or the access agreements in place.<sup>210</sup> The fact that it may be possible to use the credit/debit card to pay on several recharging points could also reduce the risk of tipping, although this could be countered by making this form of payment more expensive. Moreover, although it will guarantee consumer access, this directive will not, in our understanding, enforce eMSP interoperability which will continue to be based on bilateral and roaming agreements.

We note that the overall welfare impact of interoperability requirements is potentially ambiguous. On the one hand, greater interoperability will increase contestability and reduce the risk of market tipping. On the other, interoperability requirements could have the unintended consequence of deterring investment, particularly in more remote areas, if they limit the ability of the CPO/eMSP to monetise the investment. However, a balance can be struck between perfect interoperability, which disincentivises investment, and the existence of a pay-as-you-go model where the CPO/eMSP may offer pay-as-you-go recharging at a higher charge. Although this would still limit the extent to which CPOs/eMSPs compete on the network location dimension and hence recharging network investments pay off, this would ensure there is still some scope for monetising one's network and that consumers are still incentivised to choose the single CPO/eMSP with the most/best recharging station locations<sup>211</sup>. Similarly, bilateral or roaming agreements do not amount to "free riding" on the investments of others to the extent they are mutually beneficial due to reciprocity or the existence of appropriate access fees.

**Is there sufficient scope for multi-homing (either directly or via roaming arrangements)?** As described in Section 4.4, an EV user can single-home and rely on one eMSP while still having the ability to see the recharging points hosted by other eMSPs on their selected application due to bilateral or platform roaming agreements. In this case, even though they locate and pay for the recharging session via a certain eMSP

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<sup>209</sup> This refers to the ability of a consumer that is a subscriber of a certain eMSP to access a charging point of a CPO that is integrated (or operated in agreement) with another eMSP. Technical interoperability is distinct and, as mentioned in the regulatory section of this report (Appendix D, regulation now governs technical interoperability using the CCS standard so this is no longer a potential competitive concern.

<sup>210</sup> Due to the nascent state of the EV market and ad hoc payment in particular, we have not identified data on how significant ad hoc recharging is as an alternative for consumers vs. recharging via EMSPs. It is not yet clear if this will be a last-resort option rarely used or whether it has the potential for regular use and switching of eMSP users. The strategic response of CPOs/eMSPs with regards to pricing and loyalty incentives will clearly also play a role in this.

<sup>211</sup> Given the nascency of the market there is no explicit study or data that depicts the level of multi homing with regard to EV drivers using multiple apps to recharge, however EV driver forums do recommend many apps which highlight the need to multi home. We have not identified conclusive evidence (e.g., systematic data) on consumer preferences for eMSP single and multi-homing.

app, this eMSP will have to transfer funds to the CPO that owns the recharging point used.

All else equal, consumer preferences for eMSP multi-homing will reduce the likelihood of the market tipping. If consumers subscribe/can use several networks, the size of each individual network would not be as important for them. Although formal data on multi-homing are not available, there is anecdotal evidence that, as described in Section 4.4, an EV owner will typically use multiple (as many as 10) eMSP applications to locate a recharging point, compare prices and in-turn pay for recharging. Specialised use cases, and differences in interface and user experience may also explain multi-homing preferences. For example, many EV driver forums recommend the need for multiple apps as can be seen in Table 10 below. On the other hand, multi-homing incentives are countered by pricing that includes quantity discounting to promote loyalty. For example, the OEM vehicle model, such as Tesla or Mercedes, may have their own eMSP application and offer preferential prices to encourage loyalty. However, the user will sometimes need to recharge at a location where it is not possible to use a given app, such as in the Ubitricity network where EV users need to scan a QR code on a lamppost in order to access and start the session through the Ubitricity app.

**Table 10: Recommended recharging apps from EV forums within Europe**

EV Forum	Recommended recharging apps
Car Sloth <sup>212</sup>	PlugShare (eMSP), Zap-Map (eMSP), ChargePoint (integrated CPO/eMSP), Chargemap (eMSP), BP Pulse (integrated CPO/eMSP)
MYEV.com <sup>213</sup>	Chargehub (eMSP), ChargePoint (integrated CPO/eMSP), EVGO (integrated CPO/eMSP), PlugShare (eMSP), Tesla (integrated CPO/eMSP)
Monta <sup>214</sup>	Monta (integrated CPO/eMSP), EV Energy (eMSP), ChargePoint (integrated CPO/eMSP), E.ON Drive (integrated CPO/eMSP), Clever (integrated CPO/eMSP), and others

Beyond the eMSP route to recharge, EV users will also have the option to recharge and pay ad hoc (i.e., directly at the recharging point with a credit or debit card with no need for an eMSP membership). Given ad hoc payments are in their nascency with respect to EV recharging, there is no evidence yet on its effect in the market. The European Parliament feels that ad hoc recharging will be mostly used at the fast-recharging stations, whereas at AC recharging stations below 50kw, the eMSP subscription model will remain predominant.<sup>215</sup> While the introduction of ad hoc payment, as mandated by EC Directive 2014/94/EU discussed above, will de-facto open up the network of a CPO/eMSP to non-subscribers and hence also reduce the likelihood of the market tipping, its effect on eMSP multi-homing is less clear. In particular, ad hoc payment reduces in principle the need for the consumer to have multiple eMSP apps and can hence have the unintended consequence that consumers end up subscribing to the largest CPO/eMSP only to get wide coverage and loyalty incentives while paying ad hoc at the recharging points that do not support it.<sup>216</sup>

<sup>212</sup> Car Sloth, "18 best apps for electric car owners", November 2022

<sup>213</sup> MyEV.com, "Best smartphone apps for EV owners", 2022

<sup>214</sup> Monta, "The 30 best EV charging apps for charging at home or on the road", October 2022

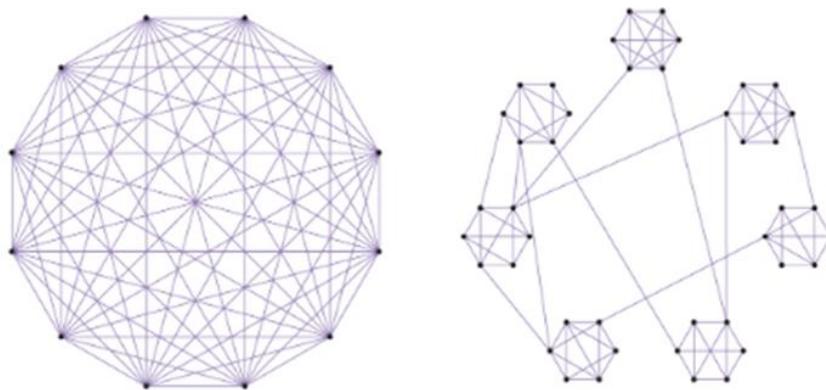
<sup>215</sup> Euractiv, "Interview with European Parliament spokesperson: Will paying for EV charging be as easy as refuelling petrol cars?" , November 2022

<sup>216</sup> In practice, this will depends on whether and by how much such form of payment is more expensive than a sub-scription. To some extent it may reduce multi-homing as consumers may opt for one eMSP and use ad hoc payments in the rare occasion they are off-network. This may actually facilitate tip-ping

**Is there scope for small scale entry and expansion?** The local nature of competition means that network effects are likely to be relatively localised in nature for most consumers. Most consumer journeys are made close to their home, so a CPO's primary task is to offer a sufficient network of recharging points near a consumer's normal haunts. For example, the fact that an EV recharging network has a dense network presence in Brussels has zero impact on the decision of a consumer in Strasbourg or Spain. An exception to this is long distance travel and networks such as IONITY, as well as countries where long commuting by car for work from the countryside to major cities is the norm, such as in Ireland and Luxembourg.

In that case, EV recharging networks and resulting network effects are closer to the right-hand graphic in Figure 20 below than the left-hand one.

**Figure 20: Some networks are more fragmented in local clusters than others**



When a network is fragmented into local clusters which are relatively isolated from each other, then small-scale entry can take place making the market more easily contestable.<sup>217</sup> This is especially so in the presence of multi-homing or interoperability requirements. If consumers have comfort that they can use third-party CPO/eMSP recharging points on a pay-as-you-go basis they may be willing to work with a smaller local CPO/eMSP.

Overall, the picture appears to be mixed. While there are elements of density and network effects, there are also important factors that could place a brake on potential market tipping. Whether EV recharging is an industry that lends itself to durable positions of concentration and market power will depend to a large extent on consumer preferences and behaviours in this evolving market and will ultimately be an empirical question.

### 5.3.3. To what extent are high concentration levels persistent or just reflective of first mover advantage?

The previous sub-sections have noted that there are some Member States with high levels of CPO concentration and that EV recharging has at least some characteristics that might allow a firm to achieve a position of durable market power. A key question therefore is whether the observed high concentration levels are indicative of a few CPOs/eMSPs having achieved positions of durable market power or, instead, reflect temporary positions of first mover advantage that can be anticipated to be likely to erode over time.

If high concentration levels in some countries primarily reflect only non-durable first mover advantages, that will ultimately be competed away as the market matures, then

<sup>217</sup> Feng Zhu, Marco Iansiti, "Why Some Platforms Thrive and Others Don't", February 2019



this would be a reason to hold off competition intervention. Indeed, intervention could even be counterproductive if it reduces private investment incentives by allowing rivals to benefit from the significant investment made by the first mover(s) to establish key market infrastructure.

To explore this issue, we have matched the concentration information above with two metrics of recharging penetration: recharging points per 100k population and EVs per recharging point. In addition, we present the classification of overall EV market maturity that we have developed in Section 2.3.2 and which takes into account the maturity of both the EV market and the EV recharging market.<sup>218</sup> These are presented in Table 11 and Table 12 below.

In Table 11 we observe that many countries with high levels of CPO concentration also feature a low or medium number of recharging points per 100k of population. At the same time, some of the countries with the highest numbers of recharging points per 100k of population also feature low levels of concentration. Although the above would be *prima facie* consistent with concentration being a feature of nascent markets which is falling as the market matures, we also observe there are counter-examples like Luxembourg and Denmark of seemingly mature recharging markets with high levels of concentration. In the case of Luxembourg, the metric is not a good indicator of EV maturity within the country as the high level of recharging points per capita is due to the small population size although the real set of EV users also includes people working in Luxembourg but living outside the country. Moreover, although there are limited competitors within Luxembourg. Commuters from other countries as well as locals may easily cross the border to recharge in other countries so CPO/eMSPs in Luxembourg face competition from recharging points in neighbouring countries.

**Table 11: Correlation between CPO concentration levels and market maturity (as measured by public recharging points per 100k people)**

Country	Level of EV market maturity <sup>219</sup>	Level of CPO concentration <sup>220</sup>	Public recharging points per 100k people <sup>221</sup>
Netherlands	Developed	Low	577
Luxembourg	Developed	High	283
Austria	Developed	Low	226
Sweden	Developed	Medium	212
Denmark	Developed	High	171
Belgium	Developed	Medium	155
Germany	Developed	Low	152
Finland	Developed	Medium	109
France	Developed	Low	98
Slovenia	In-development	Medium	73
United Kingdom	Developed	Low	71
Portugal	In-development	Low	55

<sup>218</sup> For more detail on the methodology and data supporting this classification, see Section 2.3.2

<sup>219</sup> Market maturity was defined based on EV penetration (% of total fleet) and the ratio of EVs to recharging points. More details are available in Section 2.3.2. Netherlands and Austria were the only countries with EV penetration above 2% and meeting the EC's target for EVs per recharging point ratio lower or equal to 10.

<sup>220</sup> CPO concentration is based on public information. When EV recharging shares were not available, the classification was reached using qualitative data building upon the summaries in Appendix A and is therefore indicative (the level of detail varies per country). Moreover, new entrants and investments are accelerating across the EU27 + the UK, and this October 2022 picture is rapidly evolving.

<sup>221</sup> Public recharging points per 100k people colours represent performance. Red = lower quartile, Green = upper quartile, Amber = interquartile range



Country	Level of EV market maturity <sup>219</sup>	Level of CPO concentration <sup>220</sup>	Public recharging points per 100k people <sup>221</sup>
Italy	In-development	High	50
Spain	In-development	Medium	36
Slovakia	Nascent	Low	36
Hungary	In-development	Medium	35
Latvia	Nascent	High	31
Croatia	Nascent	Medium	26
Czechia	Nascent	High	25
Ireland	In-development	High	25
Estonia	Nascent	High	20
Malta	Nascent	High	19
Bulgaria	Nascent	High	12
Romania	Nascent	Low	8
Poland	Nascent	Medium	7
Greece	Nascent	Medium	7
Cyprus	Nascent	High	6
Lithuania	Nascent	High	6

Table 12 compares concentration levels with EVs per public recharging point. This is the metric that the European Commission has chosen as a policy target, recommending a ratio of 1 public recharging point per 10 EVs.<sup>222</sup> Here the picture is more nuanced. Many of the countries with high concentration feature relatively high numbers of EVs per recharging point which indicates a nascent EV recharging market. Similarly, many of the countries with low levels of CPO concentration feature low or medium numbers of EVs per recharging point which are indicative of market maturity. However, the existence of countries with high levels of concentration and low or medium levels of EVs per recharging points, does not allow for any safe conclusion at the EU27 + the UK level.

**Table 12: Correlation between CPO concentration levels and market maturity (as measured by EVs per public recharging point)**

Country	Level of market maturity <sup>223</sup>	Level of CPO concentration <sup>224</sup>	EVs per recharging point <sup>225</sup>
Slovakia	Nascent	Low	3
Latvia	Nascent	High	3
Croatia	Nascent	Medium	4
Bulgaria	Nascent	High	4
Netherlands	Developed	Low	4
Slovenia	In-development	Medium	5
Austria	Developed	Low	6

<sup>222</sup> We note that the EVs per recharging point metric is not always an accurate representation of EV recharging market maturity as the data can be skewed by low levels of EV adoption (making countries like Slovakia, Latvia, and Bulgaria look like they have more developed markets than in reality).

<sup>223</sup> Market maturity was defined based on EV penetrations (% of total fleet) and the ratio of EVs to recharging points. More details are available in Section 2.3.2

<sup>224</sup> CPO concentration is based on public information. When EV recharging shares were not available, the classification was reached using qualitative data building upon the summaries in Appendix A and is therefore indicative (the level of detail varies per country). Moreover, new entrants and investments are accelerating across the EU27 + the UK, and this October 2022 picture is rapidly evolving.

<sup>225</sup> EVs per recharging point colours represent performance. Red = >15, Green = <10, Amber = 10 to 15

Country	Level of market maturity <sup>223</sup>	Level of CPO concentration <sup>224</sup>	EVs per recharging point <sup>225</sup>
Czechia	Nascent	High	6
Hungary	In-development	Medium	7
Italy	In-development	High	9
Spain	In-development	Medium	11
Luxembourg	Developed	High	11
Estonia	Nascent	High	11
Belgium	Developed	Medium	11
Cyprus	Nascent	High	12
France	Developed	Low	12
Poland	Nascent	Medium	12
Romania	Nascent	Low	13
Denmark	Developed	High	13
Greece	Nascent	Medium	16
United Kingdom	Developed	Low	16
Sweden	Developed	Medium	17
Germany	Developed	Low	17
Portugal	In-development	Low	18
Finland	Developed	Medium	19
Ireland	In-development	High	27
Lithuania	Nascent	High	28
Malta	Nascent	High	29

Overall, many countries with high levels of concentration appear to be more nascent. For example, Lithuania, Malta and Ireland exhibit high concentration but also feature the highest numbers of EVs per recharging point. Although this would indicate that concentration levels may dissipate as EVs become more established, there are sufficient counterexamples that one cannot take this proposition as given. For example, Latvia and Bulgaria have high market concentration but both EV car adoption and EV recharging infrastructure are similarly nascent leading to a low “EVs per recharging point” index. Luxembourg, and Denmark also have both high number of EVs as a share of the total fleet, and number of EVs per recharging point close to the EC target, and hence are classified as mature EV markets overall, while at the same time exhibiting high concentration.

This indicates that, overall, it is difficult to draw strong conclusions and that there is a need for more bespoke analysis. If concentration just reflects the nascent state of EV adoption and CPO infrastructure, early-stage intervention may well be unwarranted and could detrimentally influence competitive dynamics and investment incentives. However, the existence of countries with medium/high market maturity levels and medium/high levels of concentration illustrates why an in-depth competition analysis per country may be necessary to fully understand the competitive conditions and whether there can be legitimate concerns.

For example, in the in-depth analysis in Sections 6, 7 and 8, we find some evidence of more persistent concentration in Ireland and Italy, where in both cases the leading player is a state-owned incumbent. However, in both markets there is evidence that new entry and expansion of rivals may be in the process of further eroding the incumbents’ large national and regional shares.

#### 5.3.4. Are there conducts which might contribute towards persistency of market power?

We now consider whether there are conducts which might potentially allow first movers or other sector incumbents to protect their market positions in a way that could act to foreclose competition. Based on our high-level review of conducts in the EU27 + the UK we have identified the following categories of conducts.

**“Land grabbing” and exclusivities.** One potential concern would be if incumbent CPOs/eMSPs were to engage in securing the best locations through long-term agreements with public authorities (or through the purchase/lease of land from private landowners) in a way that raised entry barriers in future.<sup>226</sup> This would be most concerning if this land was procured in a way that was designed not with a view to providing services to customers, but to prevent expansion of rivals (e.g. if a supplier were to procure all or most of the desirable sites in a region but only develop a subset while ensuring the remainder were unavailable for rivals). This is referred to as hoarding.

Particularly choice locations would include urban areas with high EV ownership and no off-street options, or locations on motorways with high traffic levels hence higher profit margins, and optionality to easily upgrade the grid to add high-power connections. In the in-depth analysis sections that follow we find some evidence that choice of recharging supplier in Ireland is more limited on motorways and this issue was raised also by the CMA’s investigation in the UK.

Public statements from CPOs/eMSPs confirm that procurement of sites is strategic and focussed on high volume locations and also indicate a willingness to make profit sacrifices in the short run to build competitive positions. For example, Blink Recharging, one of the leading EV recharging companies across North America and Europe (e.g., Belgium, Luxembourg, the Netherlands and France), has reportedly based their strategy on this principle. CEO Michael Farkas has publicly stated that their biggest priority is securing good sites in high-demand areas, with profitability being something they will deal with in the future.<sup>227</sup> This also tends to be the approach taken by major oil & gas incumbents, who are investing into the recharging sector across all European markets (e.g., BP Pulse, Shell Recharge). Finally, specialised pure play companies like InstaVolt (who currently operates in the UK but is looking to expand into mainland Europe) are also recognising the need to lock up lucrative locations by re-investing revenues to continue with the growth of their network as quickly as possible.<sup>228</sup>

A key issue for competition analysis going forward is the extent to which these investments in procurement of strategic locations represent pro-competitive investments in recharging capacity or attempts to “hoard” locations so that they are not available to rivals. Accusations of the latter practice have been observed in the Netherlands whereby CPOs have previously filed complaints with the authorities about competitors purchasing locations along key transport corridors to exclude competitors with the ambition to develop high power recharging points only at a later stage, when utilisation improves returns of investment.<sup>229</sup>

Public procurement policies can help alleviate these concerns. First, the same policies discussed above of ensuring governmental authorities take account of competition

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<sup>226</sup> A classic economic reference would be Rasmusen, EB. Ramseyer, MK. And Wiley, JS. 1991. “Naked Exclusion”, *American Economic Review*. This shows how an incumbent can potentially foreclose competition by entering exclusive agreements with sufficient counterparties that rivals are unable to achieve a minimum viable scale. In the paper, the mechanism relies on a supplier entering exclusivities with customers, but in principle a similar dynamic could arise through exclusive agreements with suppliers, in this case suppliers of real estate.

<sup>227</sup> David Baker, “EV-Charging Industry Is Doing Everything Except Showing a Profit”, April 2021

<sup>228</sup> PwC, “Powering ahead! Making sense of business models in electric vehicle charging”, October 2018

<sup>229</sup> Study interview, CPO expert based in Belgium, November 2022

considerations when awarding concessions and ensuring that the length of the concession is not too long and concession can be sold in a secondary market. These measures can ensure that multiple suppliers have access to land to offer recharging infrastructure and that the proper balance is struck between market contestability and investment incentives.<sup>230</sup>

Second, land rights can include “use it or lose it” provisions requiring installation of recharging infrastructure within a given time otherwise land rights must be surrendered. However, these provisions may not be sufficient as there are accusations that some players have installed in some of these on-route locations low-cost slow rechargers that are more suitable for private or on-street recharging points.<sup>231</sup>

**Closed networks.** Some integrated CPO/eMSP recharging networks have traditionally been closed, allowing access only to clients of that specific eMSP. Until recently, that has been the case for the Tesla super-recharging network, although it is currently undergoing a pilot project allowing third-party access in 13 European countries.<sup>232</sup> Tesla also used to have a different plug and the use of an adapter was necessary for non-Tesla drivers to overcome this.<sup>233</sup> Overall, closed networks are becoming rare as EV drivers seem to value interoperability more and more, especially when travelling between countries.

On the eMSP side of the market, roaming platforms, which are typically privately operated by firms with coverage across multiple EU MS such as Hubeject, Gireve and e-Clearing, include a multitude of CPO and eMSP members to enhance the CPOs’ asset utilisation, and enable more recharging sessions through an eMSP that roams with an unrelated CPOs (the contractual relationships and pricing are discussed in Section 4.4.2 and 4.6). The multi-homing possibility offered by the roaming platforms in turn give the EV users access to a far reaching, diverse network of recharging points across geographies regardless of the primary CPO network of the eMSP they subscribe to.<sup>234</sup> A further step in this direction is the case of Hubeject, which is implementing a Plug & Charge service based on EV-to-recharging point authentication that allows EV users to access recharging without the need for a special RFID (Radio Frequency Identification) card or app by just connecting the EV to the recharging point.<sup>235</sup>

While roaming is increasingly common, it does not offer users the security of full network coverage since not all CPOs participate in roaming agreements. On the other hand, the diffusion of ad hoc recharging, which is developing quickly, may allow EV drivers universal access to the recharging network. Ad hoc recharging and payment allow EV drivers to pay directly for the recharging point to the CPO, usually by credit card, either contactless or via card reader. While ad hoc recharging and electronic payment is still relatively rare, as 90% of recharging stations are not equipped with credit card readers according to Chargemap, it is forecast to become more common.<sup>236</sup>

**High recharging prices for out of network usage.** While roaming and ad hoc recharging allows EV users to recharge outside of their eMSP network, this does not mean that prices are common for all types of recharging points. In principle, recharging

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<sup>230</sup> Ibid.

<sup>231</sup> Ibid.

<sup>232</sup> Tesla, “Non-Tesla Supercharger Pilot”, November 2021

<sup>233</sup> The Drive, “Tesla Releases New Charging Adapter To Allow Non-Supercharger Use”, September 2022

<sup>234</sup> In practice, an EV user that is e.g., a subscriber to an integrated CPO/eMSP will be able to also charge at other CPOs their eMSP has a bilateral agreement with, or at all CPOs that have an agreement with the roaming platform their eMSP has an agreement with. All payments would in these cases take place through the eMSP and there would be no direct contact between consumers and the roaming platform (i.e., the roaming platform is a B2B business model connecting eMSPs and CPOs).

<sup>235</sup> Hubeject, “Seamless and secure charging”

<sup>236</sup> Chargemap, “One single card. The very best charging experience. Every day or when travelling.”

at the eMSP a consumer subscribed to should be the cheapest option for consumers, while roaming to make use of other eMSP would carry a surcharge, and ad hoc/pay-as-you-go options, although involving the fewest amount of players seeking to make a margin, could be even more expensive in order to disincentivise recharging outside one's eMSP network. For example, there is evidence non-Tesla drivers can pay approximately 2.5 times more per kWh than Tesla drivers.<sup>237</sup> Although this is not a constraint for market competition, similar to closed network and lack of alternatives, consumers still have an incentive to be loyal to the eMSP they have subscribed to, which might make the market more prone to tipping. This is analogous to incentives for loyalty, own network use, and against switching that are offered by for example mobile phone networks in the form of roaming charges and by utility providers more generally in the form of long-term contracts with termination charges.

As detailed in Section 4.6, while it is difficult to make a conclusion across the EU27 + the UK, typically recharging costs increase as EV drivers diverge from on-net use, and some providers offer volume discounts through subscription schemes. However, due to the nascent state of the market there are exceptions to these norms e.g., prices can be cheaper through roaming than through the use of the CPO's integrated eMSP. This can be due to a variety of reasons related to market evolution, such as the fact that many CPOs/eMSPs are not monetising their networks yet, the fact that some eMSPs are operating with low margins and price undercut competitors in a drive to expand their user network, the fact that local authorities and the state can still be involved in EV recharging provision, and the fact that several entrants are integrated players who are seeking to monetise in other vertical market segments or adjacent markets.

**Geographic bundling.** A CPO/eMSP that faces non-contestable demand at the local level can seek to leverage that through geographic bundling.<sup>238</sup> For example, they can offer through a subscription or flat monthly fee access to recharging at that desired location where they are a local monopoly as a bundle together with access to their recharging points at other locations where they face competition.<sup>239</sup> This can result in a stronger position overall as their local monopoly power provides an advantage against market competitors and can help them beat competition in other locations hence translating into market-wide market power.

Even if the CPO/eMSP charges a per unit price instead of a subscription/flat monthly fee, loyalty discounts and other offers could also incentivise users of a popular recharging location where they are a local monopoly to remain loyal to the CPO/eMSP throughout the market. However, it should be noted that in practice firms offer a pay-as-you-go option, and, as long as this flexibility existed at a reasonable cost to consumers, this could be enough to act as a barrier to the market tipping and a single CPO becoming dominant.

### 5.3.5. Key competition themes in an assessment

We see three main potential implications going forward.

First, geographies with high levels of concentration require monitoring to determine whether these positions are likely to erode over time and if there is evidence of

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<sup>237</sup> The evidence is for the case of the UK but Chargemap (as of July 2022) offers some good general context on Tesla pricing: 'In all cases, the cost is higher for non-Tesla EVs than for drivers of the Tesla brand, who benefit from an average price rate of €0.46 per kWh. The latest known price for Tesla charging points on the pilot programme stands at €0.68 per kWh on average' (Chargemap Blog, "Tesla Superchargers open to non-Tesla EVs: how to plug-in this summer", July 2022)

<sup>238</sup> Regional market power can also be leveraged by offering the competitive (or above the competitive) price where a cPO faces competition and monopoly prices at locations where they are the sole providers.

<sup>239</sup> For a theoretical overview see Federico, G. 2011. "The antitrust treatment of loyalty discounts in Europe: towards a more economic approach". *Journal of European Competition Law and Practice*.

successful entry. Where strong positions persist for an extended period, attention should be given to whether there are barriers to contestability and the sources of such barriers.

Second, the same emphasis on competitive public procurement policies is likely to apply here as in the previous sub-section. Exclusionary land banking and exclusivities is less likely to manifest if publicly owned locations are allocated to several suppliers or with not excessively long terms.<sup>240</sup>

Third, the concerns in Section 5.3 lend themselves more naturally to traditional antitrust enforcement under Article 101 and/or Article 102 than do the concerns around lack of local competition in the previous sub-section. In particular, a hypothetical dominant CPO/eMSP who entered into exclusivities with a large proportion of choice recharging locations in a geographic area in a way that was capable of foreclosing competition could raise concerns.

Markets that are naturally prone to tipping due to the existence of strong density/network effects and small room for product differentiation or the emergence of alternative disruptive business models would, all else equal, be of higher concern in the presence of dominant CPOs. Conducts such as land grabbing, exclusive contracts, imposing closed networks with limited interoperability and restrictions to multihoming, bundling, other types of price differentiation or any combination of the above can prevent the entry and expansion of rival suppliers.

## 5.4. Unilateral exclusionary conduct

Vertical integration is a normal part of competition and can deliver efficiencies, but it may also result in conflicts of interest and foreclosure concerns. In this sub-section we work through some of the key non-horizontal “linkages” we have identified in the EU27 + the UK EV recharging industry and discuss whether there are *prima facie* indicators that require attention from competition authorities and regulators.

As explained in Section 4, CPOs can be split into categories: EV recharging pure-plays, players expanding from adjacent sectors (e.g., Oil & Gas, utilities, and vehicle OEMs), and public sector entities. We also discussed how there is a convergence between the CPO and eMSPs model with CPOs typically vertically integrated with their own eMSP and increasingly seeking to provide value added services (e.g., home installation, recharging point location finders) alongside recharging. These varying forms of vertical integration that are common in the sector give rise to concerns for foreclosure of rivals by vertically integrated CPO/eMSPs, the DSO, ICE fuel retailers, local authorities, or EV OEMs in order to favour their own or affiliated CPO/eMSP.

### 5.4.1. Exclusionary conducts by vertically integrated CPO/eMSPs

As discussed in Section 4 the industry is evolving towards an integrated CPO and eMSP model with eMSPs seeking to differentiate themselves through the provision of complementary services. This is likely to bring benefits but also potential risks as product integration creates potential conflicts of interest. We discuss potential scenarios in this section.

**Foreclosure by a dominant CPO of rival eMSPs.** In principle, a standalone CPO that is not consumer-facing would have the incentive to sign bilateral (access) agreements with as many eMSPs as possible in order to increase utilisation of their network of recharging points. In the absence of integration or e.g., an exclusive partnership with

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<sup>240</sup> The additional possibility arises for creating a secondary market for location licences. While a secondary market mechanism could in principle enhance efficiency, at the same time it may pose the risk of leading to local consolidation while escaping merger control, and hence raises the need of monitoring.



an eMSP with a large user network, incentives to block access to rival eMSPs would be limited.

Similarly, standalone eMSPs want to offer their network of users access to as many CPO recharging points as possible to expand coverage for their subscribers and, hence, incentives to not conclude such agreements or to disadvantage in how CPOs that are integrated with rival eMSPs are displayed, would be limited even if an eMSP was dominant. For example, in the UK and the Nordic countries (Norway, Sweden, Finland and Denmark), one of the main European standalone eMSP players, Chargemap, entered into a roaming agreement with a series of other actors including Allego, Chargepoint, EVBox and Shell.<sup>241</sup> Similarly, in the Netherlands, standalone eMSP XXImo has established bilateral agreements with all the other CPOs in the country, allowing its clients to have access to 100% of the recharging stations installed. Large European standalone eMSP player Plugsurfing joined in 2021 the roaming platform Hubeject that allows it to access 220k recharging points for Plugsurfing.<sup>242</sup>

However, the predominant emerging business model is that of an integrated CPO/eMSP and we have documented how there are several countries where such an integrated player has a share above 50% in the CPO segment.<sup>243</sup> In this case, these vertically integrated suppliers could have ability and incentive to either block completely rival eMSPs from making use of the recharging point network (i.e., not sign bilateral or roaming platform agreements at all that would amount to full foreclosure) or offer access but at worse terms (which would amount to partial foreclosure).

As a roaming platform agreement amounts to a vertical agreement between an eMSP and a roaming platform coupled with a vertical agreement between the CPO and the roaming platform, a dominant CPO with an integrated eMSPs may not wish to sign a roaming platform agreement at all so that they can control the individual access and access terms of rival eMSPs through bilateral agreements. According to Hubeject, there are indeed several large CPO/eMSPs that have not signed a roaming agreement with their platform.<sup>244</sup>

In the case of bilateral agreements, whose terms vary as they are the outcome of bilateral negotiations, an integrated CPO/eMSP may use their dominance in the CPO segment to disadvantage rival eMSPs by not signing bilateral agreements with them at all or by offering them worse terms of access (e.g., high access prices). The strategy would in all cases aim at leveraging CPO segment dominance to increase eMSP market share as users would be expected to switch from the rival eMSP to the integrated eMSP in order to access essential recharging locations.

In practice, we know that there is widespread use of bilateral eMSP-CPO agreements in the industry, but that these agreements do not include all of rival eMSPs and are individually negotiated hence allowing for access price/terms differentiation. For example, at an EU-wide level, TotalEnergies, an integrated CPO/eMSP player, has bilateral eMSP agreements in place allowing inbound roaming into its recharging network to clients of 71 other eMSPs.<sup>245</sup> However, there is no visibility of the key terms of these agreements such as access prices that would allow for further analysis.

**Incentives for CPOs/eMSPs to self-preference within recharging point location finders.** Recharging point location finding services are a popular emerging service

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<sup>241</sup> Chargemap, “Leading charge point operators (including Chargemap) plan roaming agreement in the UK and the Nordics”, October 2019

<sup>242</sup> Plugsurfing, “Plugsurfing and Hubeject team up again to strengthen global EV roaming”, July 2021

<sup>243</sup> We note that the national market level may still be too broad to identify market power as alluded to in our discussion of regional public recharging point concentration.

<sup>244</sup> Study interview, CPO/eMSP expert Italy, November 2022

<sup>245</sup> TotalEnergies, “Cards accepted by the TotalEnergies network”



offered by eMSPs. The vast majority of eMSPs offer a proprietary recharging location map service, with the main distinction being the size of the accessible network. For instance, both the integrated player Enel X and the standalone eMSP Plugsurfing offer recharging point location maps.<sup>246, 247</sup> Recharging points are commonly displayed over maps (online, via mobile app or the car's infotainment system) which, besides their location, include information such as the availability state of the recharging point, the charges and payment options<sup>248</sup>, the connector sockets available, and the power delivery level options.

While the maps will typically include both proprietary recharging points as well as those made available via roaming agreements, there may be incentives for eMSP location finders to self-preference by promoting the recharging points which they own (in the case of eMSP/CPO integration), or to promote those who pay the eMSP the highest commission. Whereas this is a potential concern, we do not have any examples of the extreme form of such conduct where recharging points of rivals are not displayed at all. On the contrary there are examples such as the case of Octopus Electric Universe's map where recharging points outside of their network are also displayed.<sup>249</sup> However, there are additional plausible concerns around self-preferencing according to which the rival recharging points information is displayed on a map but the software suggests a longer route to reach a rival point than its own and/or shows the price or other relevant technical information only for its own points. Although such conduct would significantly reduce the value of a location service/app, these services are typically given away for free and for eMSPs take the form of an added service for their subscribers.

Overall, these incentives will be limited as long as there is competition between location finders, but concerns can arise if this service is incorporated into other services with market power (e.g., maps supplied by tech firms or automotive operating systems). For example, if a large eMSP or a roaming platform could incorporate such a service in their offering experience from digital platforms and a small advantage in display (e.g., by displaying affiliated results first, providing less information on third parties, selectively displaying less close competitors, withholding cost/availability information or even less discernible display modifications) has been shown to easily tilt consumers' decisions in its favour.

Moreover, given that it has emerged from our research that there is room for consumer multi-homing with an abundance of recharging location map offerings available, not only from eMSPs but also from firms such as ChargeFinder who specialise in the provision of recharging maps to customers, as well as from firms who have traditionally focused on navigation software such as Google Maps and TomTom, we believe that concerns here would be limited. However, although consumers may have several apps, they may predominantly use just one, hence an app may have the ability to capture consumers and retain its subscribers on its network through not easily detectable self-preferencing. Therefore, continuous oversight would be necessary to make sure there are no leveraging attempts, particularly by firms that have significant market power in adjacent geographic markets.<sup>250</sup>

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<sup>246</sup> Plugsurfing, "On-the-go EV charging just got easier"

<sup>247</sup> Enel X, "Our Network, One App"

<sup>248</sup> Note that such information is not exhaustive. In particular, when it is a 3rd party app like Electroverse who is showing the recharging points they are only able to provide cost information for "partnered" networks and displays other networks without pricing information.

<sup>249</sup> Octopus Energy, "Electric Universe Map"

<sup>250</sup> Chargefinder, "Find charging stations on the map"

#### 5.4.2. Exclusionary conducts by the DSO

A second category of concern relates to EV recharging services provided by the DSO through a subsidiary company.

This is relatively commonplace in Europe with energy providers entering into EV recharging in a range of countries, including in Ireland where electricity DSO ESB's eMobility subsidiary ESB eCars has a share among CPOs of more than 50%.<sup>251</sup> Similarly, in France utility company EDF has the largest share, through its subsidiary firm Izivia.<sup>252</sup>

As was discussed in detail in Section 5.3, the DSO can play an important role both controlling the installation of recharging points and the running and maintenance of the network. Therefore, there is scope both for efficiencies and foreclosing effects. There are efficiencies from the elimination of double marginalisation as CPOs in the case of integration with energy providers will be able to procure energy by paying just for the cost of its production instead of paying a price that includes a profitability margin for a third party.<sup>253</sup> Moreover, there is scope for additional efficiencies in the form of joined up thinking (e.g., smart grid solutions where EV recharging networks provide storage), and operational efficiencies such as reliance on common assets, high-skilled engineers and other personnel etc.

On the other hand, there may well be foreclosure effects if third-party CPOs rely on grid operators or energy suppliers for support to install and maintain recharging points. For instance, an integrated energy supplier and recharging network may pose obstacles to the installation of rival recharging points or refuse to supply competing recharging networks with energy. Although such conduct, amounting to full foreclosure, is unlikely as access to the grid is typically mandated by regulation, the integrated firm may seek to tailor its pricing to raise the costs of competing recharging networks and capture part of their share. Even if both the access/installation conditions by the DSO and the price of energy supply are subject to regulation, there is still room for partial foreclosure on quality of service. For example, a DSO might hypothetically give precedence to its own CPOs in installing, repairing or upgrading the energy supply lines. A further potential issue arises in those MSs, such as Ireland, that may still have the distribution network maintained by energy retailers or generators to the extent they have some "regulatory" power regarding the conformity of the connections of competitors to the grid.

Overall, we see some prima facie evidence for potential market power concerns in this area. Several of the EU countries with high levels of recharging concentration have major operators who are affiliated with major energy operators (see Table 13 below). Further, there are EU countries where energy liberalisation remains incomplete and incumbent energy suppliers have strong positions including control of the electricity distribution network. The control by the upstream integrated company of the distribution network can provide them with the ability to foreclose competing CPOs by increasing the price and/or reducing the quality of the connection (e.g., through delayed connections, slower repairs of faults etc.) in which case an appropriate analysis of incentives would need to take place.

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<sup>251</sup> ESB was established in 1927 as a statutory corporation in the Republic of Ireland and the majority of shares are held by the Irish Government. Previously known as ESB Customer Supply and ESB Independent Energy, the retail division of ESB has been rebranded to Electric Ireland in 2012. ESB Networks finances, builds and maintains the electricity transmission system as well as distributes electricity from the bulk supply to users under its Distribution System Operator (DSO) License.

<sup>252</sup> Although we recognise that the DSO is not the CPO network directly but through a subsidiary company of the same group, we note that this is typically treated as equivalent from a competition perspective and hence we abstract from the exact vertical structure in this section.

<sup>253</sup> In principle these EDM effects can be resolved by the use of more complicated pricing structures (e.g., charging users the marginal cost of energy along with a fixed monthly fee). We are not aware of such arrangements being widely used in practice, however.

Although Directive 2014/94/EU regulated control and maintenance of the distribution grid in relation to recharging, introducing the requirement for DSOs to cooperate on a non-discriminatory basis with any subject installing recharging points, any rule on non-price discrimination poses obvious challenges in terms of implementation and monitoring.<sup>254</sup> In the European Union, legal unbundling for DSOs, making them a legally separated entity from the parent company, was introduced with the Third Energy Package in 2009.<sup>255</sup> In addition, Directive 2019/944/EU banned DSOs from operating as CPOs.<sup>256</sup> Furthermore, some countries such as Italy have implemented additional measures to deter DSOs from abusing their position, for instance imposing on them that they notify the regulators for any recharging point which is denied a grid connection and detail their plans for grid capacity enhancements.<sup>257</sup> Whilst there was no evidence identified regarding non-compliance of these measures, the companies listed in Table 13 are in a position where they have the ability and incentive to foreclose competing CPOs. For example in Malta, where the EV infrastructure sector is controlled by a state-run CPO, an unbundling of the electricity sector has yet to occur.<sup>258</sup> In Ireland, as discussed in Section 7.1, ESB Networks continues to act as owner of the transmission and distribution grids, and ESB eCars also accounts for over approximately 50% of all public recharging stations in the Ireland (although we have documented evidence that its position and first-mover advantage are eroding through new sector entry).<sup>259</sup> However, regulation was introduced in Ireland to limit potential foreclosure by the DSO. In fact, ESB is, as DSO, subject to strict ringfencing provisions ensuring it runs the distribution grid as neutral market facilitator, i.e., as if it was a fully independent firm.<sup>260</sup> Furthermore, the Irish Commission for the Regulation of Utilities (CRU) introduced a grid connection offer process that ensures fairness, transparency, and timeliness, further preventing foreclosure by the DSO.<sup>261</sup>

**Table 13: Countries with vertically integrated DSO/CPOs**

Country	Extent of Vertical Integration across the value chain
Cyprus	Less than 100 public recharging stations on the island which are mostly operated by the Electricity Authority of Cyprus (EAC) (state electricity utility with a DSO function)
Czechia	CEZ (state electricity utility with a DSO function) is the major CPO at the moment, however new entrants are reshaping the industry
Denmark	E.ON (energy utility with a DSO function across Europe) and Clever (pure play eMobility player) together have around 90% share
Italy	Enel X (partially state-owned electricity utility with a DSO function) accounts for 55% of public rechargers
Ireland	ESB e-cars (state electricity utility with a DSO function) have around 58% share
Latvia	CSDD are the largest player who are a state-owned entity focusing on eMobility, the second largest player Latvenergo (state electricity utility with a DSO function)
Lithuania	Nascent market with 200 rechargers operated by Ignitis.ON (state electricity utility with a DSO function), Inbalance and Elinita (pure plays)

<sup>254</sup> Directive 2014/94/EU (AFID)

<sup>255</sup> European Commission, "Third Energy Package"

<sup>256</sup> Official Journal of the European Union, "Directive (EU) 2019/944 of the European Parliament and of the Council of 5 June 2019 on common rules for the internal market for electricity and amending Directive 2012/27/EU", June 2019

<sup>257</sup> Italian Official Legislative Journal, "Decree n. 210 from November 2021", November 2021

<sup>258</sup> Council of European Energy Regulators, "Implementation of TSO and DSO Unbundling Provisions", June 2019

<sup>259</sup> Gonzalo Fernandez, "Electricity Supply Board", June 2020

<sup>260</sup> ESB Networks, "Independent Role of the DSO", September 2021

<sup>261</sup> Commission for Regulation of Utilities, "Enduring Connection Policy Stage 2 (ECP-2)", June 2020

Country	Extent of Vertical Integration across the value chain
Luxembourg	Charge that are owned and operated by Engie (energy utility with a DSO function across Europe) accounts for 90%
Malta	The limited number of recharging points are owned by Enemalta (state electricity utility with a DSO function)

Although significantly less concerning than the case of the DSO, who controls the installation of recharging points and the running and maintenance of the network, there are many examples of energy companies that have the potential to use their positions to promote use of their public recharging networks. Notably the German energy utility E.ON have a pan-European footprint when it comes to eMobility through their subsidiary E.ON Drive which includes a high share among CPOs in Denmark. To our knowledge E.ON does not offer preferential rates to energy customers who use their public recharging infrastructure, although there is a level of cross-marketing activity. For instance, E.ON Drive offer grants to E.ON energy customers for a private (at-home) recharging point.<sup>262</sup> There are likely similar brand awareness advantages for other retail utilities that also operate public recharging points, essentially allowing them to leverage their customer relationship to encourage usership of their public recharging network as a natural revenue stacking option. While such conduct is not per se anticompetitive, and indeed can be beneficial, one can hypothesise scenarios in which a dominant energy supplier might be able to implement conducts that led to foreclosing effects.

#### 5.4.3. Linkages with ICE fuel retailers or owners of service stations

Another potential for vertical foreclosure is when CPOs own or sign exclusive agreements with ICE fuel retailers or service stations that allow them to be the only CPO recharging point in key locations (e.g., along most of the highway network). In assessing foreclosure ability/incentives, key considerations will be the coverage of the ICE fuel station/service station and the exclusive nature of the agreements.

In Continental Europe, pan-European recharging network IONITY has formed strategic partnerships with key ICE fuel station operators Shell, OMV, Tank & Rest and Circle K, securing a European fast recharging network across 18 European countries. However, there is to our knowledge no indication that these agreements are exclusive.<sup>263</sup>

If agreements are not exclusive, then ICE fuel stations or service stations will typically multi-home by providing access to more than one CPOs. This is likely to significantly alleviate potential competition concerns although one could envisage more marginal effects (e.g., if certain operators can secure a disproportionate share of vehicle scarce spaces or achieve access to more visible/premium positions such as those close to restaurants and facilities).

A good example of these concerns is the UK. In 2021, Electric highway (owned by Gridserve, previously Ecotricity) controlled around 80% of all recharging points at motorway service stations, with long-term exclusivity agreements (between 10 and 15 years) covering around two-thirds of all motorway service stations. The CMA reported that, despite Electric Highway being the largest on-route operator, it had by far the lowest customer satisfaction score out of the top 16 operators.<sup>264</sup> Following a competition law investigation, the CMA asked for commitments according to which Gridserve signed a legally binding agreement to not enforce their exclusive rights over

<sup>262</sup> EON, "EV charging solutions for business"

<sup>263</sup> Global Convenience Store Focus, "Pan-European charging network, IONITY, forms strategic partnerships with key forecourt operators", January 2018

<sup>264</sup> Competition Market Authority, "Summary: Building a comprehensive and competitive electric vehicle charging sector that works for all drivers", July 2021

recharging points after November 2026, while asking the rest of the sector to steer clear from such practices.

#### 5.4.4. Linkages with local authorities

Early on in the development of EV recharging points several local authorities throughout the EU27 + the UK branched out into EV recharging and became local CPOs. As discussed in Section 4.3.1, local authorities are often in control of regulatory approval for new sites and one can envisage conflicts of interest whereby local authorities could favour their affiliated CPO/eMSPs over rivals in various respects including the allocation of land to install recharging points.

For example, until 2020, municipalities and local authorities in France played a major role in the EV recharging sector, with approximately 15% of local authorities in France acting as CPOs in their jurisdiction. Presently, several municipalities still act as CPOs.<sup>265</sup> In Ireland, Dun Laoghaire Rathdown County Council and Fingal County Council installed recharging stations in 2018 and 2019 respectively, which offer recharging for free.<sup>266</sup> Similarly, most of Scotland's local authorities act as CPOs for some recharging points, and to encourage utilisation, have offered a period of free recharging. However, there is evidence of a growing number that have now either introduced or are in the process of introducing, tariffs.<sup>267</sup> In Germany, there is evidence that local municipal utilities are still often awarded all/most of available recharging point locations, at times without a public tender.<sup>268</sup>

As the industry grows and opens up to competition, there is a concern that local authorities, instead of retracting from the market and facilitating entry by privately-owned players, will try to use their control of the regulatory process to restrict entry and retain profitability. In Section 4.3, we describe in detail the role of local authorities in the civil works/installation process of new recharging points. Although they are not heavily involved in installation, operation, or maintenance process, local authorities control access to public land that is necessary for the installation of CPO recharging points and may favour their own CPO against potential entrants.

Therefore, regulatory oversight is needed in all cases of local authority CPOs that can be locally dominant in order to make sure there are transparent competitive tendering processes in place and the lack of access to land or regulatory approval obstacles are not acting as a barrier for CPO entry.

#### 5.4.5. Linkages between recharging points and EV OEMs

We have seen above that EV OEMs, most notably Tesla, have invested in building branded recharging networks which provide preferential access (initially exclusive in the case of Tesla) to owners of their vehicles. Similarly, IONITY, the European fast recharging network, was founded by many of the large OEMs such as the BMW Group, Mercedes-Benz Group, Ford Motor Company, Volkswagen Group and Hyundai Motor Group.<sup>970</sup> Whilst IONITY is to our knowledge technically interoperable, allowing access to eMSPs from third parties (i.e., other than the founding OEMs), it does claim to offer "attractive rates, sometimes with additional benefits" when using its own eMSP in order to encourage EV owners to use IONITY infrastructure.<sup>269</sup>

<sup>265</sup> The portal of the Directorate General for Enterprises, "Charging Infrastructure for Electric Vehicles", February 2020

<sup>266</sup> County and City Management Association, "Local Authority Electrification of Fleet and EV Charging Guidance Document", 2021

<sup>267</sup> Transport Scotland, "Report on Public Electric Vehicle (EV) infrastructure in Scotland - Opportunities for Growth", July 2021

<sup>268</sup> Bundeskartellamt "Bundeskartellamt calls for more competition in the provision of charging electricity - Preliminary findings of sector inquiry into charging infrastructure", 2021

<sup>269</sup> IONITY, "Mobility Service Provider", 2022



As with any form of vertical integration there is a trade-off between the efficiencies of integration and any harm from potential foreclosure. EVs and recharging are complements and the normal mechanism of elimination of double marginalisation applies; increased demand for EVs increases demand for recharging and vice-versa and an integrated firm is likely to charge a lower combined price because it internalises the fact that greater availability of EV recharging will increase demand for its products. On the flip side, an integrated firm will likely want to raise the cost of recharging for competing brands, or even not provide recharging services to them at all, because doing so will encourage consumers to buy their brand in the first place.

**The case for proprietary networks to prevent free riding and promote investment, particularly when EVs are in their infancy.** A first consideration is that proprietary recharging networks may be required to facilitate investment and prevent free riding, particularly when EVs are in their infancy.<sup>270</sup> A major adoption barrier to EVs in their early stages is “range anxiety” when travelling over longer distances. Alleviating this concern requires a sufficiently dense network of recharging points, but many of these more remote recharging points may not be financially viable in the early stages when the number of EVs is modest and the amount of “throughput” at any given EV recharging point is low.

An OEM may be willing to make such upfront investments because they internalise the benefit from a dense recharging network which will increase sales of their EVs. If recharging networks were open to rival EVs, there is a risk of “free riding” by rival brands because the denser recharging network will increase demand for EVs in general, not just for the OEM’s particular EVs.

Concerns about longer-run effects if OEMs with market power use ownership of proprietary recharging networks to raise barriers to entry. The counter to the positive narrative above is that proprietary recharging networks might be used to raise barriers to entry and reduce competition between OEMs. The economic literature illustrates circumstances where tying can have anticompetitive effects by raising barriers to entry because a new entrant does not just have to build one complementary product (an EV), but also another (a recharging network). This can act to deter entry if rivals consider that it is not sufficiently likely they will be able to build both products simultaneously.<sup>271</sup>

While conceptually valid, this mechanism is only likely to be empirically relevant if either EV OEMs hold significant market power or if OEM-sponsored recharging networks have significant market power (either because they account for a large proportion of recharging points or hold recharging points in key strategic locations).

On the former point, the key question is whether competition among EV OEMs is likely to mirror prior competitive dynamics among ICE vehicle OEMs. Historically, competition between auto manufacturers has been robust, with low levels of concentration and multiple competing brands in general and in individual sub segments (e.g., luxury saloons, SUVs, hatchbacks, people carriers). For example, the merger of Fiat and Peugeot which created Stellantis, the 4<sup>th</sup> largest car manufacturer globally, was cleared on the basis that, outside of competition for small commercial vans where remedies were required, *“competition will remain vibrant after the merger”*.<sup>272</sup>

While the end state of the EV industry is uncertain, initial indications are inconsistent with the market tipping towards a small number of suppliers, at least in Europe. While

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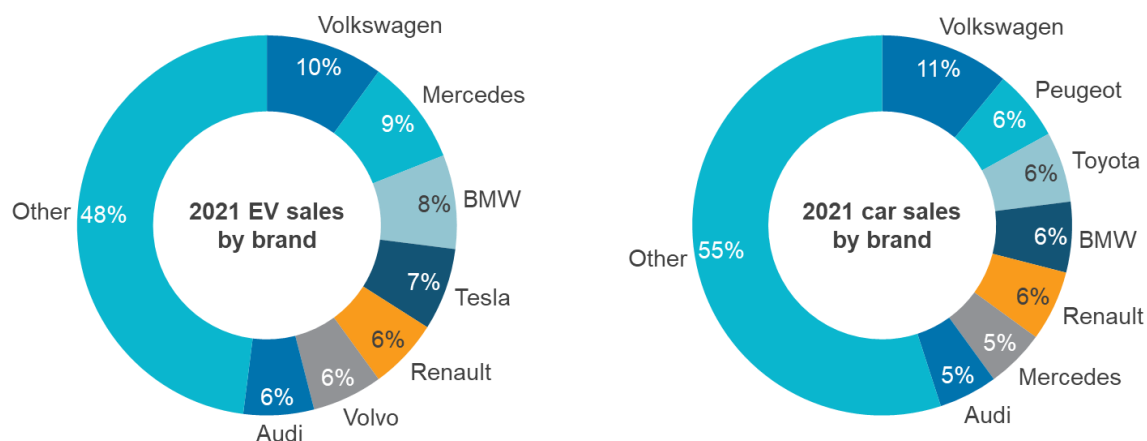
<sup>270</sup> Although free-riding concerns could be alleviated via differentiated pricing with third parties paying a higher access price, this would not consider the cost of congestion. Whereas a closed network amounts to full foreclosure, price discrimination against rivals provides an avenue for partial foreclosure.

<sup>271</sup> Jay Pil Choi, Christodoulos Stefanadis, “Tying, Investment, and the Dynamic Leverage Theory”, 2001

<sup>272</sup> European Commission, “Mergers: Commission approves the merger of Fiat Chrysler Automobiles N.V. and Peugeot S.A., subject to conditions”, December 2020

Tesla has reportedly achieved shares of EV sales in excess of 50% in the United States, its share of shipments globally is much more modest.<sup>273</sup> In Europe, in 2021, it does not even appear to be the leading supplier (even though the Tesla Model 3 was the most sold model and their proportion of sales in 2022 has slightly increased). This reflects the fact that, in part because of the legislative commitment to phase out new sales of ICE vehicles by 2035, incumbent brands (Volkswagen, BMW, Ford etc.) are also investing heavily in EVs. In Europe at least, shares of sales of new EVs by brand do not look dramatically different from sales of ICEs, as can be seen in Figure 21 below.

**Figure 21: EV vs. all passenger car sales in Europe by brand (2021)**<sup>274,275</sup>



The record market capitalisation achieved by Tesla in 2021 arguably indicated an expectation by financial markets that EV competition could crystallise around a smaller number of larger players of which Tesla would be a leader. However, Tesla's share price has fallen significantly since then (partly in line with declines in other technology stocks) and, while its market capitalisation remains far in excess of other car brands (approximately \$350b vs. approximately \$75b for Volkswagen), market sentiment appears to be pricing in competition from other players going forward.

On the second observation, the available data indicates that the share of recharging points linked to OEMs across Europe is modest. Tesla claims to have the largest 150kW+ network in Europe with approximately 10k recharging points (accounting for approximately 50% of rechargers with a capacity over 150kW and approximately 5% of total rechargers in the EU27 + the UK).<sup>276</sup> As an alternative to a proprietary recharging network, OEMs are working closely with ICE fuel stations (e.g., VW work closely with BP Pulse and Shell recharge have a similar relationship with BMW).

Tesla's movement towards opening up access to its recharging network indicates that potential competition concerns around linkages with OEMs may be self-correcting. For a profit maximising EV OEM in possession of a proprietary recharging network, the trade-off between deciding whether to grant access to recharging for rival vehicles is between the profits that can be generated from selling recharging services vs. the incremental profits that a more proprietary network might generate through increased sales of EVs.

<sup>273</sup> Adina Achim, "Here's Why Tesla Dominates EV Sales", October 2022. Note that we have conducted an analysis of either demand- or supply-side substitutability to conclude that EVs constitute a separate product market from traditional ICE vehicles.

<sup>274</sup> José Pontes, "Electric Car Market Grows To 29% In Europe As EV Sales Explode!", January 2022

<sup>275</sup> Car Sales Statistics, "2021 (Full Year) Europe : Best-Selling Car Manufacturers and Brands", January 2022

<sup>276</sup> Mark Kane, "Tesla Celebrates 10,000 Superchargers In Europe", October 2022



One would expect the latter effect to be more likely to dominate in the early stages of EV penetration. In the early years, when third-party recharging networks are sparsely populated, a proprietary recharging network may be a strong competitive differentiator for an EV OEM as it allows their products to offer greater protection against “range anxiety” than its competitors. As the prevalence of third-party recharging points increases, however, one would expect this differentiating factor to soften. This would mediate towards OEMs increasing interoperability with their competitors as the foregone revenue and profits from not recharging competing vehicles would be less likely to be offset by greater sales of EVs in the first place.

Tesla’s 2021 policy changes allow non-Tesla drivers to use their network through a pilot programme presently covering 13 countries in the EU.<sup>277</sup> However, we note that this interoperability has some caveats. First, Tesla drivers are guaranteed a lower price for recharging to mitigate potential complaints around recharging stations becoming busier. For example, in September 2022 in the UK, non-Tesla drivers paid approximately 2.5 times more per kWh (with the potential to opt into a monthly membership to enjoy lower rates, which are still higher than what Tesla drivers are charged). Second, drivers need to download the Tesla eMSP app to access the network rather than use a third-party eMSP.<sup>278</sup>

Regulatory requirements on interoperability are likely to limit the scope for access to EV recharging to be a constraint on OEM competition. As previously discussed, the introduction of pay-as-you-go options and ad hoc recharging and electronic payment in recharging stations will open up the recharging network to all EV users with the implication that any third-party OEM will always have some recharging options to offer its customers so EV recharging should not be a big barrier to entry.

Overall, our view is that the *prima facie* evidence does not yet indicate a major competition concern around linkages between OEMs and recharging infrastructure and our hypothesis is that competition between EV brands will focus on other areas of differentiation.

#### **5.4.6. Key competition themes in an assessment of foreclosure concerns**

Any of these theories of market dominance would need to be established empirically. If ability existed, then incentives would still need to be carefully analysed. As has been articulated throughout, each of these theories are likely to require a consideration of potential efficiencies and a weighing off of efficiency benefits vs. competition risks.

Overall, a mixture of appropriately designed regulatory restrictions and competition policy oversight are likely to be needed to alleviate concerns and prevent restriction of competition. In markets with local authority or state-owned CPOs, examples of which we discussed, or in regulated markets such as electricity distribution more generally, *ex ante* regulations (e.g., governing access of CPOs to the electricity grid, or competitive tendering processes for local authority concessions) could limit the ability to exercise foreclosure. Although such regulations could limit the ability to exercise market power, these are not already in place in most countries and local authorities may have an incentive to limit competition to appropriate the rents from local market power as long as private recharging does not act as a constraint. Additional analysis would, therefore, be needed to gather systematic data at the regional level on pockets of market power that may arise. Even when a local desert does not currently exist, if there is sufficient market power then restrictions could create local deserts.<sup>279</sup> When competitive markets

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<sup>277</sup> Tesla, “Non-Tesla Supercharger Pilot”, November 2021

<sup>278</sup> Cat Dow, “Using the Tesla Supercharger network UK: whichever EV you drive”, September 2022

<sup>279</sup> This point is also relevant for motorways which are a possible separate market with fewer potential substitutes (i.e., no home charging).

are concerned, however, such as in the case of CPO linkages with OEMs, ICE fuel stations/service stations, and eMSPs, competition policy oversight and intervention would be the only tool to address concerns over abuse of market power.

## 5.5. Horizontal agreements and coordinated conduct

The most common types of agreements in EV recharging are of the following three forms, each presenting different potential competition concerns:<sup>280</sup>

- joint ventures between CPOs that amount to horizontal agreements for the expansion and sharing of their recharging networks. These present similarities but also key differences to network sharing agreements (NSAs) in telecommunications and are a common practice across the industry. To the extent that the CPOs involved have (or had roll-out plans for) overlapping recharging networks, these are agreements between direct competitors that may give rise to direct coordination/collusion concerns;
- bilateral agreements between CPOs and eMSPs. These are agreements that give the eMSP access to the CPO's recharging points network. They are vertical agreements that would not in principle raise coordination concerns. However, since CPOs are most often integrated with an eMSP, bilateral agreements between integrated CPOs/eMSPs can have a horizontal dimension; and
- multilateral roaming agreements through roaming platforms. Roaming platforms such as Hubeject, Gireve and e-Clearing strike agreements with numerous CPOs. They then provide eMSPs with access to all of these CPOs' network. Although the existence of a third party in between integrated CPOs/eMSPs makes coordination less likely, the roaming platform still has in principle access to pricing and other information and could hence act as a "hub" facilitating hub and spoke collusion.<sup>281</sup> Other third parties can also act as "hubs" and raise similar concerns.

### 5.5.1. CPO collaboration agreements

There are several examples of CPO infrastructure sharing agreements or joint ventures, many of which have already been scrutinised by competition authorities.

In Denmark, Clever and E.ON, account for approximately 90% of the public recharging network and in 2017 signed an agreement to collaborate and develop hundreds of 150kW ultra-fast EV recharging points along key EU motorways. The network is open to other eMSPs than their own via various bilateral CPO-eMSP agreements as well as through a roaming platform. This has been appointed as an EU flagship project and has received €10 million in funding from the European Commission. In 2019, the parties received the final approval for their joint venture from the European Commission who did not see any competition concerns.<sup>282</sup>

In November 2021 the Italian Competition Authority (ICA) opened an investigation against a proposed joint venture (JV) between Enel X (who accounts for approximately 50% of public recharging points) and Volkswagen, to assess whether the JV could create foreclosure effects for other eMSPs, if it could lead to horizontal market concentration and to assess the non-compete agreement between the two parties. The ICA ultimately approved the joint venture<sup>283</sup> without commitments as the Authority established that no

<sup>280</sup> Virta, "Why roaming is the buzzword in electric vehicle charging", September 2022

<sup>281</sup> See: OECD, "Hub-and-spoke arrangements in competition"

<sup>282</sup> Ole Andersen, "E.ON and Clever get green light for charging station partnership", January 2019

For the EC clearing decision see Case M.9049: [https://ec.europa.eu/competition/mergers/cases/decisions/m9049\\_62\\_3.pdf](https://ec.europa.eu/competition/mergers/cases/decisions/m9049_62_3.pdf)

<sup>283</sup> Michele Giannino, "the Italian competition authority approves without conditions a joint venture in the sector for green mobility (Enel X / Volkswagen finance Luxembourg)", December 2021

horizontal market concentration would have occurred due to Volkswagen not aiming to enter the recharging sector and investing in the JV for the purpose of indirectly supporting EV adoption in Italy. Similarly, the non-compete agreement allowed Volkswagen a margin to install additional recharging points outside of the JV and was approved as it was referring to a limited number of recharging points that subsidiary company Porsche had previously committed to install.

These agreements present some of the same benefits and competition risks as NSAs in other sectors e.g. the banking sector around ATM networks, or the telecommunications sector for which they have been codified before by competition authorities and regulators, but for the fact that they happen in a nascent market.<sup>284</sup> When evaluating such agreements the fundamental trade-off is well summarised by a comment by Executive Vice-President Margrethe Vestager in her comments on the European Commission's approval of a network sharing agreement in telecoms: *"Network sharing agreements bring efficiencies, such as faster roll-out, cost savings and coverage in rural areas. But such cooperation can also dampen the incentives of mobile operators to independently improve their networks and services."*<sup>285</sup> Network sharing in EV recharging needs to be evaluated through a similar framework. The potential benefits of such agreements include faster network roll-out through the sharing of large-scale investment costs, improved network quality and geographical coverage, and further public interest benefits such as increased scope for investment on environmental projects such as renewable energy use.

On the other hand, competition concerns mainly focus around the unilateral aspect of reduced ability of firms to compete at the network level, incentives about third party exclusion of competitors, as well as on coordinated conduct stemming from the requirement for increased coordination between participants.

On the unilateral side, we have already discussed how policies leading to the opening up of networks can remove the first-mover advantage and hence dampen investment incentives due to the anticipation of lower returns, in practice removing one dimension of competition (on the network). The mechanisms at play here are similar and the prevalence of such unilateral competition effects depends on the timing, geographic scope and exact network elements specified in the agreement. In particular, these agreements present some key differences to NSA agreements in that the distinction between agreements between substitutes (NSA) and complements (roaming) is not as clearcut as for mobiles whose footprint is based on licensing. On one hand, an agreement between two largely overlapping networks could have very similar effects as a NSA, potentially leading to a network operator removing some recharging points. While this effect may not be easily visible today when the market is still emerging, it may still result in reduced investment infrastructure in the longer-run. On the other hand, an agreement between CPOs with largely non-overlapping networks that covers any new recharging point may not provide direct incentives to remove existing infrastructure but still in the longer run it can reduce individual incentives to invest in new recharging points. This could potentially have the implication of an agreement between non-overlapping networks in a nascent market having similar effects to those of an agreement between overlapping networks in a developed market.

On the coordinated effects dimension of horizontal agreements, the key concern is around the scope for increased coordination and information-sharing among participants. An agreement to share the network can cross the line, if unchecked, and

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<sup>284</sup> Body of European Regulators for Electronic Communications, "BEREC Common Position on Mobile Infrastructure Sharing", June 2019

<sup>285</sup> European Commission, "Antitrust: Commission accepts commitments from T-Mobile CZ, CETIN and O2 CZ on Czech network sharing", July 2022

turn into a market sharing initiative. Information sharing also introduces wider tacit collusion risks on pricing and other competitive dimensions and may need to be addressed via commitments.

### 5.5.2. Agreements between integrated CPO/eMSPs

As discussed, most CPOs are integrated with a consumer-facing eMSP. Therefore, two independent vertical bilateral agreements based on which the eMSP arms of two integrated CPO/eMSPs get access to each-others' CPO networks can in practice be equivalent from a competition perspective to a horizontal reciprocal agreement between two CPOs/eMSPs to access each other's network.

In Latvia, the biggest CPOs, CSDD and Elektrum which are both state-owned with Elektrum being a subsidiary of the national utility, received legal permission in August 2022 from the State Competition Council to share their recharging infrastructure amongst their customer base.<sup>286</sup> This enables CSDD or Elektrum Drive customers to use any of their recharging points whilst making payments through their original provider (CSDD or Elektrum Drive), thus promoting interoperability and limiting complexity of the consumer experience.

It is common in all countries that several bilateral agreements between CPOs/eMSPs exist, as we document in great detail in the in-depth analysis in Section 7. These agreements are necessary for the operation of eMSPs who need access to CPOs in order to be able to offer their customers wide coverage. They offer EV drivers access to a more extensive network of CPOs than the CPO that is integrated with the eMSP they are subscribed to, increasing the number of recharging points available to the average consumer. Overall, these agreements are common in the EU27 + the UK, as many firms establish high numbers of partnerships to widen their geographic footprint. TotalEnergies, for instance, has agreements in place allowing access into its recharging network to clients of 71 different eMSPs (covering France, Germany, Belgium, Luxemburg, and the Netherlands). Similarly, Dutch CPO and eMSP Allego has partnered with more than 280 eMSPs, giving them access to their network. However, in markets with high concentration of integrated CPO/eMSPs these agreements could facilitate collusion by allowing participants to coordinate on CPO to eMSP access pricing.

In principle, agreements between CPO/eMSPs with non-overlapping geographical footprints (i.e., complementary networks) should be viewed and assessed more favourably than agreements between integrated players with overlapping geographical footprints (i.e., direct rivals offering substitute services in multiple regions).

### 5.5.3. Roaming platform agreements

Roaming agreements are in principle vertical agreements between the roaming platform (typically privately operated by firms with coverage across multiple EU Member States such as Hubeject, Gireve and e-Clearing), and CPOs for access to the latter's network, and then eMSPs and the roaming platform allowing eMSPs access to the various CPOs' networks that the roaming platform is partnered with. Therefore, such roaming platforms include multitude CPO and eMSP members and enhance both eMSP geographic coverage and the CPOs' asset utilisation without introducing a direct CPO-eMSP relationship.

However, there are risks that roaming platforms may act as information aggregators and "hubs"<sup>287</sup> that could facilitate information exchange or collusion between eMSPs by

<sup>286</sup> Eng. LSM.lv, "Watchdog allows collaboration of electric car charging networks in Latvia", August 2022

<sup>287</sup> See: OECD, "Hub-and-spoke arrangements in competition"

the potential sharing of sensitive pricing data or other sensitive information such as future installation plans.

Concerns may also arise if information aggregators such as platforms offering recharging points location, price and speed data provide greater market transparency that facilitates coordination.<sup>288</sup> One could also envisage concerns around algorithmic collusion if prices are available on a comparable basis online or can be easily accessed or scraped from these sources.<sup>289</sup>

Even cooperation agreements for the promotion of EV cars through the creation of a trade association that can also act as a “hub”. In Austria, where the EV recharging sector is populated by a plethora of different players, with more than 250 registered CPOs,<sup>290</sup> twelve different CPOs (mostly integrated with utility firms) together operating roughly 8k or 40% of recharging points market<sup>291</sup> have joined forces in the Federal Association for e-Mobility in Austria (BEÖ), committed to converting mobility in Austria to electric mobility by using renewable energies. Advanced oversight is needed in such cases regarding the extent of information sharing between competitors that take part in the association.

#### 5.5.4. Key competition themes in an assessment

The agreements need to be assessed based on their exact type, as detailed above. Joint ventures can be assessed using a similar framework as the one that CAs have employed for other types of NSAs such as those in the telecommunications sector, against an accurate counterfactual (i.e., against the infrastructure/network quality and competitive landscape that would likely emerge without the agreement in question). In the case of CPO/eMSP bilateral agreements, the extent of competition between the integrated players is also important in terms of whether their proprietary networks are or are expected to be overlapping or not, which determines the extent to which their services are substitutes or complements.

Some of the key factors that overall determine whether concerns are justified across all types of agreements we discussed include:<sup>292</sup>

- **the agreement’s network coverage:** Infrastructure/network sharing with limited geographic scope will create fewer competition concerns than network sharing that covers large parts of a country as will agreements between networks whose operations are largely complementary in nature with limited overlap in footprint. Moreover, limited in scope agreements for rural/localised network sharing are seen as less problematic than bilateral agreements for urban/densely populated areas which should be able to support competition;
- **the degree of market competition as indicated by e.g., the market concentration:** higher market concentration is generally thought of as a factor facilitating coordination/collusion although the competitive conditions and dynamics of the exact market need to also be taken into account to properly assess the risks.

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<sup>288</sup> Generally increased market transparency facilitates collusion as it allows firms to more quickly identify and punish “deviations” from an explicit or tacit anticompetitive agreement. See chapter 5 of the Final Report to the DG Comp on the economics of tacit collusion by Ivaldi, M, Jullien, B. Rey, Patrick, Seabright, P. and Tirole, J. ([Link](#))

<sup>289</sup> Concerns around algorithmic collusion are in their early stages but this concern does receive some academic support. See, for example, Calvano, E. Calzolari, G. Denicolo, V. Pastorello, S. 2020. “Artificial Intelligence, Algorithmic Pricing, and Collusion”, *American Economic Review*.

<sup>290</sup> Federal Competition Authority, “Sector inquiry into EV charging infrastructure: AFCA launches comprehensive market inquiry”, May 2022

<sup>291</sup> Federal Association of Electromobility of Austria (BOE), “Association website”

<sup>292</sup> Marc Bourreau, “Implementing co-investing and network sharing”, May 2020

Higher concentration also raises more concerns for unilateral effects and for third party exclusion; and

- **the type and scope of information sharing:** the sharing of strategic decisions or a wider range of information is clearly deemed riskier. Information exchange must instead be limited to what is strictly necessary.

Overall, the fact that this is still a nascent market has implications for the competition assessment in that it is yet unclear what a no agreement counterfactual would look like. In addition, there is a risk that roaming agreements between complementary networks which are not fully developed could result in reduced investment in recharging points. Faced with the key trade-off of maximising network quality and consumer access against encouraging market competition along all dimensions, CAs need to undertake a case-by-case assessment in order to decide whether to permit joint ventures with or without commitments. For example, in its competitive assessment and decisions regarding network sharing in mobile telecommunications systems in the UK, Germany and Czechia, the European Commission analysed each case separately and concluded that it would allow the agreements either unconditionally, or under specific provisions and commitments. In marginal cases, it could also be considered to make commitments for investment etc. as a pre-condition of entering an arrangement.<sup>293</sup> In the case of Czechia for example, commitments included contractual provisions limiting information exchange to the minimum necessary for the operation of the shared network aimed to alleviate coordination/collusion concerns.<sup>294</sup> Although this approach would present similarities to that employed in telecommunications and other sectors, the degree of uncertainty seems much higher than in the case of NSAs among mobile networks.

Regarding access agreements between integrated CPOs-eMSPs, these are necessary for the operation of the market but advanced oversight is necessary in the presence of high market concentration as the parties are direct competitors in both the CPO and the eMSP markets. For example, an extensive bilateral arrangement between two integrated CPO/eMSPs with high combined market share and high reciprocal access charges, could lead to a collusive outcome with higher retail prices for consumers.

Finally, any aggregation of information through roaming platforms, location finder platforms or price aggregators and trade associations should be monitored to prevent “hub and spoke” type price coordination.

## 5.6. Public funding considerations based on data from the EU27 + the UK

As set out in Section 3 some level of public funding support to the EV sector exists across all the EU27 + the UK. However, these measures vary in structure, timing and overall make up. Public support typically involves direct support for EV recharging on the supply side, and/or more indirect support on the demand side by encouraging EV penetration. As discussed in Section 3.1.1, similar public support measures are also undertaken at an EU level whereby loans or grants are allocated to specific projects within a single or across multiple Member States.

We begin by setting out the potential justifications for public funding and the associated risks, before presenting a discussion of the cross-country experience in the EU27 +UK and whether any conclusions can be drawn based on this evidence.

<sup>293</sup> For example, the European Commission accepted a major partnership with the following [commitments](#)

<sup>294</sup> See for the EC’s [decisions](#) on network sharing in mobile telecommunications systems in the UK, Germany and the Czechia.



### 5.6.1. What are the potential justifications for national funding of EV recharging infrastructure? What are the potential risks?

As illustrated in Section 5.1, the role of EVs in achieving the Net Zero transition creates positive externalities which may justify public intervention to align private and social incentives. The presence of these externalities means that even a sector with effective competition may still lead to under-provision of EV recharging infrastructure. Developing this further, we see the following economic mechanisms that would justify public support:

**“On-boarding” issues and Dynamic demand.** The first mechanism is the existence of “on-boarding” or “chicken and egg” issues<sup>295</sup>, whereby EV ownership is attractive only if sufficient public recharging infrastructure exists and installing recharging infrastructure is attractive only if investors foresee sufficient EV penetration and demand.

Public investment may assist with the pace of roll out by making initial investments in infrastructure that provides investors comfort that the roll out will occur and demand will exist for recharging infrastructure.

This justification would naturally be most compelling in the early stages of adoption. One would ideally allow for investment in the early stages which could then be rolled back once enough EV demand has been created and enough players have entered the EV recharging market for private initiative to be trusted to further invest in the development and maintenance/updating of the network.

Further, we note that other policies in this area are already likely to assist in providing investor confidence that EV demand will be present. The ban on sale of ICE vehicles by 2035, for example, provides a commitment that the volume of EVs will rise significantly over the medium term and hence that demand for recharging infrastructure will exist.

**Local natural monopolies or recharging deserts.** The on-boarding issues set out above are likely to be particularly acute in low population density areas. Even when the market reaches a state of relative maturity, there are still market failures relating to the existence of hard to serve areas like remote and rural areas with limited demand that can give rise to natural monopolies. This is similar to the situation in other sectors (e.g., the ATM network or postal services) where public investment may be necessary to serve these areas.

**Recent challenges.** More recently, as the EV recharging sector progresses from nascent to in development/developed states, new challenges manifest themselves and may require public funding to achieve the required level of investment if private investment incentives are not adequate. For example, the need to ensure a sufficient fast and ultra-fast recharging infrastructure, with the potential need for replacing existing infrastructure is gaining traction among Member States. Similarly, policies such as the ‘right to plug’<sup>296</sup> may require public support to achieve the envisaged results. Finally, there is always the need to ensure grid updates, sufficient recharging capacity and technological progress, such as digitalisation/smart recharging features, are achieved even if private investment falls short.

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<sup>295</sup> The “chicken and egg” problem or paradox refers to the situation where in markets with network externalities, in order to succeed, firms must get both sides of the market on board. Here CPOs find it profitable to enter/expand as long as there is sufficient EV car demand, but EV car demand will be limited as long as there is not adequate recharging infrastructure. See more on the definition of this problem in the context of all two-sided platforms: Jean-Charles Rochet, Jean Tirole, Platform Competition in Two-Sided Markets, Journal of the European Economic Association, Volume 1, Issue 4, 1 June 2003, Pages 990–1029.

<sup>296</sup> For calls for such policies see e.g., Euractiv, “EU’s buildings directive should give EV owners the right to a smart plug”, November 2021



On the other hand, State aid is prohibited unless it can be found compatible with the TFEU, with specific provisions allowing for that under the CEEAG and under the GBER.

Some key concerns around the provision of public funding are:

**The danger of crowding out.** While justifications for investment exist, public intervention also comes with risks. While the successful deployment of public funds can lead to crowding in (i.e., a situation where higher government spending leads to the sector's growth and therefore generates profitable investment opportunities and encourages private firms to take up subsequent investment in the sector), it can also lead to crowding out if public investment simply displaces private sector investment that would have occurred anyway.

The design and decisions taken by the EU and national authorities regarding the amounts of public support but crucially also the criteria according to which it is granted, and the choice of beneficiaries are very important to ensure there are no market distortions created. Examples of crowding-out effects could include instances when state measures effectively provide a single provider CPO with an advantage as the 'first mover', reducing the incentive of subsequent private market involvement and the entry and viability of other market players. Even if there are entrants from multiple industries of the wider ecosystem (e.g., O&G, OEMs, utilities, tech firms, start-ups) that are interested to grow their share in EV recharging/eMSP services, public support needs to ensure that it does not distort competition by favouring one of the existing CPOs or new business models more than another.

**Favouring of state-owned CPO** In the extreme, crowding out could lead to the exclusion of private operations in favour of a single state-owned or sponsored player. In Cyprus, Ireland, Latvia, Lithuania, Estonia, Czechia, and Malta state-owned companies account for a significant majority of recharging points. A key question is whether this is a temporary phenomenon, which might be addressed as the market gains maturity and more entry occurs, or if there are policy decisions which risk leading to the permanent crowding out of private investment.

**Negative effects on trade between Member States** Given that products and services are traded between Member States, aid flowing to almost any firm/sector is capable of affecting trade, directly or indirectly.

**Necessity, appropriateness, incentive effect and proportionality of aid** Given its distortionary risks, aid needs to be necessary and proportional to the investment that the aid would incentivise to materialise, and of appropriate type and minimum amount to achieve its objective. It also needs to affect the behaviour of the beneficiary regarding the decision to invest in light of the market failure which prevails in the sector in such a way that it contributes to the achievement of its public-interest objective that would not be otherwise achievable in the same manner or extent.

### 5.6.2. What is the correlation between level of public support and market outcomes in the EU27 + the UK?

To better understand these issues, we have conducted a review of high-level data points for the EU27 + the UK. More specific discussion of the four in-depth analysis Member States (Italy, Belgium, Ireland and Croatia) is provided in Sections 6 through 8.

Table 14 below provides a summary of the extent of public support for the EU27 + the UK distinguishing between national support and EU support via the CEF, the EIB and Interreg grants. We have then overlayed on this a summary of the level of EV sector maturity and the level of CPO concentration.<sup>297</sup> Countries with a state-owned CPO are

<sup>297</sup> The detailed data gathered, and methodology deployed are described in Appendix D.

indicated with an asterisk next to the country name. Because of the absence of comparable financial data across Member States, we cannot assess the level of national public support in terms of volumes and instead present a qualitative indication of whether each Member State + UK offers public financial support to the public recharging sector or not at the national level.

**Table 14: public support correlation with market concentration and maturity**

Country <sup>298</sup>	Level of market maturity <sup>299</sup>	CPO Con- centra- tion <sup>300</sup>	EU public support <sup>301</sup>			National public support <sup>302</sup>
			EIB loans	CEF grants	Interreg grants	
Netherlands	<b>Developed</b>	Low	Medium	Medium	Medium	Y
Austria	<b>Developed</b>	Low	Zero	Medium	Medium	Y
France	Developed	Low	Medium	Low	Zero	Y
Germany	Developed	Low	Zero	Low	Low	Y
UK	Developed	Low	Zero	Low	Low	Y
Belgium	Developed	Medium	Zero	Medium	Medium	Y
Finland	Developed	Medium	Zero	Low	Zero	Y
Sweden	Developed	Medium	Zero	Medium	Low	Y
Denmark	Developed	High	Zero	Medium	Medium	Y
Luxem- bourg	Developed	High	Zero	High	Zero	Y
Portugal	In-development	Low	High	Medium	Zero	N
Hungary	In-development	Medium	Zero	Low	Medium	Y
Slovenia	In-development	Medium	Zero	High	High	Y
Spain	In-development	Medium	Medium	Medium	Zero	Y
Italy	In-development	High	Medium	Low	Low	Y
Ireland	In-development	High	Zero	Medium	High	Y
Romania	Nascent	Low	Zero	Low	Low	Y
Slovakia	Nascent	Low	Low	High	High	Y
Greece	Nascent	Medium	Zero	Zero	Medium	Y
Poland	Nascent	Medium	Low	Low	Low	Y
Croatia	Nascent	Medium	Zero	High	Low	Y
Bulgaria	Nascent	High	Zero	Zero	Low	N
Cyprus	Nascent	High	Zero	Zero	Zero	Y
Czechia	Nascent	High	Low	Medium	Low	Y
Estonia	Nascent	High	Zero	Medium	Zero	N
Latvia	Nascent	High	Zero	Medium	Zero	N
Lithuania	Nascent	High	Zero	Medium	Low	Y
Malta	Nascent	High	Zero	Zero	Zero	N

Table 14 above reveals that there is substantial heterogeneity in terms of both outcomes and policy approaches. While most of the EU Member State's eMobility markets have

<sup>298</sup> Countries marked with an asterisk (\*) have a CPO with significant market share that is majority owned by the state or for instance through a state-owned utility, detail of these players can be found in Appendix A.

<sup>299</sup> For more detail on the methodology and data supporting this classification, see Section 2.3.2 and Table 1, Netherlands and Austria are the only two Member States that both exceed the recommended EVs per recharger ratio of 10:1 and have an EV penetration as a % of total fleet that exceeds 2%. We hence mark these with dark green.

<sup>300</sup> CPO concentration is based on public information. When EV recharging shares were not available, the classification was reached using qualitative data building upon the summaries in Appendix A and is therefore indicative (the level of detail varies per country). Moreover, new entrants and investments are accelerating across the EU27 + the UK, and this October 2022 picture is rapidly evolving.

<sup>301</sup> EU public support categorisation based on the Member State funding summary described in Table 4.

<sup>302</sup> Current National level of public support is a qualitative indication based on Appendix A and D, whereby if a country has a form of public support for EV recharging infrastructure currently in place then they achieve a Y for Yes, conversely where there is currently no public support, they receive a N for No.

received public funding, there is substantial variation in the level and type of this support. While care is needed in interpreting such data, some observations can be made on the overall pattern across countries.

While there is heterogeneity, there is a correlation consistent with public support being necessary for rapid roll out of EV public recharging infrastructure. At a high level, we see that the countries with the lowest level of development have disproportionately low levels of public support and that most countries with high levels of development have higher levels of public support in terms of volume and availability of a variety of funding types. However, the correlation is imperfect with some countries with higher levels of EU support achieving lower levels of market maturity (e.g., Croatia) and others (e.g., Germany) achieving high levels of market maturity with more limited EU public support.<sup>303</sup>

While simple correlations of this sort cannot be used to make firm causal conclusions about how policy influences outcomes (e.g., countries with high penetration and high public support may also differ in other respects such as levels of GDP per capita, population density, and interest in EVs), there is a sufficiently strong correlation to permit a tentative conclusion that EU public support can indeed play a role in accelerating the EV roll out.<sup>304</sup>

The presence of a state-sponsored CPO can be associated with both good and bad outcomes and there are examples (e.g., Austria, France) where a market with a major state-sponsored CPO has transitioned to a more competitive space as private operators have expanded. We also see substantial variation in the role of state-owned or affiliated CPOs with examples of both more and less-developed EV countries either with or without a state-operated CPO. While many countries exist with high sector concentration and a state-owned CPO, this may simply reflect the fact that they are at a very early stage of development (Cyprus, Malta, Latvia, etc.) in which state-owned firms may be used to kickstart the sector.

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<sup>303</sup> The lack of EU public support can be compensated by high volumes of national public support. Although we present available data on the national funding dimension in Annex D, we do not have full visibility across all countries to allow us to calculate comparable national budget volumes allocated to public recharging infrastructure.

<sup>304</sup> As above, EU public support likely has a cumulative role with national public support, however, our visibility of that dimension is significantly more limited.

**Table 15: State affiliated CPOs per Member State**

Country <sup>305</sup>	Publicly owned CPO	Players	CPO Concentration <sup>306</sup>
Austria	Y	EnBW (fully integrated utility)	Low
Belgium	N		Medium
Bulgaria	N		High
Croatia	Y	Elen (subsidiary of fully integrated utility and DSO Hrvatska Elektroprivreda)	Medium
Cyprus	Y	Electricity Authority of Cyprus (fully integrated utility)	High
Czechia	Y	ČEZ (fully integrated utility)	High
Denmark	N		High
Estonia	Y	Elmo (pure play)	High
Finland	Y	Fortum (subsidiary of fully integrated utility Fortum)	Medium
France	Y	Izivia (subsidiary of fully integrated utility EDF)	Low
Germany	N		Low
Greece	N		Medium
Hungary	N		Medium
Ireland	Y	ESB eCars (subsidiary of fully integrated utility ESB)	High
Italy	Y	Enel X (subsidiary of integrated utility Enel, the Italian state is majority shareholder, 23.6% of total shares) <sup>307</sup>	High
Latvia	Y	Road Traffic Safety Directorate (CSDD) and Elektrum (subsidiary of fully integrated utility Latvenergo)	High
Lithuania	N <sup>308</sup>		High
Luxembourg	Y	Creos (electricity and natural gas TSO and DSO)	High
Malta	Y	Charge My Ride (pure play)	High
Netherlands	N		Low
Poland	Y	PKN Orlen (oil refiner and fuel retailer, the Polish state is majority shareholder with 49.9% total shares) <sup>309</sup>	Medium
Portugal	Y	Mobi.E (pure play)	Low
Romania	N		Low
Slovakia	N		Low
Slovenia	Y	Elektro Ljubljana (electricity distribution firm)	Medium
Spain	N		Medium
Sweden	Y	Vattenfall InCharge (subsidiary of integrated utility Vattenfall)	Medium
UK	N		Low

There are some relative “success stories” (i.e., countries with high EV market maturity and relatively low CPO concentration). Among developed EV countries, Austria, the Netherlands, France, Germany, and the UK also exhibit low CPO concentration, while Belgium, Finland and Sweden exhibit medium CPO concentration.

In more detail:

<sup>306</sup> CPO concentration is based on public information. When EV recharging shares were not available, the classification was reached using qualitative data building upon the summaries in Appendix A and is therefore indicative (the level of detail varies per country). Moreover, new entrants and investments are accelerating across the EU27 + the UK, and this October 2022 picture is rapidly evolving.

<sup>307</sup> Enel, “Shareholders”

<sup>308</sup> In Lithuania there is no major publicly owned CPO. Nonetheless, many local authorities operate as CPOs as discussed in Appendix A.

<sup>309</sup> PKN Orlen, “Company Structure”

- the Netherlands has implemented both EU and national support with no state-owned CPO.<sup>310</sup> It has also, according to Table 5, achieved a particularly dense network of EV recharging points. It is one of the most developed EV markets in the EU27 + the UK as it exceeds 2% EV vehicle penetration, and at the same time is above the EU's target for EVs per recharging point presented in Table 5, indicating a particularly dense network of recharging points;
- Austria has a state-controlled CPO, but its share has eroded by private competitors. It is one of the most developed EV markets in the EU27 + the UK as it exceeds 2% EV vehicle penetration, and at the same time is above the EU's target for EVs per recharging point presented in Table 5, indicating a particularly dense network of recharging points. It achieved demand market maturity through a mixture of EU and national public support;
- France also has a state-owned CPO whose share has eroded substantially. It has used national support and limited EU public support;
- Germany has reached a relatively developed EV market state with virtually zero levels of EU public support, but with national public support to private CPOs, without a state-owned CPO; and
- similarly, the UK has reached a high level of EV market maturity and achieved a competitive EV recharging market without a state-owned CPO, with a very low level of EU public support (even before Brexit) but with public support at the national level.

Among the developed EV countries with medium levels of CPO concentration:

- Belgium does not have a state-owned CPO and has used a mixture of national public support and medium overall EU public support, mainly from CEF grants. More detail including on regional variation is presented in Section 8.5;
- Finland has a state-owned CPO and has made use of national support and low levels of EU support for the EV recharging sector; and
- Sweden has a state-owned CPO, national public support but relatively limited EU public support.

On the other hand, there are several countries with high EV demand maturity but also high CPO concentration:

- Denmark does not have a state-owned CPO and has deployed national support and medium levels of EU support;
- Luxembourg has a state-owned CPO and has used a mixture of national support and high level of CEF grants; and
- in addition to these two countries, Ireland, while still in an in development market state, exhibits high CPO concentration by the state-owned player, national support and high levels of Interreg grants.

Among all of the remaining countries, we observe that there is a range of Member States with high CPO concentration but low EV market maturity (Bulgaria, Czechia, Cyprus, Estonia, Latvia, Lithuania and Malta). Therefore, it is too early to reach any conclusions as, experience from other countries is that CPO concentration can be short-lived. On the public support side, it is notable that some of these countries (such as Malta) are using low levels of public support of any form.

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<sup>310</sup> Allego used to be owned by the state-owned DSO but was subsequently privatised and then taken public in early 2022.

**Correlation of public support and CPO concentration:** Most of the countries with high levels of EU support (such as Croatia, Portugal, Ireland, Slovakia and Slovenia) are still in a nascent or in development EV market state. However, given the small scale of cumulative levels of EU public support even in cases where this support benefited a first-mover CPO in a nascent market, there would not necessarily be a distortive effect in the long-run as the market reached a state of maturity.

We estimate the cumulative cost of installed recharging points across the EU27 + the UK at around €15bn based on the total number of recharging points and the approximate cost of installation per recharger as can be observed in Table 16.<sup>311</sup>

**Table 16: Total estimated spend on all public recharging infrastructure currently in place across the EU27 + the UK<sup>312</sup>**

	Slow (<22kW)	Fast (22-150 kW)	Ultra-Fast (>150kW)
Number of rechargers	374,234	47,878	19,634
Total cost	€6.5b	€3.8b	€4.7b
Total investment	<b>€15.0b</b>		

By comparison, total EU funds allocated to the deployment of public recharging infrastructure in all Member States and the UK during the period 2014-2022 amount to €0.65bn (€358m for EIB, €272m for CEF and €15.5m for Interreg). Systematic data on national funding is not available, with only partial data available for instance on State aid provided as per article 36.a of the GBER, which is discussed in Appendix D. But even if national funding was the same or even twice as much as EU public support, the implication is that private investment is likely to exceed public expenditure by a significant magnitude.<sup>313</sup>

Overall, we can observe that among Member States that have achieved a similarly successful market status, different avenues have been followed, but there appears to be a reliance on some form of national and/or EU public support that likely has a cumulative effect. We see that kickstarting the sector via a state-owned CPO is just one paradigm that can work and that the existence of a state-sponsored CPO need not preclude subsequent competition. Due to the heterogeneity observed across countries, additional data granularity would be needed to assess the path to success or obstacles faced by each country. We hence further develop our analysis assessing the effects of public support on the sector's development in Section 8.5 for the four in-depth Member States in focus for which more extensive data are available.

### 5.6.3. Key competition themes in an assessment of public support

Based on the discussion above, data from the EU27 + the UK does not currently permit identification of distortive effects of public expenditure and there is evidence both that public support can play a positive role in supporting investment and that countries with strong public operators can support private investment and expansion.

On this basis, a country-by-country assessment would be helpful which would address the following key competition themes:

<sup>311</sup> Please note, however, that the picture is more complex regarding the role of national support as state-owned CPOs still operate in several countries in several of which they are still market leaders.

<sup>312</sup> Calculation based on the number of installed rechargers in the EU27 + the UK multiplied by the cost per kW derived from a Ireland case study that considers all installation costs, this analysis therefore assumes that Irish costs are similar to other Member States. CCMA EV Working Group, "Local Authority Electrification of Fleet and EV Charging Guidance Document", August 2021

<sup>313</sup> This is consistent with press coverage and reports highlighting that EV uptake and roll-out of recharging infrastructure is led by private investment. See e.g., ChargeUp Europe, "State of the Industry – Insights into the Electric Vehicle Charging Infrastructure Ecosystem", 2022.

**Effectiveness of public support in onboarding.** One of the most important themes in a competition assessment of EU public support and State aid would be whether there is evidence that such funding and incentives indeed helped kickstart the EV recharging sector by aiding in surpassing the “chicken and egg” issue. Alternatively, there can be a mixture of private sector residual failures, idiosyncratic/cultural factors and technological challenges that explain heterogeneity among countries in terms of the sector’s success in achieving maturity.

**Funds disproportionately flowing to market leaders, first movers, or state-owned operators.** This is a natural concern and one that should be monitored. However, the initial support to kickstart the sector may necessarily be given to the single (or a few) player in existence that is in many cases a state-owned CPO. While high levels of concentration may persist while the sector is still nascent, first mover advantages may erode quickly if the subsequent allocation of public funds is made in a competitive manner to avoid further distortions.

**Benchmarking across Member States can be used as a first screen for potential distortive policies.** Although the substantial heterogeneity both in policy approaches and in outcomes prevents generalised conclusions and, as discussed, the evidence points to more than one paths to success for the sector, there is still significant scope to use developed countries and countries which persistently lag behind as benchmarks to identify best practices or distortionary measures respectively.

**Channelling public support towards applications that are most likely to generate positive externalities.** While public sector support may be justified in the early stages of the industry when demand for EVs is less well established, as EV adoption rises the “on boarding” justification for investment is likely to dissipate. In more developed markets, expenditure can be rechannelled to more targeted issues, such as expanding recharging networks to reach underserved areas that provide less private investment incentives, maintaining and updating of infrastructure to implement technological innovation and enforcing a “right to plug” policy.



## 6. Summary of key learnings from Member States in-depth assessments

The Member States' in-depth analysis builds upon the research conducted throughout this report, considering the regulatory landscape across the EU27 + the UK, major CPO and eMSP business models, and the associated competition concerns raised up to this point. Leveraging these elements, and by analysing more granular data, this section conducts a systematic assessment to evaluate the level of competition, and the key related issues, in the EV recharging sectors in Belgium, Italy, Ireland, and Croatia. Four Member States were selected to cover different levels of market maturity ranging from 'nascent' to 'in-development' to 'developed' (based on relative EV penetration and recharging deployment maturity), business models, regulatory framework characteristics, level of market competition, and levels of public support, to ensure that a variety of competition concerns could be assessed. By using this approach, the four Member States (Belgium, Croatia, Ireland, Italy) were chosen to provide a representative picture across markets. More details on the selection criteria and methodology are available in Appendix E.

For each selected Member State, the in-depth analysis explored market dynamics and their implications for competition issues in further detail. Key market topics covered for supporting the competition analysis include:

- **market evaluation:** a more in-depth picture of the EV recharging sector in each country was developed through granular market data extracted from a mix of public and proprietary sources (see Appendix F). This also included a macro picture presenting the evolution of each market from 2016 to October 2022, supported by a more thorough analysis of the EV recharging sector. Specifically, the growth of public recharging points and their geographical distribution in each country was critically evaluated to provide the context needed for the ensuing competition analysis;
- **market participant dynamics:** this provides an overview of market participants, CPO shares, and level of competition among players within each Member State. A more holistic picture was developed assessing the degree of vertical and horizontal integration in the sector. The major CPO and eMSP players were also assessed to provide an overview of their participation in the market, their legal structure, and how these firms changed over time. Finally, market development trends were contrasted with regulatory trends and the level of public support for key players;
- **regulation and public funding:** starting from the overview provided in each of the country summaries (Appendix A), the in-depth analysis includes additional detail on the major policies and regulations within the selected Member States. Moreover, significant attention was placed on the timing of approved legislation and public support measures to identify any correlation with market developments (e.g., number of rechargers and EVs, number of ecosystem players and new entries, market shares, etc.). Special emphasis was also given to regulation around openness of access given its large impact on the sector and its wide-ranging implications on competition; and
- **assessment of competition:** drawing from the information on public recharging market evolution, participants and from more granular market data available on the characteristics, an assessment of competition in each market is performed. Each category of Theories of Harm presented in Section 5 is covered in turn, and the key competition themes in the assessment of the set of theories of harm that are of higher relevance for each of the four countries are discussed making use of the collected data.

To complement the research, stakeholders across the EV recharging ecosystem were also consulted in each market through a series of interviews. These expert interviews were leveraged to substantiate our analyses by providing the latest views on each of the four Member States. To ensure the holistic picture was captured, the expert interviews were chosen to cover the full value chain, including leading CPOs and eMSPs, regulatory agencies, EV industry associations, energy companies, and competition authorities. A synopsis of the findings from each interview is available in Appendix G.

## 6.1. Data and analytical approach

Given that the EV recharging sector is a new market, and considering the rapid ongoing evolution of the industry, there is limited information available from market participants. Additionally, there are no clear standards for market data, and different counting methodologies are employed across the EU27 + the UK, as well as limitations in the quality of data available. Moreover, there is no single database which provides the level of granularity needed for this analysis across all markets. Therefore, to present a comprehensive picture, several data sources were combined and triangulated. This data gathering methodology provided more granular data to support the market assessment and competitive analyses. The methodology is described in detail in Appendix F, however, the following summarises the overall approach:

- all quantitative data was gathered up to October 2022;
- national level data was extracted from the European Commission’s Alternative Fuels Observatory Database;<sup>314</sup>
- additional data was gathered for individual recharging points (e.g., operator, location, power capacity) and was obtained from leading roaming provider Hubeject and by downloading data from publicly available recharging point location platforms Application Programming Interfaces (APIs).<sup>315</sup> Finally, desk-based research was used to validate findings, fill data gaps, and correct any clear errors; and
- given inconsistencies in definitions across markets, there may be small variations in the levels of ‘public’ rechargers included in the statistics (e.g., some workplace, hotels, and other semi-public recharging points may be counted in the overall data).

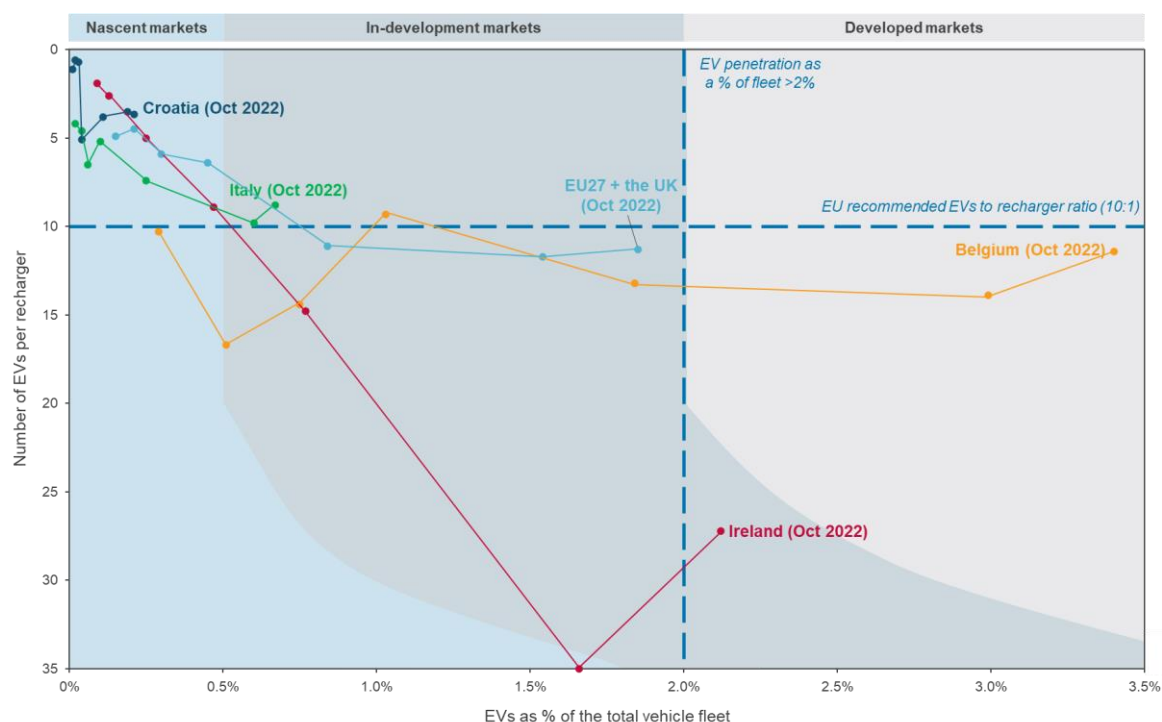
## 6.2. Summary of conclusions

As previously mentioned, the following four markets were investigated to provide a representative picture across the EU27 + the UK: Belgium (developed), Italy (in-development), Ireland (in-development), and Croatia (nascent).<sup>316</sup> Figure 22 displays each market’s journey from 2016 to October 2022, highlighting how (in general) EV adoption has outpaced recharging infrastructure deployment (depicted by the negative slope of each coloured line). However, over the last 12 months this trend seems to have reversed, with accelerating recharging rollouts in all selected countries and across the EU27 + the UK as a whole. This suggests CPOs may need time to adjust to the uptake in EVs on the road, perhaps opting to delay deployment of infrastructure until demand is sufficient to limit financial risk. This trend is particularly prevalent and clear when focusing on Ireland, where EV recharging infrastructure deployment significantly picked up from 2021 to 2022 outpacing the growth in EV adoption (54% vs. 27% year-on-year growth, a substantial shift from what the Irish industry experienced from 2016 to 2021).

<sup>314</sup> European Commission, “European Alternative Fuels Observatory”, October 2022

<sup>315</sup> “Open Charge Map” and “Open Street Map”, October 2022

<sup>316</sup> The classifications are based on the approach outlined in Section 2.3.2 and the data presented in Figure 6 (depicting market maturity across the EU27 + the UK as of October 2022)

**Figure 22: Market maturity evolution from 2016 to October 2022, based on EVs per recharger ratio and EV penetration (% of total vehicle fleet) for selected countries<sup>317</sup>**

Along with market maturity, several factors were considered to define and conduct the analysis. Table 17 summarises some of the characteristics based on which these countries were selected, ultimately looking to enable the assessment of a broad range of competition typologies, themes, challenges and concerns. In particular, we highlight the best available information on the share of main CPOs as of October 2022 at the national level as well as on market dynamism and new entry implying first-mover advantages are likely to be in the process of eroding.

**Table 17: Public EV recharging overview and dynamics for the selected Member States**

Member State	Ireland (in-development)	Italy (in-development)	Croatia (nascent)	Belgium (developed)
Market context (Oct '22) <sup>318</sup>	<ul style="list-style-type: none"> <li>48k EVs (2.1% of fleet) – <b>9<sup>th</sup>/28</b></li> <li>1.8k rechargers (27 EVs/point) – <b>26<sup>th</sup>/28</b></li> </ul>	<ul style="list-style-type: none"> <li>267k EVs (0.7% of fleet) – <b>14<sup>th</sup>/28</b></li> <li>30.2k rechargers (9 EVs/point) – <b>10<sup>th</sup>/28</b></li> </ul>	<ul style="list-style-type: none"> <li>4k EVs (0.2% of fleet) – <b>24<sup>th</sup>/28</b></li> <li>1.1k rechargers (4 EVs/point) – <b>3<sup>rd</sup>/28</b></li> </ul>	<ul style="list-style-type: none"> <li>203k EVs (3.4% of fleet) – <b>5<sup>th</sup>/28</b></li> <li>17.8k rechargers (11 EVs/point) – <b>14<sup>th</sup>/28</b></li> </ul>
Top CPOs rechargers share <sup>319</sup> (Oct '22)	<ul style="list-style-type: none"> <li>ESB eCars 58%</li> <li>EasyGo 27%</li> <li>EVBox 7%</li> <li>Tesla 4%</li> </ul>	<ul style="list-style-type: none"> <li>Enel X 55%</li> <li>Be Charge 21%</li> <li>Tesla 5%</li> <li>A2A/Hera 3% each</li> </ul>	<ul style="list-style-type: none"> <li>Hrvatski Telekom. 32%</li> <li>Elen 27%</li> <li>Moon 12%</li> <li>Petrol 11%</li> </ul>	<ul style="list-style-type: none"> <li>EVBox 32%</li> <li>Allego 29%</li> <li>TotalEnergies 22%</li> <li>Blue Corner 11%</li> </ul>

<sup>317</sup> European Commission, "European Alternative Fuels Observatory", October 2022

<sup>318</sup> Ibid.

<sup>319</sup> Indicative and based on CRA Analysis as described in Appendix F

Member State	Ireland (in-development)	Italy (in-development)	Croatia (nascent)	Belgium (developed)
Market dynamics	Market controlled by ESB eCars, integrated CPO and eMSP, subsidiary of state-owned utility, CPO concentration has decreased over time but remains high.	Market controlled by Enel X, integrated CPO and eMSP, subsidiary of fully integrated utility.  CPO concentration has decreased over time but remains high.	Nascent market, with two major players experiencing 1st mover advantages.  New entrants from across the ecosystem are emerging eroding 1st mover advantage.	Varying levels of EV infrastructure, with Wallonia falling behind Flanders and Brussels.  Developed market with several players operating.
Public Support	National grant scheme for EV recharging since 2019 and €35m additional grants awarded to ESB eCars. CEF awarded €6.5m in grants.	National grants for EV recharging were provided only in 2018. CEF awarded €30.5m in grants. EIB gave €95m in loans.	National grants scheme for EV recharging since 2016. CEF awarded €9.1m in grants.	No national measure for EV recharging as the sector is mainly supported via regional grants. CEF awarded €41.52 in grants.

It is clear that each country presents a distinct picture in terms of its state of maturity, market structure and level of national and local concentration. Apart from GDP levels, idiosyncratic elements on the demand side and geographical features (such as the geographic isolation of Ireland, parts of Croatia and parts of Italy compared to Belgium) appear to play a role in the state of market development. These differences lead to a unique competition picture in each country that is summarised in Table 18.

**Table 18: Overview of main Theories of Harm of relevance for the selected Member States**

Theories of harm	Ireland (in-development)	Italy (in-development)	Croatia (nascent)	Belgium (developed)
Unilateral conduct about abuse of local market power	Although entry has been eroding first-mover shares, there is still significant concentration at the national and regional level.  No evidence of local price differentiation consistent with exercise of local market power.	Although first-mover shares have been eroding, there is still significant national concentration and shares at the local level can reach 90% of recharging points.  No evidence of local price differentiation consistent with exercise of local market power.	Dynamic market with relatively low concentration both as the national and regional level, and recent new entry.	Dynamic market with relatively low concentration both at the national and regional level, and continuous new entry.
National concentration and	No evidence or complaints of abuse of	Enel has received formal complaints of exclusionary	Competitive market hence no concerns over	Competitive market hence no concerns over

Theories of harm	Ireland (in-development)	Italy (in-development)	Croatia (nascent)	Belgium (developed)
"tipping" concerns	<p>dominance type of conducts by market leader.</p> <p>Bilateral and roaming platform agreements prevalent but no information on terms allowing for detailed assessment.</p>	<p>conduct to limit competition in the retail electricity market – but not on EV recharging.</p> <p>No evidence of abuse of dominance type of conducts by market leader.</p> <p>Bilateral and roaming platform agreements prevalent but no information on terms allowing for detailed assessment.</p>	"tipping" or dynamic leveraging.	"tipping" or dynamic leveraging.
Unilateral exclusionary conduct	<p>ESB eCars is vertically integrated with the monopoly DSO but rules/regulations governing DSO conduct apply.</p> <p>High share of recharging points raises concerns over ability of ESB eCars to partially foreclose rival eMSPs through price/terms discrimination.</p> <p>Local authorities present as CPOs in some counties but not currently monetizing.</p> <p>No integrated OEM/CPO with high enough share in either market to raise foreclosure concerns.</p> <p>No vertical integration with ICE fuel stations or evidence of exclusive agreements.</p>	<p>Enel X is vertically integrated with the DSO e-distribuzione which has 80% of connections, but rules/regulations governing DSO conduct apply.</p> <p>High share of recharging points raises concerns over ability of Enel X to partially foreclose rival eMSPs through price/terms discrimination.</p> <p>No local authorities involvement as CPOs at a scale that could give rise to foreclosure concerns.</p> <p>No integrated OEM/CPO with high enough share in either market to raise foreclosure concerns.</p>	<p>Elen, the second largest CPO based on share of public recharging points, is owned by the state-controlled Hrvatska Elektroprivreda (HEP Group) group, which accounts for about 75% of electricity generation and 80% of electricity transmission and distribution.</p> <p>Low shares make CPO/eMSP foreclosure unlikely.</p> <p>No local authorities involvement as CPOs at a scale that could give rise to foreclosure concerns.</p> <p>No integrated OEM/CPO with high enough share in either market to raise foreclosure concerns.</p> <p>CPO Petrol also owns a large and</p>	<p>No vertically integrated CPO with a DSO.</p> <p>Low shares make CPO/eMSP foreclosure unlikely.</p> <p>No local authorities involvement as CPOs at a scale that could give rise to foreclosure concerns.</p> <p>No integrated OEM/CPO with high enough share in either market to raise foreclosure concerns.</p> <p>CPO TotalEnergies is also the leading network of ICE fuel stations hence ability to foreclose competitors may exist.</p>

Theories of harm	Ireland (in-development)	Italy (in-development)	Croatia (nascent)	Belgium (developed)
			expanding network of ICE fuel stations hence foreclosure concerns can arise.	
Agreements and coordinated conduct	<p>No evidence of CPO joint ventures.</p> <p>Bilateral agreements between integrated CPO/eMSPs are prevalent including between market leading firms in a concentrated market.</p> <p>Roaming platform agreements prevalent.</p>	<p>CPO joint ventures, some of which have been scrutinized by authorities.</p> <p>Bilateral agreements between integrated CPO/eMSPs are prevalent including between market leading firms in a concentrated market.</p> <p>Roaming platform agreements prevalent.</p>	<p>No evidence of CPO joint ventures.</p> <p>Bilateral agreements between integrated CPO/eMSPs prevalent but less concerning due to low market concentration.</p> <p>Roaming platform agreements prevalent.</p>	<p>No evidence of CPO joint ventures.</p> <p>Bilateral agreements between integrated CPO/eMSPs prevalent but less concerning due to low market concentration.</p> <p>Roaming platform agreements prevalent.</p>
Public Support	<p>Significant public support to the state-owned CPO but consistent with need to kick off the sector in 2014.</p> <p>Privately owned competitor with funding through a consortium of private investment and national funding, and new entrants using 2017 CEF grants.</p>	<p>Majority of both CEF and EIB to the first-mover in which the Italian state is the largest shareholder.</p> <p>State aid to local authorities who allocate the funds to CPOs for regional projects. Limited visibility on share allocated through competitive tendering or share won by first mover.</p>	<p>Low amounts of EU support, benefiting all CPOs at the current nascent state of EV car adoption.</p> <p>State aid has been targeted at fast recharging infrastructure.</p>	<p>State aid mostly in the most developed region of Flanders, which has an advanced public tendering regime.</p> <p>CEF grants have not flown to the sector leader.</p> <p>Lacking visibility on regional concentration and EV car adoption, but country data consistent with a developed sector in Flanders which has made use of both EU funding and State aid in a manner conducive to competition.</p>

There is overall evidence that, as the markets are evolving, there is new entry and investment leading to the erosion of the shares of first movers. Moreover, there are no formal complaints to our knowledge against incumbents that they are taking steps which may be classified as anti-competitive behaviour to preserve their position. However,

there appears to be need for monitoring in countries such as Italy and Ireland that are no longer nascent but still display high concentration, particularly at the regional level or around the most profitable/strategic locations such as motorways and urban centres.

Regional disparities within countries also highlight the role regional and local authorities can play in actively fostering competition, and how inactivity or the lack of a regulatory framework stipulating competitive design of tendering processes can pose barriers to local entry and result in incumbent positions persisting in the long run.

Although our research has not identified any evidence of local price differentiation consistent with the exercise of local market power, it is clear that the conditions for this may exist in both Ireland and Italy. The lack of price transparency and comparability inherent to the sector makes monitoring even more challenging and further highlights the importance of fostering competitive conditions instead.

The emergence of a different competitive picture in both the developed market of Belgium and the nascent market of Croatia shows a competitive EV recharging sector can arise under the right conditions. In Belgium, although some regional asymmetries and challenges may exist, the market has matured without DSO or local authorities acting as CPOs,<sup>320</sup> and strong competition between several private CPO/eMSPs seems to preclude the risk of market tipping. In Croatia, the strong competitive market conditions seem to also make tipping concerns unlikely and the first-mover advantage of the DSO affiliated CPO seems to have eroded with it being displaced to the second position in terms of share of public recharging points.

On the other hand, the endurance of the strong position of CPOs that are vertically integrated with a monopoly or dominant state-owned DSO in both Ireland and Italy poses concerns about potential tipping at the regional or national level. However, there is evidence that leading sector positions and first-mover advantages are eroding and no formal complaints have been documented.

At the unilateral non-horizontal level, there can be exclusionary concerns in markets with high concentration of integrated CPO/eMSPs, such as Italy and Ireland, that the terms of bilateral agreements can be used to leverage the power in the CPO segment in order to foreclose rivals in the eMSP segment. Even when CPO concentration appears to be less of an issue, as in Croatia or Belgium, vertical integration with a dominant DSO, a local authority with regional control of the land, or exclusive partnership with a market leading ICE fuel stations network, may still pose foreclosure concerns. We have flagged such concerns where they are more likely and also pointed out that even when full foreclosure is infeasible due to regulatory restrictions, partial foreclosure concerns may arise and pose additional challenges in terms of detection. However, even if ability to foreclose existed, this would not imply that incentives existed while the significant efficiencies associated with vertical linkages could still prevent negative net effects to competition from arising.

On the other hand, vertical integration of OEMs seems to be unlikely to result in the foreclosure of rivals as no vertically operated OEMs with a significantly high share of EV demand appear at the European level and there are furthermore indications that vertically integrated OEMs/CPOs are moving towards an open recharging points network.

Coordination concerns seem to be unlikely in these countries at this stage but, all else equal, more likely when CPO/eMSP concentration is higher. In particular, the prevalence of the integrated CPO/eMSP business model introduces a horizontal dimension to otherwise vertical access agreements between CPOs and eMSPs that are integral to the

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<sup>320</sup> However, DSOs and local authorities have been heavily involved in the sector development (e.g., Fluvius in Flanders, the Charge.Brussels initiative in Brussels, etc.).



functioning of the market. Advanced oversight regarding the sharing of information, similar to purely horizontal agreements such as joint ventures, may be needed to make sure there is no price collusion between overlapping CPO networks or market allocation between complementary ones. The prevalence of data aggregators and roaming platform agreements may also pose risks over algorithmic collusion or “hub and spoke” coordination although the lack of price transparency and comparability characterising the EV recharging sector at its current state make such concerns less pressing.

Finally, on public support, each of the four countries presents a very heterogeneous picture with varying levels of EU public support and State aid, associated with different levels of sector maturity. While no general conclusions can be drawn, useful lessons can be learned from the success of Flanders in the pro-competitive policies that can be applied by local authorities. On the other hand, caution should be applied to make sure future public support is assigned competitively and avoid crowding out risks or contributing to the preservation of sector leading positions.

## 7. In-depth market review of the four selected Member States

This section provides a more detailed “market review” summarising industry and competitive conditions in the four selected Member States (Ireland, Italy, Croatia, and Belgium). In each case we provide detail on industry evolution, policy and regulatory initiatives around EV recharging, active competitors and shares of supply, and a view of regional dynamics.

### 7.1. In-depth market review for Ireland

Based on data as of October 2022, Ireland was classified as an “in-development” market due to its relative performance in recharging points deployed and EV penetration across the EU27 + the UK. Ireland has a well-established EV industry with over 2% of the total fleet being electric.<sup>321</sup> However, the ratio of EVs per recharger (27:1) is among the worst in the EU27 + the UK.

The Irish Government has identified the electrification of transport as one of the top priorities to meet its carbon emission commitments, with up to €1b being dedicated to this effort as part of the 2021 National Development Plan. The plan includes a national target of approximately 1 million EVs by 2030, increasing the importance of the present and future adequacy of public recharging infrastructure.<sup>322</sup> To promote this objective, the Government allocated €100 million for investments in recharging infrastructure (to be spent by 2025), which is expected to greatly accelerate growth for the sector.<sup>323</sup> As the EV recharging market in Ireland ramps up, some important dynamics and overarching factors gain even more relevance, and a well-developed and competitive infrastructure network that people can trust and feel confident using will be critical.

#### 7.1.1. Industry statistics in Ireland

As with the rest of the EU27 + the UK and as depicted in Figure 23, EV adoption in Ireland has grown significantly since 2016 – from approximately 2,000 to 48,000, or a CAGR of 72%. This growth was driven by both BEVs and PHEVs, accounting respectively for 54% and 46% of EVs on the road in 2022.<sup>324</sup> Between 2020 and 2021 an upsurge of EVs were sold, with cumulative numbers rising by 122%. Nevertheless, while the transition away from ICE vehicles is accelerating (with 20% of new car sales now being EVs) and more than 2% of the total fleet being electric, substantial work is still needed to meet the government target of 1 million EVs by 2030.<sup>325</sup>

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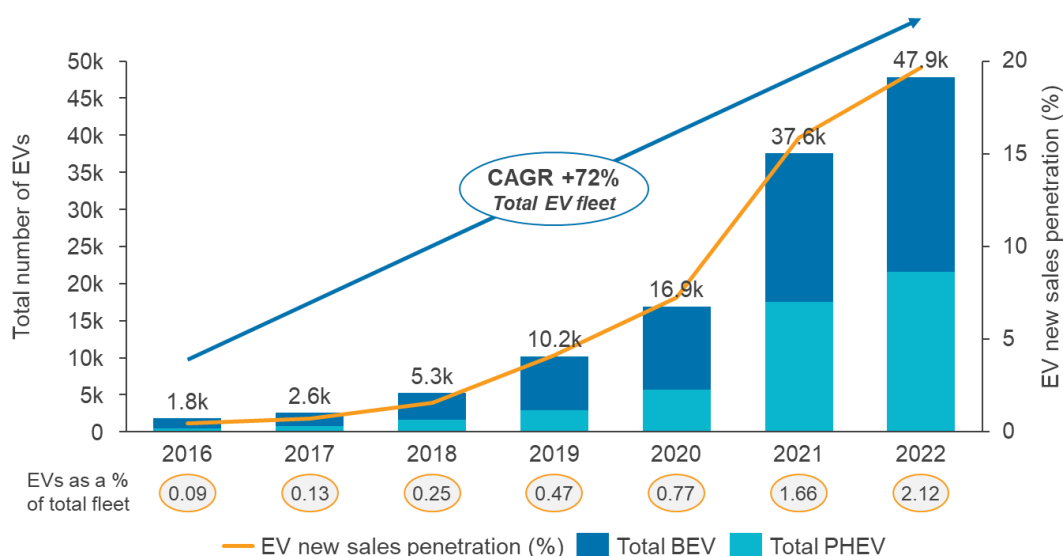
<sup>321</sup> Ireland was deemed in-development even if falling at the bottom in terms of EVs per recharger due to high EV penetration, with more than 2% of the total vehicle fleet being electric

<sup>322</sup> Irish Government, “National Development Plan 2021-2030”, October 2021

<sup>323</sup> Irish Government, “Electric Vehicle Charging Infrastructure Strategy”, 2022

<sup>324</sup> European Commission, “European Alternative Fuels Observatory – Ireland”, October 2022

<sup>325</sup> Irish Government, “Electric Vehicle Policy Pathway”, September 2021

**Figure 23: Ireland EV sector growth (total EVs and proportion of all yearly vehicle sales)<sup>326</sup>**

Ireland has experienced relatively slow growth in recharging infrastructure compared to the rest of the EU. As of October 2022, 1,762 public recharging points had been installed (approximately 79% with a power level <22kW, 14% between 22kW and 150kW, and 7% >150kW).<sup>327</sup>

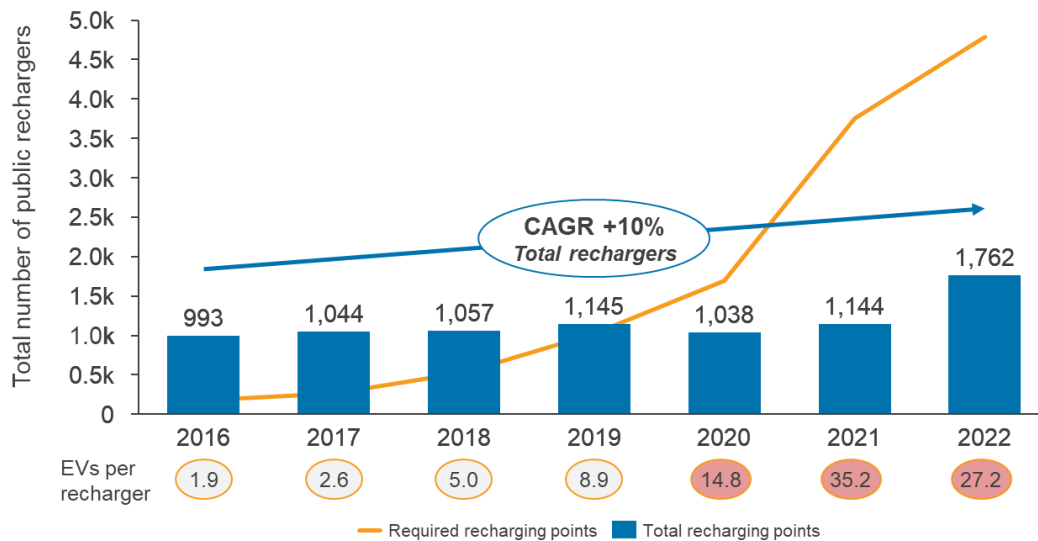
As seen in Figure 24, since 2016, public EV rechargers installed have risen at a CAGR of 10% and have been unable to keep pace with the 72% CAGR seen in the EV fleet over the same period. This was especially evident since 2020, driven by a rapid uptick in EV adoption. The EV recharging infrastructure was sufficient in the period up to 2019, but a lag can be seen in the EV recharging infrastructure rollout as it was not able to keep up with a nearly tripling number of EVs on the road since 2019. However, the recharging rollout has started to accelerate in 2022, with the total number of public recharging point increasing from 1,144 in December 2021 to 1,762 by October 2022, or a 54% annual growth so far. Much of this growth can be attributed to new CPO market entrants, such as recent recharging infrastructure investments of €15 million by EasyGo, trying to take share from the leading ESB eCars.<sup>328</sup>

<sup>326</sup> European Commission, "European Alternative Fuels Observatory – Ireland", October 2022

<sup>327</sup> European Commission, "European Alternative Fuels Observatory – Ireland", October 2022 and CRA analysis

<sup>328</sup> Silicon Republic, "EasyGo invests millions to deploy 200 EV chargers across Ireland", November 2022

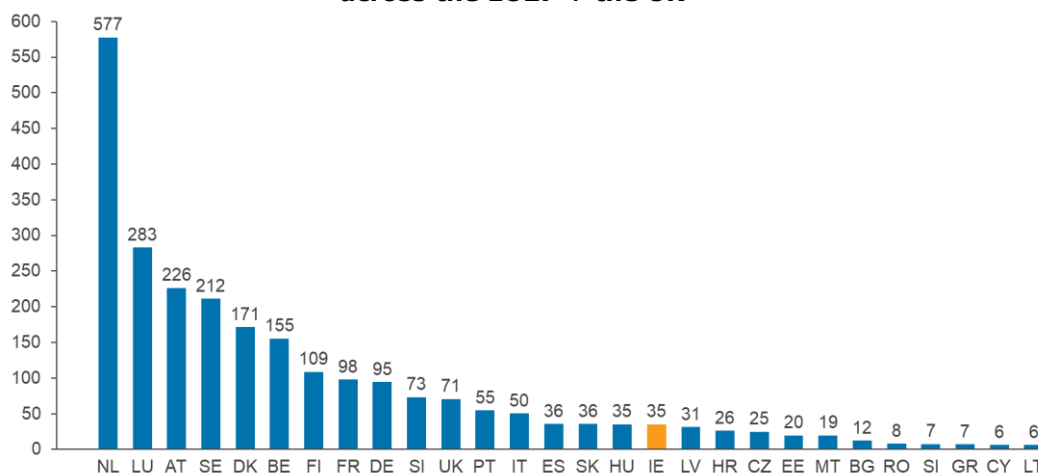
**Figure 24: Ireland recharging points vs. required recharging points (based on the EU recommended ratio of 1 recharger per 10 EVs)<sup>329</sup>**



This rate of growth has caused Ireland to fall behind the EU recommendation of 1 recharging point per 10 EVs, going from a ratio of 1.9 in 2016 to 27.2 in 2022. Specifically, EV recharging infrastructure was adequate until 2019 but did not to keep up with EV adoption since. As of October 2022, only Malta and Lithuania had a higher EV per recharger ratio. Nevertheless, the recent pick up in public recharging stations may indicate a market shift is underway, with EV recharging infrastructure becoming more of a focus and major CPOs (from the leading player and new entrants) progressively adjusting to the uptake of EVs on the road.

Normalising public rechargers deployed by population and comparing it across the EU27 + the UK, a similar picture emerges showing Ireland ranks 17<sup>th</sup> out of 27 EU MS + the UK when it comes to number of EV recharging points installed per capita as observed in Figure 25.

**Figure 25: Public recharging points installed per 100k people as of October 2022 across the EU27 + the UK<sup>330</sup>**



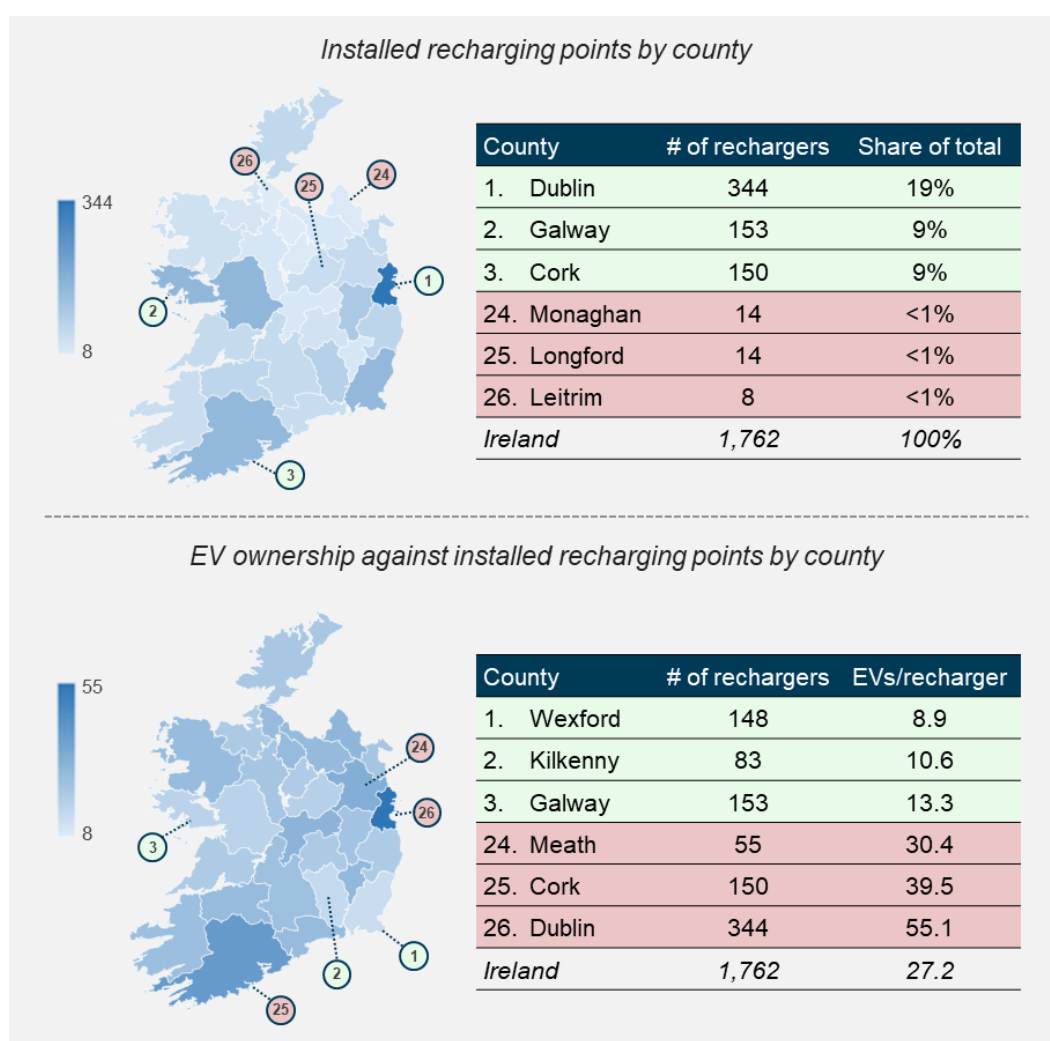
<sup>329</sup> European Commission, "European Alternative Fuels Observatory – Ireland", October 2022

<sup>330</sup> European Commission, "European Alternative Fuels Observatory – Ireland", October 2022

These dynamics may be partially driven by the fact that Ireland is an island nation with most driving distances within the range of an average EV, thus making home recharging the preferred solution. According to the Irish government, around 80% of EV recharging presently takes place at home.<sup>331</sup> Nevertheless, as EVs become more prevalent, demand for strategically located public recharging stations is increasing, and a well-developed network will be crucial to meet the ambitious targets set to decarbonise the transport sector (transport emissions account for 20% of Ireland's GHG emissions, with road transport responsible for 96% of this).<sup>332</sup>

As highlighted by Figure 26 below, the geographical distribution of public recharging points is uneven, with considerable differences between counties across Ireland.

**Figure 26: Geographical dispersion of recharging points in Ireland**  
(top 3 performing counties in green, bottom 3 in red)<sup>333</sup>



These figures each show that while there has been some growth in the number of public recharging points, this has not been uniform across Ireland. The metropolitan area around Dublin has by far the most recharging points in the country, accounting for 19% of the market which is more than the bottom eleven counties combined (Kerry, Mayo,

<sup>331</sup> Irish Government, "Electric Vehicle Charging Infrastructure Strategy", 2022

<sup>332</sup> EOLAS, "Decarbonising Irish transport", June 2022

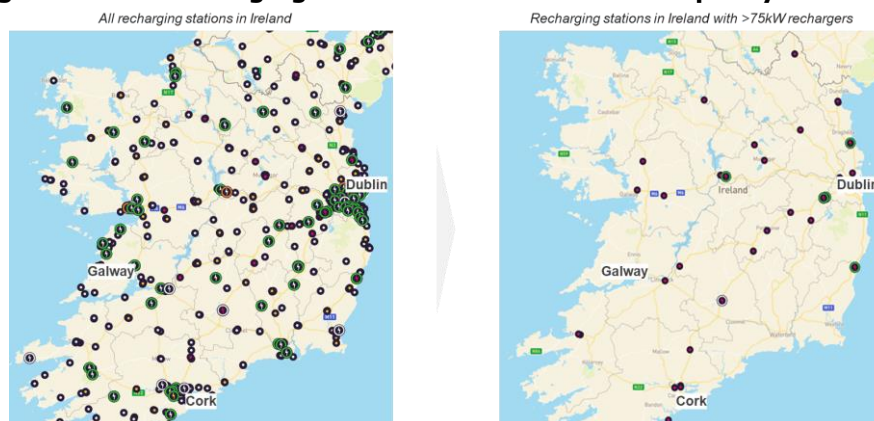
<sup>333</sup> CRA analysis. Data on the number of recharging points split by region per 100k people is available in Appendix G

Laois, Sligo, Roscommon, Carlow, Cavan, Offaly, Longford, Monaghan, Leitrim). More than 50% of recharging points are installed in just five counties (Dublin, Galway, Cork, Wexford, and Kildare), meaning the more remote areas of the country are less well served. This has been cited as a key focus area by the Irish government, specifically to fill the gap around the many tourist destinations which involve driving long distances to rural locations (e.g., the highly popular Wild Atlantic Way and the Ancient East routes require recharging facilities at strategic locations).<sup>334</sup>

However, even though County Dublin has the highest share of EV rechargers, this is not sufficient to address EV demand – as Dublin accounts for approximately a quarter of Ireland’s population and has the highest levels of EV adoption. Moreover, Dublin has the highest EVs per recharger ratio in the country with 55 EVs per recharger, or more than five times higher than what is currently recommended by the European Commission (10 EVs per recharger). The same is true for County Cork, home of the second largest urban centre, which currently has installed 1 recharging point for every 40 EVs (four times higher than what is recommended). In contrast, the regions surrounding the next two most densely populated cities (Limerick and Galway) have been more successful in keeping up with EV adoption, having on average less than 20 EVs on the road per public recharging point installed – however, that could also be simply caused by a lag in the acceleration in EV adoption seen elsewhere. When normalising the network within each county in terms of population the picture is more uniform, however significant disparities remain with numbers ranging from 21 to 99 recharging points per 100k people.

These disparities seem to become more accentuated when focusing on the fast and ultra-fast on-route recharging segment. When filtering for recharging stations with a capacity >75 kW, and as seen in Figure 27, Electric Universe shows that no such stations exist in the Southwest and Northeast of the country (a very different picture to what is shown on the left of the Figure when exploring all recharging points). Additionally, as one would expect, most of these high-speed recharging points are found on the M6, M7, & M8 - the motorways connecting the three major cities - with very limited consumer choice in terms of the network or operator. For instance, when travelling from Dublin to Galway (approximately a 200km journey and one of the most popular routes in Ireland) no >75kW recharging point is available for the initial 120 km, and only IONITY and ESB eCars provide such a service along the route. The motorway from Dublin to Cork is instead better covered, with >75kW recharging points (i.e., Tesla, ESB eCars, IONITY).<sup>335</sup>

**Figure 27: EV recharging stations in Ireland with a capacity >75 kW**<sup>336</sup>



<sup>334</sup> CCMA EV Working Group, “Local Authority Electrification of Fleet and EV Charging Guidance Document”, August 2021

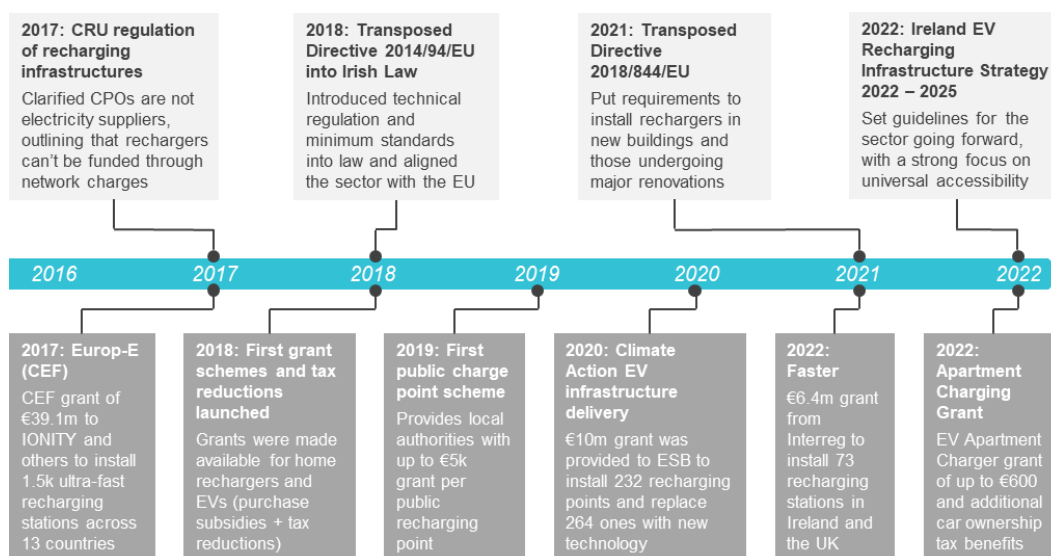
<sup>335</sup> Based on Electroverse, ESB eCars accounts for slightly over 50% of >75kW recharging points on the major highway from Dublin to Cork

<sup>336</sup> Octopus Energy, “Electroverse EV recharging map”, December 2022

### 7.1.2. Policy overview in Ireland

The EV recharging sector in Ireland is regulated both via national rules and, for the most part, by the adoption and implementation of EU legislation. At the same time, public support measures for eMobility in the country are aimed at both EVs and EV recharging infrastructure. In particular, broader public support to the EV recharging industry consists both of larger grants to specific market players attributed via competitive tendering procedures, with the only beneficiary being ESB eCars as of October 2022, as well as of smaller grants accessible by all firms on a first come first served basis and aimed at the deployment of public recharging infrastructure.<sup>337,338</sup> It must be noted that the list of national incentives to EV recharging is currently under discussion and is expected to grow following the operational launch of the Zero Emissions Vehicles Ireland (ZEVI) office (discussed in more detail in the following section). Lastly, Ireland also benefitted from EU financing, both through an Interreg Europe project and as part of an initiative of the CEF.

**Figure 28: Regulatory (light grey) and Public support (dark grey) timeline<sup>339</sup>**



### 7.1.3. Regulation in Ireland

EV recharging regulation in the country has mainly originated from the national regulatory agency for energy as well as from the transposition of EU norms.

In 2017, the Commission for the Regulation of Utilities (CRU) of Ireland established that EV recharging activities could not be funded by network charges, thus enforcing the unbundling of recharging services from other business areas covered by the DSO.<sup>340</sup> The decision was particularly relevant considering the role ESB played at the time, both operating as a DSO and being virtually the only player in the EV recharging market. In the same year, the CRU also decided upon the legal status of CPOs, establishing that they were not to be considered suppliers of electricity but should rather be classified as end users.<sup>339</sup> The decision simplified market entry for CPOs, as it abolished the need for them to hold an electricity supply license to operate as previously otherwise indicated

<sup>337</sup> Commission for Energy Regulation, "Decision on ESB Networks Electric Vehicle Pilot", March 2014

<sup>338</sup> Refers in particular to the Public Charge Point Scheme which provides a grant of €5k per public recharging point. A detailed discussion of the measure can be found in Section 7.1.4

<sup>339</sup> Detailed descriptions can be found in the Regulation and Public Support sections below

<sup>340</sup> Commission for Regulation of Utilities, "ESBN Electric Vehicle Pilot & Associated Assets", October 2017



by the Electricity Regulation Act of 1999.<sup>341, 342</sup> This enhanced competition in the market and paved the entry of several new players (such as EasyGo in 2018).

Besides the two decisions from the CRU, EU policies are the main regulatory driver in the country. The AFID was transposed into national law with Regulation 647/2018 European Union (Deployment of Alternative Fuels Infrastructure) No. 2.<sup>343</sup> As a consequence, all AFID's rules were adopted, including technical specifications for recharging points.<sup>344,345</sup> In line with the AFID, the Irish Regulation 647/2018 stipulated that all public recharging points should be accessible on an ad hoc basis without the need to enter into contractual obligations with the eMSP.<sup>342</sup> Similarly, EU Directive 2018/844 on the energy performance of buildings was transposed into national law with Regulation 393/2021, European Union (Energy Performance of Buildings);<sup>346</sup> Regulation 393/2021 adopted all clauses from the Directive.

In 2021, Ireland set a target of 190k EVs on the road by 2025, and 945k by 2030 in its National Energy & Climate Action Plan.<sup>347</sup> To achieve these targets, the EV Policy Pathway Working Group, consisting of seven different government departments and the Sustainable Energy Authority of Ireland (SEAI), published a report including 36 policy recommendations.<sup>348</sup> These included expanding both tax relief measures and grants for EV purchases, as well as establishing a single entity called the Office of Zero Emissions Vehicles to centralise policy management and achieve the objectives outlined above.<sup>347</sup> The Zero Emissions Vehicle Ireland (ZEVl) office is currently being set up and will centralise eMobility policy-making, coordinating government strategies on the sector, including taxation and regulation, as well as public support measures to support EV adoption and the rollout of recharging infrastructure.<sup>349</sup>

Moreover, in March 2022, the Department of Transport published the "Electric Recharging Infrastructure Strategy 2022-2025" detailing the government's approach to the sector for the next three years.<sup>350</sup> While the strategy does not have the legal power of law, it nonetheless sets the guidelines for the sector's development going forward. The strategy highlighted the importance of granting universal accessibility to recharging regardless of people's age, health, income, or other needs. It also stressed the importance of home-recharging as the main recharging solution, which currently accounts for approximately 80% of total EV recharging sessions in the country and is supported by a €0.6k government grant per home recharger.<sup>351</sup> However, it was emphasised that alternatives such as public on-street recharging, co-recharging (which allows sharing home-recharging points with other EV drivers), destination recharging, and faster speed on-route recharging must be available for those who do not have off-street parking available. Lastly, the strategy emphasised the importance of ease of access to recharging, suggesting both ad hoc and membership options should be offered to EV drivers.<sup>349</sup>

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<sup>341</sup> Arthur Cox, "Green mobility in Ireland: Legal Considerations in the Development of Electric Vehicle Charging Infrastructure", April 2021

<sup>342</sup> Irish Statute Book, "Electricity Regulation Act, 1999", July 1999

<sup>343</sup> Irish Statute Book, "S.I. No. 647/2018 - European Union (Deployment of Alternative Fuels Infrastructure) (No. 2) Regulations 2018", December 2018

<sup>344</sup> A detailed discussion of relevant EU regulations on EV recharging can be found in Appendix D

<sup>345</sup> European Parliament, "DIRECTIVE 2014/94/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 22 October 2014 on the deployment of alternative fuels infrastructure", October 2014

<sup>346</sup> Irish Statute Book, "S.I. No. 393/2021 - European Union (Energy Performance of Buildings) Regulations 2021", July 2021

<sup>347</sup> Department of the Environment, Climate and Communications, "Climate Action Plan 2021", November 2021

<sup>348</sup> Department of Transport, "Government approves Electric Vehicle Policy Pathway Report", September 2021

<sup>349</sup> Government of Ireland, "Zero Emission Vehicle Ireland"

<sup>350</sup> Department of Transport, "Electric Vehicle Charging Infrastructure Strategy 2022-2025", March 2022

<sup>351</sup> Sustainable Energy Authority of Ireland, "Electric Vehicle Home Charger Grant"

#### 7.1.4. Public support for EVs and recharging in Ireland<sup>352</sup>

Public support in the country has been provided via grants to citizens, and public authorities, as well as to eMobility market players. This section presents both national and EU State aid schemes, discussing them in detail.

When it comes to grants provided to EV recharging market players, the most noticeable example was the support provided from the CRU to ESB eCars for the early development of the industry in Ireland in 2014.<sup>353</sup> The project kickstarted EV recharging in Ireland, with the infrastructure's ownership being left to ESB eCars.<sup>354</sup> In addition to that, ESB eCars was awarded a €10m grant from the Climate Action Fund's first call for projects in 2018. The grant, which covered 50% of total investment costs and was matched with another €10m by ESB eCars, was awarded via a public tender open to companies from across the European Union.<sup>355</sup> However, with few firms operating in Ireland at the time, as competitor EasyGo had just entered the market, ESB eCars was the main candidate to receive the funding.<sup>356</sup> The project was aimed at the installation of more than a hundred ultra-fast speed rechargers, as well as the replacement of a hundred fast-speed rechargers and the refurbishment of two hundred slow-speed rechargers.<sup>357</sup>

Another relevant issue at the junction between public support and regulation concerns the procurement procedures of EV recharging services at the local level. In Ireland, the main public support measure to the EV recharging sector, the Public Charge Point Scheme, does not specify the procedures for local authorities to procure the EV recharging infrastructure and select the firms benefitting from the State aid measure. Nevertheless, as mentioned in Section 3.2.1 Member States abide by either national or EU rules on public tendering, ensuring transparency and an equal treatment are applied.<sup>358</sup> Moreover, no evidence emerged of local authorities awarding grants without competitive tendering processes.

Most of the other incentives, including the Public Charge Point Scheme and the EV Home Charge Point Grant, are instead equally accessible by all recharging firms, thus having a limited impact on companies' market power. However, the recently introduced Apartment Charging Grant allows access to the grant only to listed CPOs. Noticeably, as confirmed by the Sustainable Energy Authority of Ireland, the largest market player ESB eCars is not included among the authorised CPOs within the programme as they did not apply to join the programme, while the second largest firm EasyGo is. Lastly, when EU public support is considered, the only contribution to market players in Ireland has been provided to IONITY under the CEF project Europ-E.

<sup>352</sup> The list of public support is an exhaustive representation of State aid support for EV recharging at the national level based on the results of this study's desk-based research. The measures included were in force, for some or all years, between 2016 and 2022, due to the infancy of the sector and the way data is publicly accessible and presented, additional evidence may come to light with other searches.

<sup>353</sup> Commission for Energy Regulation, "Decision on ESB Networks Electric Vehicle Pilot", March 2014

<sup>354</sup> Commission for Regulation of Utilities, "Electric Vehicle Charging Infrastructure Project Close Down Report", July 2018

<sup>355</sup> Department of Communications, Climate Action & Environment, "Climate Action Fund Call for Applications clarifications", September 2018

<sup>356</sup> No public information is available on the presented projects which were not awarded a grant. It is therefore not possible to discern whether other EV recharging market players aside from ESB eCars presented proposals.

<sup>357</sup> ESB, "ESB welcomes Climate Action Fund support to develop a national high power EV charging network"

<sup>358</sup> Your Europe, "Public Tendering Rules", October 2022

**Table 19: Total EU public support to Ireland by firm (2016-2022)**<sup>359</sup>

Company	EIB loans (€m)	CEF grants (€m) <sup>360</sup>
ESB eCars	0	0
EasyGo	0	0
EVBox	0	0
Tesla	0	0
IONITY	0	6.5

The different national and EU funded Public Support measures to eMobility in Ireland are discussed below:

### ***EV recharging subsidies***

(Semi) public recharging

- CRU Pilot Project grant: In 2014 the CRU provided ESB eCars with a €25m grant, following the company's request for the financing of a pilot project for the installation of approximately 1k slow recharging points across the country.<sup>361</sup> The project kickstarted EV recharging in Ireland, with the infrastructure's ownership being left to ESB eCars after the deployment phase.
- Public Charge Point Scheme: established in 2019 by the SEAI, it provides local authorities with grants of up to €5k per recharging point for the rollout of on-street recharging points. In turn, local authorities select private market players to install the recharging points. The Scheme focuses on slow recharging. <sup>362</sup> As of July 2022, only three local authorities had taken advantage of the programme, for a total of 33 installed recharging points over three years, falling short of the 200 recharging points per year target originally adopted.<sup>363</sup> The measure was exempted from notification to the European Commission under the GBER article 56 for Investment aid for local infrastructures.<sup>364</sup>
- Irish Climate Action Fund grant: following its first call for application in 2018, the Irish Climate Action Fund provided ESB eCars with a €10m grant, matched by the company, in 2021.<sup>365</sup> The grant was designed to deliver a "state-of-the-art" EV recharging network capable of facilitating large-scale EV uptake in Ireland over the next decade. The key elements of the infrastructure to be funded includes: six ultra-fast recharging hubs on motorways capable of recharging eight vehicles simultaneously, 16 ultra-fast recharging hubs capable of recharging four vehicles simultaneously, additional 50kW fast DC rechargers at 34 current locations, upgrading over 50 22kW (slow) AC rechargers to 50kW DC and replacing up to 264 (528 recharge points) pre-existing Pilot Grade 22kW (slow) AC rechargers to next

<sup>359</sup> Summary table of the EU public funding measures discussed below. Initiatives from Interreg Europe were not included as recipients are local public authorities rather than private market players. National public support measures were also not included as data granularity does not allow for a view of total grant amounts allocated to each company. "0" means the company did not receive any contribution from the specific source.

<sup>360</sup> CEF grants have been assumed to be split equally among all beneficiary firms within each project

<sup>361</sup> Commission for Energy Regulation, "Decision on ESB Networks Electric Vehicle Pilot", March 2014

<sup>362</sup> Sustainable Energy Authority of Ireland, "Electric Vehicle Public Charge Point Grant"

<sup>363</sup> Eithne Dodd, "Just three local authorities take advantage of three-year-old EV charging scheme", July 2022

<sup>364</sup> European Commission, "Competition Policy State Aid Register: Electric Vehicle Public Charge Point Grant", October 2019

<sup>365</sup> Government of Ireland, "Low Emissions Vehicle Taskforce Progress Report", September 2018

generation high reliability models. The grant was awarded via a competitive tendering procedure open to companies from the European Union.<sup>366</sup>

- **Apartment Charging Grant:** launched in 2022 by the SEAI, the grant covers some of the installation costs for the deployment of recharging points in building car parks as well as an additional grant of €0.6k per installed recharging point. The percentage of installation costs covered varies depending on the type of applicant, with a coverage of 60% for Management companies of Build-to-Rent developments which grows to 80% for Owners' Management Companies and 90% for Local Authorities or Approved Housing Bodies. Furthermore, applicants are required to select a CPO from a list of registered firms to manage the recharging points.<sup>367</sup> ESB eCars is not part of the list of authorised CPOs within this scheme, while the other main market player EasyGo is.<sup>368</sup>

### **EU public support**

In Ireland, between 2014 and 2022, no company received funding from the EIB, however both a CEF initiative and an Interreg Europe project were conducted in the country.

#### **CEF**

- **Europ-E European Ultra-Charge Roll Out Project:** launched in 2017, the project was aimed at the installation of 1.5k ultra-fast recharging stations across 13 countries in the period from 2017 to 2023. IONITY was the project coordinator. The initiative was awarded a €39.1m grant from the CEF.<sup>369</sup>

#### **Interreg Europe**

- **Faster project:** launched in 2021 and lasting until 2023, the project is financed via a €6.4m grant from Interreg Europe, €5.7m of which are provided via co-financing by the ERDF. The initiative aims at installing 73 recharging stations (approximately 145 recharging points) with a capacity of 50 kW across Ireland, Northern Ireland and Scotland. The project is led by the East Border Region, a local authority serving people across Ireland and Northern Ireland and is supported by six other local authorities and institutions. While limited public information is available concerning the firms involved in the installation and operation of recharging points, the research conducted offered no evidence that the main market players were involved in the project.<sup>370</sup>

### **EV purchase subsidies**

- **Electric Vehicle Grant:** launched in 2018, the grant supports the purchase of EVs. The amount provided varies between €2k and €5k for BEVs and between €1k and €2.5k for PHEVs depending on the listed price of the vehicle.<sup>371</sup>
- **Electric Small Public Service Vehicles (SPSV) Grant Scheme:** established in 2018, provides grants of up to €25k for the purchase of BEVs in the SPSV sector, including taxis and limousines.<sup>372</sup>

<sup>366</sup> ESB, "About ESB eCars"

<sup>367</sup> Sustainable Energy Authority of Ireland, "Apartment Charging Grant"

<sup>368</sup> Sustainable Energy Authority of Ireland, "Find a Charge Point Operator"

<sup>369</sup> Innovation and Network Executive Agency, "Europ-E European Ultra-Charge Roll Out Project", April 2022

<sup>370</sup> Interreg Europe, "Faster Project"

<sup>371</sup> Zero Emission Vehicles Ireland, "Electric Vehicle Grants"

<sup>372</sup> National Transport Authority, "Electric SPSV Grant Scheme", 2022

- Alternatively Fuelled Heavy-Duty Vehicle (AFHDV) Purchase Grant Scheme: introduced in 2021, offers grants for the purchase of alternatively fuelled heavy-duty vehicles including BEVs and PHEVs. The grant partially covers the price differential between the EV and the diesel-fuelled equivalent. The percentage of price differential covered depends on the size of the company requesting the grant, going from the 60% granted to small enterprises, to 50% for medium ones and 40% for large companies.<sup>373</sup>

### **EV Tax benefits**

- Accelerated Capital Allowance: launched in 2008, allows for the tax reduction of the full cost of EVs from the profits matured by companies in the year of purchase. For EVs, the allowance is calculated based on the lower value between their listed price and €24k.<sup>374</sup>
- Low Emissions Vehicle Toll Incentive: established in 2018, is a toll reduction for highways. The reduction is of 50% for BEVs and of 25% for PHEVs, up to an annual threshold of €0.5k for private vehicles and €1k for commercial vehicles.<sup>375</sup>
- Vehicle Registration Tax relief: introduced in 2019, offers up to €5k tax reduction to EVs, while the relief for hybrid cars and PHEV expired as of 31<sup>st</sup> December 2020.<sup>376</sup>
- Low Motor Tax: established in 2019, positions BEVs in the lowest level of Motor Tax at €120 per annum. PHEVs typically qualify for the 2nd and 3rd lower motor tax bands available of €140 and €150 per annum for cars registered from 1st January 2021. PHEVs registered before this date typically pay €170 per annum.<sup>377</sup>
- No benefit in kind tax for employers: Introduced in 2019, this scheme ensures no benefit in kind charge to tax arises for employers when they make an electric car available to their employees for private use.<sup>378</sup>

#### **7.1.5. CPO shares in Ireland and evolution over time**

As outlined in the Ireland country summary in Appendix A, the Irish EV recharging industry started off as a non-competitive one in 2011 whereby the government owned first mover utility, the Electricity Supply Board (ESB), was supported by the regulator in developing recharging infrastructure throughout the country. This resulted in the creation of ESB eCars which remains the leading supplier. However, since 2018, there has been a shift away from this state of high concentration environment, to one that features two main players following the entry of EasyGo. Other firms such as EVBox, Tesla and IONITY are also present. The key CPOs operating in the Irish market can be seen in the breakdown of market players in Figure 29.

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<sup>373</sup> Transport Infrastructure Ireland, "Alternatively Fuelled Heavy Duty Vehicle Purchase Grant Scheme"

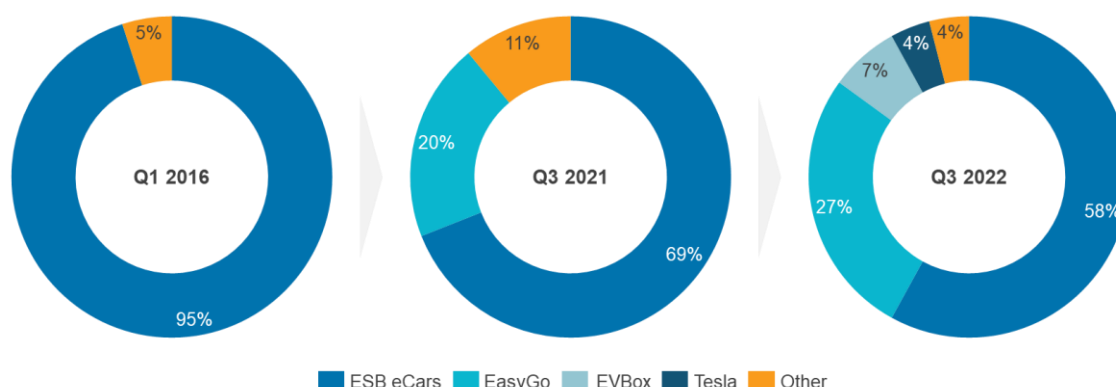
<sup>374</sup> Sustainable Energy Authority of Ireland, "Accelerated Capital Allowance"

<sup>375</sup> eToll, "Low Emissions Vehicle Toll Incentive"

<sup>376</sup> Irish Tax and Customs, "Calculating Vehicle Registration Tax (VRT)"

<sup>377</sup> Sustainable Energy Authority of Ireland, "EV Cost Savings"

<sup>378</sup> Irish Tax and Customs, "Private use of employer-provided vehicles"

**Figure 29: Ireland CPO share by installed recharge points<sup>379</sup>**

The market share picture observed in Figure 29 is correct as of October 2022 and gives the most accurate current market share breakdown based on data availability and quality. This picture has however evolved over the past years following the entry of other market participants such as EasyGo and EVBox. The historical industry data available does not allow for a year-by-year market share evolution analysis, however there are some key data points that highlight trends over time. Specifically:

- In 2015, ESB eCars claimed to have 903 public recharging points across the island of Ireland (incl. Northern Ireland), at the same time, there were 838 recharging points in Ireland (excluding Northern Ireland) suggesting that ESB eCars had approximately 100% of the market.<sup>380,381</sup>
- In 2018, EasyGo was founded and entered the market in March 2019.<sup>382</sup> During 2020 EasyGo added 166 public recharging points to their network bringing their total number of recharging points to more than 431 across the island (incl. Northern Ireland).<sup>383</sup> Based on the same source as above, using the European Alternative Fuels Observatory as a reference it is suggested that 1,144 recharging points were installed in Ireland as of 2020, meaning that EasyGo had grown their market share significantly.
- EVBox and Tesla first entered the market in 2017 and have progressively developed their networks since.<sup>384,385</sup> The same goes for IONITY which entered in 2019 though their partnership with the fuel and convenience retailer Circle K.<sup>386</sup> There is no conclusive evidence that depicts their market share at these time points, however given expansion dynamics of ESB eCars and EasyGo, they are estimated to be small relative to the major players.

These prominent market participants have each emerged from different areas of the energy and mobility ecosystems, some from the utilities segment, others from the OEM segment and some as pure eMobility companies. In Table 20 below, an overview of each company's legal structures and ownership dynamics is provided.

<sup>379</sup> CRA analysis: The 2022 picture was developed based on the data gathering methodology presented in Appendix F. The 2016 and 2021 pictures are based on desk-based research and CRA analysis which provides confidence on the market players ranking but not on the precise shares estimated.

<sup>380</sup> ESB eCars, "Preparations for EVs on the Distribution System", November 2015

<sup>381</sup> European Commission, "European Alternative Fuels Observatory – Ireland", October 2022

<sup>382</sup> EasyGo, "Number of advanced public EV charging points in Ireland set to increase", March 2020

<sup>383</sup> The Effect, "EasyGo EV Charging Network Ireland", June 2020

<sup>384</sup> Phillips, D, "EVBox launches smart charging in Ireland", March 2017

<sup>385</sup> Electrek, "Tesla to open first store, service center and Supercharger in Ireland", April 2017

<sup>386</sup> PowerRight, "Guide to Electric Vehicle Charging 2020", September 2020



**Table 20: CPO and eMSP legal structure and key services detail (October 2022)** <sup>387</sup>

Firm	Number of Rechargers	CPO share	Type of player (legal structure)	Key CPO services	Interoperability and openness of access
ESB eCars	1,020	58%	Fully integrated CPO and eMSP, subsidiary of fully integrated state-owned electricity utility	On-route, destination, on street	Bilateral agreements with other eMSPs, roaming, ad hoc via pay-as-you-go
EasyGo	480	27%	Fully integrated CPO and eMSP founded as an eMobility company	On-route, destination, on street	Bilateral agreements with other eMSPs, roaming, ad hoc via pay-as-you-go
EVBox	116	7%	Fully integrated CPO and eMSP founded as eMobility company, owned by a fully integrated utility	On-route, destination, on street	Bilateral agreements with other eMSPs, roaming, ad hoc via pay-as-you-go
Tesla	68	4%	Fully integrated CPO and eMSP and automotive OEM	On-route, small amount of destination	Closed network, access only via Tesla app, ad hoc via pay-as-you-go
IONITY /Circle K	22	1%	Fully integrated CPO and eMSP from a consortium of automotive OEMs, hosted at refueling stations	On-route	Bilateral agreements with other eMSPs, ad hoc via pay-as-you-go
Other	56	3%	Small players with few rechargers (<20)	--	--
Total	1,762	100%	--	--	--

ESB eCars, EasyGo, and EVBox provide a full suite of recharging services including on-street, on-route, and destination recharging, whereas Tesla and IONITY typically serve only the on-route market with fast recharging services (with Tesla also having some destination chargers), as can be seen in Table 20. All these companies are also fully integrated CPOs with an eMSP offering for their customers. Regarding interoperability and the openness of access, the Irish landscape is relatively simple given the low number of players. Each eMSP gives transparency of recharging point availability and can facilitate payment, each with preferential pricing and memberships on offer, and the main players in the market do not yet support ad hoc recharging via direct credit card payment. However, the e-roaming platform Gireve has partnerships with most Irish CPOs (more than 1k recharge points on the platform in June 2022) including ESB eCars, EasyGo and EVBox, allowing payment from a single RFID card or app.<sup>388,389</sup> In contrast, however, the larger CPOs have not signed an agreement with Hubject, who are a leading

<sup>387</sup> CRA analysis

<sup>388</sup> Radio Frequency Identification (RFID) cards are used by most eMSPs across the EU27 + the UK to allow their customers to access recharging services. These cards are connected to the driver's profile registered with the eMSP, so that they can be used as an identification method to access recharging points.

<sup>389</sup> Gireve, "Easygo.le Partners With Gireve Roaming Platform As Emsp"



roaming platform provider across the EU (as of October, 2022 Hubject had 18% coverage in Ireland). Each of these players are described in more detail below.

### 7.1.6. Key CPO/eMSP players in Ireland

#### ESB eCars

ESB eCars, a subsidiary of the 95% government owned (remaining 5% is an employee trust scheme) utility ESB, holds a 58% share as an integrated CPO and eMSP. Across the liberalised and competitive Irish electricity market, ESB is vertically integrated throughout, holding a 33% share in generation and a 40% share within the Transmission & Distribution and Retail segments (across Northern Ireland and Republic of Ireland).<sup>390</sup> ESB is considered a trusted energy partner by Irish consumers due to its long history as the state-owned market leader.<sup>391</sup>

The ESB eCars business provides full end-to-end EV recharging solutions to businesses, retailers, property owners, transport authorities, and local authorities. Public recharging solutions are their primary focus, but ESB also offers eMobility solutions for businesses to install recharge points through offering design, grid connection, operation and maintenance, customer support, and marketing. On the eMSP side of their business, their public recharge points can be located via the ESB eCars app where recharging sessions can be paid for at the rates described in Table 21. ESB eCars recently announced that its per kilowatt hour rates will increase by approximately 20% starting in December 2022.<sup>392</sup>

**Table 21: ESB eCars Pricing Model**<sup>393</sup>

Pay-as-you-go	Subscription	Prepay cards
No monthly fee	€4.8pm subscription fee then rates of:	No monthly fee
Standard (slow): €0.56/kWh	Standard (slow): €0.51/kWh,	Standard (slow): €0.56/kWh
Fast: €0.647/kWh	Fast: €0.59/kWh	Fast: €0.65/kWh
High power (ultra-fast): €0.68/kWh	High power (ultra-fast): €0.62/kWh	High power (ultra-fast): €0.68/kWh
Fees: €8 after 10 hours for pay monthly, €8 after 45 minutes (for prepay and PAYG)		

ESB established ESB eCars in 2010 and initially their recharge points had low utilisation (<1%) and were only economically feasible through government support.<sup>394</sup> In 2014, the firm received a €25m public grant for a pilot project to install 1.1k recharging points across Ireland.<sup>395</sup> As a consequence, ESB eCars was prevented from charging fees on their network of recharging points until 2020. During these early years of the market, local authorities had limited choice of suppliers when rolling out public infrastructure and ESB eCars was commonly seen as the only viable supplier option based on capability

<sup>390</sup> ESB, "2021 ESB Annual Report and Financial Statements", March 2022

<sup>391</sup> Study interview, Irish Competition and Consumer Protection Commission, November 2022

<sup>392</sup> ESB, "ESB announces price increase for EV public charging", November 2022

<sup>393</sup> ESB, "Price Plans", December 2022

<sup>394</sup> CRA analysis – project interview with ESB stakeholder regarding Customer of 2030, August 2021

<sup>395</sup> ESB, "ESBN Electric Vehicle Pilot & Associated Assets", November 2016

and financial depth.<sup>396</sup> In 2020, ESB eCars received a €10m grant from the Climate Action Fund, for the installation of new fast recharging points and the upgrade of existing infrastructure.<sup>397</sup>

This public support has allowed ESB eCars to build out and optimise its value chains and structures. While ESB's role as sole Electricity Distribution System Operator (DSO), being the only fully integrated utility in the country, might have raised concerns for fairness of access to grid connections for other CPOs, that is not the case as the Commission for Regulation of Utilities (CRU) has a connection offer process that ensures fairness, transparency, and timeliness.<sup>398</sup>

## **EasyGo**

EasyGo is the second largest CPO in Ireland with 27% share and acts as a fully integrated CPO and eMSP. It is a privately held eMobility pure play founded in 2018, only operating in Ireland. In 2021 EasyGo received €15 million in private funding to be used to add 500 DC fast rechargers to its public electric vehicle recharging network. The funding was secured through the partnership with investors Air Core, Rubicon Capital Advisors and DunPort Capital Management. The high-powered rechargers will be installed at destination locations such as retail, town centre and hospitality via a range of strategic partnerships that EasyGo has and continues to enter.<sup>399</sup> As part of the 2021 equity injection, EasyGo recently announced a partnership with Irish telecoms company Eir to leverage the existing telephone kiosks across the country that are starting to become obsolete with the move towards fibre-optic broadband and dense cellular networks for mobile phones. Together, they plan to use the existing sites to install 200 EV rechargers in locations that have unused infrastructure.<sup>400</sup>

EasyGo claims to be the leading public EV recharging eMSP network on the island of Ireland through hosting and managing access to more than 2,000 rechargers with over 20,000 EV drivers on the network as of December 2022. This is already a progressive increase compared with the network size in October 2022 when the data for this study was gathered indicating the growth among CPOs in Ireland in response to the increasing demand for EVs. EasyGo has leveraged the partnership model to develop its network whereby they install fast DC rechargers for free and share the profits with the car park partner. Most of their rechargers are in locations such as supermarket car parks with some being semi-public in places like car dealerships. They offer a full service similar to that of ESB eCars through the provision and installation of suitable recharging hardware, as well as the operation and maintenance of the recharging points and stations for Private, Commercial and Public Sector clients.<sup>401</sup>

Being an integrated CPO/eMSP, all of the EasyGo recharge points can be found via its application and can be paid for either via a PrePay subscription where the pre-paid credit that can be used on any IONITY (hosted at Circle K stores), EasyGo, or ESB eCars recharger. Alternatively, ad hoc recharging is offered via a Pay-as-you-go membership where the EV owner pays for each recharging session using a debit or credit card. All EasyGo owned AC and DC Chargers have a €0.27 access fee and a rate of €0.49 per kWh (inc. VAT).<sup>402</sup>

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<sup>396</sup> Study interview, Irish Competition and Consumer Protection Commission, November 2022

<sup>397</sup> ESB, "About ESB eCars"

<sup>398</sup> European Commission for Regulation of Utilities, "Enduring Connection Policy Stage 2 (ECP-2)", June 2020

<sup>399</sup> EasyGo, "EasyGo Secures €15 Million Investment to Grow Local EV Charging Network", October 2022

<sup>400</sup> Silicon Republic, "EasyGo invests millions to deploy 200 EV chargers across Ireland", November 2022

<sup>401</sup> EasyGo, "Become a Part of the Network", November 2022

<sup>402</sup> EasyGo, "Charging Network", November 2022

## EVBox

The EVBox network covers around 7% market share and provides fully integrated CPO and eMSP services. EVBox are a Dutch company conceived in 2010 as a pure play eMobility provider acting as an all-in-one EV recharging provider for their clients which sometimes operate the rechargers under the EVBox brand or labelled as the partner's branding.<sup>403</sup> EVBox provide partners with tailored recharging solutions whereby they manufacture the rechargers, have an option to provide or operate software to manage and access the rechargers (eMSP services), and can provide services to maintain and ensure rechargers remain operational (CPO services). In 2014, Dutch private equity firm Gilde Equity Management acquired a majority stake in EVBox. Three years later in 2017, the vertically integrated French utility Engie purchased EVBox for an undisclosed amount and expanded its recharging footprint beyond the Netherlands to also cover other EU markets and areas of the US, now with a global footprint of approximately 400k recharging points.<sup>404</sup> Towards the end of 2020, EVBox was almost taken public via a Special Purpose Acquisition Company (SPAC), with Engie retaining 40% ownership of EVBox,<sup>405</sup> however the initial public offering (IPO) did not complete and EVBox remain privately owned.

EVBox entered Ireland in 2016 focussing on all recharging services in both the private and public segments. They have also developed software to help customers with managing their recharge point asset base, as well as providing professional services to support the design, operation and maintenance of recharging assets.

EVBox do not prescribe prices at a national level for Ireland, instead the real-time pricing is identified through the EVBox Everon app.<sup>406</sup>

## Tesla

Tesla currently have 4% share, acting as a fully integrated CPO and eMSP. As identified within this report, Tesla are a global EV OEM that also provide their own recharging infrastructure.

Tesla entered Ireland in 2017 and has grown its network of on-route ultra-fast rechargers that are strategically placed along Irish highways and near the Dublin city area. Historically its network has been closed to any vehicle that was not a Tesla, both from a physical recharging connector, and digital access perspective. As discussed earlier in this report, Tesla are now running pilots in some countries to test interoperability with other models.

As with all Tesla Supercharger stations, specific pricing for each site is shown on the selected recharging station, but it can be deduced from their eMSP application that a recharging session can cost up to €0.81/kWh for non-Tesla owners in countries where they have opened their network to other users.<sup>407</sup> Idle fees are also charged at €0.50/minute after the recharge has completed, or €1.00/minute if the station is 100% occupied.<sup>408, 409</sup>

<sup>403</sup> Public information on the split of these recharging points is not readily available, and from the customer perspective, they interface with an EVBox recharging point and associated software (whilst sometimes the brand of their partner is also visible). Therefore, the analysis considers the EVBox network holistically to include all rechargers EVbox branded, or partner co-branded.

<sup>404</sup> Engie, "ENGIE acquires EVBox, the largest European electric vehicle charging player", March 2017

<sup>405</sup> Bloomberg, "Engie's EVBox to Go Public in \$1.4 Billion SPAC Deal", December 2020

<sup>406</sup> EVBox, "What are the charging fees of EVBox roaming partners?", November 2022

<sup>407</sup> Tesla Recharging application, supercharger example December 2022

<sup>408</sup> An idle fee is a per minute charge paid by the EV driver if the EV is connected to the recharger after the recharging session has finished.

<sup>409</sup> Tesla, "Supercharger Idle Fee"

## IONITY

IONITY has approximately 1% share, acting as a fully integrated CPO and eMSP, it has operated its network of fast recharging on-route rechargers through Circle K refuelling and convenience store locations since 2020.<sup>410</sup> IONITY are a European fast recharging network that was founded by many of the large OEMs such as the BMW Group, Mercedes-Benz Group, Ford Motor Company, Volkswagen Group and Hyundai Motor Group, including backing from financial investor BlackRock.<sup>411</sup> Circle K Ireland is the largest fuel and convenience retailer in Ireland, and are part of the global fuel and convenience store brand Circle K. Circle K is owned and operated by publicly listed Canadian convenience store operator, Alimentation Couche-Tard.<sup>412</sup>

IONITY focus on the on-route segment specifically, with ultra-fast rechargers positioned at six Circle K sites across the Irish key transport routes, with four rechargers at each of the sites.<sup>413</sup> IONITY focuses its brand around recharging for everyone and carbon neutral driving, in turn it claims that its rechargers use 100% renewable electricity (by function of only selecting providers that generate electricity exclusively from renewable sources), IONITY have almost 2,000 high power ultra-fast rechargers across Europe.<sup>414</sup>

Being an integrated CPO/eMSP, an EV driver can access the network via the IONITY smartphone app. However, with regard to OEM founding partners, IONITY encourage users to access the network using one of the native OEM eMSP networks (e.g., Mercedes me Charge, Charge myHyundai, or BMW Charging) that have the IONITY recharge points listed, sometimes with more attractive rates. Recharging with IONITY directly has no monthly fee or subscription but is charged at €0.71/kWh.<sup>415</sup>

### 7.1.7. Regional dynamics in Ireland

As depicted in Figure 30, the CPO landscape remains dominated by ESB eCars and EasyGo, with ESB eCars accounting for over 50% of recharging points in 21 out of 26 of counties (and approximately 100% in Roscommon and Leitrim). This is also the case in the major urban areas (i.e., Dublin and Cork), where it operates approximately 60% of recharging points. However, in Galway, home of the third largest city, ESB eCars, EasyGo, and EVBox all have presence. Private sector activity is increasing, and concentration has reduced significantly in the recent years. In fact, the picture is likely to look vastly different in 2023 as new entrants' recharging stations take time to become operational due to the lag associated with deploying EV infrastructure. This trend can be seen with EasyGo, who has amassed significant share across the Ireland since entering. Specifically, they now operate 43% of recharging points in Carlow, 42% in Galway, 41% in Wexford, and 40% in Kilkenny (with its position increasing month by month). Nevertheless, increased presence of new players is underway, and a competitive market seems to be developing over time.

<sup>410</sup> Circle K, "Circle K and IONITY announce latest installation of high-power EV chargers in Ireland", December 2020

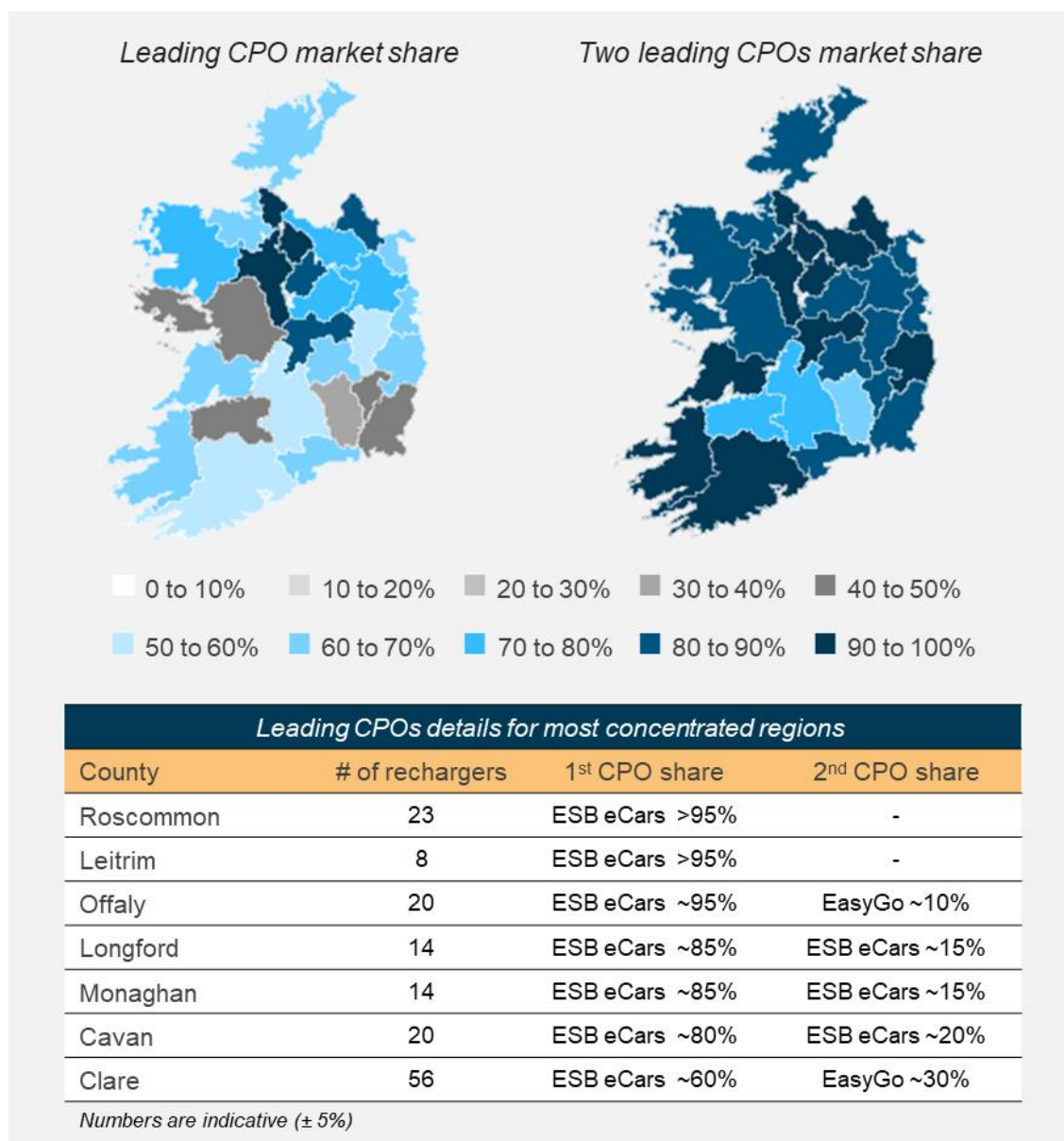
<sup>411</sup> IONITY, "Discover our network"

<sup>412</sup> The Irish Times, "Circle K Ireland Energy Group Limited", 2020

<sup>413</sup> Circle K, "Circle K and IONITY announce latest installation of high-power EV chargers in Ireland", December 2020

<sup>414</sup> IONITY, "Discover our network"

<sup>415</sup> IONITY, "Mobility Service Provider", 2022

**Figure 30: CPO concentration across Irish counties (October 2022)**<sup>416</sup><sup>416</sup> CRA analysis

## 7.2. In-depth market review for Italy

The EV transition has been a focus area in Italy for many years, with the country recently reiterating its commitment to developing the public EV recharging network. Specifically, in 2022, the government announced plans to invest €740m of its National Recovery and Resilience Facility into the sector to support EV adoption.<sup>417</sup> However, while significant advancements have been made, Italy is still lagging in terms of EV penetration as demand for electric cars has been lower than the more developed markets across the EU27 + the UK.

Based on data as of October 2022, Italy was classified as an “in-development market” due to its relative performance in recharging points deployed and EV penetration across the EU27 + the UK – 10<sup>th</sup> best ratio in terms of EVs per recharger (9:1) meeting EU recommendations, but with limited EV adoption with only 0.67% of the total vehicle fleet being electric.

### 7.2.1. Industry statistics in Italy

In Italy, as presented in Figure 31 below, EV adoption has picked up significantly since 2016 – rising from approximately 8.6k EVs on the road in 2016 to over 260k in 2022, or a CAGR of 77%. This evolution has been driven almost evenly by BEVs and PHEVs, with a CAGR of 71% and 86% respectively over the last six years (and each accounting for 50% of the total EV fleet as of October 2022). Moreover, this growth accelerated significantly from 2020 to 2021 with approximately 140k EVs being registered in just 12 months.

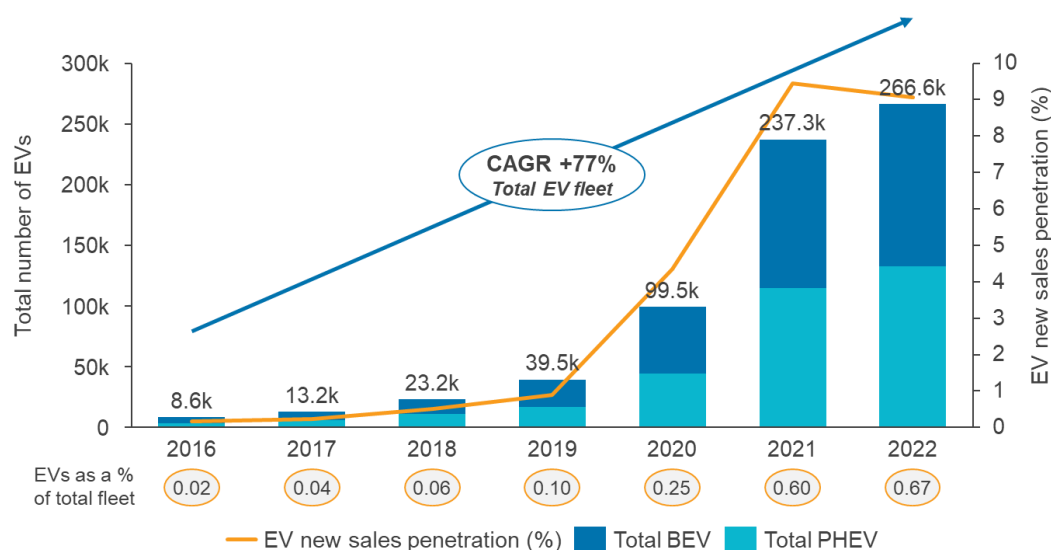
While the eMobility industry has advanced significantly, the proportion of EVs in new vehicle sales remains below 10%– a milestone achieved by all other Member States + the UK with a GDP per capita greater than €30k (who averaged approximately 25% EV new sales penetration as of October 2022). As a result, only 0.67% of the total vehicle fleet in Italy is electric (less than half of the average across the EU27 + the UK). Nevertheless, although current EV uptake is relatively slow in Italy, this is expected to pick up significantly in the coming years with the International Council on Clean Transportation estimating the EV stock will rise to over 6m by 2030 (68% implied CAGR), in line with government estimates of 4m BEVs and 2m PHEVs on the road in 2030.<sup>418</sup>

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<sup>417</sup> Italian Competition and Market Authority, “Weekly Bulletin n.51”, December 2021

<sup>418</sup> International Council on Clean Transportation, “Preparing Italy’s charging infrastructure for rapid vehicle electrification”, March 2022



**Figure 31: Italy EV sector growth (total EVs and proportion of all yearly vehicle sales)<sup>419</sup>**

From 2016 to 2022 EV recharging deployment in Italy has kept up with demand, growing at a CAGR of 56% from approximately 2.1k to 30.2k. Figure 32 depicts this progress, highlighting how Italy has been able to keep the EVs per recharger ratio in line with EU recommendations (i.e., below 10:1). Specifically, as of October 2022, one recharging point had been installed for every 8.8 EVs on the road, the 10<sup>th</sup> best performance across the EU27 + the UK. These recharging points are spread across 13k+ locations, approximately 75% of which are installed on public land (e.g., roads) and the remaining 25% on private land but available to the public (e.g., commercial centres, retailers). The proportion on private land has been accelerating, up from 23% in summer 2022.<sup>420</sup>

Nevertheless, from 2016 to 2022, EV adoption has been growing slightly faster than recharging infrastructure (77% CAGR vs. 56% CAGR). The current installation process has been identified as a significant impediment to deploying EV infrastructure. Motus-E, the primary eMobility industry association in Italy, highlighted in a study in September 2022 that while deployment rates are accelerating, 12% of public rechargers installed were not operational due to grid connection or other approval issues (rising to 20% when focusing on fast, DC recharging stations).<sup>421</sup> This was reaffirmed by market participants who shared that when network reinforcements are needed, electrical connection for high-capacity (ultra-fast) recharging stations can take up to two years.<sup>422</sup>

<sup>419</sup> European Commission, “European Alternative Fuels Observatory – Italy”, October 2022

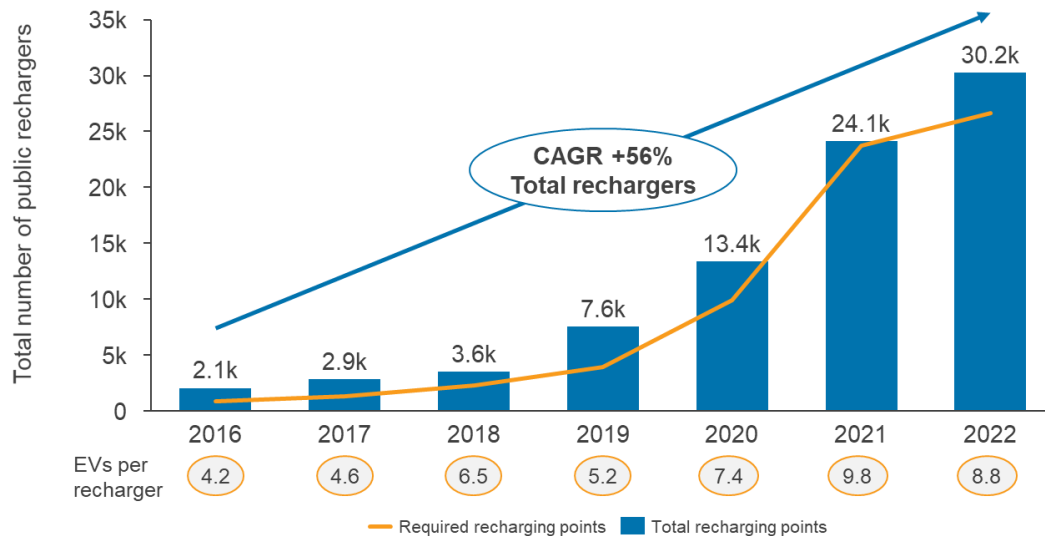
<sup>420</sup> Motus-E, “Market Analysis, October 2022”, November 2022

<sup>421</sup> Marco Dell’ Aguzzo, “Auto elettriche, come vanno le colonnine di ricarica in Italia. Numeri e problemi”, October 2022

<sup>422</sup> Study interview, Italian regulator, November 2022

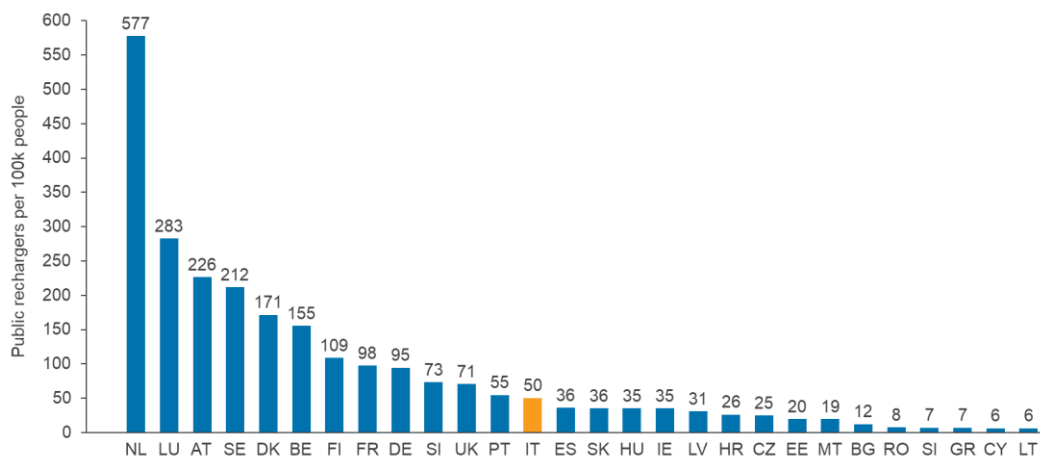


**Figure 32: Italy recharging points vs. required recharging points**  
(based on EU recommended ratio of 1 recharger per 10 EVs)<sup>423</sup>



When normalising public rechargers deployed by population and comparing it across the EU27 + the UK, as seen in the chart below, Italy falls behind countries of similar economic development levels.

**Figure 33: Public recharging points installed per 100k people as of October 2022 across the EU27 + the UK<sup>424</sup>**



The geographical distribution of installed public recharging points in Italy has not been even across the territory, with substantial differences between the North, Central, and Southern regions. According to Motus-E, and confirmed by our analysis, 57% of recharging points are found in Northern Italy, 23% in Central Italy, and only 20% in the Southern regions. Moreover, while areas like Lombardy and Veneto now boast a recharger every 9 and 12 km<sup>2</sup> respectively (reducing range anxiety), regions like Basilicata and Calabria are more prone to recharging deserts with a station only every 79 and 51 km<sup>2</sup> respectively.<sup>425</sup>

<sup>423</sup> European Commission, "European Alternative Fuels Observatory – Italy", October 2022

<sup>424</sup> European Commission, "European Alternative Fuels Observatory – Italy", October 2022

<sup>425</sup> La Repubblica, "Colonnine elettriche, ecco la mappa", October 2022

**Figure 34: Geographical dispersion of recharging points in Italy**  
(top 3 performing regions in green, bottom 3 in red)<sup>426</sup>

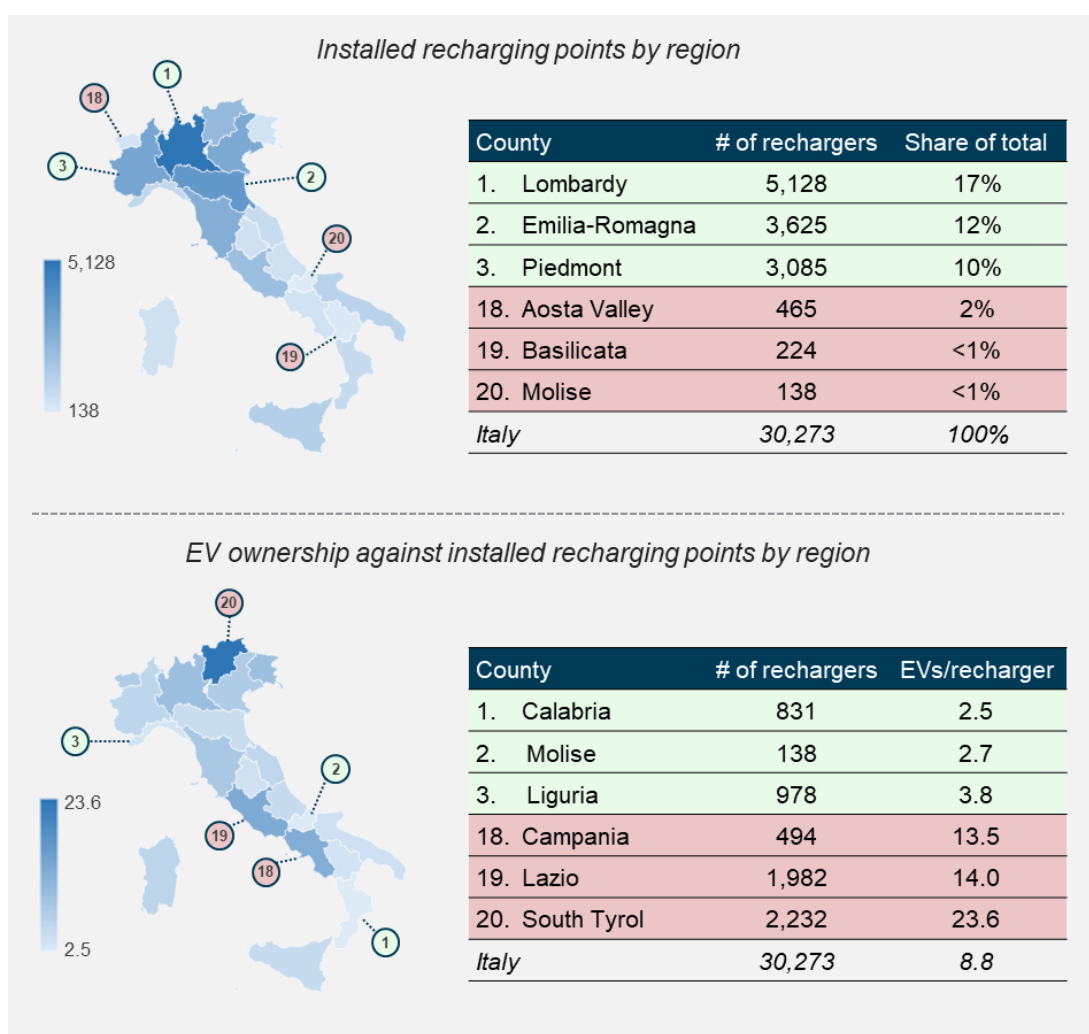


Figure 34 displays the non-homogenous nature of the Italian EV recharging sector. As of October 2022, Lombardy has the highest number of installed rechargers (17%), followed by Emilia-Romagna (12%), Piedmont and Veneto (10% each), Tuscany (9%) and Lazio (7%). Together, these six regions account for approximately 65% of all EV recharging infrastructure in Italy.<sup>427</sup> However, some of the less developed parts of the territory have accelerated EV recharging deployment. From June to October 2022, the areas which experienced the greatest growth in installed rechargers were Sicily (+16%), Sardinia (+12%), Campania (+10%), and Molise (+9%), all Southern regions.<sup>428</sup>

However, the picture is more uniform when assessing the recharging point roll-out against EVs deployed, highlighting that the number of rechargers being deployed is in line with EV adoption. The same index also helps in observing that more focus is needed in Lazio and Campania, which are the two most populous regions after Lombardy, and home to the key urban hubs of Rome and Naples.

<sup>426</sup> CRA analysis. Data on the number of recharging points split by region per 100k people is available in Appendix G

<sup>427</sup> CRA analysis

<sup>428</sup> Motus-E, "Market Analysis, October 2022", November 2022

One of the primary limitations of the EV recharging market in Italy remains the lack of coverage on major highways. As of October 2022, only 310 recharging points (75% fast or ultra-fast) were available on the 7,318 km of highways (i.e., 4.2 every 100 km). While this part of the sector has seen major growth (+250% over the last year), the current provision of infrastructure is still insufficient and additional work is needed.<sup>429</sup> To address this, the government introduced regulatory obligations for the installation of recharging infrastructure along highways with law n. 120 in 2020. Partially as a consequence of that, major companies in the sector have now dedicated more resources to this segment with Enel X (the biggest player) reaching out to all 440+ highway concessionaires to share that they are at their disposal if they are interested in developing a recharging station.<sup>430</sup> Autostrade per L'Italia (one of Europe's leading concessionaires for the management of toll motorways, with around 3,000 km of network in Italy) has also stepped in and created an entity, Free to X, to act as a CPO and deploy rechargers along its highways. Free to X has already installed over 30 recharging stations, each with multiple recharging points, and plans to reach 100 operating recharging stations by summer 2023 (expecting to deliver 5 to 6 per month until then).<sup>431</sup> Its network is open to eMSPs, guaranteeing access (with equal conditions) to any interested eMSP or roaming provider.<sup>432</sup>

### 7.2.2. Policy overview in Italy

The EV recharging sector was first developed in Italy following national guidance, later on aligning with EU recommendations as they were published. Nevertheless, national policies have regulated the industry setting technical standards as well as imposing recharging interoperability, with ad hoc recharging made mandatory in 2016. Italian laws and policies also regulated State aid measures at the national level, determining selection criteria for the grant programmes that supported the industry in its early phases of development. As a matter of fact, public support to the sector was first announced in 2012, and then implemented in 2018 via a centralised initiative coordinated by the Ministry of Transport and Infrastructure together with regions, which financed the initial rollout of recharging infrastructure via several local projects across the country. Moreover, some of the main market players in the country benefitted from EU support, both in the form of loans from the EIB and as grants from the CEF.

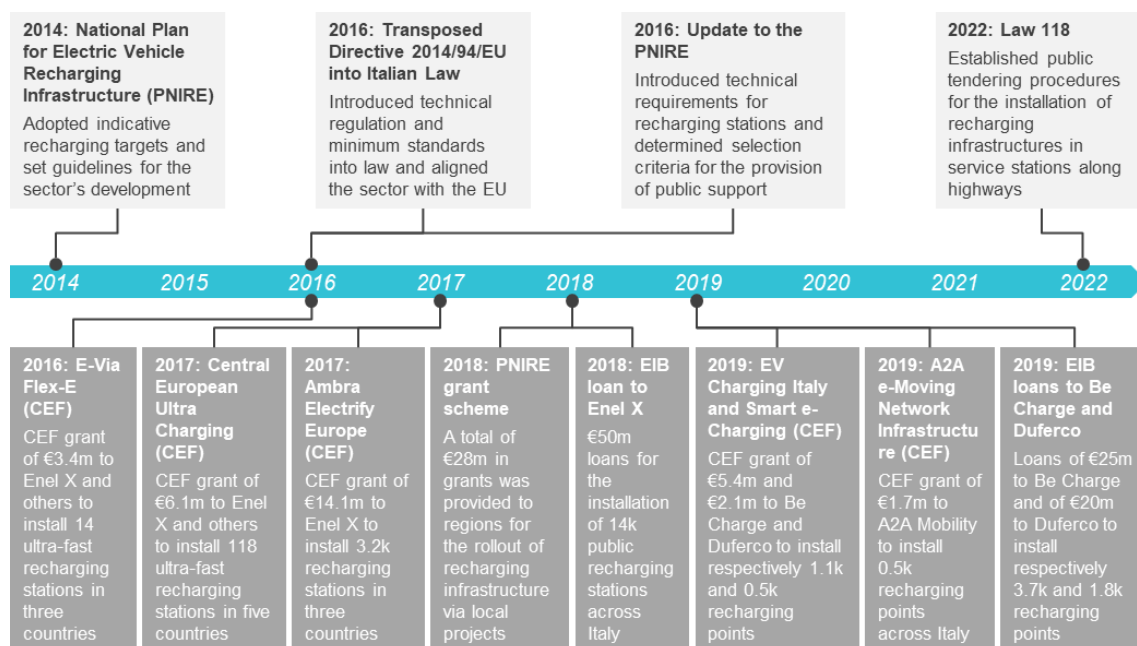
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<sup>429</sup> Motus-E, "Market Analysis, October 2022", November 2022

<sup>430</sup> Emanuela Acri, "Colonnine per la ricarica in autostrada, il punto della situazione", July 2021

<sup>431</sup> Sicurauto, "Dove sono le colonnine elettriche in autostrada?", July 2022

<sup>432</sup> To recharge an EV on the Free to X network, drivers can use the app or RFID card of most eMSPs (e.g., Duferco, Enel X, evway, Nextcharge, Neogy, Be Charge, etc.) or access through international roaming platforms (e.g., Hubeject, Gireve)

**Figure 35: Regulatory (light grey) and Public support (dark grey) timeline<sup>433</sup>**

### 7.2.3. Regulation in Italy

National regulation of the EV recharging sector was developed in Italy starting in 2012 when law n.134 required the Council of Ministers to establish a National Plan for Electric Vehicle Recharging Infrastructure to ensure the homogeneous rollout of recharging points across the country. The law called upon the National Plan to regulate recharging point technical interoperability standards, as well as to introduce public support measures for the sector's development. The law also made funds available to support infrastructure rollout efforts, which were to be provided by the Ministry of Infrastructure and Transport to Regional Authorities based on "Programme Agreements" for the realisation of projects supporting EV recharging. For this purpose, a total of €20m for 2013 and €15m for each 2014 and 2015 was allocated.<sup>434</sup>

Following the law, in 2014 the National Plan for Electric Vehicle Recharging Infrastructure (PNIRE) was approved by decree, providing a total budget of €50m for the support of eMobility, of which €28m were allocated to EV recharging projects as discussed in Section 7.2.4. The PNIRE provided indicative targets for the rollout of public EV recharging infrastructure: 90k recharging points to be installed by 2016, 110k by 2018 and 130k by 2020. Furthermore, the plan clarified that local authorities should consider elements such as population density, rate of vehicle ownership and EV penetration in local vehicles fleet when planning for the installation of recharging stations. Additionally, it was specified that local authorities had a maximum of thirty days to provide the concessions needed for the installation of recharging points, while it was made clear that the recharging service should be open to customers both on an ad hoc basis as well as via subscriptions.<sup>435</sup>

In 2016, Decree 257 was promulgated, transposing the AFID into Italian national law. The Decree introduced the provisions of the European Directive on all aspects, including

<sup>433</sup> To be noted the picture provides a non-exhaustive list of public support measures, detailed descriptions can be found in the Regulation and Public Support sections below.

<sup>434</sup> Official Legislative Gazette of the Republic of Italy, "Law n.134 2012", August 2012

<sup>435</sup> Official Legislative Gazette of the Republic of Italy, "Decree 26<sup>th</sup> September 2014", September 2014

technical standards for rechargers.<sup>436</sup> Furthermore, previous national legislation, including the PNIRE, was updated to reflect EU guidelines, for instance on the ratio of EVs to public recharging points setting a goal of between 4.5k and 13k slow public recharging points and between 2k and 6k fast and ultra-fast ones to be installed by 2020.<sup>437,438</sup>

Following that, in 2016 the PNIRE was updated to provide clear criteria for the attribution of public support contributions. In addition to that, all recharging points were mandated to allow ad hoc recharging via credit card payment by the end of 2016. However, most players implemented ad hoc recharging as per Directive 2014/94/EU, not enabling card payment but rather proposing pay-as-you-go option. The Plan also specified that highways, as well as high-occupation areas such as shopping mall car parks, should be prioritised in the rollout of recharging infrastructure.<sup>439</sup>

In terms of public support, the PNIRE set up a grant scheme financing up to a maximum of 50% of project costs. Grants were allocated to all interested regions and split based on an agreement between the Ministry of Transport and Infrastructures and the regions. While the instrument is still in force, a single round of financing has been conducted so far in 2018.<sup>440</sup> Total financial contributions could go up to 35% of the total purchase and installation cost for projects on recharging with capacities up to 22 kW, and up to 50% for projects offering capacities up to 50 kW. Recharging infrastructure was required to satisfy technological interoperability requirements and needed to be equipped with adequate management software allowing to automatically feed data into central systems. Selection criteria were based on three main elements that determined each project's total score:

- **social-territorial and environmental dimension** (30% of the total score): accounted for the need for eMobility from a social and environmental perspective. The former includes parameters such as the vehicle ownership rate, the average trip time, home-to-work commuting trends as well as occupancy rate of the spaces selected for the installation of recharging stations. Moreover, elements such as the presence of a local eMobility strategy were valued positively. Lastly, environmental considerations such as high air pollution or high levels of noise were also considered;
- **technological and innovation dimension and integration with the power grid** (45% of the total score): considered how much of the local demand the project could meet, as well as the level of coherence between the proposal and the local needs identified. Synergies with other transport methods (e.g., sharing RFID card with public transports) are valued positively together with the provision of additional services (e.g., whether an online platform was available), the use of renewable electricity and smart grids and the integration of security systems to prevent vandalism and inappropriate parking (e.g., cameras); and
- **economic and financial dimension** (25% of the total score): financial elements were considered including total cost, the share of financing requested, as well as the inclusion of appropriate private market players in the initiative. Similarly, the presence of a long-term operation and maintenance plan and the possibility of actual development in the short run were valued positively.<sup>440</sup>

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<sup>436</sup> A detailed discussion of relevant EU regulations on EV recharging can be found in Appendix D

<sup>437</sup> Italian Law Portal, "Legislative Decree n.257", December 2016

<sup>438</sup> Slow refers to capacities below 7.4 kW. Accelerated refers to capacities between 7.4 kW and 22 kW. Fast refers to capacities between 22 kW and 50 kW. Ultra-fast refers to capacities above 50 kW.

<sup>439</sup> Jonathan Packroff, "EU parliament adopts targets for EV charging infrastructure", October 2022

<sup>440</sup> Official Legislative Gazette of the Republic of Italy, "National Plan for Electric Vehicle Recharging Infrastructure", June 2016

Concerning recharging infrastructure along the highway network, law n. 120, in 2020 mandated concessionaires of service stations to install recharging infrastructure at each newly built or renovated service station.<sup>441</sup> The mandate to highway service stations concessionaires was then reiterated by law n. 78 from 2020, which stated concessionaires were to install 50 kW rechargers within 180 days or they would have been removed to allow any other interested party to step in.<sup>442</sup> The provision was then revoked by law n. 118 from 2022, which introduced an open, competitive, transparent and non-discriminatory public tender procedure for the selection of CPOs for recharging stations along highways.<sup>443</sup>

#### 7.2.4. Public support for EVs and recharging in Italy<sup>444</sup>

Italy has provided limited public support for the deployment of public EV recharging infrastructure. While that might change with the funds from the National Recovery and Resilience Plan, which has €740m for EV recharging have yet to be allocated, the only grant scheme provided so far accounted for a total of €28m allocated to regions in 2018. However, as shown in Table 22 below, most of the main players received public support from EU sources, either via EIB loans or grants from the CEF.

**Table 22: Total EU public support to Italy by firm (2016-2022)<sup>445</sup>**

Company	EIB loans (€m)	CEF grants (€m) <sup>446</sup>
Enel X	50	16
Be Charge	25	5.4
A2A eMobility	0	1.7
Duferco	20	2.1
Petrol	0	2.2
Kuwait Petroleum	0	3.1

The different national and EU funded Public Support measures to eMobility in Italy are discussed below:

#### **EV recharging subsidies**

(Semi) public recharging

- Favourable electricity tariff: in 2010 the Italian Authority for the Regulation of Energy Networks and the Environment (ARERA) introduced a special electricity tariff available for public recharging stations, which is still in force. The tariff is solely

<sup>441</sup> Official Legislative Gazette of the Republic of Italy, "Decree n. 76", July 2020

<sup>442</sup> Official Legislative Gazette of the Republic of Italy, "Law n. 178 on State balance for financial year 2021 and for period 2021-2023", December 2020

<sup>443</sup> Official Legislative Gazette of the Republic of Italy, "Law n. 188 for Market and Competition", August 2022

<sup>444</sup> The list of public support is an exhaustive representation of State aid support for EV recharging at the national level based on the results of this study's desk-based research. The measures included were in force, for some or all years, between 2016 and 2022, due to the infancy of the sector and the way data is publicly accessible and presented, additional evidence may come to light with other searches.

<sup>445</sup> Summary table of the EU public funding measures discussed below. Initiatives from Interreg Europe were not included as recipients are local public authorities rather than private market players. National public support measures were also not included as data granularity does not allow for a view of total grant amounts allocated to each company. "0" means the company did not receive any contribution from the specific source.

<sup>446</sup> CEF grants have been assumed to be split equally among all beneficiary firms within each project



based on a variable cost expressed in €/kWh and determined by ARERA, thus excluding any fixed cost. It was developed to support the installation of new recharging points, as the lack of a fixed price component made it most convenient at a small scale.<sup>447</sup> However, the tariff was devised on the assumption that the break-even utilisation rate for recharging stations was 6%. In practice, public recharging stations have an average utilisation of 1.5% in Italy, making the tariff a direct subsidy to CPOs.<sup>448</sup>

- National Plan for Electric Vehicle Recharging Infrastructure (2018): launched in 2016, the PNIRE was allocated a total budget of €50m to support the development of eMobility in the country. The funds were assigned to regional authorities which in turn financed local projects across municipalities via the provision of grants. As specified by previous laws, financial support was provided based on “programme agreements” between regional authorities and the Ministry of Infrastructure and Transport. Partner companies to implement projects were selected via competitive tendering processes. Overall, by 2018 a total of €28m in grants were allocated to regions for the installation of recharging infrastructure. However, the low level of available data granularity as well as the difference between implementation procedures at the local level do not allow to determine which firms benefitted from these grants.<sup>449</sup>
- National Recovery and Resilience Plan: introduced in 2021 but yet to be fully implemented, the Plan allocated €740m to the rollout of EV recharging infrastructure. Total funds are aimed at the installation of EV recharging infrastructure in non-urban areas (€360m) and in urban centres (€353m).<sup>450</sup> The plan aims to install 21k fast and ultra-fast recharging points, 14k of which in urban centres and 7.5k of which along extra-urban roads, in addition to 100 recharging stations equipped with energy storage facilities.<sup>451</sup> While the allocation of funds within the Plan has for the most part yet to occur, in May 2022 the Italian government provided a €21.1m grant to Poste Italiane, the state-owned postal services company, for the installation of 5k public recharging stations across 2.1k small municipalities in the country. While Poste Italiane will own the infrastructure, a third-party CPO will be selected based on a competitive tendering process. The measure was approved by the European Commission under EU State aid rules.<sup>452</sup>
- Subsidiary measure for local authorities to incentivise the deployment of EV recharging infrastructure across the Lombard territory: introduced in 2021 with a total budget of €10.1m, the scheme provided grants to cover up to 100% of the planning, purchase, installation and grid connection costs of publicly accessible recharging points.<sup>453</sup> The measure, which will last until 2023, is aimed at local authorities and public institutions, which are then required to select a CPO to install and manage recharging points. While CPO selection procedures are not specified, the local authorities benefitting from the grant are required to maintain ownership over the recharging infrastructure for at least three years, with the possibility to then sell it at market value.<sup>454</sup> Each project can receive grants up to €200k.<sup>455</sup> The

<sup>447</sup> Italian Authority for the Regulation of Energy Networks and the Environment, “Decision ARG/let 242/10”, December 2010

<sup>448</sup> Study interview, Italian Authority for the Regulation of Energy Networks and the Environment, December 2022

<sup>449</sup> Official Legislative Gazette of the Republic of Italy, “Decree 26<sup>th</sup> September 2014”, September 2014

<sup>450</sup> Economia Circolare, “From MITE €741m for the installation of EV rechargers”, May 2022

<sup>451</sup> Italian Competition and Market Authority, “Weekly Bulletin n.51”, December 2021

<sup>452</sup> European Commission, “State aid: Commission approves €21.1 million Italian measure to support Poste Italiane in deploying recharging infrastructure”, May 2022

<sup>453</sup> Lombardy Region, “Subsidiary measure for local authorities to incentivise the deployment of EV recharging infrastructure across the Lombard territory”, November 2021

<sup>454</sup> Lombardy Region, “Tender EV recharging infrastructure for public institutions 2022”, November 2021

<sup>455</sup> Ibid.



State aid measure was implemented under article 36.a of the General Block Exemption Regulation (GBER), a more detail discussion of which can be found in Appendix D.<sup>456,457</sup>

### **EU public support**

#### **EIB**

- Loan to Enel X: provided in 2018, the total loan amount of €50m was aimed at supporting the installation of approximately 14k recharging stations across Italy in the period from 2018 to 2022.<sup>458</sup>
- Loan to Be Charge: provided in 2019, the total loan amount of €25m was aimed at supporting the installation of 3.7k recharging points across Italy in the period from 2019 to 2024.<sup>459</sup>
- Loan to Duferco: provided in 2019, the total loan amount of €20m was aimed at supporting the installation of 1.8k recharging points in Northern and Central Italy in the period from 2020 to 2024.<sup>460</sup>

#### **CEF**

- Unit-E: started in 2014, the project was aimed at the installation of 38 fast recharging stations across four countries, 4 of which are in Italy, in the period from 2015 to 2018. Electricite de France (EDF) was the project coordinator and Italian partners included ABB. The initiative was awarded a €1.7m grant from the CEF.<sup>461</sup>
- EVA+ Electric Vehicles Arteries in Italy and Austria: begun in 2015, the project was aimed at the installation of 200 fast rechargers across Italy and Austria in the period from 2016 to 2019. Enel was the project coordinator. The initiative was awarded a €4.1m grant from the CEF.<sup>462</sup>
- E-Via Flex-E Mobility: launched in 2016, the project was aimed at the installation of 14 ultra-fast recharging stations across Italy, France and Spain in the period from 2017 to 2022. Enel X was the project coordinator. The initiative was awarded a €3.4m grant from the CEF.<sup>463</sup>
- Central European Ultra Charging: launched in 2017, the project was aimed at the installation of 118 ultra-fast recharging stations across Italy, Austria, Czechia, Romania and Slovakia in the period from 2018 to 2022. Verbund was the project coordinator and other beneficiaries included Enel X. The initiative was awarded a €6.1m grant from the CEF.<sup>464</sup>
- Ambra Electrify Europe: launched in 2017, the project is aimed at the installation of 3.2k recharging stations across Italy, Romania and Spain in the period from 2018 to 2024. Enel X is the project coordinator and only beneficiary. The initiative was awarded a €14.1m grant from the CEF.<sup>465</sup>

<sup>456</sup> European Commission, "Competition Policy: State Aid Register"

<sup>457</sup> No information emerged from desk-based research on the CPOs selected to deploy EV recharging infrastructure

<sup>458</sup> European Investment Bank, "Enel Open Power EV Charging Network", February 2018

<sup>459</sup> European Investment Bank, "EV Recharging Italy", May 2019

<sup>460</sup> European Investment Bank, "EV Smart e-Charging Network", May 2020

<sup>461</sup> Innovation and Network Executive Agency, "Unit-E", April 2022

<sup>462</sup> Innovation and Network Executive Agency, "EVA+ (Electric Vehicles Arteries in Italy and Austria)", April 2022

<sup>463</sup> Innovation and Network Executive Agency, "E-VIA – FLEX-E mobility", April 2022

<sup>464</sup> Innovation and Network Executive Agency, "Central European Ultra Charging", April 2022

<sup>465</sup> Innovation and Network Executive Agency, "Ambra Electrify Europe", April 2022

- Multi-E Multiple Urban and Long-distance Transport Initiatives: launched in 2017, the project is aimed at the installation of 24 ultra-fast public rechargers and 349 public AC rechargers across Croatia, Italy, Slovenia and Slovakia in the period from 2019 to 2023. Petrol is the project coordinator. The initiative was awarded a €12.9m grant from the CEF.<sup>466</sup>
- CRE8 Creating the station of the future: started in 2017, the project was aimed at the installation of 26 EV fast recharging stations across Italy in the period from 2018 to 2022. Kuwait Petroleum was the project coordinator and only beneficiary. The initiative was awarded a €3.1m grant from the CEF.<sup>467</sup>
- EV Charging Italy: launched in 2019, the project is aimed at the installation of 1.1k recharging points across Italy in the period from 2020 to 2024. Be Charge is the project coordinator and only beneficiary. The initiative was awarded a €5.4m grant from the CEF.<sup>468</sup>
- A2A e-Moving Network Infrastructure: launched in 2019, is aimed at the installation of 0.5k recharging points with capacities above 50 kW across Italy in the period from 2021 to 2024. A2A Mobility was the project coordinator and the only beneficiary. The initiative was awarded a €1.7m grant from the CEF.<sup>469</sup>
- Development of Smart e-Charging in Italy: launched in 2019, the project is aimed at the installation of 1.8k recharging stations across Italy in the period from 2020 to 2023. Duferco was the project coordinator and only beneficiary. The initiative was awarded a €2.1m grant from the CEF.<sup>470</sup>
- EV Stations 2.0: launched in 2019, the project is aimed at the installation of 90 fast recharging points and 90 ultra-fast recharging points across Italy in the period from 2020 to 2024. Italiana Petroli is the project coordinator and only beneficiary. The initiative was awarded a €3.7m grant from the CEF.<sup>471</sup> While Italiana Petroli does not operate as CPO, no visibility is available on CPO firms involved in the project.

#### Interreg Europe

- MobiTour: started in 2016, the project was financed via a €1.1m grant from Interreg Europe. The initiative was aimed at the enhancement of alternative fuels infrastructure in touristic areas along the coasts of Italy and Slovenia.<sup>472</sup> In total, five pilot projects for the deployment of EV recharging infrastructure in parking locations were conducted. Two Italian municipalities, Caorle and Lignano, as well as the Institute for International Sociology of Gorizia were the beneficiaries of the funds.<sup>473</sup>
- Smisto, Development of Integrated and Sustainable Mobility between Ticino and Lombardy: launched in 2016, the project was awarded a €1.4m grant from Interreg Europe, entirely financed by the ERDF. The initiative was aimed at the improvement of public transport and sustainable mobility options between northern Italy and Switzerland.<sup>474</sup> In total, two public EV recharging stations were installed. The

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<sup>466</sup> Innovation and Networks Executive Agency, "MULTI-E: Multiple Urban and Long-distance Transport Initiatives – Electric and CNG", October 2022

<sup>467</sup> Innovation and Network Executive Agency, "CRE8 Creating the station of the future", April 2022

<sup>468</sup> Innovation and Network Executive Agency, "EV Charging Italy", April 2022

<sup>469</sup> Innovation and Network Executive Agency, "A2A e-Moving Network Infrastructure", April 2022

<sup>470</sup> Innovation and Network Executive Agency, "Development of Smart e-Charging Services in Italy", April 2022

<sup>471</sup> Innovation and Network Executive Agency, "EV Stations 2.0 – Building up the next generation infrastructures for Electric Vehicles", April 2022

<sup>472</sup> CRA analysis

<sup>473</sup> Interreg Italy-Slovenia, "MobiTour"

<sup>474</sup> Interreg Italy-Switzerland, "Smisto" Interreg Italy-Switzerland, "Smisto"

project's beneficiaries included local transport agencies from Lombardy and Ticino as well as regional authorities of Lombardy.<sup>475</sup>

### EV purchase subsidies

- EV purchase grant: first introduced in the period between 2013 and 2015, the grant was then suspended until 2019. The amount provided varied between years, going from €6k for the purchase of a car with fewer emissions than 20 gCO<sub>2</sub> /km with the scrappage of the old car in 2019, to €5k in 2022 (€3k without scrappage).<sup>476</sup> In 2022, a further grant of €4k (€2k without scrappage) was introduced for cars with emissions between CO<sub>2</sub> 21-60 g/km.<sup>477</sup> An additional incentive of €2k for the purchase of EVs and PHEVs was launched in 2021.<sup>478</sup>

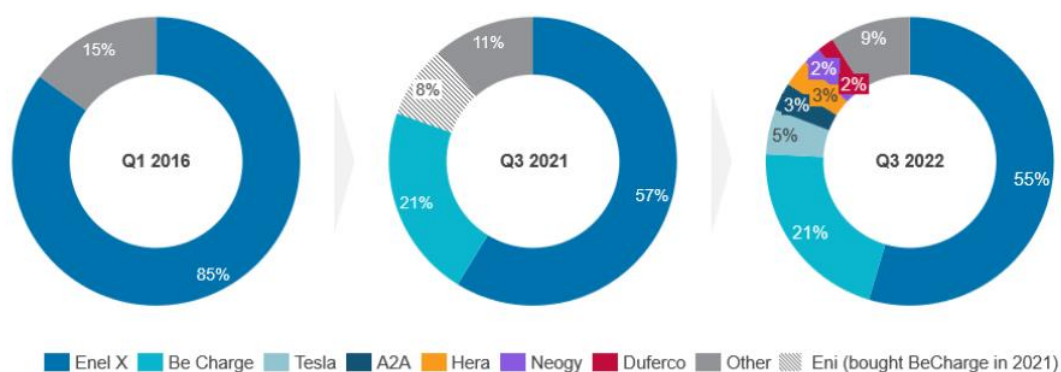
### EV Tax benefits

- Circulation tax exemption: introduced in 2017, provides EVs with an exemption from the annual circulation tax (ownership tax) for the first five years after their registration. After this five-year period, EVs benefit from a 75% reduction of the tax rate applied to the equivalent petrol vehicles.<sup>479</sup>

## 7.2.5. CPO shares in Italy and evolution over time

As outlined in the Italy country summary in Appendix A the Italian market kicked off in 2011 when Enel (a fully integrated electricity utility that is partially owned by the Italian government) installed several recharging points throughout the country. Enel, or more recently under their re-brand, Enel X have continued to operate more than 50% of rechargers throughout Italy, but now with other players, such as Be Charge, gaining share. The key CPOs operating in the Italian market can be seen in the breakdown of market players in Figure 36.

**Figure 36: Italy CPO share by installed recharging points<sup>480</sup>**



The data in the Figure above is correct as of October 2022 and gives the most accurate current share breakdown based on data availability and quality. This picture has however evolved over the past years following the entry of other market participants such as Be Charge, A2A and Hera. While the historical industry data available does not

<sup>475</sup> CRA analysis

<sup>476</sup> European Automobile Manufacturers Association, "Electric Vehicles: Tax Benefits & Incentives in the EU", September 2019

<sup>477</sup> European Automobile Manufacturers Association, "Electric Vehicles: Tax Benefits & Incentives in the EU", September 2022

<sup>478</sup> European Automobile Manufacturers Association, "Electric Vehicles: Tax Benefits & Incentives in the EU", November 2021

<sup>479</sup> European Automobile Manufacturers Association, "Electric Vehicles: Tax Benefits & Incentives in the EU", August 2017

<sup>480</sup> CRA Analysis: The 2022 picture was developed based on the data gathering methodology presented in Appendix F The 2016 and 2021 pictures are indicative and based on desk-based research and CRA analysis – these views have a lower level of absolute confidence and are more indicative

allow for a year-by-year share evolution analysis, there are some key data points that highlight trends over time. Specifically:

- In June 2017, Enel X had approximately 850 recharging stations (each with 2 recharging points) and at the time there were approximately 2k recharging points across the country. It was also known that A2A and Duferco had approximately 100 recharge points each.<sup>481</sup>
- By December 2021, Enel X claimed to have 13k public recharging points,<sup>482</sup> Be Charge had 5k<sup>483</sup> and Eni had 2k.<sup>484</sup> At the time Italy had approximately 23.5k recharging points.

These prominent market participants have each emerged from different areas of the ecosystem, some from the utilities segment, others from the OEM segment and some as pure eMobility companies. In Table 23 below, an overview of each company's legal structures and ownership dynamics is provided.

**Table 23: CPO and eMSP legal structure and key services detail (October 2022)**<sup>485</sup>

Firm	Number of rechargers	CPO share	Type of player (legal structure)	Key CPO services	Interoperability and openness of access
Enel X	16,529	55%	Fully integrated CPO and eMSP, subsidiary of fully integrated electricity utility	On-route, destination, on street	Bilateral agreements with other eMSPs, roaming with Hubject, ad hoc via pay-as-you-go
Be Charge	6,420	21%	Fully integrated CPO and eMSP owned by oil and gas major	On-route, destination, on street	Bilateral agreements with other eMSPs, roaming, ad hoc via pay-as-you-go
Tesla	1,602	5%	Fully integrated CPO and eMSP, and automotive OEM	On-route, small amount of destination	No bilateral or roaming agreements, access only via Tesla app (open as part of pilot program), ad hoc via pay-as-you-go
A2A	958	3%	Fully integrated CPO and eMSP owned by regional state utility	On-route, destination, on street	Bilateral agreements with other eMSPs, roaming, ad hoc via pay-as-you-go
Hera	938	3%	Fully integrated CPO and eMSP owned by regional multi-utility	On-route, destination, on street	Bilateral agreements with other eMSPs, roaming, ad hoc via pay-as-you-go

<sup>481</sup> Al Volante.it, "Electric cars, guide to recharging in Italy", June 2017

<sup>482</sup> Enel X, "E-mobility: Enel X, Be Charge and Eni in synergy for electric vehicle charging", December 2021

<sup>483</sup> Be Power, "The acquisition of Be Power s.p.a. by Eni, an important transaction that marks a further step towards the development of the charging network in Italy and Europe", August 2021

<sup>484</sup> Enel, "E-mobility: Enel X, BeCharge and Eni in synergy for electric vehicle charging", December 2021

<sup>485</sup> CRA analysis

Firm	Number of rechargers	CPO share	Type of player (legal structure)	Key CPO services	Interoperability and openness of access
Neogy	650	2%	Fully integrated CPO and eMSP partially owned by regional public utility	On-route, destination, on street	Bilateral agreements with other eMSPs, roaming, ad hoc via pay-as-you-go
Duferco	577	2%	Fully integrated CPO and eMSP owned by steel and utility company	On-route, destination, on street	Bilateral agreements with other eMSPs, roaming, ad hoc via pay-as-you-go
Other	2,599	9%	Small players with <1% share	--	--
Total	30,273	100 %	--	--	--

Enel X, the eMobility pure play owned by utility Enel, accounts for 55% of Italy's EV recharging points. The second key player is Be Charge with just over 20%, and Tesla is third with 5%. A high number of smaller players follow with 3% share or below. Interoperability is also a major focus in the Italian market, and while CPOs often also act as an eMSP, consumers have access to most rechargers in the country via roaming hubs (e.g., Hubject has close to 100% coverage and has partnered with both leading CPOs) and bilateral agreements (e.g., A2A partnered with Enel X in January 2022).<sup>486</sup>

## 7.2.6. Key CPO/eMSP players in Italy

### **Enel X**

Enel X is the largest CPO in Italy, holding a share of 55% of public recharging points, and acting as an integrated CPO and eMSP. They are an energy services provider offering slow, fast and ultra-fast recharging services, as well as other solutions such as distribution systems and energy storage technologies. Enel X is a subsidiary of the global energy company Enel, which also operates across other areas of the energy sector including power generation, electricity distribution and power retail. Enel, including Enel X, operates globally with a footprint in 30 countries across five continents.<sup>487</sup> Enel X was founded in 2017. Prior to that Enel operated their share of Italian recharging points under the Enel Drive brand since approximately 2010.

Enel was first founded in 1962 as Italy's national entity for electricity and was a public body until the reform and privatisation of the Italian electricity market in 1999.<sup>488</sup> Currently the Ministry of Economy and Finance remains Enel's main shareholder with 23.6% of the share capital.<sup>489</sup> Although the state monopoly was opened up to competition when the market was liberalised, Enel has retained a strong position in Italian electricity supply and distribution. Just last year, Italian antitrust authorities found that Enel may be in violation of the EU's antitrust laws due to accusations that it

<sup>486</sup> Pierluigi Sandonnini, "Which are the CPOs in Italy and which ones practice interoperability", April 2022

<sup>487</sup> Enel, "Company Profile"

<sup>488</sup> Enel, "Our history, our future", September 2016

<sup>489</sup> Enel, "Shareholders", December 2021

was abusing its leading position to keep new businesses from entering the electricity retailing market and getting customers to stay with Enel.<sup>490</sup>

Founded in 2017, Enel X's portfolio offering extends beyond eMobility and covers a broad range of energy solutions/services in areas such as demand response, smart homes, financial services and telecoms.<sup>491</sup> More specifically regarding eMobility, in April 2022, Enel Group announced a new global business line dedicated to electric mobility, Enel X Way, which is focussed on the provision and operation of public recharging infrastructure.<sup>492</sup> JuicePass, provides EV users access to Enel X's network of approximately 250k recharging points across Europe.<sup>493</sup>

As of August 2022, Enel X had set up (and owns) more than 16k recharging points in Italy and has access to a further 13k recharging points<sup>494</sup> via bilateral interoperability agreements with companies such as Be Charge and A2A.<sup>495,496</sup> In order to access these recharging points, EV users must enrol in a subscription program via the JuiceWallet app as described below.

**Table 24: Enel X Pricing Model<sup>497</sup>**

Pay-as-you-go	Subscription
Pay Per Use Basic: payment at the end of the session. The price for Pay Per Use varies depending on recharging station.	Flat Small: fixed fee of € 25.00 / month (VAT and taxes included) for a total energy consumption of 70 kWh. (If threshold is exceeded before the monthly renewal, for any further recharging session the tariff plan will follow the Pay per Use Basic tariff plan. Flat Small also includes unlimited booking service.)
Pay Per Use Premium: payment at the end of the single session. €25 annual fee to allow unlimited recharging point booking. The price for Pay Per Use varies depending on recharging station.	Flat Large: fixed fee of € 45.00 / month (VAT and taxes included) for a total energy consumption of 145 kWh. (If threshold is exceeded before the monthly renewal, for any further recharging session the tariff plan will be enhanced to the Pay per Use Basic tariff plan. Flat Large also includes unlimited booking service.)
Fees: Additional fees of €0.09 / minute for AC plugs and €0.18 / minute for DC plugs are applied for not releasing the plug at the end of the recharging session.	

In December 2017, Enel X kicked off its E-VIA FLEX-E mobility project, for the installation of 14 ultra-fast recharging stations in Italy, France and Spain. This project was coordinated by Enel and co-financed by the European Commission via a grant from its CEF initiative.<sup>498</sup>

Shortly after this, in July 2018, the EIB agreed to work alongside Enel X in financing approximately 14k recharging stations in Italy over the period between 2018 and 2022.

<sup>490</sup> Courthouse News Services, [Court adviser eyes clarifying antitrust laws in Italy electricity dispute](#), December 2021

<sup>491</sup> Enel X, "Company Overview", March 2021

<sup>492</sup> Enel X, "Enel X Way: a global provider of integrated solutions for e-mobility", April 2022

<sup>493</sup> Enel X Way, "Charging Stations"

<sup>494</sup> Enel, "E-mobility: Enel X Way and E-GAP bring on-demand charging to major Italian tourist destinations", August 2022

<sup>495</sup> Enel, "E-mobility: Enel X, Be Charge and Eni in synergy for electric vehicle charging", December 2021

<sup>496</sup> Enel, "E-mobility: Enel and A2A sign agreement on interoperability between charging networks", January 2022

<sup>497</sup> Enel X Way, "Charging FAQs: What fees are available for the public charging service?"

<sup>498</sup> Enel, "Enel kicks off the "E-VIA FLEX-E" project for the installation of ultra-fast charging stations...", December 2017



Enel X received approximately €50m of EIB financing, which was expected to cover approximately 25% of the total investment requirement.<sup>499</sup>

More recently, in February 2020, Enel X secured further funding for the AMBRA-Electrify Europe project it was coordinating. The project was aimed at deploying 3k recharging stations in Italy, Spain, and Romania by 2022, envisaging a total investment of €70.8m shared amongst Enel, the European Commission, and the EIB. Funding was provided by the European Commission for this purpose, channelled through the CEF and the EIB. The CEF grant was listed as being approximately €14.2m, and the EIB's unspecified share came from the loan described above.<sup>500</sup> Overall, Enel X was involved in several CEF projects between 2016 and 2022, which positioned the company as main beneficiary from CEF grants in Italy over this period.<sup>501</sup>

Italy has ambitious targets for recharging point infrastructure, aiming to install 135k points by 2024 and Enel could play a role in this growth based on their existing network of recharging points and ambitions to further expand. Enel is working with local authorities, such as the Sardinia Regional Council, and partnering with companies such as those listed below:

- McDonald's Italia (the Italian subsidiary of the publicly listed American fast-food chain) partnered with Enel X with the target of installing 200 recharging points inside the 100 McDonald's car parks across Italy by 2022.<sup>502</sup>
- IONITY (the pure play on-route recharging company founded by a consortium of OEMs) signed an e-mobility cooperation agreement with Enel X to install up to 20 IONITY recharging sites by the end of 2019. Enel provided IONITY with a turnkey solution whereby Enel X scouted for the sites, procured, and installed the recharging stations on each site, and maintained the stations.<sup>503</sup>
- IP Gas Stations (the Italian brand of refuelling forecourts owned by Gruppo Api) partnered with Enel X to install ultra-fast recharging points at seven of its refuelling forecourts by 2022.<sup>504</sup>
- Volkswagen (German OEM) partnered with Enel X in 2021 on a joint venture to deploy and operate more than 3k high power (ultra-fast) recharging points in Italy.<sup>505</sup> During the same year the Italian Competition Authority (ICA) opened an investigation against a proposed joint venture between Enel X and Volkswagen, warning that it could reduce competition and hurt consumers. The ICA ended up approving the joint venture.<sup>506</sup>

## Be Charge

Be Charge is the second largest recharging point operator in Italy with a 21% share acting as an integrated CPO and eMSP.<sup>507</sup> Be Charge is a subsidiary of energy transition company Be Power that was acquired in August 2021 by Eni Gas e Luce (rebranded as

<sup>499</sup> European Investment Bank, "ENEL OPEN POWER EV CHARGING NETWORK", July 2018

<sup>500</sup> Enel, "Enel X teams up with the European Commission and EIB...", February 2020

<sup>501</sup> EU Public Support measures to EV recharging firms in Italy are discussed in Section 7.2.4

<sup>502</sup> Enel, "McDonald's Italia meets Enel X", November 2020

<sup>503</sup> Enel, "Enel teams up with IONITY to build the first network of ultra-fast 350 kW charging stations in Italy", May 2018

<sup>504</sup> Enel, "Enel X and IP: the first ultrafast charging stations of the European E-VIA FLEX-E project are now operational in Italy", January 2021

<sup>505</sup> Volkswagen AG, "Enel X and Volkswagen team up for electric mobility in Italy", July 2021

<sup>506</sup> Michele Giannino, "The Italian competition authority approves without conditions a joint venture in the sector for green mobility (Enel X / Volkswagen finance Luxembourg)", December 2021

<sup>507</sup> Plenitude & Be Charge, "Be The Change, Be Electric", June 2022



Plenitude in 2022), a subsidiary of the Eni Group, an Italian multinational oil and gas company with a network of refuelling stations across Italy and throughout Europe.<sup>508</sup>

Be Power S.p.A (including its Be Charge subsidiary) was founded in 2018 and has steadily grown its number of recharging points over the years that followed, amassing over 5k public recharging points by mid-2021. It was then, in August 2021, that Be Power was acquired by Eni Gas e Luce (now Plenitude), strengthening its existing portfolio of retail customers and power generation capacity. As of June 2022, Be Charge has installed approximately 7k recharging points (the majority of these in Italy but it is also active in 8 other European countries) and is aiming to install approximately 30k points across the continent by 2024.<sup>509</sup>

As with many other CPOs, Be Charge offers a variety of subscription-based, pay-as-you-go rates for its EV users, as well as prepaid packages that can be credited to one's account on the Be Charge app. These are summarised below:

**Table 25: Be Charge Pricing Model<sup>510</sup>**

Pay-as-you-go	Subscription	Prepay cards
Quick (AC): Offers up to 22kW speeds at €0.60/kWh	Be Light 50: 50 kWh usage at a cost of €20 per month	Prepay cards for users who recharge their vehicle less often. These cards cost between €50, €100 or €150 and the real value of the card has a bonus (e.g., a card costing €50 would have a value of €53).
Fast (DC): Offers up to 99kW speeds at €0.85/kWh	Be Regular 100: 100 kWh usage at a cost of €38 per month	
Fast+ (DC): Offers up to 149kW speeds at €0.90/kWh	Be Large 250: 250kWh usage at a cost of €90 per month	
Ultrafast (DC): 150kW+ speeds at €0.95/kWh	Be Electric 500: 500kWh usage at a cost of €175 per month	
Fees: 60 minutes of free parking then EV drivers will be charged an idle penalty: on Quick columns 0.05€/min and on Fast, Fast+ and Ultra-fast columns 0.18€/min		

In December 2019, Be Charge secured support from the EIB in the form of a €25m 10-year loan facility via the CEF and the NER 300 programme.<sup>511</sup> Also, more recently in September 2022, Be Charge was one of 24 projects selected by the European Commission to receive a non-repayable grant. At this stage it is unclear how large the grant is or for what specific purpose it is to be used.<sup>512</sup>

In 2018, Eni also announced a framework agreement with IONITY (the pure play on-route recharging company founded by a consortium of OEMs). The agreement aimed at electrifying thirty of Eni's ICE fuel stations in Italy, each offering six 350 kW chargers.<sup>513</sup>

<sup>508</sup> Eni, "Eni acquires Be Power and expands electric charging services offering in Italy and Europe", August 2021

<sup>509</sup> Plenitude & Be Charge, "Be The Change, Be Electric", June 2022

<sup>510</sup> Be Charge, "Rates"

<sup>511</sup> European Investment Bank, "Italy: E-Mobility: EIB to support Be Charge for charging network expansion", December 2019

<sup>512</sup> Eni, "The European Commission select Be Charge to build one of the largest high-speed charging...", September 2019

<sup>513</sup> electrive, "High power charging network IONITY coming to Italy", October 2018

## Tesla

Tesla currently have 5% share, acting as a fully integrated CPO and eMSP. As identified within this report, Tesla is a global EV OEM that also provides its own recharging infrastructure.

Tesla entered Italy in 2014 and has grown its network of on-route high power rechargers that are strategically placed along Italian highways. Notably they opened one of Europe's largest Supercharger stations in Italy in 2015, located at one end of the Mount Blanc tunnel and thus useful for cars coming from and heading to France.<sup>514</sup>

Historically, its network was closed to any vehicle that was not a Tesla, both from a physical recharging connector, and digital access perspective. However, as part of the pilot mentioned earlier in this report that opened the Tesla Supercharger network to other OEM brands across 15 European countries, some but not all Supercharger locations in Italy have been opened to non-Tesla brands.<sup>515</sup>

As with all Tesla Supercharger stations, specific real-time pricing for each site is shown on the selected recharging station. However, Tesla do provide indicative prices through the Tesla app for both Tesla owners, and for non-Tesla owners following the introduction of the pilot scheme. Idle fees are also charged at €0.50/minute after the recharge has completed, or €1.00/minute if the station is 100% occupied.<sup>516</sup>

## A2A

A2A is one of the smaller CPOs in Italy with a share of approximately 3% acting as an integrated CPO and eMSP. As of 2021, A2A was owned by the Municipality of Milan (25%), the Municipality of Brescia (25%), and other shareholders or the public market (50%).<sup>517</sup> Founded in 2008, A2A was formerly a pure utility operator in Italy, generating, distributing, and marketing electricity, gas, water and wastewater.<sup>518</sup> Since 2010, it has been developing its EV recharging network and expects its network to grow significantly over the next 10 years.<sup>519</sup> For mobility segments that will not have an evolution towards electricity, such as heavy transport, A2A is pursuing solutions such as green hydrogen and bio-LNG.<sup>520</sup> A2A operates the majority of its recharging points in the Lombardy region.

A2A recently updated its strategic plan noting that it expects to grow its EV recharging business to 24k recharging points by 2030, a significant increase against the original target of 6k recharging points.<sup>521</sup> A2A offers eMobility solutions to retail customers, business customers, and infrastructure providers e.g., car parks; synergising well with its existing utility structure. For its public recharging infrastructure, A2A has developed its E-moving app, which can be used to access A2A's full recharging network and associated rates.<sup>522</sup> As with the other main players in the market, A2A offers subscription based and pay-as-you-go rates to its EV users as described below.

<sup>514</sup> Lifegate, "Tesla opens Europe's largest Supercharger in Italy", June 2015

<sup>515</sup> electrive, "Tesla Superchargers open to third parties in Italy", November 2022

<sup>516</sup> Tesla, "Supercharger Idle Fee"

<sup>517</sup> A2A, "Shares", December 2021

<sup>518</sup> A2A, "What We Do"

<sup>519</sup> A2A, "Company Profile", 2022

<sup>520</sup> Global Happenings, "A2A: Target of 24 thousand electric vehicle charging points", January 2022

<sup>521</sup> A2A, "Strategic Plan 2021-30 Update", January 2022

<sup>522</sup> A2A, "E-moving"

**Table 26: A2A Pricing Model<sup>523</sup>**

Pay-as-you-go	Subscription
For Isole Digitali and Quick columns: €0.56/kWh	E-Moving Small: 30 kWh for €16 per month
For Fast columns: €0.66/kWh	E-Moving Medium: 80 kWh for €29 per month
For Ultra-Fast columns: €0.79/kWh	E-Moving Large: 180 kWh at €60 per month

In terms of funding support, A2A received a CEF grant in 2019 for its A2A E-moving network infrastructure programme, which aims to deploy 552 recharging points across urban areas in Northern Italy. These recharging points have been installed since January 2021 and the programme is expected to be completed by December 2024. The overall cost of the programme was approximately €11million and the CEF contribution was 15% or approximately €1.7m.<sup>524</sup>

As mentioned above, in January 2022 A2A signed an interoperability agreement with Enel X. The partnership will give users of A2A's E-moving app and Enel's JuicePass app access to the two companies' recharging facilities, increasing A2A accessible network significantly.

### **Hera**

Hera Group have approximately 3% share in Italy acting as an integrated CPO and eMSP. Hera Group are a publicly owned multi-utility company that provides energy, waste management services, as well as public lighting and telecommunications services.<sup>525</sup> They are controlled by a syndicate agreement to which 111 Municipalities adhere, with Bologna, Modena, Imola, Ravenna, Trieste, Padua and Udine being noted as relevant shareholders.<sup>526</sup> With respect to eMobility, it started in approximately 2010, offering a variety of services for both public and private purposes such as public rechargers, private home rechargers, E-Bikes, and E-Scooters.<sup>527</sup> Hera operates the majority of its recharging points in the northeast region of Italy.

Specifically for public recharging, its HeraRecharge service can be paid for by consumers through either of the following models:

**Table 27: Hera Pricing Model<sup>528</sup>**

Pay-as-you-go	Subscription
Consumption offer which costs €2/month and all consumption costs are charged at €0.64/kWh	Flat offer which costs €20/month and includes 40kWh of usage (with any usage beyond this costing €0.64/kWh)
Idle Fees: After 60 minutes from the end of the recharge, if the vehicle is still connected to the plug of the recharge point, the EV driver will be charged up to €0.15/minute.	

<sup>523</sup> All Info, "Electric cars, how much does it cost to recharge in Italy?", October 2022

<sup>524</sup> European Commission, "A2A E-moving network infrastructure", April 2022

<sup>525</sup> Hera Group, "Who we are"

<sup>526</sup> Consob, "Listed Companies - Hera SPA - Shareholders", December 2022

<sup>527</sup> Hera Group, "Our services in electric mobility"

<sup>528</sup> Hera Group, "Tariffs"

## Neogy

Neogy have 2% share and operate as an integrated CPO/eMSP. Neogy was established in 2019 and is a joint venture between two fully integrated energy providers in the Trentino-Alto Adige region, Alperia and the Dolomiti Energia Group.<sup>529 530 531</sup> Neogy claims that all recharging sessions are solely fuelled by renewable energy, and this is the main appeal to its customer base. Neogy is only present in the Trentino-Alto Adige region of Northern Italy, where it operates approximately 40% of recharging points. Neogy customers (or customers recharging at a Neogy recharge point via a roaming agreement through Hubject) can pay for the sessions using the app or the pre-paid RFID card at the following rates:

**Table 28: Neogy Pricing Model<sup>532</sup>**

Pay-as-you-go	Subscription	Prepay cards
€35 one off activation fee then:	N/A	Prepay cards available at the South Tyrol tourist office at either 80kWh or 40kWh access – option geared at tourists.
Neogy Quick (AC) €0.65/kWh		
Neogy Fast and Hyper (DC) €0.89/kWh		
Roaming (AC) €0.73/kWh		
Roaming (DC) €0.89/kWh		
Fees: Following the completion of a recharge customers have 60 minutes to disconnect their vehicle. After that AC stations will incur a €0.08 /min; and DC stations a €0.15/min charge.		

## Duferco

Duferco Energia commands approximately 2% of the market acting as an integrated CPO/eMSP. Duferco is a privately held utility that produces and distributes electricity and gas to its residential, commercial, and industrial sector customers, as well as producing steel and extracting raw materials. It also has been offering energy efficiency and eMobility solutions to its customers since 2014.<sup>533</sup> Duferco already has approximately 650 recharging points and offers a large network of recharging points to its customers through bilateral agreements with players such as Be Charge.<sup>534,535</sup> Duferco operates the majority of its recharging points in the Northern region of Italy. Duferco offers pay-as-you-go, subscriptions and prepaid cards as summarised below.

<sup>529</sup> Neogy, "Who we are", 2022

<sup>530</sup> Dolomiti Energia, "Who we are", 2022

<sup>531</sup> Alperia, "Who we are", 2022

<sup>532</sup> Neogy, "Subscription based on consumption", 2022

<sup>533</sup> Duferco Energia, "Duferco Energia"

<sup>534</sup> L'edizione online di Tribuna Economica, "€26 million to Duferco to strengthen national electric charging network", March 2022

<sup>535</sup> Be Power, "Be Charge and Duferco Energia activate the interoperability of their...networks", March 2021

**Table 29: Duferco Pricing Model<sup>536</sup>**

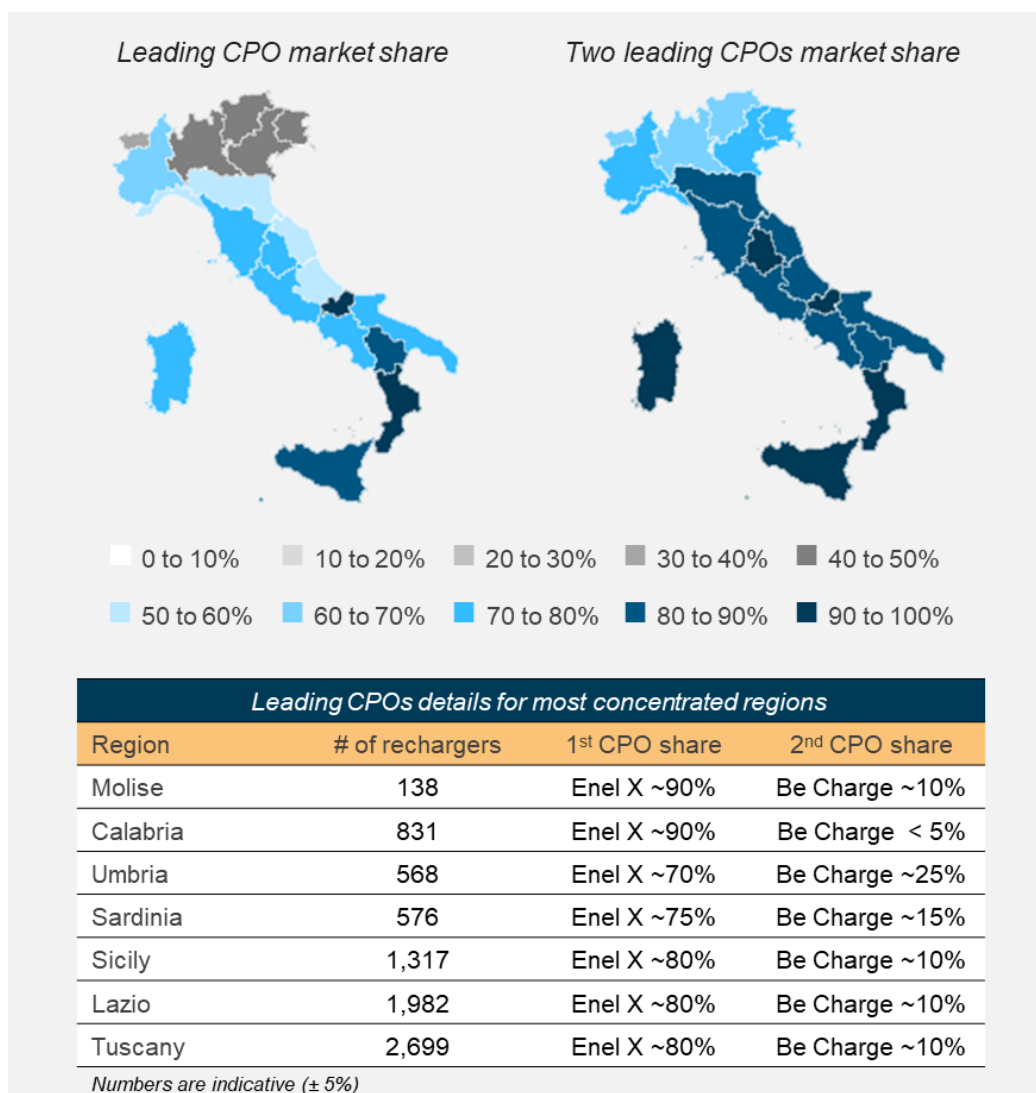
Pay-as-you-go	Subscription	Prepay cards
Slow and Fast columns up to 50 kW of power cost €0.65/kWh	Flat rate of €129 for 200kWh usage per month	Prepaid cards valid for three months and redeemable at Quick and Fast recharging points (up to 50 kW of power):
Ultra-Fast columns over 50 kW of power cost €0.79/kWh		100 kWh for €65 150 kWh for €95 400 kWh for €249

In March 2022, Duferco Energia entered a €26m finance contract with Cassa Depositi e Prestiti (CDP), Credit Agricole Italia (CAI), and the EIB. Both the CDP and CAI will provide €13m credit lines, which benefit from €10m of funding from the EIB each. The investment will support the deployment of 1.8k new public recharging stations in Italy which will be coordinated by Duferco.

### 7.2.7. Regional dynamics in Italy

As depicted in Figure 37, Enel X remains the key player in most of the country – especially in the regions with the highest CPO concentration. Specifically, Enel X has a share equal to, or more than, 50% in 15 out of the 19 regions. However, the Northern regions, where both EV adoption and EV rechargers are more prominent, are significantly less concentrated.

<sup>536</sup> All Info, “Electric cars, how much does it cost to recharge in Italy?”, October 2022

**Figure 37: CPO concentration across Italian regions (October 2022)**<sup>537</sup>

In Lombardy (home to 17% of rechargers and 18% of Italian residents), the segment is fairly fragmented with Enel X accounting for approximately 40% of rechargers, Be Charge approximately 30%, and A2A approximately 20%.<sup>538</sup> This is partially due to A2A focusing solely on the Lombardy region, where they also operate as an electricity retailer. Be Charge also surpassed Enel X in other Northern regions, such as Veneto and Friuli-Venezia Giulia where they operate approximately 40% of recharging points (compared to Enel X's 30%). Duferco Energia also plays a key role in this part of the country, accounting for over 30% of recharging points in the Aosta Valley. Similarly, Hera also focuses mainly on the North-East of Italy where it has built up a relatively strong presence, operating approximately 7% of rechargers in Veneto and 14% in Emilia Romagna. Lastly, Neogy is another interesting player, essentially only providing EV recharging services in Trentino-Alto Adige, where it has gathered close to a 40% share.

<sup>537</sup> CRA analysis

<sup>538</sup> CRA analysis

### 7.3. In-depth market review for Croatia

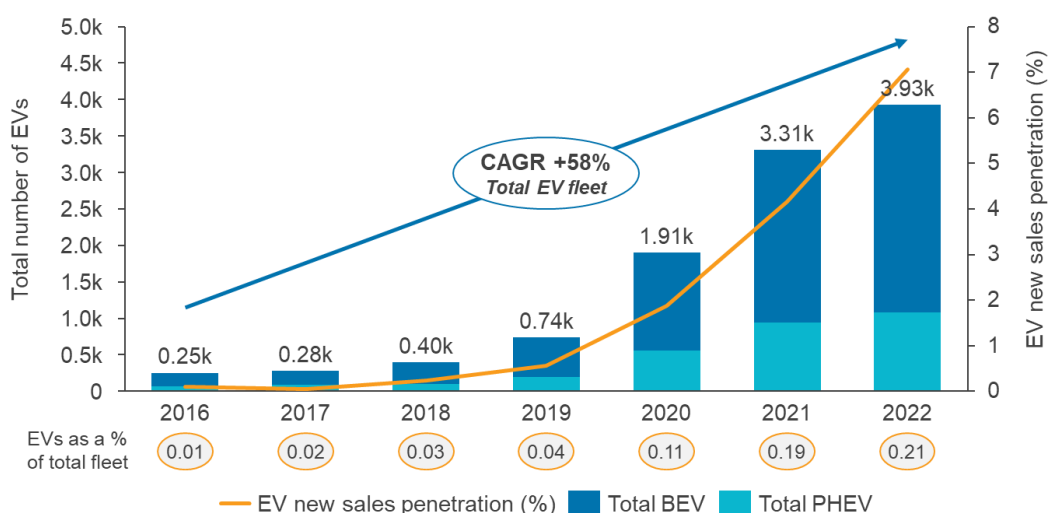
The eMobility market in Croatia remains nascent, lagging other Member States - the first 150 EVs were registered in 2015, compared to other countries establishing fleets at the start of the decade. Since then, Croatia has followed a top-down approach to the development of its eMobility sector, whereby the government sets targets and rolls out incentive to meet them, historically relying on EU funds to kick-start the industry.<sup>539</sup> The national eMobility association, Strujni Krug, believes that a strong recharging infrastructure is necessary to increase EV adoption. Croatia ranks third across the EU27 + the UK, with 3.7 EVs per recharging point,<sup>540</sup> but this is partially due to the un-developed EV fleet.

For the ensuing assessment, and as of October 2022, Croatia was classified as “nascent market” due to its relative performance in recharging points deployment and EV penetration across the EU27 + the UK – the eMobility transition is just starting to accelerate with 0.2% of the fleet being electric (24<sup>th</sup> out of the EU27 + the UK) and only 1.1k public recharging points deployed.<sup>541</sup>

#### 7.3.1. Industry statistics in Croatia

As shown in Figure 38, Croatia’s eMobility sector has grown significantly since 2016, with almost 4k EVs now registered in the country (73% BEVs, 27% PHEVs). However, this only represents 0.2% of the total fleet, the 3<sup>rd</sup> lowest across the EU27 + the UK. Nevertheless, EV adoption has been accelerating, rising at a CAGR of 74% from 2019 to October 2022 after remaining relatively steady over the prior three years with the trend expected to continue in the coming years.

**Figure 38: Croatia EV sector growth (total EVs and proportion of all yearly vehicle sales)<sup>542</sup>**



Croatia has performed well given the nascent state of the EV industry. In absolute numbers however, as highlighted by Figure 39 below, only around 1k recharging points were installed as of October 2022 (approximately 65% with a power level <22kW, 28%

<sup>539</sup> European Regional Development Fund, Emobicity, “Report on EV charging pricing, regulatory framework and DSO role in the e-mobility development”, August 2021

<sup>540</sup> Strujni Krug, “Website”, 2022

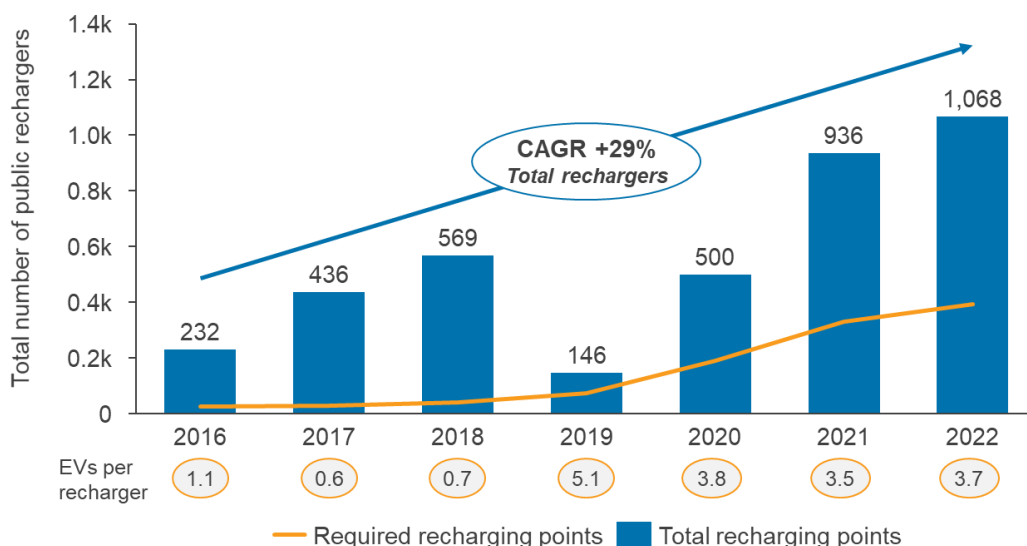
<sup>541</sup> European Commission, “European Alternative Fuels Observatory – Croatia”, October 2022

<sup>542</sup> Ibid.



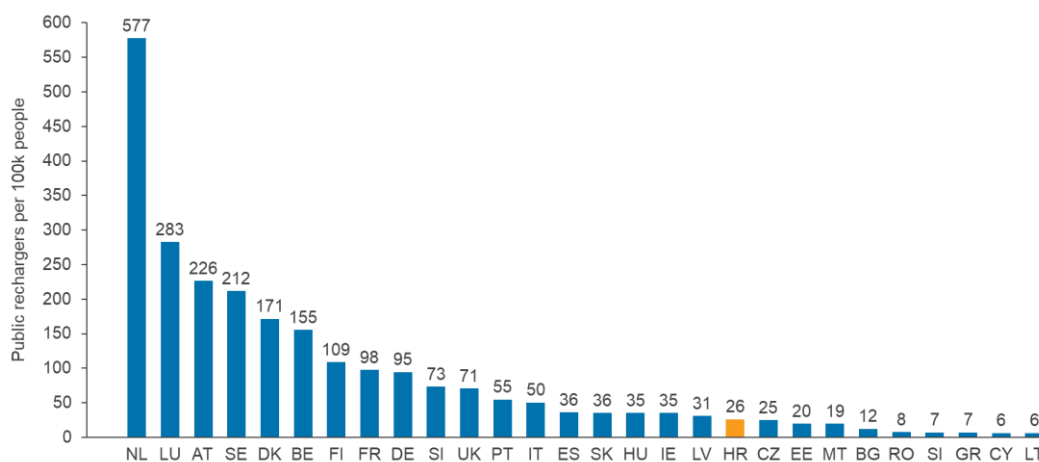
between 22kW and 150kW, and 7% >150kW). Interestingly, a sharp drop was observed in 2019 likely due to outdated infrastructure needing to be upgraded to be in line with EU technical recommendations.<sup>543</sup>

**Figure 39: Croatia recharging points vs. required recharging points (based on EU recommended ratio of 1 recharger per 10 EVs)<sup>544</sup>**



Normalising public rechargers deployed by population and comparing it across the EU27 + the UK, Croatia falls within the bottom 10 markets with only 26 public rechargers per 100k inhabitants. This is illustrated in the chart below

**Figure 40: Public recharging points installed per 100k people as of October 2022 across the EU27 + the UK<sup>545</sup>**



Like Italy and Ireland, the geographical distribution of installed public recharging points in Croatia is not even across the territory, with EV infrastructure concentrated in the major metropolitan and tourism centres. As shown in Figure 41, Zagreb city accounts for approximately 16% of rechargers, followed by the Split-Dalmatia and Primorje-

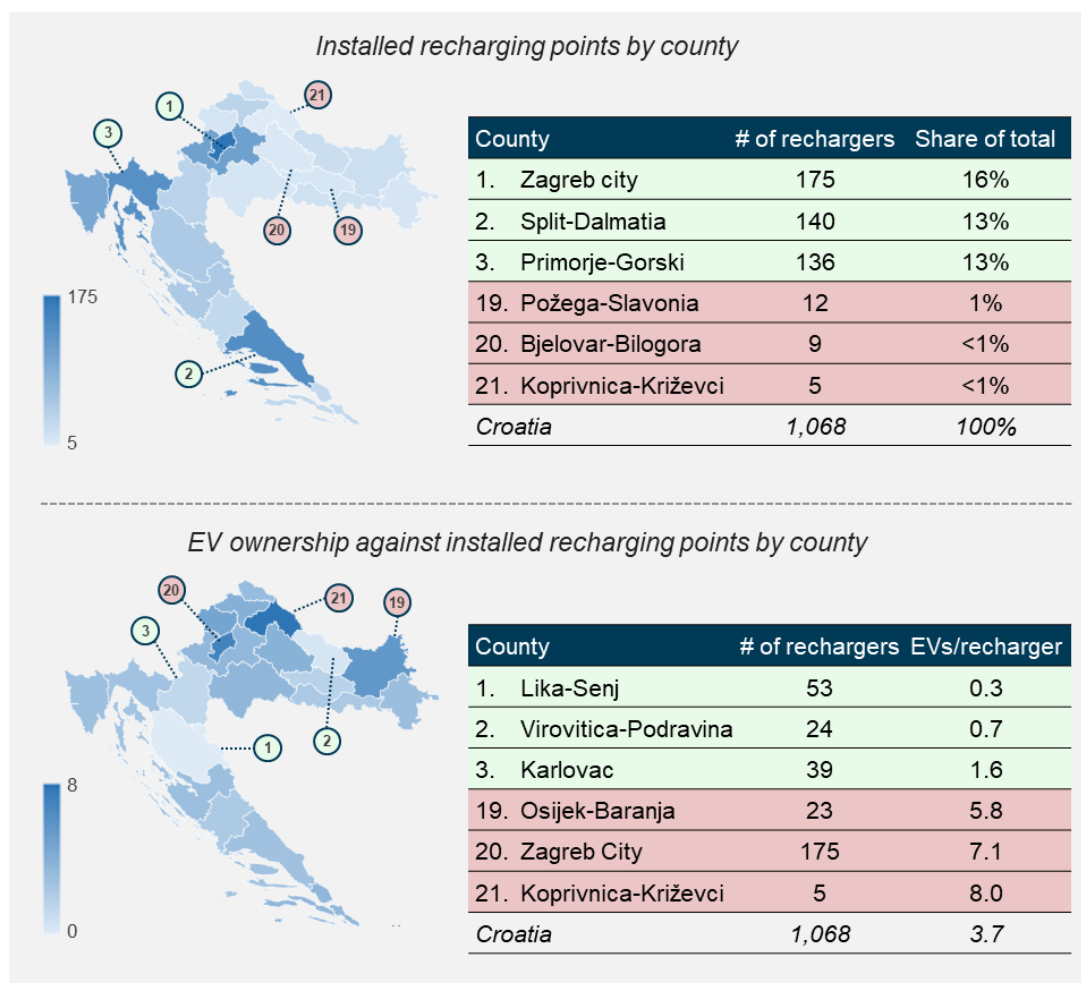
<sup>543</sup> We have been unable to confirm the source for this striking fall, therefore a data accuracy issue by the European Alternative Fuels Observatory, a change in definition or other data anomaly can not be excluded

<sup>544</sup> European Commission, "European Alternative Fuels Observatory – Croatia", October 2022

<sup>545</sup> Ibid.

Gorski counties each accounting for 13%. Generally, the most eastern part of the country has experienced a lower level of investment in EV infrastructure, with some counties having installed less than 10 rechargers as of October 2022 (i.e., Bjelovar-Bilogora, Koprivnica-Križevci). Nevertheless, given the nascent state of the eMobility sector with less than 4k EVs on the road, all counties remain in line with the EU recommended ratio of 1 public recharger per 10 EVs.

**Figure 41: Geographical dispersion of recharging points in Croatia (top 3 performing counties in green, bottom 3 in red)<sup>546</sup>**



In Croatia, recharging stations deployment has largely mirrored population density and EV adoption, highlighting EV infrastructure is following other macro-economic trends. Specifically, the four most highly populated areas (Zagreb city, Split-Dalmatia, and Primorje-Gorski Kotar) account for approximately 45% of Croatian residents, 50% of public recharging points, and 60% of EVs.<sup>547</sup> Providing recharging infrastructure in urban centres remains a focus in the country, with a pilot commencing in 2023 to install on-street recharging points on lampposts across the six major cities of Croatia. This will be financed using the National Recovery and Resilience Fund.<sup>548</sup> The network has also developed on key highways and principally along the corridors of the TEN-T network found in the North-West and connecting Zagreb with other major cities like Rijeka

<sup>546</sup> CRA analysis. Data on the number of recharging points split by region per 100k people is available in Appendix G

<sup>547</sup> CRA analysis

<sup>548</sup> Study interview, Croatian eMobility association, October 2022

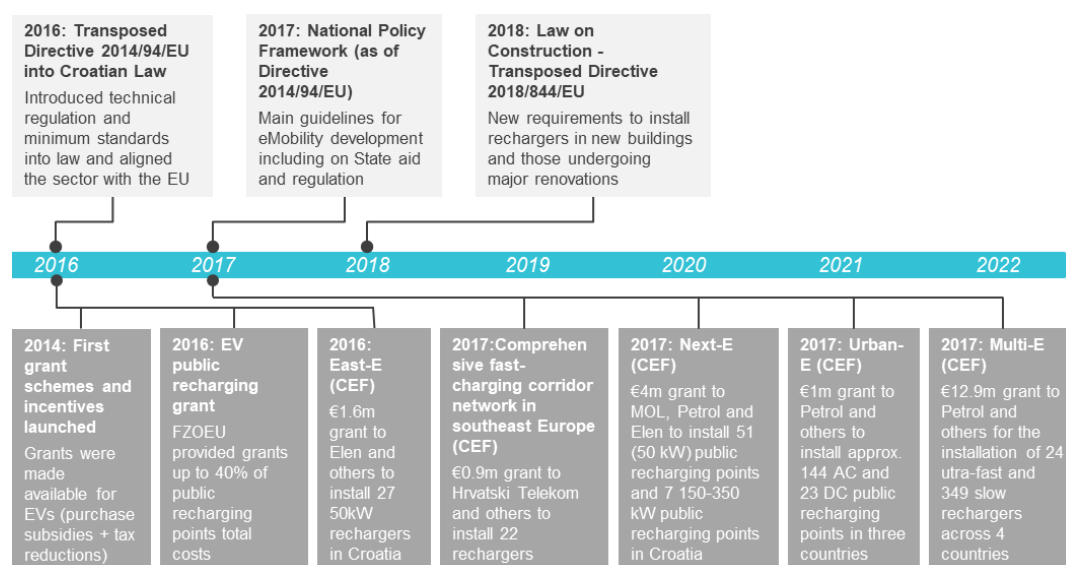
(inPrimorje-Gorski Kotar County) and Budapest (the capital of Hungary). As discussed in more detail in the following sections, this was largely driven by the EU co-financed Next-E project.<sup>549</sup>

Overall, apart from the surroundings of Zagreb and other larger cities, Croatia's EV recharging infrastructure is currently limited, with a lack of operational recharging points in rural areas due to low expected utilisation rates and a lack of financial incentive for CPOs to invest in infrastructure. There is also a need for increased focus on key highways and motorways, particularly in Southern parts of the country (not part of TEN-T network), to avoid the emergence of recharging deserts as EV adoption accelerates.<sup>550</sup> Lastly, the many islands of the country, which rely heavily on tourism, should be a focus for EV recharging infrastructure in the coming years.<sup>551</sup>

### 7.3.2. Policy overview in Croatia

As a nascent market, Croatia has limited national regulation on EV recharging in place. Similarly, while national public support measures have been offered since early on, EU public support in the form of CEF grants has been the main driver of the industry's development. As discussed below, both main market players, Hrvatski Telekom and Elen, have benefitted from CEF grants which were key to support the installation of recharging points.

**Figure 42: Regulatory (light grey) and public support (dark grey) timeline<sup>552</sup>**



### 7.3.3. Regulation in Croatia

Croatia mainly relies on the EU legal framework to regulate the EV recharging sector. The main regulation is Law n. 120 on the Establishment of Infrastructure for Alternative Fuels from December 2016, which transposes EU Directive 2014/94, makes ad hoc recharging mandatory for all recharging points<sup>553</sup> and specifies that CPOs are classified as electricity end users, thus absolving them from the duties of electricity suppliers.<sup>554</sup>

<sup>549</sup> Next E, "Next-E project", 2022

<sup>550</sup> Marko Emanović et. al, "Challenges and Opportunities for Future BEVs Adoption in Croatia", July 2022

<sup>551</sup> Study interview, Croatian eMobility association, October 2022

<sup>552</sup> Detailed descriptions can be found in the Regulation and Public Support sections below

<sup>553</sup> A detailed discussion of relevant EU regulations on EV recharging can be found in Appendix D

<sup>554</sup> Official Legislative Journal of the Republic of Croatia, "Law on the Establishment of Infrastructure for Alternative Fuels", December 2016

Additionally, a National Policy Framework (NPF) for the Establishment of Infrastructure and the Development of the Market for Alternative Fuels in Traffic was passed in 2017, providing guidelines for the development of eMobility in the country; for instance, it suggested that public support measures should be implemented to support both the purchase of EVs and the installation of recharging points. It also suggested that public support financing should come from the national Fund for Environmental Protection and Energy Efficiency (FZOEU) and should be financed by an excise duty on highly polluting fuels.<sup>555</sup> Similarly, it was advised that subsidies should be provided both at the national and at local levels, including tax reliefs and possibly free parking for EVs.<sup>556</sup>

Other key EU regulations on the EV recharging sector were also transposed into national law. In 2019 the Law on Construction was amended to transpose Directive 2018/844/EU on the energy performance of buildings, implementing its norms on the mandatory installation of recharging points in buildings.<sup>1291</sup> Furthermore, Directive 2019/944/EU was transposed into law with the update to the Electricity Market Act in 2021.<sup>557</sup> The updated norm was aligned with the EU Directive in preventing the DSO from operating in the EV recharging sector unless exceptional circumstances applied.<sup>558</sup>

#### 7.3.4. Public support for EVs and recharging in Croatia<sup>559</sup>

Public support to eMobility is aimed at supporting both EV purchases and the installation of recharging infrastructure. Furthermore, Croatia has benefitted from several grants from the CEF for the rollout of recharging stations along its main transport networks.

**Table 30: Total EU public support to Croatia by firm (2016-2022)<sup>560</sup>**

Company	EIB loans (€m)	CEF grants (€m) <sup>444</sup>
Hrvatski Telekom	0	0.9
Elen	0	2.9
MOON	0	0
Petrol	0	4
Mol Group	0	1.3

The different national and EU funded Public Support measures to eMobility in Croatia are discussed below:

<sup>555</sup> The Fund for Environmental Protection and Energy Efficiency was established in 2004 and is managed by the Croatia Government. The Fund's purpose is to secure additional resources for the financing of projects in the field of conservation, sustainable use, protection and improvement of the environment. Source: FZOEU, "About us"

<sup>556</sup> Ministry of Sea, Transport and Infrastructures, "National Policy Framework", July 2015

<sup>557</sup> European Parliament, "DIRECTIVE 2014/94/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 22 October 2014 on the deployment of alternative fuels infrastructure", October 2014

<sup>558</sup> Official Legislative Journal of the Republic of Croatia, "Law on the Electricity Market", October 2021

<sup>559</sup> The list of public support is an exhaustive representation of State aid support for EV recharging at the national level based on the results of this study's desk-based research. The measures included were in force, for some or all years, between 2016 and 2022, due to the infancy of the sector and the way data is publicly accessible and presented, additional evidence may come to light with other searches.

<sup>560</sup> Summary table of the EU public funding measures discussed below. Initiatives from Interreg Europe were not included as recipients are local public authorities rather than private market players. National public support measures were also not included as data granularity does not allow for a view of total grant amounts allocated to each company. "0" means the company did not receive any contribution from the specific source.

### **EV recharging subsidies<sup>561</sup>**

First launched in 2016, the FZOEU provides a grant for the installation of public recharging points. The grant covers up to 40% of individual project costs to a maximum of HRK200k (approximately €27k).<sup>562</sup> While the total budget available varies on a yearly basis, going for instance from HRK5.8m (approximately €0.8m) in 2019 to HRK10m (approximately €1.3m) in 2020, the Fund finances recharging stations with a capacity of at least 50 kW for DC rechargers and of at least 22 kW for AC rechargers.<sup>563, 564</sup> Even though anticipated to be renewed in 2022, as of November 2022 the grant had not been provided yet.<sup>565</sup> While the initiative's total budget is publicly disclosed, no visibility is given on the grant amounts provided to each company.

### **EU public support**

In Croatia, no EV recharging company received loans from the EIB, however, the country was part of different projects under both the CEF and Interreg Europe.

#### **CEF**

- **East-E:** Launched in 2016 for the deployment of recharging stations across 3 East European countries, the project assigned Croatia a grant of €1.6m.<sup>566</sup> The funding provided allowed for the installation of 27 public EV rechargers with a capacity of 50 kW in the country, deployed in cooperation with Elen.<sup>567</sup>
- **Comprehensive fast-recharging corridor network in southeast Europe:** Started in 2017 in Croatia and Romania, the project provided Croatia with a €0.9m grant for the installation of public recharging stations.<sup>568</sup> 21 public EV rechargers were installed in the country, with capacities between 22 kW AC and 50 kW DC, as well as one 150 kW DC recharger. The deployment of recharging infrastructure was done in partnership with Hrvatski Telekom.<sup>569</sup>
- **Next-E:** Launched in 2017, the project covered Croatia, Czechia, Hungary, Romania, Slovakia and Slovenia. With a grant to Croatia of €4m, 51 recharging points with a capacity of 50 kW and 7 recharging points with a capacity of between 150 kW and 350 kW were installed across the country. The initiative was realised in Croatia in cooperation with MOL Group, Elen and Petrol.<sup>570</sup>
- **Urban-E:** Started in 2017, the project covered Croatia, Slovakia and Slovenia with the installation of 144 AC public recharging points and 23 multi-standard AC and DC recharging points across the three capital cities.<sup>571</sup> Croatia received a €1m grant

<sup>561</sup> Due to data granularity issues, only aggregated figures are available. The total share of funds received by each company is not publicly available.

<sup>562</sup> Svetlana Jovanović, "Croatia to co-finance installation of EV charging stations in 2018", August 2018

<sup>563</sup> Fund for Environmental Protection and Energy Efficiency, "Co-financing the construction of EV charging stations started", May 2019

<sup>564</sup> Fund for Environmental Protection and Energy Efficiency, "Public call for direct co-financing of infrastructure development for alternative fuels - construction of electric and hydrogen vehicle filling stations in 2020", June 2020

<sup>565</sup> Study interview, Croatian eMobility Association "Electric Circuit", November 2022

<sup>566</sup> Ministry of Sea, Transport and Infrastructures, "Development of a network of charging stations for electric vehicles", December 2020

<sup>567</sup> Innovation and Networks Executive Agency, "East-E"

<sup>568</sup> Ministry of Sea, Transport and Infrastructures, "Development of a network of fast charging stations for electric vehicles", December 2021

<sup>569</sup> Innovation and Networks Executive Agency, "Comprehensive fast-charging corridor network in southeast Europe", December 2021

<sup>570</sup> Next-E, "About the project"

<sup>571</sup> Innovation and Networks Executive Agency, "URBAN-E: e-Mobility, Infrastructure and Innovative Intermodal Services in Ljubljana, Bratislava and Zagreb", June 2022

within the initiative, for the rollout of recharging infrastructure in collaboration with Petrol and the Municipality of Zagreb.<sup>572</sup>

- Multi-E: Launched in 2017, the project, which is expected to last until December 2023, includes Croatia, Italy, Slovenia and Slovakia for a total budget of €12.9m. The initiative aims for the installation of 24 ultra-fast public rechargers and 349 public AC rechargers across the four countries, deployed in partnership with Petrol in Croatia.<sup>573</sup>

#### Interreg Europe

- EVcc project: aimed at improving public awareness around eMobility in two border communities, the project led to the purchase of two EVs and the installation of two recharging stations to conduct demonstration activities across Hungary and Croatia.<sup>574</sup>

### **EV purchase subsidies**

The FZOEU has been offering incentives to Croatian citizens for the purchase of EVs since 2014.<sup>575</sup> With a total budget of HRK7.5m (approximately €99m), the FZOEU provided up to HRK70k (approximately €9k) for BEV, up to HRK50k (approximately €7k) for PHEV and up to HRK30k (approximately €4k) for hybrid vehicles.<sup>576</sup> In 2018 the scheme was updated to cover up to 40% of the purchase price to a maximum of HRK80k (approximately €10.7k) for EVs and HRK40k (approximately €5.4k) for PHEVs. The incentive was extended to companies for a total budget of €1.6m for citizens and €1.8m for firms.<sup>577</sup> While the total budget made available for the measure changed throughout the years, for instance increasing to €5.8m in 2020, the contribution given per EV remained constant.<sup>578</sup> However, the incentives struggled to satisfy levels of demand; in fact, due to the limited funding size, the total budget available was quickly used up. In 2020, the time lag between the opening of the online call for application and the depletion of all available funds was of only two minutes, which grew to thirty minutes in 2022.<sup>579,580,581</sup> Nonetheless, despite the limited amount available only 50% of recipients ended up using the awarded grant in 2021 to purchase an EV, with half of the total attributed remaining unspent.<sup>582</sup>

### **Tax benefits**

Since its entry in the European Union in 2013, Croatia has applied a tax on motor vehicles. The Law on the Special Tax on Motor Vehicles determines the excise by combining the vehicle's price together with its level of GHG emissions and EVs have been exempted from paying the duty.<sup>583</sup>

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<sup>572</sup> Ministry of Sea, Transport and Infrastructures, "Urban-E", June 2022

<sup>573</sup> Innovation and Networks Executive Agency, "MULTI-E: Multiple Urban and Long-distance Transport Initiatives – Electric and CNG", October 2022

<sup>574</sup> CRA analysis of data from "keep.eu"

<sup>575</sup> Chris Randall, "Croatia subsidizes EV purchasing with €5.8 million", July 2020

<sup>576</sup> Fund for Environmental Protection and Energy Efficiency, "Public call for direct co-financing of the purchase of electric and hybrid vehicles", September 2015

<sup>577</sup> Vladimir Spasić, "Croatia gives new incentives to citizens and companies for EV purchases", April 2018

<sup>578</sup> Chris Randall, "Croatia subsidizes EV purchasing with €5.8 million", July 2020

<sup>579</sup> Vladimir Spasić, "Limit for electric vehicle incentives in Croatia reached in just two minutes", July 2020

<sup>580</sup> Lauren Simmonds, "Croatian Electric Car Purchase Incentives Prove an Absolute Hit", June 2022

<sup>581</sup> Study interview, Croatian eMobility Association "Electric Circuit", November 2022

<sup>582</sup> Lauren Simmonds, "Croatian Government Incentives for Electric Vehicle Purchases Begin", May 2022

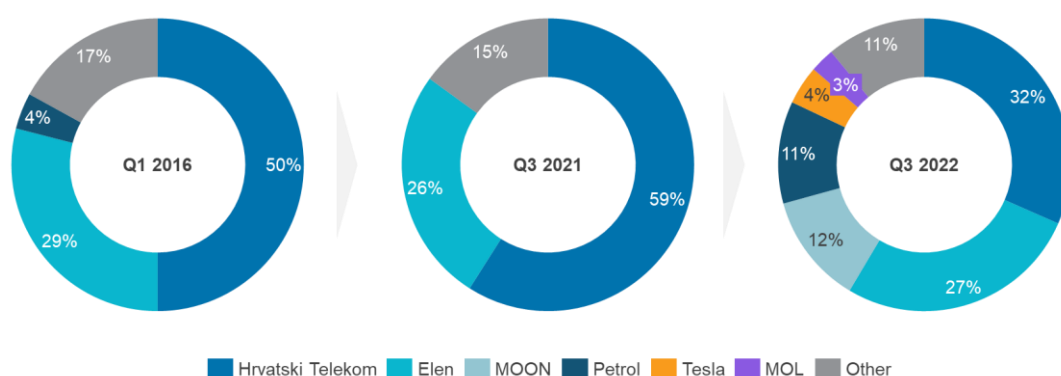
<sup>583</sup> Ius Info, "Ecological Tax", March 2013



### 7.3.5. CPO shares and evolution over time

As outlined in the Croatia country summary in Appendix A, the Croatian eMobility industry began to develop in 2015 with the registration of the first 150 EVs. In the early years of the sector, the EV recharging market was largely controlled by two players: Elen, a state-owned electric utility established in 2014 to develop the national network, and Hrvatski Telekom, a subsidiary of a multi-national telecommunications company who built a strong market position from the start.<sup>584</sup> However, by October 2022, several other players have entered the market (e.g., Moon, Petrol, Tesla, MOL) giving rise to a more fragmented picture. The key CPOs operating in the Croatian market can be seen in the breakdown of market players in Figure 43.

**Figure 43: Croatia CPO share by installed recharging points<sup>585</sup>**



The share picture depicted in Figure 43 is correct as of October 2022 and gives the most accurate current share breakdown based on data availability and quality. This picture has however evolved over the past years following the entry of other market participants such as MOON and Petrol.

Historical data available does not allow for a year-by-year share evolution analysis, however there are some key data points that highlight trends of the major players over time. Specifically:

- Elen (through HEP Group) was one of the first to deploy recharging points in the country, with 27 public recharging stations installed by the end of 2016, representing approximately 30% share.<sup>586</sup>
- By the end of 2018, Hrvatski Telekom had installed more than 50% of public EV recharging stations in Croatia and had installed the first fast EV recharging station in Croatia as part of a project co-funded under the EU CEF program.<sup>587</sup>
- By September 2021, Elen had installed 245 public recharging points, accounting for close to 30% of the network.<sup>588</sup> Hrvatski Telekom remained in control of the majority share, with more than 500 recharging points operational (approximately 60% of the network).

These prominent market participants and other new entrants have each emerged from different areas of the energy and mobility ecosystems, some from the utilities and

<sup>584</sup> Hrvatski Telekom, "Hrvatski Telekom has set up the first fast EV charging station in Croatia", 2018

<sup>585</sup> CRA Analysis: The 2022 picture was developed based on the data gathering methodology presented in Appendix F. The 2016 and 2021 pictures are indicative and based on desk-based research and CRA analysis – these views have a lower level of absolute confidence and are more indicative

<sup>586</sup> HEP, "ELEN charging station for electric vehicles put into operation in Buje", December 2016

<sup>587</sup> Hrvatski Telekom, "Hrvatski Telekom has set up the first fast EV charging station in Croatia", 2018

<sup>588</sup> VL Promo, "HEP covered the whole of Croatia with a network of charging stations for electric vehicles", 2021



refuelling segments, others from the telecommunications segment and some as pure eMobility companies. In Table 31 below, an overview of each company's legal structures and ownership dynamics is provided.

**Table 31: CPO and eMSP legal structure and key services detail (October 2022)**<sup>589</sup>

Firm	Number of rechargers	CPO share	Type of player (legal structure)	Key CPO services	Interoperability and openness of access
Hrvatski Telekom	337	32%	Fully integrated CPO and eMSP, subsidiary of major telecommunication services company	On-route, destination, on street	Bilateral agreements with other eMSPs, roaming, ad hoc via pay-as-you-go
Elen	288	27%	Fully integrated CPO and eMSP, subsidiary of fully integrated state-owned energy company	On-route, destination, on street	Bilateral agreements with other eMSPs, roaming, ad hoc via pay-as-you-go
MOON	130	12%	Fully integrated CPO and eMSP, founded by major German automotive OEM	On-route, destination, on street	No data available
Petrol	121	11%	Fully integrated CPO and eMSP, subsidiary of ICE refueller with presence in Croatia	On-route, destination, on street	Bilateral agreements with other eMSPs, roaming, ad hoc via pay-as-you-go
Other	192	18%	Smaller players and unspecified data points	--	--
Total	1,068	100%	--	--	--

As of October 2022, Hrvatski Telekom remains the leading CPO in the Croatian market, accounting for over 30% of installed recharging points. Elen, the state-owned provider, has also been a key player since the beginning, now operating just under 30% of recharging points. Other notable players in the market include Moon (12%), Petrol (11%), Tesla (4%), and MOL (3%). This recent entry from players across the mobility value chain reflects the strategy chosen by the national eMobility association, who believes a competitive and well-developed EV recharging network is necessary to allow the Croatian eMobility industry to flourish. Interoperability has also been cited as a focus as the sector matures, with Hubject already having established roaming agreements with Hrvatski Telekom, Elen, and Petrol and having over 50% coverage as of October 2022.

### 7.3.6. Key CPO/eMSP players in Croatia

#### *Hrvatski Telekom*

Hrvatski Telekom (Croatia Telecom) is the leading EV recharging service provider in Croatia with a 32% share acting as an integrated CPO and eMSP. Hrvatski Telekom,

<sup>589</sup> CRA analysis

founded in 1998, has been majority owned (52.2%) by Deutsche Telekom since October 2001.<sup>590</sup> Hrvatski Telekom, along with its parent company, primarily provide telecommunication services including fixed and mobile telephony networks and internet services.<sup>591</sup>

Hrvatski Telekom entered the EV recharging industry in 2012 and offers recharging solutions at all speed levels (slow to ultra-fast) at various locations, including semi-public hotel and shopping centre parking spaces, fully public areas in city centres and ports across 90 towns in Croatia.<sup>592 593</sup> They have also leveraged their existing locations of telephony boxes at strategic locations on the edge of semi-rural and rural areas, which are no longer needed for telephone infrastructure due to the shift towards fibre broadband and cellular devices. These sites already have a connection to the electricity grid and require fewer planning approvals as they can be repurposed rather than built on a green field site.<sup>594</sup> Access to Hrvatski Telekom's network of rechargers is done either via a pre-pay RFID card or its mobile app, espoTs. Some recharging points are offered free of charge through partnerships with other organisations, while others are pay-to-use at the following rates.

**Table 32: Hrvatski Telekom Pricing Model<sup>595</sup>**

Pay-as-you-go	Prepay cards
espoTs application can be used to book recharging stations in advance and pay for this via deposited funds under the "HT prepayed" subscription. The price is dependent of recharge point location ranging from €0.04 to 0.80/kWh for chargers under 22kW and €0.14 to 0.80/kWh for chargers above 22kW. <sup>596</sup>	Users can also acquire a prepaid T-RFID card that can be purchased for HRK 200 (approximately 27€, including VAT) in selected T-Centers. At filling stations where the service is free, the card is used for an unlimited number of activations. This card can also be topped up through the espoTs application. The RFID card prepaid credit is charge at the same per kWh rate as their pay-as-you-go tariff.

In December 2018, Hrvatski Telekom set up the first 8 of 73 fast and ultra-fast chargers planned at 31 locations on corridors across Croatia and Romania. This initiative was co-financed by the EU's CEF programme at a value of €4.3m.<sup>597</sup>

Hrvatski Telekom were the first Croatian company to join the Hubject roaming network in 2017, promoting interoperability and allowing EV drivers to roam onto different CPO networks across Europe.<sup>598</sup> In February 2021, Hrvatski Telekom further enhanced interoperability for its EV drivers through a bilateral agreement with two large Slovenian operators, Elektro Ljubljana d.d. and Porsche Slovenija d.o.o, which provided access to 300 recharging stations. There is also a reciprocal arrangement in place for Slovenian EV drivers to access Hrvatski Telekom recharging stations in Croatia.<sup>599</sup>

In August 2021, Hrvatski Telekom and Tommy, a supermarket retail chain, installed the first five fast EV recharging stations within Tommy's retail locations in Dubrovnik, Malinska (island of Krk), Solin, Split, and Zadar. As part of the cooperation, Hrvatski

<sup>590</sup> UPI, "Feature: Trouble at Deutsche Telekom", March 2002

<sup>591</sup> Hrvatski Telekom, "About us", 2022

<sup>592</sup> Hrvatski Telekom, "e-mobility @ Croatian Telekom", 2016

<sup>593</sup> Hrvatski Telekom, "e-mobility", 2022

<sup>594</sup> Study interview, Croatian eMobility association, October 2022

<sup>595</sup> Hrvatski Telekom, "e-mobilnost"

<sup>596</sup> Hrvatski Telekom, "Charging Price List", 2022

<sup>597</sup> Hrvatski Telekom, "Hrvatski Telekom has set up the first fast EV charging station at the ROX gas station in Croatia", December 2018

<sup>598</sup> Hubject, "Hrvatski Telekom and Hubject join forces to connect Croatian EV chargers", June 2017

<sup>599</sup> Hrvatski Telekom "Annual report 2021", 2022

Telekom and Tommy provide a free recharging service for all visitors to Tommy shops from 7 am to 10 pm. The fast-recharging stations have been set up as part of the project "Comprehensive network of fast-recharging corridors in Southeast Europe", which is co-financed under the EU CEF programme.<sup>600</sup>

### Elen

Elen holds a 27% share and acts as an integrated CPO and eMSP. Elen is owned by the HEP Group, a fully vertically integrated national energy company owned by the state of Croatia.<sup>601</sup> The HEP Group has a strong market position with approximately 75% in generation, and 80% in transmission & distribution and retail.<sup>602</sup>

The HEP Group participated in early pilot projects in 2010, and then by 2014, the Elen brand was conceived as an eMobility pilot project on behalf of the HEP Group where 30 initial public recharging points were installed in cities across the nation. Five of these rechargers were fast rechargers installed in the city of Koprivnica that were fully funded by the EU project led by Civitas (an initiative that works to make sustainable and smart urban mobility a reality for all). This was known as the DYN(at)MO project and was designed to learn from different markets, specifically Aachen in Germany, Gdynia in Poland, Mallorca in Spain and Koprivnica in Croatia.<sup>603,604</sup>

Initially, these recharge points existed without a consumer facing eMSP, specifically, there was no app and customers would apply via email for an Elen RFID card that they could use at the recharging points to activate a session and were never billed for these sessions (free recharging).<sup>605</sup> However, from January 2022 onwards, the recharging at on-route destinations within the Elen network was no longer free of charge and the same then happened to other rechargers (destination and on-street) in March of 2022. The implemented prices are listed in Table 33.

**Table 33: ELEN Pricing Model<sup>606</sup>**

Pay-as-you-go	
EV recharging off highways	EV recharging on highways
Recharging from connectors at up to 22.1 kW of rated power: €0.29/kWh for consumption during peak hours and €0.24/kWh for consumption during non-peak hours.	Recharging from connectors at up to 22.1 kW of rated power: €0.36/kWh for consumption during higher rate and €0.31/kWh for consumption during lower rate.
Recharging from connectors from 22.2 kW to 50 kW of rated power: €0.39/kWh for consumption during higher rate and €0.34/kWh for consumption during lower rate.	Recharging from connectors from 22.2 kW to 50 kW of rated power: €0.46/kWh for consumption during higher rate and €0.38/kWh for consumption during lower rate.
	Recharging from connectors at above 50 kW of rated power: €0.66/kWh for consumption during higher rate and €0.59/kWh for consumption during lower rate.

<sup>600</sup> Hrvatski Telekom "Annual report 2021", 2022

<sup>601</sup> HEP Group, "About us", November 2022

<sup>602</sup> Enerdata, "Croatia energy report", March 2022

<sup>603</sup> Odogovorno, "HEP: HEP's network of charging stations for electric vehicles in Croatia is expanding", October 2016

<sup>604</sup> Civitas, "CIVITAS DYN(at)MO project"

<sup>605</sup> Balkan Green Energy News, "First ELEN charger for electric vehicles installed in Rijeka", February 2017

<sup>606</sup> Elen, "Elen charging station fee changes", 2022

Pay-as-you-go	
EV recharging off highways	EV recharging on highways
Fees: Free connector occupation time is 180 minutes for chargers up to 22.1 kW and 60 minutes for rechargers from 22.1 to 50 kW. Connector occupation overrun fee (VAT included) of €0.07/min for all recharger types.	Fees: Free connector occupation time is 180 minutes for rechargers up to 22.1 kW; 60 minutes for rechargers from 22.1 to 50 kW; and 45 minutes for rechargers above 50kW. Connector occupation overrun fee (VAT included) of €0.13/min for all recharger types.

Elen have also received public support through the EU co-financed projects, specifically the East-e and Next-e projects as summarised above in Section 7.3.4.

### **MOON**

MOON in Croatia holds 12% share and acts as an integrated CPO and eMSP. Porsche Holding Salzburg, a subsidiary of the Volkswagen Group, founded the MOON brand in 2019 as a subsidiary of Salzburg-based Allmobil GmbH.<sup>607</sup> Following successful development and start-up of business activities, a new independent organisation, MOON Power GmbH was created in autumn 2021. MOON expanded to other countries, including Croatia. The MOON brand currently has companies in two countries and operates in a total of 18 countries, with 12 countries having recharging infrastructure services listed. These are Austria, Germany, Bosnia and Herzegovina, Bulgaria, Croatia, Czechia, Hungary, Macedonia, Portugal, Romania, Slovenia, Ukraine.<sup>608</sup>

Moon offers both private and business recharging solutions in terms of a portfolio of devices including domestic rechargers up to 22kW and business rechargers up to 300kW.<sup>609</sup>

With MOON being one of the smaller Croatian players, in what is already a nascent market, information on its activities remains limited. However, parallels can be drawn from their engagements with partners to enable EV recharging solutions in other countries. For instance, MOON has provided<sup>610</sup> recharging solutions for various entities such as the training facility of Munich's biggest football club, the Porsche AG mobile charging unit and the Austrian Ski Federation through their recharging stations.

### **Petrol**

Petrol holds a 11% share and acts as an integrated CPO and eMSP. The Petrol Group is a Slovenian energy company with a network of 500 refuelling forecourts across Europe.<sup>611</sup> It also distribute and sell natural gas and LPG, supply power to households and provide energy and environmental systems. The Petrol Group are active in Slovenia, Croatia, Bosnia and Herzegovina, Serbia and Montenegro.<sup>612</sup> In the last five years, the Petrol Group has invested €276.7m into Croatia, and just recently completed the legal merger of Crodex derivati dva business (Croatian petroleum retailer) into the Petrol Group. This transaction added 93 additional service stations to their Croatian network. Now with a total of 202 refuelling stations, the Petrol Group's share in the petroleum products segment in Croatia has increased from 13% to 23%. The Petrol Group also

<sup>607</sup> Porsche Holding, "MOONCITY: exciting centre for new and electric mobility opens in Salzburg", September 2019

<sup>608</sup> Porsche Holding, "Porsche Holding Salzburg achieves further revenue growth in 2021 thanks to its robust business model", March 2022

<sup>609</sup> MOON, "MOON filling stations", 2022

<sup>610</sup> ChargePoint, "MOON POWER & ChargePoint: Charging infrastructure and energy management solutions that transcend brands", 2022

<sup>611</sup> Next-E, "Next-E's 262 fast and ultra-fast chargers in 6 countries will be available on one platform", October 2020

<sup>612</sup> Petrol Group, "About Petrol Group", 2022

runs renewable electricity generation in Croatia, specifically the Glunča and Ljubač wind power plants produce enough electricity to supply approximately 45k Croatian households.<sup>613</sup>

Petrol offer EV recharging stations in both Slovenia and Croatia with slow 22kW, fast 100kW and ultra-fast 350kW solutions.<sup>614</sup> It implemented its first recharging station in Slovenia in 2012 and in Croatia in 2017 and has a strategy to expand to over 1.5k recharging stations across all their markets by 2025.<sup>615</sup> Petrol rechargers can be accessed through either Petrol electromobility cards or the OneCharge app which was launched in 2021 that ended free recharging at Petrol recharging stations. The prices can be found in Table 34.<sup>616</sup>

**Table 34: Petrol Pricing Model<sup>617</sup>**

Pay-as-you-go	Subscription
<p>Varying tariffs largely depending on recharging speed.</p> <p>Recharging at connections with power up to 22 kW</p> <p>Fully registered users – €0.30/kWh</p> <p>Temporarily registered users – €0.37/kWh</p> <p>Recharging at connections with power from 22.01 kW to 50 kW</p> <p>Fully registered users – €0.44/kWh</p> <p>Temporarily registered users – €0.52/kWh</p> <p>Recharging at connections with power above 50.01 kW</p> <p>Fully registered users – €0.73/kWh</p> <p>Temporarily registered users – €0.80/kWh</p>	<p>Petrol offer recharging packages that can be redeemed at its recharging stations across Croatia and Slovenia.</p> <p>Careless packages are subscription-based and binding for 12 months.</p> <p>Careless M: Includes 1,425kWh per annum at cost of €36/month</p> <p>Careless L: Includes 2,850kWh per annum at cost of €71/month</p> <p>Careless XL: Includes 5,000kWh per annum at cost of €125/month</p> <p>OneCharge packages are not binding, offer discounts on regular tariff prices and other benefits.</p> <p>OneCharge M: €2.99/month for 15% discount on regular prices + other benefits.</p> <p>OneCharge L: €12.99/month for 20% discount on regular prices + other benefits.</p> <p>OneCharge XL: €19.99/month for 25% discount on regular prices + other benefits.</p>
<p>Fees: Varying secondary tariff fees largely depending on recharging speed and time of recharging.<sup>618</sup></p> <p>Recharging at connections with power up to 22 kW - Secondary tariff fees billed after 180 minutes of recharging between hours of 07:00 – 20:00 at a cost of €0.07/min.</p> <p>Recharging at connections with power from 22.01 kW to 50 kW - Secondary tariff fees billed after 60 minutes of recharging 24/7 at a cost of €0.15/min.</p> <p>Recharging at connections with power above 50.01 kW - Secondary tariff fees billed after 40 minutes of recharging 24/7 at a cost of €0.30/min.</p>	

<sup>613</sup> Inter Capital, "Petrol Completes Crodux Merger" November 2022

<sup>614</sup> Petrol, "Report on the operations of the Petrol Group and Petrol d.d., Ljubljana in the first nine months of 2022", November 2022

<sup>615</sup> Petrol, "Strategy of the Petrol Group 2021 - 2025 Summary", 2021

<sup>616</sup> Petrol, "Charging stations"

<sup>617</sup> Petrol, Price list for charging, July 2022

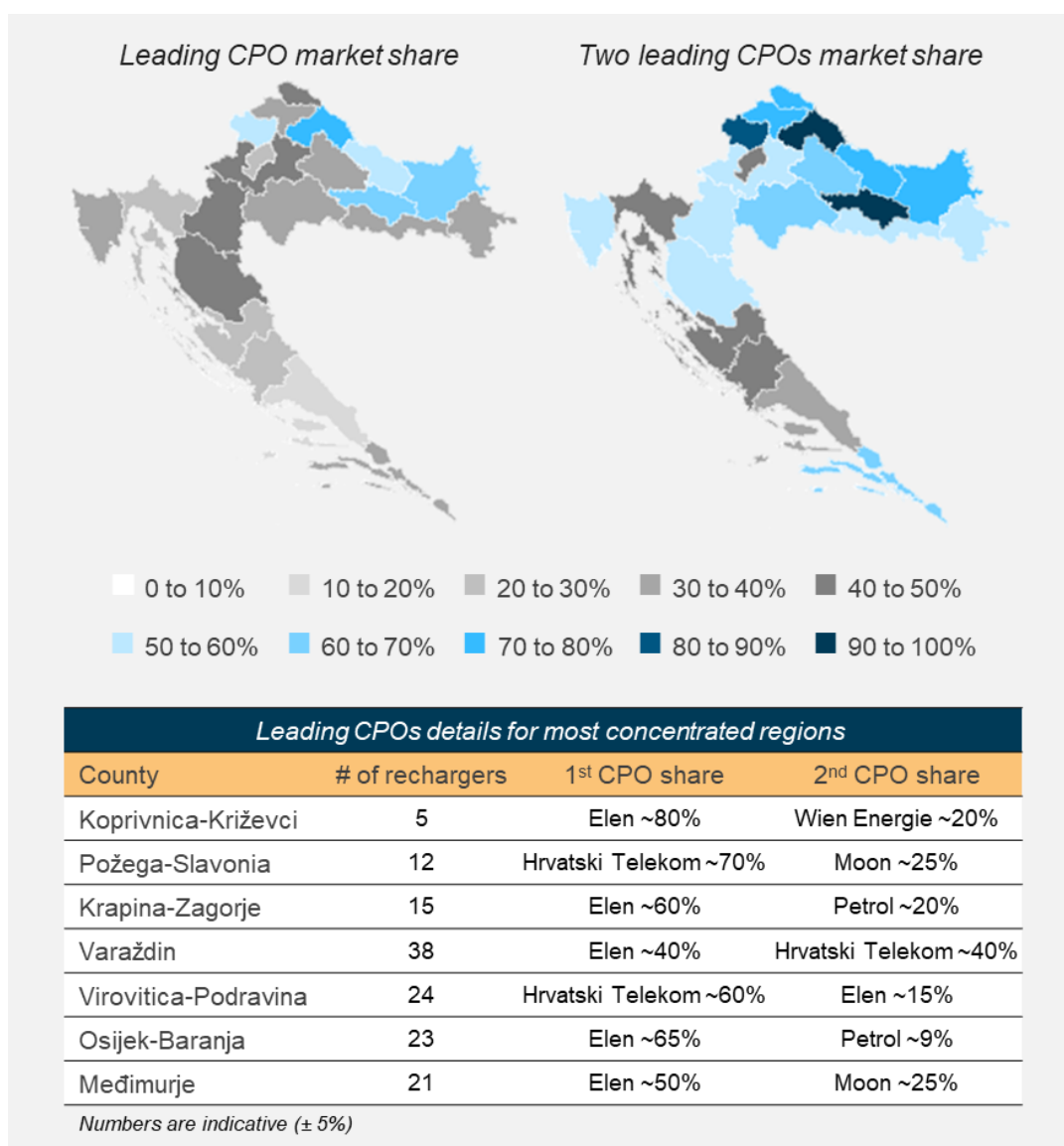
<sup>618</sup> Ibid.

Petrol has also secured EU grants for three international projects to co-finance recharging point deployment at motorway and city centre service stations in Slovenia and Croatia as part of the NEXT-E, URBAN-E, and MULTI-E projects which are within the CEF programme.<sup>619</sup> More detail is available in Section 7.3.4.

### 7.3.7. Regional dynamics in Croatia

As depicted in Figure 44 below, the Croatian EV recharging market is composed of major players that compete at both a national and a regional level. However, some counties, particularly in the North-East of Croatia, have a highly concentrated market, with a single player controlling around 60% of recharging points. This is likely to change as EV ownership and infrastructure focus in these areas increase and first mover advantages become less accentuated, and a more competitive market develops.

**Figure 44: CPO concentration across Croatian counties (October 2022)**<sup>620</sup>



<sup>619</sup> Petrol, "Report on the operations of the Petrol Group and Petrol d.d., Ljubljana in the first nine months of 2022", November 2022

<sup>620</sup> CRA analysis. Note: 17% of recharging points included in the analysis did not have a CPO attached to them due to data quality limitations and are therefore considered to be operated by 3<sup>rd</sup> parties.

In the more developed network areas, such as Zagreb and Split-Dalmatia, EV drivers have access to services of several recharging providers, with market being fragmented among multiple players. In Zagreb city, the most populous area of the country, Hrvatski Telekom accounts for approximately 30%, Petrol and Elen for approximately 20%, and MOON for approximately 15%. The rest is made up of smaller players like Tesla and Mol, while 11% of rechargers identified did not specify the operator. In Split-Dalmatia, the second most populous county, which accounts for 13% of rechargers, the market is similarly fragmented. Specifically, as of October 2022, Elen and Hrvatski Telekom account for approximately 20% respectively, followed by MOON and Petrol with approximately 10% each. Tesla also has a significant share in tourist destinations like Split-Dalmatia, where over time it has amassed a network similar in size to MOON and Petrol. Finally, in Primorje-Gorski which hosts 13% of the nation's recharging points, Hrvatski Telekom is the leading CPO with over 30% share, followed by Elen (approximately 15%), MOON and Petrol (approximately 10%) and several smaller players or business owners.



## 7.4. In-depth market review for Belgium

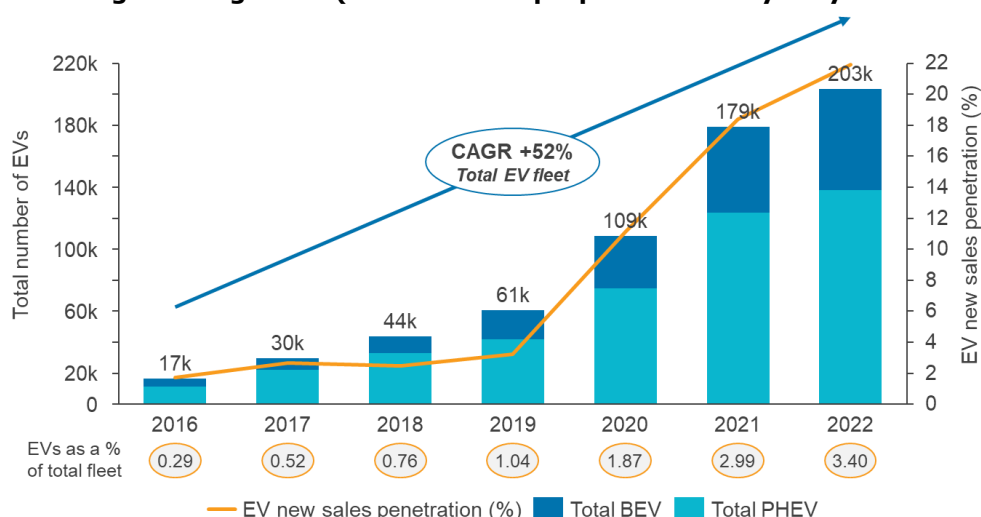
The eMobility sector in Belgium is highly differentiated between the three regions with Flanders being most developed region accounting for 82% of total public EV rechargers installed in the country as of October 2022.<sup>621</sup> This is in line with the region's ambitious targets to reach 100k installed semi-public recharging points by 2030, which is higher than those of Brussels, 22k public recharging points by 2035, and of Wallonia, 7k public recharging points by 2025.<sup>622,623,624</sup> As EV adoption continues to rise in Belgium, with Flanders considering a ban on ICE vehicles from 2029,<sup>625</sup> authorities have stressed the importance of an appropriate recharging infrastructure to achieve higher EV penetration.<sup>620</sup> Although, home recharging is expected to play a more prominent role in the country compared to its neighbours (as in Belgium 60% of the population have a driveway where a home recharging unit could be installed, compared to only 9% in the Netherlands), public rechargers deployment will need to quicken to align with the levels recommended by the European Commission, as depicted in Figure 46 below.<sup>626</sup>

For the ensuing assessment, and as of October 2022, Belgium was classified as a "developed market" due to its relative performance in recharging points deployed and EV penetration across the EU27 + the UK – 11<sup>th</sup> best ratio in terms of EVs per recharger (11:1) and 3.4% of all cars on the road being electric (5<sup>th</sup> best).

### 7.4.1. Industry statistics in Belgium

In recent years, Belgium has seen significant growth in EV adoption. Between 2016 and 2022, the number of EVs on the roads in Belgium increased 12-fold, rising from 17k to 203k. This growth has been mainly driven by BEVs, which accounted for 68% of all EVs in 2022. Furthermore, EV penetration among new vehicle sales in Belgium increased dramatically, rising from less than 4% in 2019 to around 22% in 2022. Consequently, EVs now make up 3.4% of the total vehicle fleet in Belgium, which is the fifth highest share among the EU27 + the UK.

**Figure 45: Belgium EV growth (total EVs and proportion of all yearly vehicle sales)<sup>627</sup>**



<sup>621</sup> CRA analysis

<sup>622</sup> Frank Jacobs, "Flanders to ban new ICE sales by 2029", November 2021

<sup>623</sup> Nora Manthey, "All Brussels car parks must provide EV charging by 2025", October 2022

<sup>624</sup> Félix Bouland, "7 000 charging points in Wallonia by 2025", May 2021

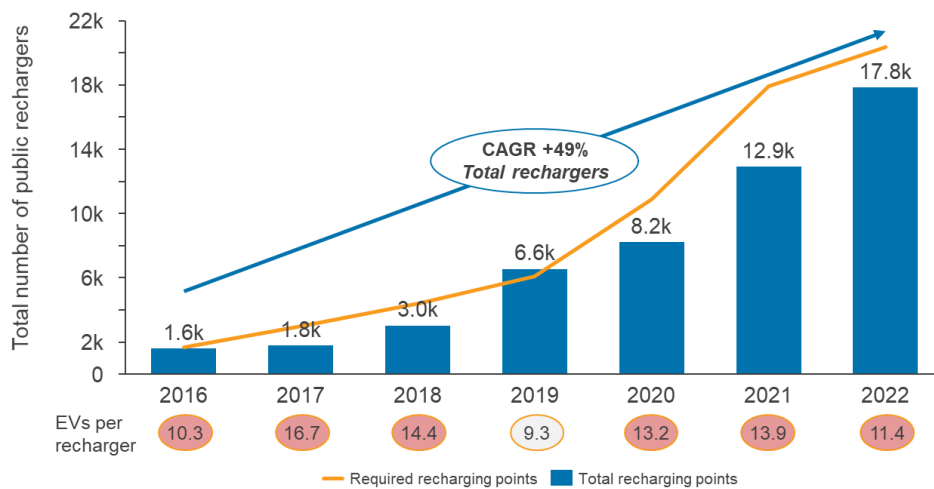
<sup>625</sup> Chris Randall, "Flanders considers banning combustion vehicles from 2035", December 2022

<sup>626</sup> Peter Nikolov, "The Essential Guide to EV and EV charging incentives in Belgium", August 2021

<sup>627</sup> European Commission, "European Alternative Fuels Observatory – Belgium", October 2022

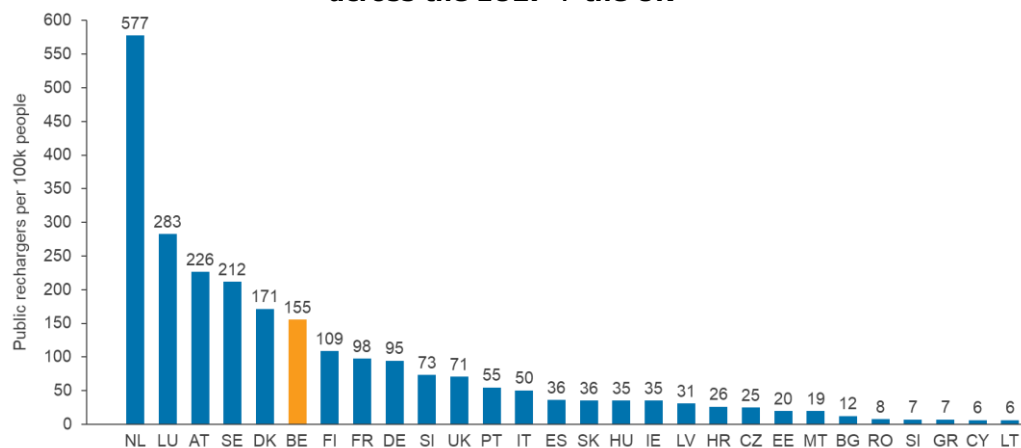
When it comes to recharging infrastructure, as shown in Figure 46, Belgium has seen steady growth in the number of recharging points over the last few years. The number of public recharging points grew by more than 10-fold from 2016 to 2022, with a CAGR of 49% over the same period. Nevertheless, the rollout of rechargers has not kept up with the country's pace of EV adoption, resulting in a ratio of EVs to recharging points of 11.4 that is higher than the level recommended by the European Commission. This trend was only broken in 2019, due to a slower rate of EV adoption and a 100% year-on-year growth in the number of public recharging points. As of October 2022, there were 17.8k public recharging points installed, with 90% of them having a power level <22kW, 7% between 22kW and 150kW, and 3% >150kW. This put Belgium in 14<sup>th</sup> place among EU27 + the UK<sup>628</sup> countries in terms of EVs per charge point.

**Figure 46: Belgium recharging points vs. required recharging points (based on EU recommended ratio of 1 recharger per 10 EVs)<sup>629</sup>**



Normalising public rechargers deployed by population and comparing it across the EU27 + the UK, Belgium falls within the top 10 markets, ranking sixth, with 155 public recharging points per 100k inhabitants. This is illustrated in the chart below.

**Figure 47: Public recharging points installed per 100k people as of October 2022 across the EU27 + the UK<sup>630</sup>**



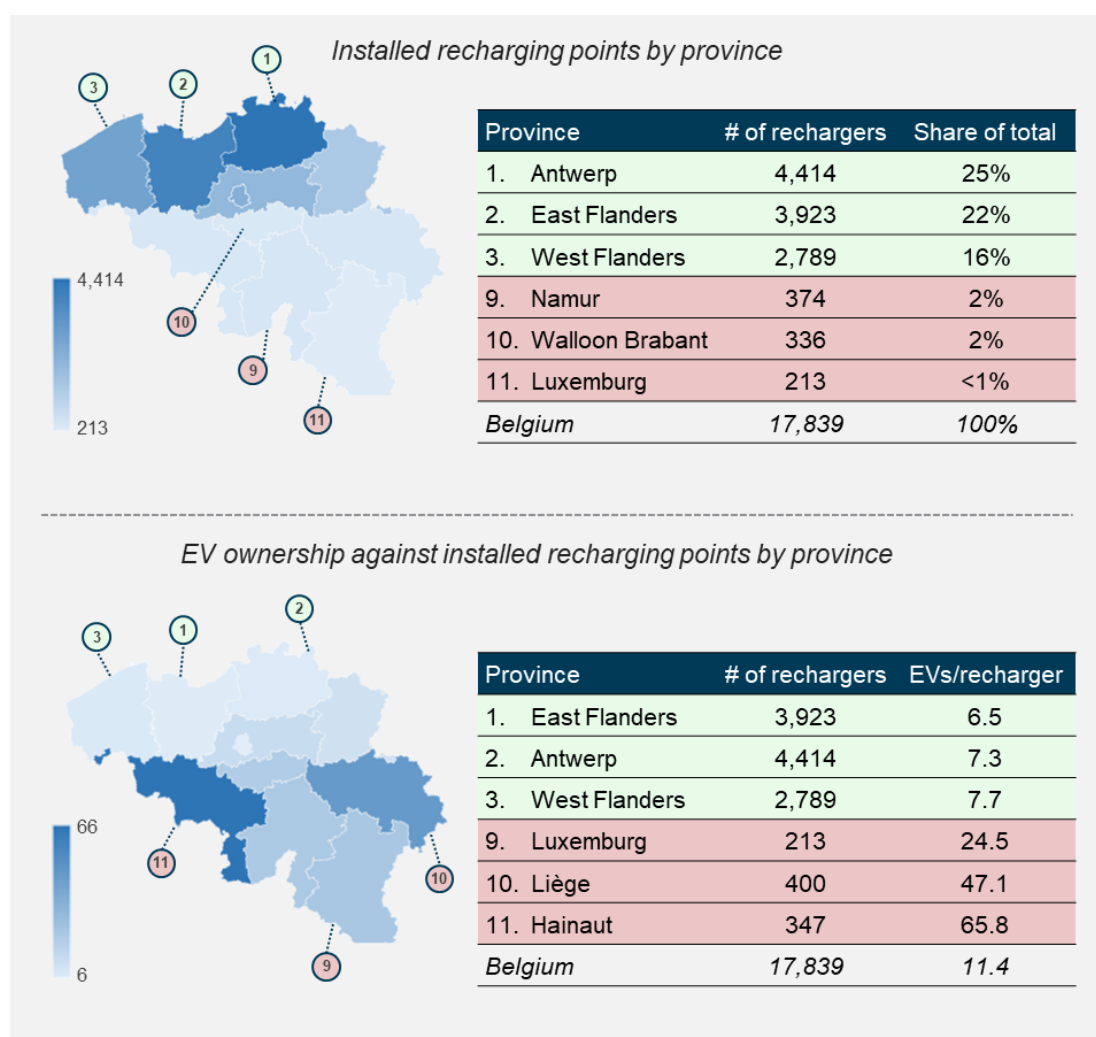
<sup>628</sup> CRA analysis

<sup>629</sup> European Commission, "European Alternative Fuels Observatory – Belgium", October 2022

<sup>630</sup> European Commission, "European Alternative Fuels Observatory – Belgium", October 2022

As seen in Figure 48, the distribution of recharging points in Belgium has not developed evenly across the country. Specifically, as of October 2022, only 9% of all recharging points in Belgium were installed in Wallonia (3.6m people) and the capital region of Brussels (1.2m people) combined, while the remaining 82% were deployed across the Flemish provinces (6.6m people).<sup>631</sup> These disparities between the regions become more heightened when focusing on the high-speed recharging segment. When filtering for recharging stations with a capacity >75 kW, it emerges that a very limited number of such stations exist in Wallonia (a vastly different picture to the rest of Belgium) and almost none are situated along major motorways in the most Southern provinces.<sup>632</sup>

**Figure 48: Geographical dispersion of recharging points in Belgium**  
(top 3 performing counties in green, bottom 3 in red)<sup>633</sup>



### Brussels

In Brussels, investments in EV infrastructure from both the private and public market have led to the development of an extensive network. As of October 2022, over 1.6k recharging points could be found in the province – approximately 1 for every 10 EVs,

<sup>631</sup> CRA Analysis based on Appendix Fand Electromaps

<sup>632</sup> Octopus Energy, "Electroverse EV recharging map", December 2022

<sup>633</sup> CRA Analysis. Data on the number of recharging points split by region per 100k people is available in Appendix G

the 4<sup>th</sup> best ratio out of all Belgian provinces.<sup>634</sup> The current distribution of public recharging points, and future deployment goals, are depicted in Figure 49 below. Unlike other areas across Member States, Brussels is a highly dense urban centre with 65% of cars belonging to households with no off-street parking. Therefore, local authorities estimate only 44% of recharging will occur at home, making public recharging crucial to the advancement of eMobility in the region (in contrast, across the EU27 + the UK private recharging is expected to account for close to 80% of recharging).<sup>635</sup>

**Figure 49: Geographical distribution of recharging stations in Brussels**  
(blue = public, yellow = semi-public)<sup>636, 637</sup>



#### Present status (October 2022)

- Approx. 1.6k public recharging points as of October 2022
- Approx. 1k+ public recharging stations (65% <22kW)

#### Deployment goals

- 1 public terminal <150m from each household in Brussels by 2024
- 9.5k public recharging points by 2025
- 22k public recharging points by 2035

#### Flanders

Flanders, and the 5 individual Flemish provinces (East Flanders, Antwerp, West Flanders, Limburg, Flemish Brabant), has been extremely successful in promoting the development of EV infrastructure with over 14.5k recharging points installed as of October 2022. East Flanders, Antwerp, and West Flanders have all been able to keep their EVs per recharger ratio below 10, an impressive feat considering wide-spread EV adoption (at an aggregate level, the Flemish provinces remained below the threshold with approximately 8.5 EVs per recharger). Moreover, when assessing the picture in Flanders at a municipal level and as shown in Figure 50, the network is more developed in the larger cities, but all Flemish municipalities had a minimum of one recharging point installed as of January 2022.<sup>638</sup> This highlights that no clear recharging deserts have emerged in the region, with the top 5 municipalities only responsible for approximately 20% of recharging points, enabling EV drivers to recharge where most convenient.

<sup>634</sup> CRA Analysis

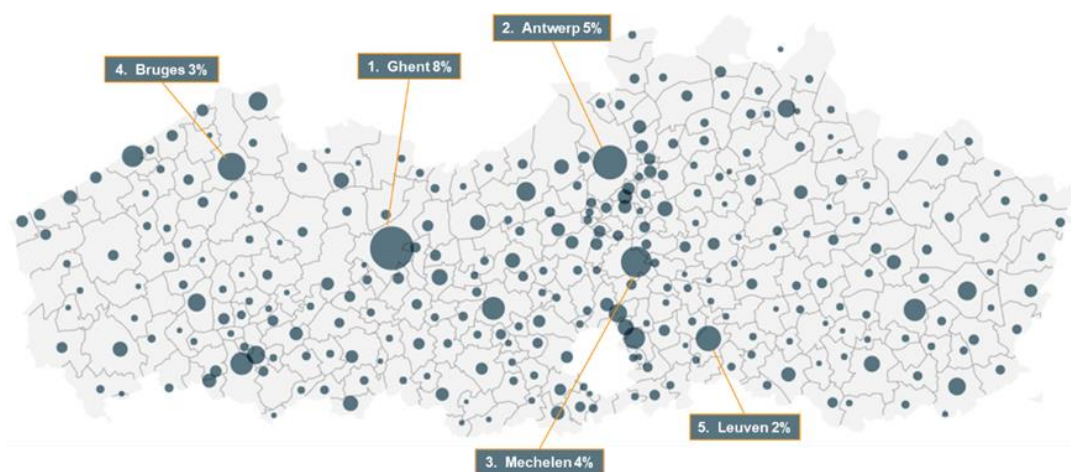
<sup>635</sup> Electrify.Brussels, "EV recharging deployment plan", 2022

<sup>636</sup> Ibid.

<sup>637</sup> Public recharging stations refer to terminals located on the street and accessible 24/7. Semi-public recharging stations refer to terminals located in public car parks or buildings open to the public

<sup>638</sup> Ghent was the leader with 478 public recharging points. Antwerp, Mechelen, Bruges, Leuven, Kortrijk, Hasselt, Aalst and Zaventem also had more than 100 public recharging points on their territory by the end of 2021.

**Figure 50: Geographical distribution of recharging points across the Flemish municipalities at the end of 2021 (the larger the circle, the more recharging points installed)<sup>639</sup>**



### Wallonia

The three worst performing provinces in terms of total rechargers installed and in terms of EVs per recharger are all found in Wallonia. In fact, while the 5 provinces of Wallonia (Hainaut, Liège, Namur, Walloon Brabant, Luxembourg) account for 32% of the Belgian population and close to 30% of EVs in the country, together they only host 9% of all recharging points.<sup>640</sup> This has led Wallonia to be significantly behind the EU recommended EVs per recharger ratio, with almost 40 EVs on the road for every public recharging point (above the figures of any country across the EU27 + the UK, surpassing Malta and Lithuania who as of October 2022 had approximately 30 EVs per public recharging point).<sup>641</sup> Out of the 5 provinces, Hainaut has been the slowest to develop, having installed less than 350 rechargers (2% of the public points in Belgium) to serve a population of over 1.3m residents (placing it in the bottom 20% in terms of rechargers per capita across the EU27 + the UK). This overall lack of availability of recharging points in the South has given rise to recharging deserts, with significant work needed to bridge the gap and to ultimately enable EV drivers to reap the benefits of a well-developed network across the entirety of Belgium. This is partially due to the central role played by the local DSO who has been cited by market participants as a blocker to deploying EV recharging infrastructure in the region. Specifically, in the past it has discouraged any direct grid connection for recharging points, suggesting behind the meter should be the focus, making it very difficult to find locations with spare power capacity to install recharging points.<sup>642</sup>

The Government of Wallonia has recognized it has lagged compared to neighbouring regions when it comes to EV infrastructure, announcing in November 2022 that it intends to speed up the pace of installation of recharging stations. The ambition is to deploy 6k evenly distributed public recharging points by 2026 – 4k on public roads, 2k in private areas accessible to the public, and 1k fast rechargers on major motorways and national roads (to be deployed by SOFICO, the road network managing company). To support this, €15m have been allocated to the initiative in 2022 and 2023 as part of the country's recovery and resilience plan, reducing the financial risk and resources

<sup>639</sup> Flemish Government, "Public recharging points for electric cars", January 2022

<sup>640</sup> CRA Analysis

<sup>641</sup> European Commission, "European Alternative Fuels Observatory", October 2022

<sup>642</sup> Study interview, Belgian CPO, November 2022

needed from local authorities and other stakeholders. Moreover, a map identifying over 2k target sites has been established through consultation with players in the field, including SOFICO, distribution network managers and territorial development agencies.<sup>643</sup>

#### 7.4.2. Policy overview in Belgium

Belgian regulation around EVs and EV recharging infrastructure is governed by both the federal state and the three regions – Flanders, Wallonia, and Brussels. There is a division of responsibility between the state and the regions, each holding a specific set of duties with respect to the regulation of EVs and EV recharging infrastructure. Flanders in particular has a history of being the most developed out of the three regions, with 90% of Belgian rechargers situated in Flanders at the beginning of 2019 (as of October 2022, this disparity slightly decreased, and Flanders now accounts for slightly over 80% of recharging points).<sup>644</sup>

The remit of the federal state is smaller, where duties pertain to controlling and maintaining product standards, enabling access to the transmission grid, and ensuring the security of supply. The regions have a wider remit which centres around town and country planning, environmental protection measures, communal urban and regional transport, distribution of electricity and other dimensions.<sup>645</sup> Overall, the country does not have a unified regulatory approach when it comes to EV recharging. In fact, no national strategy concerning the rollout of recharging infrastructure has been established, leaving municipalities free to decide on the installation of recharging points at the local level.<sup>646</sup>

This division of governance and responsibility between the federal state and the regions, as well as between the regions themselves, is a possible driver of the significant differences in the availability of recharging infrastructure across regions. Hence, while the Belgian EV recharging market has been classified as developed, that is not the case for the entirety of its territory.

With respect to permits for the installation of public recharging infrastructure, public authorities usually work with operators to provide domain concessions, granting the operator rights to use an area of the public domain for an indefinite period. This concession typically prevents other operators from occupying the area in question. For installation of recharging points in the private domain (e.g., a car park), operators will be expected to follow public procurement rules.<sup>647</sup>

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<sup>643</sup> Walloon Government, "Towards a uniform deployment of electric charging stations in Wallonia", November 2022

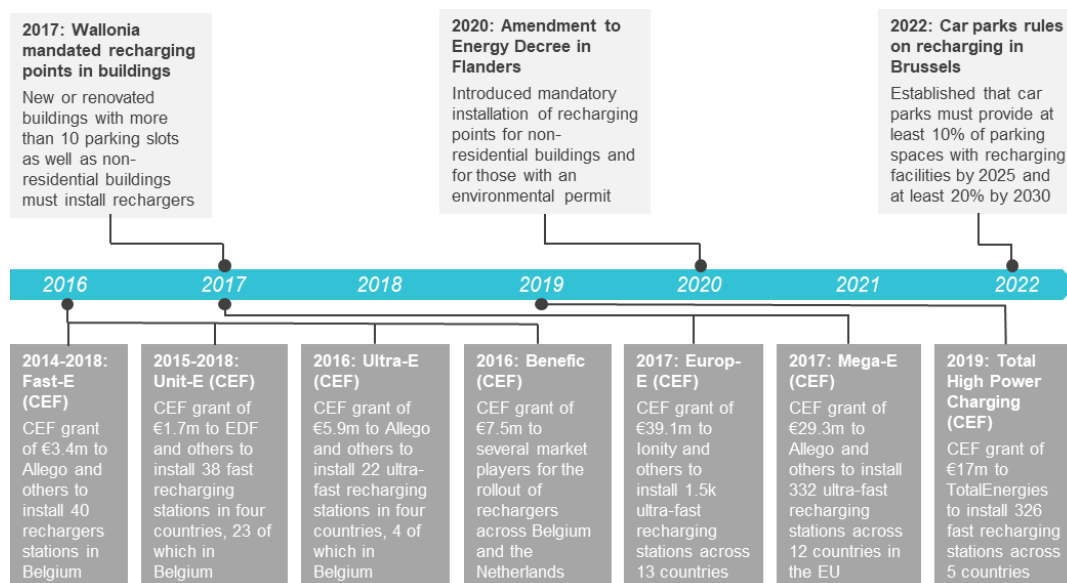
<sup>644</sup> Statista, "Number of charging points in Belgium in 2019, by province,"

<sup>645</sup> David Haverbeke, Wouter Vandenborgh and Guillian Baclin, "Green mobility – Charging Infrastructure and Electric Vehicles in Belgium", January 2022

<sup>646</sup> Robert van der Eijk *et al.*, "Electric Vehicles in Belgium, Charging Towards the Future", June 2020

<sup>647</sup> David Haverbeke, Wouter Vandenborgh and Guillian Baclin, "Green mobility – Charging Infrastructure and Electric Vehicles in Belgium", January 2022



**Figure 51: Regulatory (light grey) and Public support (dark grey) timeline<sup>648</sup>**

### 7.4.3. Regulation in Belgium

There are varying regulatory actions that have been taken in each of the regions with respect to both EVs and recharging infrastructure.

#### Brussels

Brussels has a target of 11k public recharging stations by 2035 and a goal to have a recharger located within 250 meters of every citizen's residence by 2022 (and within 150 meters by 2024).<sup>649</sup> It also passed a decree on 25<sup>th</sup> February 2021 setting out recharging infrastructure requirements for new car parks. Any new car park must be fitted with a technical room to enable connection of recharging points to the grid and each new car park must be fitted with at least one recharging point as well as connection infrastructure for every space to enable future installation of recharging points.<sup>650</sup> This obligation was further refined in October 2022, when the City of Brussels ordered that office car parks must provide at least 10% of parking spaces with recharging facilities by 2025 and at least 20% by 2030. For public car parks, the quote is slightly lower – 5% by 2025 and 10% by 2030.<sup>651</sup>

As with other regions, no town planning or environmental permit is required for the installation of a recharging point. Although there is no explicit regulation on the obligation of a town planning permit, this is typically not deemed necessary. However, The Brussels-Capital Region works with an exclusive partner for the supply, installation and operation of publicly accessible recharging stations through an exclusive service concession.<sup>652</sup> Since 2018, this has led to only two CPOs operating on public roads, with more details available in Section 7.4.7.

Brugel (the Brussels energy regulator) has advised that the offering of recharging services does not qualify as the supply of electricity in the strict sense but as a broader

<sup>648</sup> Detailed descriptions can be found in the Regulation and Public Support sections below

<sup>649</sup> The Brussels Times, "Everyone in Brussels to live within 250m of an electric vehicle recharger by 2022", November 2021

<sup>650</sup> Mon Astuces & Conseils, "Mandatory charging stations in Wallonia and Brussels", May 2021

<sup>651</sup> The Brussels Times, "All Brussels car parks must install electric vehicle charging points by 2025", October 2022

<sup>652</sup> David Haverbeke, Wouter Vandorpe and Guillian Baclin, "Green mobility – Charging Infrastructure and Electric Vehicles in Belgium", January 2022



service. As such, a supply license, as per Article 21 of the Brussels Electricity Ordinance, is not required for the operator of a recharging station. However, Brugel has not communicated the possibility to extend the network and create a larger grid, as is the case in Flanders. Since no exemption on the general ban on private distribution grids exist, it is assumed that Article 24 of the Brussels Electricity Ordinance applies, which obliges the distribution grid operator to adopt and implement the necessary technical measures to allow the electricity supply via these recharging points, as a public service obligation.

### Flanders

In October 2020, the Flemish government published an amendment to the Energy Decree of 19<sup>th</sup> November 2010. This states that for new buildings and parking areas for which an environmental permit is requested, there is an obligation to have recharging stations installed as of 11<sup>th</sup> March 2021. For permit applications prior to this date, there was no requirement to meet these obligations. For new non-residential buildings or renovations, buildings with car parks of at least 11 spaces at least two recharging stations must be installed (with a minimum power of 3.7kW). Further to this, connection infrastructure must be provided for 1 in 4 parking spaces. Flanders has also introduced future obligations, requiring that, from 2025, at least two recharging points are provided in parking areas of existing non-residential buildings where there are at least 21 spaces.<sup>653</sup>

With respect to permitting, Article 10 (5) of the Flemish Decree on Exemption states that no permit (town planning or environmental) is required to install a recharging point on public domain or private land. This exemption is aimed at incentivising the adoption of electric vehicles and the rollout of supporting infrastructure. However, permission from the Flemish Region or one of its associated agencies is required if the recharging point is to be installed on a road or domain managed by the region.<sup>654</sup>

Installation of a recharging point requires a connection to the distribution network, and the recharging point operator can also choose to build the remaining network for the distribution of the access point on the distribution network. This gives the operator responsibility for the construction, management and maintenance of the private distribution network but avoids any public service obligations to the customer. An additional supply license is not required but if the private network crosses into the public domain, then the operator must obtain permission from the distribution network operator.<sup>655</sup>

### Wallonia

Announced in February 2017, buildings to be constructed or those undergoing major renovation (more than 1/4 of the building area) that are connected to more than 10 parking spaces, have electric recharging obligations from 11<sup>th</sup> March 2021. For buildings that are intended for individual housing (e.g., houses or apartments), there needs to be connection infrastructure (pre-wiring to allow installation of recharging stations) installed for every car parking space. For non-residential buildings (e.g., offices, industry, or collective housing such as nursing homes and hotels), there needs to be a recharging station and associated connection infrastructure installed for every 1 in 5 parking spaces. The Walloon government has yet to determine the requirements applicable from 2025 for non-residential buildings with more than 20 parking spaces.<sup>656</sup>

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<sup>653</sup> Flemish Government, "Decree of the Flemish Government amending Energy Decree...", October 2020

<sup>654</sup> David Haverbeke, Wouter Vandorpe and Guillian Baclin, "Green mobility – Charging Infrastructure and Electric Vehicles in Belgium", January 2022

<sup>655</sup> Ibid.

<sup>656</sup> Wallonie energie SPW: EPB & electromobility requirements from March 11, 2021: February 2017

For the installation of recharging points, no permit is required in Wallonia, town planning or environmental, except when the recharging point is to be located outside the private domain. In these cases, a town planning permit is required but this can be obtained via a simplified procedure.<sup>657</sup>

With regards to requirement of a supply license, Article 30.6 of the Walloon Electricity Decree states that the exemption of a supply license for the supply of electricity to users of public recharging points applies if the recharging point connection itself is covered by a supply licence. One circumstance that contradicts this however is if the operator is also the supplier of its self-generated electricity. This operator would, under the Decree, need a supply license. The CWaPE (Walloon energy regulator) has suggested that in such a case the operator should be explicitly exempted from the obligation to have a supply license.<sup>655</sup>

For larger grids, no similar exemption exists regarding the ban on private distribution grids as in Flanders above. One exemption to this ban, however, is the provision of electricity as part of a larger service, also found in the Walloon Electricity Decree under Article 15 (1). This is because the CWaPE classified recharging via recharging points as a service instead of as a supply of electricity. Following this classification as a service, recharging stations can be considered as an exemption to the ban on private distribution grids and are therefore not in need of a supply license.<sup>655</sup>

#### 7.4.4. Public support for EVs and recharging in Belgium<sup>658</sup>

EV registrations and deployment of EV recharging infrastructure have accelerated significantly in recent years, following a period of stagnancy prior to 2020. Regional governments have introduced various schemes and incentives but there have also been federal-level initiatives introduced to support the rollout. In fact, while the federal government is responsible for tax reductions via personal taxes and benefits in kind, regions oversee road taxes and the tax on traffic.<sup>655</sup> Furthermore, many companies operating in Belgium benefitted from EU public support in the form of grants from the CEF, as shown in Table 35 below.

**Table 35: Total EU public support to Belgium by firm (2016-2022)<sup>659</sup>**

Company	EIB loans (€m)	CEF grants (€m) <sup>444</sup>
Allego	0	18
EVBox	0	0
TotalEnergies	0	17
IONITY	0	6.5
EDF	0	0.2

<sup>657</sup> David Haverbeke, Wouter Vandenborgh and Guillian Baclin, "Green mobility – Charging Infrastructure and Electric Vehicles in Belgium", January 2022

<sup>658</sup> The list of public support is an exhaustive representation of State aid support for EV recharging at the national level based on the results of this study's desk-based research. The measures included were in force, for some or all years, between 2016 and 2022, due to the infancy of the sector and the way data is publicly accessible and presented, additional evidence may come to light with other searches.

<sup>659</sup> Summary table of the EU public funding measures discussed below. Initiatives from Interreg Europe were not included as recipients are local public authorities rather than private market players. National public support measures were also not included as data granularity does not allow for a view of total grant amounts allocated to each company. "0" means the company did not receive any contribution from the specific source.

The main regional, federal and EU funded public support to eMobility in Belgium are discussed below.

### ***Federal Level EV and EV recharging subsidies***

Subsidies for EVs adoption and EV recharging infrastructure in Belgium are limited, and generally apply to businesses. Of the three regions, Flanders is the only to provide State aid to public EV recharging in the form of grants. Furthermore, Flanders have conducted public tenders for public EV recharging projects, supporting the sector's development. Brussels support only EV adoption, via both tax discounts and the provision of grants for EVs purchase. Wallonia provides the least State aid to eMobility, limited to tax discounts to EVs.

### ***Brussels EV purchase subsidies***

Micro or small companies can benefit from regional government subsidies for the replacement of light commercial vehicles that can no longer drive in Brussels' Low Emission Zone. Certain conditions allow such companies to apply for aid of up to €15k when leasing or purchasing an electric or petrol utility vehicle and this can also partially cover the cost to install a recharging station.<sup>660</sup>

### ***Brussels Tax benefits***

Battery and fuel cell electric vehicles are both required to pay the minimum registration tax rate of €62 and must also pay the lowest rate of annual road tax at a cost of €85 for passenger vehicles (M1) and €39 for vehicles <3.5 tonnes carrying goods (N1).<sup>661</sup>

### ***Flanders EV recharging subsidies<sup>662</sup>***

(Semi) public recharging

- Since 2020, Flanders have been financing the rollout of recharging infrastructure as part of the regional government's Clean Power for Transport (CPT) programme.<sup>663</sup> The regional DSO Fluvius conducted four public tenders on behalf of the regional government between 2019 and 2020. All concessions were awarded to Allego, which was mandated the installation of 5k public recharging points and 0.4k private ones in more than 300 municipalities across Flanders.<sup>664</sup> Furthermore, in 2020 the regional government announced it was allocating €30m to build up to 30k additional recharging points by 2025 with the aim to provide a fast-recharging facility with every 25 kilometres along the major transport axes.<sup>665</sup>
- In 2022 the Flemish government introduced a grant for the installation of public recharging infrastructure.<sup>666</sup> The grant covers up to 20% of total purchase and installations costs for a maximum of €1k per recharging point and €300k per project.<sup>667</sup>

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<sup>660</sup> Brussels Economy & Employment, "Prime LEZ: replace its utility and install a charging station"

<sup>661</sup> ACEA, "Electric vehicles tax benefits & purchase incentives", 2022

<sup>662</sup> Due to data granularity issues, only aggregated figures are available. The total share of funds received by each company is not publicly available.

<sup>663</sup> The measure's total budget is not publicly available

<sup>664</sup> Allego, "Network Allego expands its network with 1,300 charging points in Flanders", January 2020

<sup>665</sup> Chris Randall, "Flanders targets 30,000 new charging points by 2025", November 2020

<sup>666</sup> The measure's total budget is not publicly available

<sup>667</sup> Wouter Desmet, "Subsidy call for investment projects regarding EV charging infrastructure", July 2022

### ***Flanders EV purchase subsidies***

The Flanders government provided a €4k BEV purchase incentive to consumers, which was later scrapped in 2020.<sup>668</sup> Flanders provides an ecology bonus through its Ecology Premium Plus scheme, which is a grant for SMEs and large companies which realise ecology-related investments in the Flemish region. Investments in environmental technologies; energy technologies; and/or renewable energy among other things are all eligible for the bonus, including EV recharging infrastructure. Each company can receive a grant of as much as 55% of the cost of investment – this is dependent on the size of the company and the category that the technology belongs to. The grant is calculated based on the supplementary investment cost of the eligible investment components and can amount to €1m at most over a period of 3 years.<sup>669</sup>

### ***Flanders Tax benefits***

Battery electric vehicles and pure hydrogen vehicles are exempt from registration tax and are also exempt from paying road tax.<sup>670</sup> These benefits apply to both personal and company electric vehicles.<sup>671</sup>

### ***Wallonia Tax benefits***

Battery and fuel cell electric vehicles are both required to pay the minimum registration tax rate of €62 and must also pay the lowest rate of annual road tax at a cost of €85 for passenger vehicles (M1) and €39 for vehicles <3.5 tonnes carrying goods (N1).<sup>672</sup>

### ***Federal Level Tax benefits***

- In November 2021, the federal government introduced Circular 2021/C/113, which included measures for the VAT treatment of the installation of recharging stations for electric vehicles, recharging of an electric vehicle, and deductibility of input VAT for company vehicles. The new rules on the deductibility of costs for company cars that are electric put them at an advantage over petrol, diesel, and hybrid cars (i.e., more costs can be deducted for electric vehicles – up to 100% deduction before 2027). Businesses can also benefit from tax incentives for recharging station installation with a 200% deduction for investments made by the end of 2022 and a 150% deduction for investments made before the 31<sup>st</sup> of August 2024. There are also investment deductions provisioned for investments in zero-emission trucks, in electric recharging infrastructure for such trucks and in tank infrastructure for hydrogen.<sup>673</sup>
- The government has also recognised the need for accelerated uptake of recharging stations at home. Tenants or property owners can benefit from an investment tax reduction benefit if they purchase and install a recharging station between the 1<sup>st</sup> of September 2021 and the 31<sup>st</sup> of August 2024. The tax reduction is 45% between the 1<sup>st</sup> of September 2021 and the 31<sup>st</sup> of December 2022 and will fall to 30% in 2023 and 15% in 2024. The recharging station must be smart, can only use green electricity, and has a cost limit of €1,500, which also applies per taxpayer.<sup>674</sup>

<sup>668</sup> European Alternative Fuels Observatory, "Belgium, Incentives and Legislation"

<sup>669</sup> Flanders Government: "Ecology Premium Plus"

<sup>670</sup> Flanders Government, "Exemption for pure electric and pure hydrogen vehicles"

<sup>671</sup> Flanders Government: "Additional benefits"

<sup>672</sup> ACEA, "Electric vehicles tax benefits & purchase incentives", 2022

<sup>673</sup> KPMG, "Electrification of company cars: new rules on deductibility and incentives for charging...", December 2021

<sup>674</sup> Autovista24, "Belgian government pushes electrification of company cars", June 2021

- With respect to electric vehicle tax benefits, there are some regional differences that exist in relation to the acquisition and ownership of personal and company vehicles.

### **EU public support<sup>675</sup>**

Since 2014, Belgium has received over €18m in funding for deployment of recharging infrastructure through a variety of projects connected to the CEF initiative. These program initiatives have generally been in conjunction with other European countries, where recharging developers have deployed infrastructure across several countries.<sup>676</sup>

- **Fast-E:** launched in 2014, the project was aimed at the installation of 40 fast rechargers in Belgium and 181 in Germany over the period from 2014 to 2018. Allego was the project coordinator. The initiative was awarded a €3.4m grant from the CEF.<sup>677</sup>
- **Unit-E:** started in 2014, the project was aimed at the installation of 38 fast recharging stations across four countries, 23 of which in Belgium, in the period from 2015 to 2018. Electricite de France (EDF) was the project coordinator. The initiative was awarded a €1.7m grant from the CEF.<sup>678</sup>
- **Ultra-E:** established in 2015, the project was aimed at the installation of 22 ultra-fast recharging stations across four countries, 4 of which in Belgium, in the period from 2016 to 2019. Allego was the project coordinator. The initiative was awarded a €5.9m grant from the CEF.<sup>679</sup>
- **Benefic:** launched in 2016, the project was aimed at supporting the cross-border deployment of alternative fuel infrastructure in Belgium (regions of Flanders and Brussels Capital) and in the Netherlands in line with the respective National Policy Framework (NPF) prepared for the implementation of Directive 94/14/EU. The Flemish Government was the project coordinator. The initiative was awarded a €7.5m grant from the CEF.<sup>680</sup> While the list of realised projects and respective beneficiaries is publicly available, there is no visibility on the funding split between firms.<sup>681,682</sup>
- **Europ-E:** launched in 2017, the project was aimed at the installation of 1.5k ultra-fast recharging stations across 13 countries in the period from 2017 to 2023. IONITY was the project coordinator. The initiative was awarded a €39.1m grant from the CEF.<sup>683</sup>
- **Mega-E:** started in 2017, the project was aimed at the installation of 332 ultra-fast recharging stations across 12 countries in the period from 2017 to 2023. Allego was the project coordinator. The initiative was awarded a €29.3m grant from the CEF.<sup>684</sup>
- **Total High-Power Charging:** launched in 2019, the project is aimed at the installation of 326 fast recharging stations across Belgium and four other countries over the

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<sup>675</sup> CRA analysis – CEF grants

<sup>676</sup> CRA analysis

<sup>677</sup> Innovation and Network Executive Agency, “Fast-E”, April 2022

<sup>678</sup> Innovation and Network Executive Agency, “Unit-E”, April 2022

<sup>679</sup> Innovation and Network Executive Agency, “Ultra-E”, April 2022

<sup>680</sup> Innovation and Network Executive Agency, “Benefic”, April 2022 Innovation and Network Executive Agency, “Benefic”, April 2022

<sup>681</sup> Benefic, “Selected projects from the three calls for projects”

<sup>682</sup> Beneficiary companies include but are not limited to Fastned, PitPoint, Blue Corner, Allego and ESB

<sup>683</sup> Innovation and Network Executive Agency, “Europ-E European Ultra-Charge Roll Out Project”, April 2022

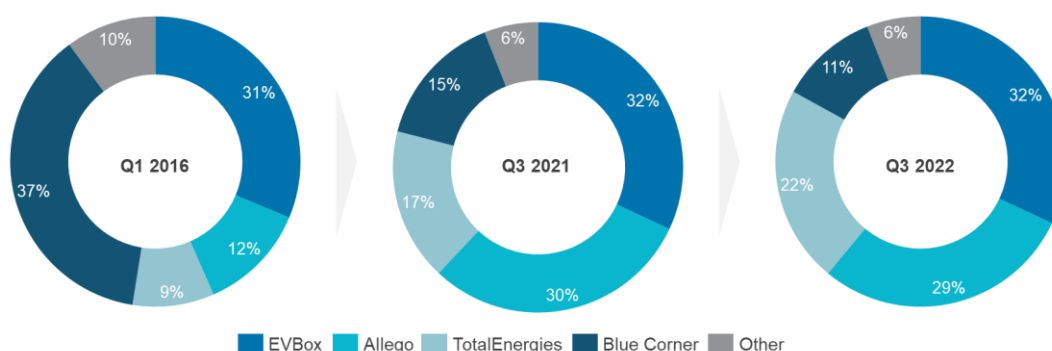
<sup>684</sup> Innovation and Network Executive Agency, “Mega-E Metropolitan Greater Areas”, April 2022

period from 2020 to 2023. TotalEnergies is the project coordinator and only beneficiary. The initiative was awarded a €17m grant from the CEF.<sup>685</sup>

#### 7.4.5. CPO shares in Belgium and evolution over time

As outlined in the Belgium country summary in Appendix A, the Belgian eMobility industry is advanced relative to the EU average with the country's position driven mainly by the Flanders and Brussels regions. As early as 2016 several major EV recharging players were present (i.e., EVBox, Allego, TotalEnergies, Blue Corner), each accounting for close to or more than 10% of installed recharging points. As of October 2022, EVBox and Allego have cemented their position each operating approximately 30% of rechargers, however ambitious commitments from all four major CPOs and other aspiring new entrants cause the picture to constantly evolve. The key CPOs operating in the Belgian market can be seen in the breakdown of market players in Figure 52.

**Figure 52: Belgium CPO share by installed recharging points<sup>686</sup>**



The data illustrated in Figure 52 is correct as of October 2022 (as described at the start of this section) and gives the most accurate current share breakdown based on data availability and quality. The historical industry data available does not allow for a year-by-year share evolution analysis, however there are some key data points that highlight trends over time. Specifically:

- Blue Corner was the market leader early on, gaining a strong foothold by partnering with Flemish municipalities to run pilot projects starting in 2013 and operating close to 600 recharging points by 2016.<sup>687</sup> At the time, Total also operated around 150 recharging points.<sup>688</sup>
- In 2017, EVBox had approximately 36k recharging points installed across 20+ countries with an estimated 1.8k in Belgium (which saw a 350% year-on-year increase, indicating EVBox had slightly more than 50,000 recharging points in 2016).<sup>689</sup> At the same time, there were 1.6k recharging points in Belgium.
- In 2021, Blue Corner was acquired by Blink Charging. At the time, it had approximately 1.7k operational recharging points in Belgium.<sup>690</sup> Moreover, according to Hubject and Fleet Europe, Allego and EVBox each operated close to 3.5k

<sup>685</sup> Innovation and Network Executive Agency, "Total High Power Charging", April 2022

<sup>686</sup> CRA Analysis: The 2022 picture was developed based on the data gathering methodology presented in Appendix F. The 2016 and 2021 pictures are indicative and based on desk-based research and CRA analysis – these views have a lower level of absolute confidence and are more indicative

<sup>687</sup> S. Bakker and J.J. Trip, "E-Mobility in Europe: Trends and Good Practice", 2013

<sup>688</sup> TotalEnergies, "Total and fast-E are joining forces for a network of electrical fast-charging infrastructure in Belgium", May 2016

<sup>689</sup> EVBox, "2017 Year in Review", 2017

<sup>690</sup> Electrive, "Blink Charging acquires Blue Corner", May 2021



recharging points.<sup>691</sup> At an aggregate level, there were more than 11.5k recharging points in Belgium by Q3 2021.

These prominent market participants have each emerged from different areas of the energy and mobility ecosystems, ranging from international energy conglomerates to pure play eMobility companies. In Table 36 below, an overview of each company's legal structures and ownership dynamics is provided.

**Table 36: CPO and eMSP legal structure and key services detail (October 2022)** <sup>692</sup>

Firm	Number of Rechargers	CPO share	Type of player (legal structure)	Key CPO services	Interoperability and openness of access
EVBox	5,708	32%	Fully integrated CPO and eMSP founded as eMobility company, owned by a fully integrated utility	On-route, destination, on street	Bilateral agreements with other eMSPs, roaming, ad hoc via pay-as-you-go
Allego	5,173	29%	Fully integrated CPO (focus) and eMSP, separated from a Dutch grid operator and now publicly listed	On-route, destination, on street	Bilateral agreements with other eMSPs, roaming, ad hoc via pay-as-you-go
Total Energies	3,925	22%	Fully integrated CPO and eMSP, founded by international energy company and fuel retailer	On-route, destination, on street	Bilateral agreements with other eMSPs, roaming, ad hoc via pay-as-you-go
Blue Corner	1,962	11%	Fully integrated CPO and eMSP, owned by pure-play EV recharging company Blink Charging	On-route, destination, on street	Bilateral agreements with other eMSPs, roaming, ad hoc via pay-as-you-go
Other	1,071	6%	Small players with less than 1% share	--	--
Total	17,839	100%	--	--	--

As of October 2022, the Belgian market has four major CPOs accounting for approximately 90% of public recharging points (EVBox 32%, Allego 29%, TotalEnergies 22% and Blue Corner 11%). Nevertheless, several other players have developed EV recharging networks across the country, with new entrants and incumbents' expansion plans causing the picture to constantly evolve. Moreover, the maturity of the market, regulatory support, and competitive landscape is highly varied across its three regions, with public recharging and EV adoption being significantly more advanced in Flanders and Brussels compared to Wallonia. These local and national dynamics are discussed in more detail in the following sections. Hubject also has good coverage in the Belgium

<sup>691</sup> Fleet Europe, "EVBox charging stations are now available to 915.000 Chargemap customers", December 2021

<sup>692</sup> CRA analysis



market with more than 76% of recharging points listed on its platform as of October 2022.

#### 7.4.6. Key CPO/eMSP players in Belgium

##### **EVBox**

The EVBox network covers around 32% market share and provides fully integrated CPO and eMSP services. EVBox are a Dutch company conceived in 2010 as a pure play eMobility provider acting as an all-in-one EV recharging provider for their clients which sometimes operate the rechargers under the EVBox brand or labelled as the partner's branding.<sup>693</sup> EVBox provide partners with tailored recharging solutions whereby they manufacture the rechargers, give the option to provide or operate software to manage and access the rechargers (eMSP services), and can provide services to maintain and ensure rechargers remain operational (CPO services).

In 2015, EVBox began its expansion beyond the Netherlands and entered Belgium and Luxembourg.<sup>694</sup> In 2014 Dutch private equity firm Gilde Equity Management acquired a majority stake in EVBox. Three years later in 2017, the vertically integrated French utility Engie purchased EVBox for an undisclosed amount. Engie is a French multinational utility company and the market leader in the sale of electricity, natural gas and energy services in Belgium. As part of its green energy solutions, Engie sells, installs, and maintains smart recharging products for EVs, for employees in their homes and at work.<sup>695</sup>

Following the acquisition from Engie, EVBox expanded its recharging footprint beyond the Netherlands to also cover other EU markets and areas of the US, now with a global footprint of approximately 400k recharging points and offices in Amsterdam, Antwerp, Bordeaux, Copenhagen, Libertyville, Madrid, Milton Keynes, Munich, New York City, Oslo, Paris, Rotterdam, and Warsaw.<sup>696</sup> Towards the end of 2020, EVBox was almost taken public via a Special Purpose Acquisition Company (SPAC) with Engie still retaining 40% ownership of EVBox,<sup>697</sup> however the initial public offering (IPO) did not complete and EVBox remain privately owned.

In 2019, EVBox together with Engie, entered a partnership with Mercedes-Benz for the BeNeLux (Belgium, Netherlands, Luxembourg) countries.<sup>698</sup> This partnership includes private and public recharging and fleets. EVBox provides recharging stations for fleets. Including commercial recharging stations (AC) to fast rechargers (DC) up to 350kW.<sup>699</sup> For public (i.e., freely accessible) recharging stations, EVBox ensures significant coverage in the BeNeLux region of up to 98% and customers pay via real time pricing on the Everon app.<sup>700</sup>

In September 2022, Engie won a concession for the financing, installation, and operation of 2.8k new public EV recharging stations – a total of 5.6k recharging points in Belgium

<sup>693</sup> Public information on the split of these recharging points is not readily available, and from the customer perspective, they interface with an EVBox recharging point and associated software (whilst sometimes the brand of their partner is also visible). Therefore, the analysis considers the EVBox network holistically to include all rechargers EVbox branded, or partner co-branded.

<sup>694</sup> EV Obsession, "EV Charging Solutions Company Entering Belgium and Luxembourg", December 2015

<sup>695</sup> Engie, "Engie in Belgium"

<sup>696</sup> Engie, "ENGIE acquires EVBox, the largest European electric vehicle charging player", March 2017

<sup>697</sup> Bloomberg, "Engie's EVBox to Go Public in \$1.4 Billion SPAC Deal", December 2020

<sup>698</sup> EVBox, "Mercedes-Benz enters BeNeLux partnership with ENGIE and EVBox to electrify fleet", April 2019

<sup>699</sup> Ibid.

<sup>700</sup> Ibid.

(Flemish provinces of Antwerp, Limbourg and Western Flanders). It currently appears that these will be operated under the Engie brand, rather than EVBox.<sup>701</sup>

### **Allego<sup>702</sup>**

Allego is a recharging infrastructure provider that was founded in 2013 in the Netherlands as part of grid operator Alliander and has a share of approximately 29% in Belgium. Since then, it has been independent in its advice, service, and operation of recharging solutions. In 2018, Allego became part of Meridiam (an investor and asset manager) and rapidly expanded within its European network. In March 2022, it became a publicly listed company on the New York Stock Exchange.

Allego delivers smart recharging solutions for electric cars, motorcycles, buses, and trucks for consumers, businesses, and cities. Its end-to-end recharging solutions make it easier for businesses and cities to deliver the infrastructure EV drivers need, while the scalability of its products position it well in the future market.

The company has an international recharging network made up by 28k recharge points operational throughout Europe. Allego's recharging solutions are connected to EV-Cloud, its proprietary platform, which provides customers and itself an array of features and services to satisfy customer needs. A key feature of its service and product delivery is ensuring that customers can recharge at all times, irrespective of which recharging station they are at or type of car, motorcycle, bus, or truck they want to recharge.

Currently, Allego operates 5k public AC recharging points in over 305 Flemish municipalities together with 63 DC fast recharging stations throughout Belgium.<sup>703</sup> It is launching an additional 56 ultra-fast recharging locations alongside the main highways in 2022-2023. Once finalized, it will be the largest DC network in Belgium.<sup>704</sup>

In May 2022 it entered a long-term High-Power Charging (HPC) partnership with G&V Energy Group (the biggest independent player in the Belgian ICE fuel stations market) in order to install ultra-fast EV recharging stations at 100 ICE fuel stations operated by G&V Energy Group's by 2024.<sup>705</sup> The construction of 12 locations is due by the end of 2022, with all locations co-financed by the European Union.<sup>706</sup> This partnership sees the potential for another 150 sites.<sup>707</sup>

In September 2022, Allego introduced new prices for its recharging stations in various European countries (i.e., Germany, France, Belgium, and the Netherlands). At present, in Belgium EV drivers pay €0.60/kWh for regular rechargers, €0.75/kWh for fast rechargers and €0.85/kWh for ultra-fast rechargers.<sup>708</sup>

### **TotalEnergies**

TotalEnergies, is a French multi-energy company and integrated player of electric mobility with a share of approximately 22% in Belgium. In 2019, it launched "EV Charge" as its own international business line dedicated to electric mobility.<sup>709</sup> In 2018,

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<sup>701</sup> Engie, "ENGIE steps up its commitment to low-carbon mobility and wins a concession for 5600 electric vehicle charging points in Belgium" September 2022

<sup>702</sup> Allego, "About us"

<sup>703</sup> Electrive, "Allego EV chargers coming to pit stops across Belgium", May 2022 Electrive, "Allego EV chargers coming to pit stops across Belgium", May 2022

<sup>704</sup> Business Wire, "Allego Enters a Partnership With G&V Energy Group in Belgium", May 2022 Business Wire, "Allego Enters a Partnership With G&V Energy Group in Belgium", May 2022

<sup>705</sup> Ibid.

<sup>706</sup> Ibid.

<sup>707</sup> Ibid.

<sup>708</sup> Allego, "Introducing new charging tariffs on October 7, 2022", September 2022

<sup>709</sup> TotalEnergies, "EV CHARGE: TotalEnergies and electric mobility"

TotalEnergies acquired G2mobility, a French company with leadership and deep expertise in the EV recharging sector.<sup>710</sup> EV Charge's objective is to steer electric mobility interests within the Group, including defining and implementing TotalEnergies' strategy in this space.<sup>711</sup>

In Brussels, TotalEnergies was the sole operator of public road (on-street) rechargers from 2018 to 2021, winning exclusive rights through the charge.brussels initiative (more detail available in Section 7.4.7).<sup>712</sup> In August 2022, the Flemish Government entrusted the company with the installation and commercial operation of a recharging service for EVs in the regions of West Flanders (Westhoek, Kortrijk and Bruges) and Flemish Brabant (Brussels Periphery, Leuven). As part of this undertaking, 4.4k public recharge points will be installed over the next two years.<sup>713</sup>

TotalEnergies has also won public contracts to install and operate EV recharging stations in cities such as Antwerp and Ghent (3k and 800 respectively). It operates 50 fast and ultra-fast recharging points, mainly along highways. It plans to offer an HPC e-service (up to 350 kW) for main roads and highways at its service stations and is anticipating the installation of recharging points for those customers (professionals and individuals) it supplies electricity to.<sup>714</sup>

### **Blue Corner**

Blue Corner is a Belgium EV recharging infrastructure pure player founded in 2011, which provides smart recharging solutions and has a share of approximately 11% in Belgium. As of 2021, it operates a network of approximately 7k recharging points across Belgium, Luxembourg, the Netherlands, and France. In May 2021, Blink Charging, a U.S. based owner, operator, and provider of recharging infrastructure, acquired Blue Corner, which marked the first of several acquisitions to expand into the European market.<sup>715</sup>

Shortly following the acquisition, Blue Corner signed a contract with Belgian research university KU Leuven to deploy and operate approximately 300 to 500 recharging stations across KU Leuven campuses over four years, starting in late 2021. The agreement included a 10-year service agreement for operation of the recharging stations.<sup>716</sup>

More recently in September 2022 Blue Corner signed an agreement with Q-Park, a Belgian car parking provider, to install 200 recharging points in its car parks. The agreement has also been extended to the UK and Ireland where Blue Corner will install 600 further recharging points across 80 Q-Park locations.<sup>717</sup>

Blue Corner is also actively looking at energy management services, such as the integration of renewable energy and smart recharging technology. In April 2022, Blue Corner was awarded a €450k grant to develop its energy management services from Flanders Innovation and Entrepreneurship (VLAIO), a government agency that finances strategic and industrial research.<sup>718</sup>

<sup>710</sup> TotalEnergies, "Electric Vehicle Charging Solutions : Total Acquires G2mobility and Forms Partnership with Nexans", September 2018

<sup>711</sup> *Ibid.*

<sup>712</sup> Electrify.Brussels, "Charging providers", December 2022

<sup>713</sup> TotalEnergies, "TotalEnergies selected to install 4,400 EV charging stations for electric vehicles in Flanders", August 2022

<sup>714</sup> *Ibid.*

<sup>715</sup> Blink Charging, "Blink Charging acquires Blue Corner, expanding European...footprint", May 2021

<sup>716</sup> Blink Charging, "Blink Charging's Blue Corner to install up to 500 EV charging stations...", July 2021

<sup>717</sup> Blue Corner, "Blue Corner and Q-Park join forces!", September 2022

<sup>718</sup> Blink Charging, "Blue Corner, the European subsidiary of Blink received a grant...", April 2022

Blue Corner offers a variety of subscriptions via recharging card to allow EV users to recharge at all Blue Corner recharging points as well as those under interoperability agreement. There are three subscription types that can be purchased and used in conjunction with the Blue Corner recharging card. The prices below are applicable for Blue Corner rechargers.

**Table 37: Blue Corner Pricing Model<sup>719</sup>**

Pay-as-you-go	Subscription
Starter: No annual subscription fee. Recharging at AC rechargers costs €0.43/kWh and DC rechargers costs €0.69/kWh.	Fan: Annual subscription fee of €59. Recharging at AC rechargers costs €0.38/kWh and DC rechargers costs €0.60/kWh.
	Addict: Annual subscription fee of €169. Recharging at AC rechargers costs €0.36/kWh and DC rechargers costs €0.56/kWh.
Fees: Blue Corner charge a rotation fee to encourage users to free up the recharging point once their vehicle is fully charged. This charge is €0.030/min for AC rechargers and €0.25/min for DC rechargers. This is only charged between the hours of 08:00 to 20:00.	

#### 7.4.7. Regional dynamics in Belgium

Unlike the other markets selected for an in-depth assessment, the data gathering approach outlined in Appendix F did not provide sufficient coverage to estimate regional CPO shares. Therefore, to support the ensuing analysis, desk-based research was used to evaluate CPO concentration and dynamics in Flanders, Brussels, and Wallonia.

##### **Brussels**

Brussels is characterised by a fragmented EV recharging industry; however some specialised players are leading the way in some business segments (e.g., on-street recharging). To reach its ambition goal of 11k recharging stations by 2035, the Brussels Government has requested Sibelga (the gas and electricity distribution network manager) to play an active role, organizing concessions to install rechargers across the 19 Brussels municipalities.<sup>720</sup> The location of terminals on public land is defined by the Region and Sibelga according to precise criteria, who then work with preferred partners to install and operate recharging stations through the charge.brussels initiative. Moreover, citizens can notify authorities on places where a terminal may be needed via a tailored online form. The government has also recently streamlined this process, adopting eight administrative simplification measures to reduce the request and installation waiting period to two months.<sup>721</sup>

In Brussels, there are currently two CPOs operating on public roads: TotalEnergies and EnergyDrive.<sup>722</sup> Between 2018 and 2021 the Brussels-Capital Region worked with an exclusive partner, PitPoint (acquired by TotalEnergies in 2017) for the supply, installation, and operation of publicly accessible recharging stations along public roads, with an exclusive service concession.<sup>723,724</sup> Through this concession, 100 recharging locations (with 2 recharging points each) were initially installed. It was then planned

<sup>719</sup> Blue Corner, "Charging Services – Apply for a charging card"

<sup>720</sup> Sibelga, "11,000 publicly accessible charging stations by 2035", December 2022

<sup>721</sup> Electrify.Brussels, "Install a charging station", December 2022

<sup>722</sup> Electrify.Brussels, "Charging providers", December 2022

<sup>723</sup> FleetEurope, "First public charging stations unveiled in Brussels", February 2019

<sup>724</sup> TotalEnergies, "Total Acquires PitPoint B.V."

that between 19 October 2021 and 18 October 2022, the distribution network operator organised calls for tender for the concession of public spaces that allow the installation of recharging stations.<sup>725</sup> In February 2022 EnergyDrive won the public tender for the installation of 492 recharging points along Brussels' public roads, to be operated by the company for a period of ten years. The tender set the recharging price at €0.24/kWh.<sup>726</sup>

Nevertheless, several other players have installed recharging points at semi-public locations. As seen in Figure 53 below, and according to the official Electrify.Brussels EV recharging deployment plan, in February 2022 TotalEnergies was the leading CPO in the region, accounting for approximately 40% of recharging stations, almost fully through the charge.brussels initiative. Blue Corner and Mobility Plus controlled another significant share, operating 23% and 15% of recharging stations respectively. Other major players included EVBox (approximately 10% share) and Allego (approximately 5% share).<sup>727</sup> In recent months, EnergyDrive has been selected by Sibelga as a preferred partner for the deployment of a public recharging infrastructure in the Brussels region (and according to their website, they have over 50 active public recharging stations, with many more expected to go live over time).<sup>728</sup>

**Figure 53: Installed recharging stations in Brussels region by CPO as of January 2022**<sup>729,730</sup>



## Flanders

The Flemish Government has been successful in stimulating the deployment of recharging points, with several major players operating large networks (e.g., Allego, Total, EVBox, Blue Corner, etc.). Fluvius, the local DSO, guided the tendering process from 2016 to 2020 aiming to have one recharging point per municipality and running open concessions for pre-defined locations. Over this period, all tenders were won by Allego. These concessions were typically set-up for a 10-year period, designed to provide enough time for CPOs to recover their cost. The process has recently been restructured, with tenders now set-up by the local authority allowing Fluvius to focus on providing the required electrical connection.<sup>731</sup> Moreover, individuals and companies can

<sup>725</sup> David Haverbeke, Wouter Vandorpe and Guillian Baclin, "Green mobility – Charging Infrastructure and Electric Vehicles in Belgium", January 2022

<sup>726</sup> EnergyVision, "EnergyVision (Brusol) installs 492 public charging points in Brussels", February 2022

<sup>727</sup> Electrify.Brussels, "EV recharging deployment plan", 2022

<sup>728</sup> EnergyDrive, "Our network", December 2022

<sup>729</sup> Electrify.Brussels, "EV recharging deployment plan", 2022

<sup>730</sup> Public recharging stations refer to terminals located on the street and accessible 24/7. Semi-public recharging stations refer to terminals located in public car parks or buildings open to the public

<sup>731</sup> Study interview, Belgian DSO, November 2022

now request the installation of public recharging points, with the authorities promising to install a recharger within 250 meters of the location within 90 days.<sup>732</sup>

Allego enjoyed first mover advantages in the region, installing roughly 5k public recharging points in the region since 2016. While they operate across all recharging segments, they have recently increased their focus on the on-route, fast recharging segment with plans for 112 ultra-fast rechargers installed by mid-2024.<sup>733</sup> TotalEnergies has recharging stations in operation or under construction in several cities across the region, including commitments to quickly expand its portfolio to a total of 3k recharging points in Antwerp, 0.8k in Ghent, and 4.4k in West Flanders and Flemish Brabant.<sup>734</sup> EVBox also already operates 600+ recharging stations in Flanders, with its parent company Engie announcing plans to install 2.8k new public EV recharging stations over the coming years.<sup>735,736</sup>

According to ChargeMap and company statements, in Ghent, the Flemish municipality with the largest share of recharging points at the end of 2021 (8% of total), Allego is the largest player (approximately 57% share) followed by EVBox (approximately 12% share).<sup>737,738,739,740</sup> Shell and Total are also present, each operating approximately 5% of recharging stations (TotalEnergies is rapidly gaining a strong foothold planning to soon operate 800 recharging points in the municipality).<sup>741,742</sup> According to the Flemish government, the second most developed municipality by the end of 2021 was Antwerp, accounting for approximately 5% of recharging points.<sup>743</sup> In Antwerp, Blue Corner (whose headquarters are in Antwerp) is the leading CPO accounting for approximately 50% of recharging stations.<sup>744,745</sup> Overall small and big players seem to operate across the region, with existing players announcing plans to expand their portfolios and new entrants preparing to provide recharging services in the market.

## **Wallonia**

Wallonia remains significantly behind Flanders and Brussels, with less than 2k public recharging points as of October 2022. While the region is less densely populated, with people typically able to recharge at their own premises due to the wide availability of off-street parking, significant work is needed to ensure a national public recharging network is in place. Nevertheless, several players are present within the region including the major operators in the country such as Allego, EVBox, TotalEnergies, Blue Corner, and Shell.<sup>746</sup> Moreover, other networks and CPOs are present and are beginning to accelerate deployment of recharging points in the area (e.g., IONITY, Virta, Optimile, LastMileSolutions, FastNed, GreenFlux, etc.) creating a relatively fragmented picture

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<sup>732</sup> Restrictions apply. Usually the process is much faster, especially if there is no need for grid upgrades. Four municipalities opted out of this project and are still relying on the previous concession system.

<sup>733</sup> Allego, "14 new ultra-fast charging locations along major highways in Belgium", January 2022

<sup>734</sup> Junaid Shah, "Solar Energy International – Three Firms That Have Surprised Us With Their Plunge Into EV Charging", November 2022

<sup>735</sup> ChargeMap, "Charging stations of EVBox", December 2022

<sup>736</sup> Engie, "ENGIE steps up its commitment to low-carbon mobility and wins a concession for 5600 electric vehicle charging points in Belgium", September 2022

<sup>737</sup> Flemish Government, "Public recharging points for electric cars", January 2022

<sup>738</sup> ChargeMap, "Charging stations in Gent", December 2022

<sup>739</sup> Allego, "Find a chargepoint near me", December 2022

<sup>740</sup> ChargeMap, "Charging stations of EVBox", December 2022

<sup>741</sup> ChargeMap, "Charging stations of Shell-Recharge", December 2022

<sup>742</sup> TotalEnergies, "How to find a TotalEnergies service station in Belgium?", December 2022

<sup>743</sup> Flemish Government, "Public recharging points for electric cars", January 2022

<sup>744</sup> ChargeMap, "Charging stations in Antwerpen", December 2022

<sup>745</sup> ChargeMap, "Charging stations of Bluecorner", December 2022

<sup>746</sup> ChargeMap, "Map", December 2022



when considering the nascency of the sector.<sup>747</sup> However, focusing on the high-speed recharging segment, and filtering for public recharging points with a capacity >75kW on Electroverse, the market becomes more concentrated with IONITY and TotalEnergies operating the majority of recharging points.<sup>748</sup>

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<sup>747</sup> ShellRecharge, "Public charging in Belgium", December 2022

<sup>748</sup> Octopus Energy, "Electroverse EV recharging map", December 2022



## 8. Competitive assessment of four selected Member States

Having presented the details of the industry, regulatory and competitive landscape in the four Member States (Ireland, Italy, Croatia, Belgium) we now consider the strength of evidence in respect of each of the Theories of Harm identified in Section 5. Specifically, we identify the theories that are relevant for each country and discuss the key competition themes in the assessment of the concerns that appear most plausible for each country based on the available market data.

### 8.1. Anti-competitive concerns around the exercise of local market power

As per the taxonomy of concerns in Section 5, the first category of concerns focuses on the exercise of local market power. We document below, based on available data, the extent of local concentration of recharging points for each country. We then examine whether there are indications of market entry or if there are entry barriers allowing for local concentration and market power to persist. We finally assess whether data on pricing by main market players supports local price differentiation based on regional market power.

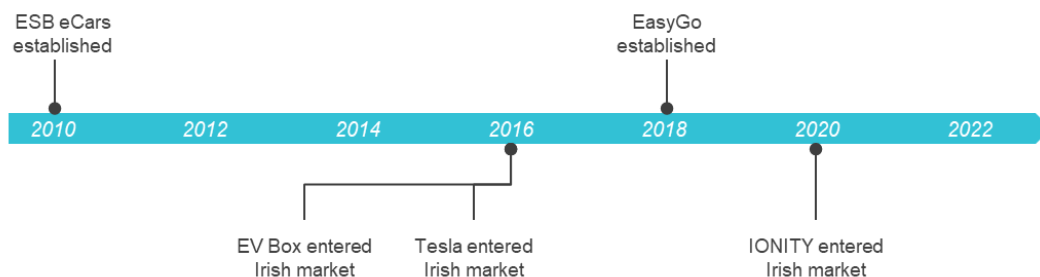
#### 8.1.1. Ireland

As discussed above, Ireland is still in the early stages of EV recharging infrastructure development. The special features of Ireland as an island economy are relevant for unilateral concerns, as there is no competition from CPOs in neighbouring nations due to the lack of a land border, but at the same time, distances tend to be more limited, which increases the potential for substitutability between home recharging and public recharging. Moreover, the market is currently entering the steep upward phase of the adoption curve with the EV fleet tripling in size over the last three years. The recharging sector is also in an active state of development with the past few years characterised by significant growth. To preserve this trajectory of growth and promote competition, the government is developing additional supporting regulation and incentives to accelerate the deployment of new infrastructure.

#### *Local price differentiation and regulation*

Similar to several other EU Member States, the initial years of the sector featured a highly vertically integrated government-owned monopoly provider of EV recharging services. Although this former state monopoly has subsequently opened up to competition, and new entry has taken place since 2016, the state-owned player ESB eCars still holds the leading position with a 58% share in EV public recharging.

**Figure 54: Timeline of market entry by leading operators in Ireland**



In terms of local market power, as noted above, ESB eCars has seen its share eroded substantially in the last few years, but still accounts for over 50% of recharging points

in 21 out of 26 of the Irish counties as of October 2022 (and up to 100% in some others). It also controls approximately 60% of recharging points in the major urban areas (i.e., Dublin and Cork). Moreover, ESB eCars accounts for more than 50% of >75kW recharging points on the major highway from Dublin to Cork with Tesla and IONITY covering the rest.<sup>749</sup> The geographical distribution of public recharging points is overall uneven, with considerable differences between counties across Ireland, especially when focusing on ultra-fast rechargers, which raises concerns for potential recharging deserts if only one main player were present.

Fully granular data on ESB eCars' pricing that would allow us to determine if ESB eCars has been able to use its stronger position in some localities to raise prices is not available. However, Table 38 summarises our pricing model information for the main Irish CPOs and allows us to make some interesting observations. First, ESB eCars' website includes pay-as-you-go prices that are uniform across Ireland, which suggests that ESB eCars is not price differentiating at the local level and are not using their stronger market presence to charge higher prices in certain areas. The same nation-wide pay-as-you-go pricing model has been adopted by the second largest firm EasyGo, while other competitors, such as EVBox, offer real time pricing at the recharging point. Moreover, ESB eCars offers a subscription option and a prepaid card option, which again are not consistent with an intention to charge more in locations where it is not facing strong local competition.

**Table 38: Pricing structures advertised by operators**

Operator	Pay-as-you-go	Subscription	Prepaid card	Idle Fees
ESB eCars <sup>750</sup>	Slow: €0.38/kWh, Fast: €0.43/kWh, Ultra-fast: €0.46/kWh	€4.79/month and Slow: €0.36/kWh, Fast: €0.39/kWh, Ultra-fast: €0.42/kWh	Slow: €0.38/kWh, Fast: €0.43/kWh, Ultra-fast: €0.46/kWh	€8 after €10 hours (monthly), €8 after 45 minutes (prepay, PAYG)
EasyGo <sup>751</sup>	€0.27 access fee + €0.49/kWh (inc. VAT)	N/A	€0.27 access fee + €0.49/kWh (inc. VAT)	N/A
EVBox <sup>752</sup>	Real-time pricing at recharger	N/A	N/A	N/A
Tesla <sup>753</sup>	Real-time pricing at recharger	N/A	N/A	€0.50/minute after recharge complete, or €1.00/minute if the station is 100% occupied
IONITY <sup>754</sup>	€0.71/kWh	N/A	N/A	N/A

<sup>749</sup> Based on Electroverse, ESB eCars accounts for slightly over 50% of >75kW recharging points on the major highway from Dublin to Cork.

<sup>750</sup> ESB, "Price Plans", December 2022

<sup>751</sup> EasyGo, "Charging Network", November 2022

<sup>752</sup> EVBox, "What are the charging fees of EVBox roaming partners?", November 2022

<sup>753</sup> Tesla, "Supercharger Idle Fee"

<sup>754</sup> IONITY, "Mobility Service Provider", 2022 From our research, they do not offer subscription.

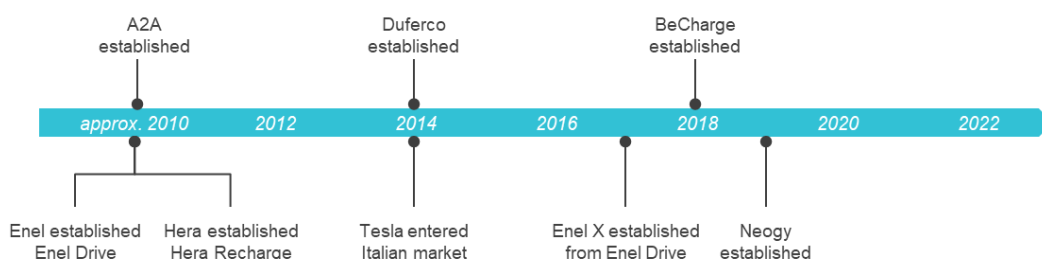
### Local barriers to entry

Our market research has uncovered that clear guidance and procurement laws for EV infrastructure do not seem to exist at present and local authorities still attribute projects on an individual basis.<sup>755</sup> This framework can lead to a direct allocation of concessions without a competitive tendering process, potentially giving an advantage to the incumbent, who can leverage its proven track-record and overall brand reputation. However, it does not appear that this has been the case with ESB eCars in Ireland.

#### 8.1.2. Italy

Enel X is the CPO with the largest share of public recharging points in Italy. As seen in Section 7.2, they had a share of 85% of total recharging points in 2016 which has since fallen to 57% in 2021 and 55% in 2022 due to the entry of rival CPOs. Enel X is a subsidiary of the global energy company Enel Group, and is fully vertically integrated, providing through its subsidiary services from power generation to electricity distribution and retail, including EV recharging services with an integrated eMSP. Enel was previously fully owned by the Italian state which is still its largest shareholder with 24%.

**Figure 55: Timeline of market entry by leading operators in Italy**



The second largest share of recharging points is held by Be Charge who entered the market in 2018 and currently owns 21% of Italian recharging points. The remaining approximately one quarter of recharging points are shared by numerous smaller CPOs, many of whom have only a limited presence at the local level. Both Enel X and Be Charge, as well as the majority of smaller players reviewed, as documented in Table 23, are present in the on-route, destination and on-street segments.

### Local price differentiation and regulation

From Figure 37, we observe that there is significant local concentration in central and southern Italy, with Enel X owning more than 50% of recharging points in the majority of Italian regions and up to 90% in some. Moreover, Enel X and Be Charge together account for more than 80% of recharging points in the majority of Italian regions, except in the north where their combined share is between 60-80%.

This could raise concerns over the persistence and exercise of local market power by Enel X, as it appears that market entry by Be Charge and other smaller players has not been enough to dissipate local market power. Although Be Charge is present throughout Italy, it has not increased its share which has stagnated at 21% between 2021 and 2022. Moreover, small entry has only been successful at the regional level, with small CPOs leveraging their pre-existent market presence and brand names.

Enel X's pay-as-you-go prices are based on a real time pricing model at the recharger. This implies that there is room for local price differentiation with the potential for dynamic pricing. However, this also means that prices may be higher in locations where

<sup>755</sup> CCMA EV Working Group, "Local Authority Electrification of Fleet and EV Charging Guidance Document", August 2021

Enel X is not facing strong competition from other CPOs.<sup>756</sup> On the other hand, Enel X's main competitor Be Charge charges a common pay-as-you-go price based on speed in all locations.

Overall, more data and a fuller investigation would be required to conclude whether there is price differentiation at the local level consistent with the exercise of local market power. However, Italy does exhibit several necessary conditions, namely locally concentrated markets and pricing schemes that permit prices to vary based on local competitive conditions.

**Table 39: Pricing structures advertised by operators**

Operator	Pay-as-you-go	Subscription	Prepay cards	Idle Fees
Enel X <sup>757</sup>	Basic tariff with real-time pricing at recharger, or premium tariff at €25 per annum with real-time pricing at recharger and pre-booking capability	Flat small: €25 / month for a total energy consumption of 70 kWh Flat large: €45 / month for a total energy consumption of 145 kWh	N/A	€0.09 / minute for AC and €0.18 / minute for DC
Be Charge <sup>758</sup>	Four tariffs based on speed: up to 22kW at €0.60/kWh, up to 99kW at €0.85kWh, up to 149kW at €0.90/kWh, more than 150kW at €0.95/kWh	Four subscriptions based on usage: 50kWh for €20/month, 100kWh for €38/month, 250kWh for €90/month, 500kWh for €175/month	Cards available with small bonus ( 2.5%) applied when topping up	€0.05/minute for up to 22kW, €0.18/minute for all other capacity rechargers
Tesla <sup>759</sup>	Real-time pricing at recharger	N/A	N/A	€0.50/minute after the recharge has completed, or €1.00/minute if the station is 100% occupied
A2A <sup>760</sup>	Quick (slow): €0.56/kWh, Fast: €0.66/kWh	30 kWh for €16 per month or 80 kWh for €29 per month	N/A	N/A

<sup>756</sup> However, using the ChargePrice app we have not identified any evidence of local price differentiation (e.g., of Enel X charging high prices in areas it owns 90% of recharging points compared to areas where it is facing stronger local competition).

<sup>757</sup> Enel X Way, "Charging FAQs: What fees are available for the public charging service?"

<sup>758</sup> Be Charge, "Rates"

<sup>759</sup> Tesla, "Supercharger Idle Fee"

<sup>760</sup> All Info, "Electric cars, how much does it cost to recharge in Italy?", October 2022

Operator	Pay-as-you-go	Subscription	Prepay cards	Idle Fees
Hera <sup>761</sup>	€2/month and all consumption costs are then charged at €0.64/kWh	Flat offer which costs €20/month and includes 40kWh of usage (with any usage beyond this costing €0.64/kWh)	N/A	€0.15/minute
Neogy <sup>762</sup>	One off activation fee of €35 then: Slow: €0.65/kWh, or fast €0.89/kWh (premium of €0.08/kWh if roaming applied)	N/A	Prepaid cards available at the South Tyrol tourist office at either 80kWh or 40kWh access	€0.08/minute for slow, €0.15/minute for fast
Duferco <sup>763</sup>	Up to 50 kW at €0.65/kWh, or more than 50kWh €0.79/kWh	Flat rate of €129 for 200kWh usage per month	100kWh for €65, or 150kWh for €95, or 400kWh for €249	N/A

### Local barriers to entry

Our research reveals that there is lack of transparency on how local authorities award concessions e.g., on an exclusive basis or through a competitive tendering process. In central and southern Italy, where Enel X's share of recharging points reaches up to 90%, future competitive assessments should consider the presence of regulatory barriers. Future competition is also likely to depend on regulatory decisions over whether to promote or require competitive tendering or whether to permit multiple operators to install recharging points in any given locality. As documented in Section 5.2.1., Italy seems to be headed in this direction by integrating the tender process on motorways into their Annual Law for Competition which requires the process to be open, competitive, transparent and non-discriminatory.<sup>764</sup>

#### 8.1.3. Croatia

In Croatia, the EV recharging infrastructure market is relatively nascent, but dynamic. Elen was one of the first players to enter the market, but it has not acquired a first-mover advantage or significant share, holding less than 30% of public recharging stations in 2022. Hrvatski Telekom, which entered the market in 2012, has the largest share of public recharging stations (approximately 32%), while smaller players Petrol and Moon hold approximately 10% of recharging stations each.<sup>765</sup>

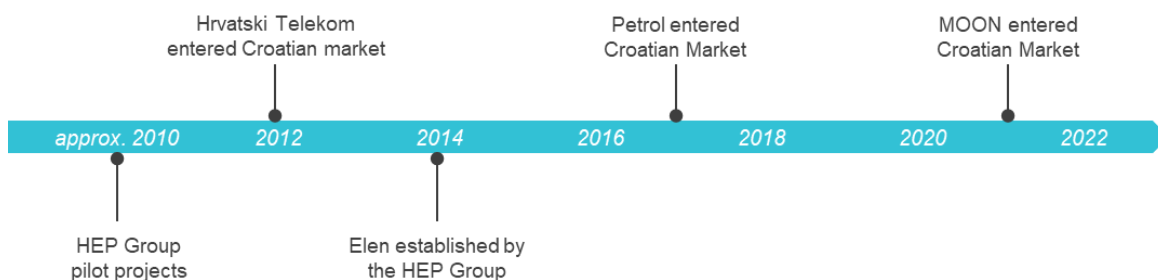
<sup>761</sup> Hera Group, "Tariffs"

<sup>762</sup> Neogy, "Who we are", 2022

<sup>763</sup> All Info, "Electric cars, how much does it cost to recharge in Italy?", October 2022

<sup>764</sup> Italian Senate, "Annual law for market and competition 2021", February 2022

<sup>765</sup> 17% of recharging points included in the analysis did not have a CPO attached to them due to data quality limitations and are therefore considered to be operated by 3rd parties.

**Figure 56: Timeline of market entry by leading operators in Croatia**

This contestability appears to extend across the Member State, without the same level of geographic disparity observed in Ireland or Italy. Indeed, Figure 43 shows that the share of local recharging points above 40% by Elen or Hrvatski Telekom is concentrated in a few regions only. There are only 3 regions where the two firms own together more than 80% of recharging stations. Nevertheless, given the market is in a nascent state this could quickly change. Although Table 40 indicates that pay-as-you-go prices can vary by location, lack of data granularity prevents us from examining whether prices are higher where local shares are higher.

**Table 40: Pricing structures advertised by operators**

Operator	Pay-as-you-go	Subscription	Prepay cards	Idle Fees
Hrvatski Telekom <sup>766</sup>	The price ranges from €0.04 to 0.80/kWh for rechargers under 22kW and €0.14 to 0.80/kWh for rechargers above 22kW.	N/A	Prepaid T-RFID card that can be purchased for HRK 200 (€26) in selected T-Centers.	Not available
ELEN <sup>767</sup>	Tariffs based on speed, location, and time of recharging. Up to 22.1 kW ranging from €0.24 to 0.36/kWh; 22.2 – 50kW ranging from €0.34 to 0.46/kWh; and above 50kW ranging from €0.59 to 0.66/kWh.	N/A	N/A	€0.07/min for all recharger types located off highways and €0.13/min for all recharger types located on highways.
MOON	Not available	Not available	Not available	Not available

<sup>766</sup> Hrvatski Telekom, "e-mobilnost"

<sup>767</sup> Elen, "Elen charging station fee changes", 2022

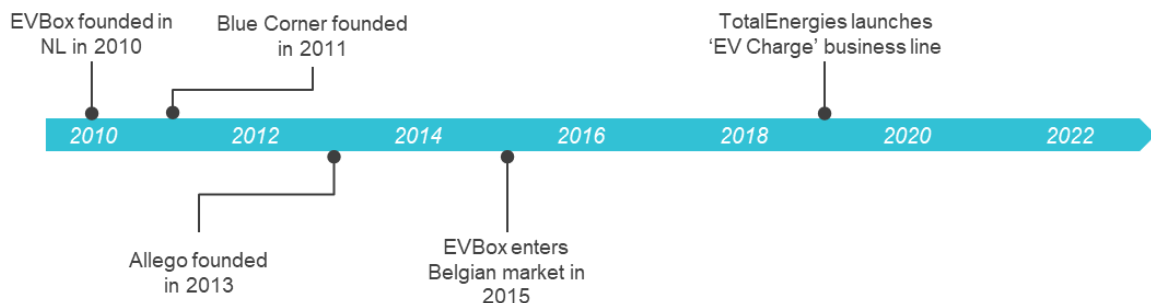
Operator	Pay-as-you-go	Subscription	Prepay cards	Idle Fees
Petrol <sup>768</sup>	Tariffs based on recharging speed. Up to 22 kW ranging from €0.30 to 0.37/kWh; 22.2 – 50kW ranging from €0.44 to 0.52/kWh; and above 50kW ranging from €0.73 to 0.80/kWh.	Annual packages charged monthly providing 1,425 – 5,000kWh annually at a cost of €36.00–125.00/month. Also subscription-based discounts cost €2.99 – 19.99/month for a discount from 15-25%	N/A	€0.07/min for rechargers with power up to 22kW. €0.15/min for rechargers from 22 – 50Kw. €0.30 for rechargers above 50kW.

Overall, available data highlights a fairly competitive sector with multiple instances of entry and no prima facie signs of significant local market power in Zagreb, the tourist destinations of Dalmatia, or the majority of other regions.

#### 8.1.4. Belgium

In Belgium, as shown in Figure 52, there are three main CPOs (EVBox, Allego and TotalEnergies) with shares above 20%. Figure 57 indicates that Blue Corner, the first mover, did not translate its first-move advantage into a durable leading market position as subsequent market entry by Allego in 2013 and then EVBox in 2016 and TotalEnergies in 2019 created a competitive recharging sector.

**Figure 57: Timeline of market entry by leading operators in Belgium**



As explained in Section 7.4.7, data availability does not allow for the construction of regional share maps in Belgium which would permit a more granular analysis of local recharging points concentration. However, additional quantitative and qualitative analysis of available information in Flanders, Brussels, and Wallonia is consistent with strong competition in all regions. In Brussels, entry by EnergyDrive in 2022 will result in lower shares for TotalEnergies that was the leading incumbent. In Flanders, where Allego still owns the majority of recharging points, there is evidence of ongoing investment with numerous new recharging points under construction from TotalEnergies and EVBox. In Wallonia, there are also indications of several CPOs competing and undertaking investment to expand their recharging point network.

Overall, concerns about local barriers to entry or local price differentiation are not likely to arise in Belgium due to well-designed tendering processes, the relatively low regional

<sup>768</sup> Petrol, "Price list for charging", July 2022



concentration, and the competitive pressure through continuous entry and expansion of CPOs at both the national and regional level.

**Table 41: Pricing structures advertised by operators**

Operator	Pay-as-you-go	Subscription	Prepay cards	Idle Fees
EVBox <sup>769</sup>	Real time pricing on the EVBox Everon app	N/A	N/A	Applicable fees available on EVBox Everon app
Allego <sup>770</sup>	Prices range for €0.60/kWh to €0.85/kWh dependent on speed of the recharger	N/A	N/A	Not publicly available
TotalEnergies <sup>771</sup>	Real time pricing on the Total EV Charge app	N/A	N/A	Applicable fees available on Total EV Charge app
Blue Corner <sup>772</sup>	€0.43/kWh for AC (slow) rechargers and €0.69/kWh for DC (fast) rechargers costs	Two annual subscription offerings which influence price of recharging. Ranging from €59 to €169 per annum.	N/A	Idle fees dependent on recharger type. €0.03/min for AC and €0.25/min for DC rechargers.

## 8.2. Potential for “tipping” of national or regional markets

In order to assess whether market “tipping” concerns arise at the national or regional level, data on national and regional concentration needs to be examined in conjunction with information of market share evolution and new entry. In the presence of high and persistent concentration consistent with market dominance by an incumbent, conducts that may pose barriers to contestability may arise.

### 8.2.1. Ireland

In Ireland, the existence of a state-owned CPO with a share above 50%<sup>773</sup> that has managed to retain its market leading position when the state monopoly market opened up to private sector competition raises concerns around the drivers of persistent market power and on whether the market has possibly “tipped”.

As discussed in Section 5, the EV recharging market exhibits important density and network effects hence tipping is a valid concern. However, Ireland is still in an active state of development with high CPO concentration but medium levels of recharging points per 100k of population and a high number of EVs per recharging point. Therefore,

<sup>769</sup> EVBox, “Mercedes-Benz enters BeNeLux partnership with ENGIE and EVBox to electrify fleet”

<sup>770</sup> Allego, “Introducing new charging tariffs on October 7, 2022” September 2022

<sup>771</sup> TotalEnergies, “EV Charge”

<sup>772</sup> Blue Corner, “Charging Services – Apply for a charging card”

<sup>773</sup> Since October 2022, EasyGo’s CPO network has risen significantly, now being similar in size to ESB eCars

the EV recharging point network is not yet dense, with virtually all Irish areas not meeting the EU target of 10 EVs per recharging points as we can see in Table 5. This, together with the fact that the Irish EV recharging market overall is not developed and that there has been recent private CPO entry and significant private investment (with a typical lag of several years before it manifests in shares), make it likely that high concentration is just reflective of ESB eCars' first mover advantage.

However, the existence of a market leader with a share of public recharging points above 50% brings into the spotlight concerns around dynamic leveraging (i.e., strategies with the aim of retaining current market power against entrants and restricting competition on the merits). ESB's strong brand name and credibility in retail electricity could allow it to leverage its position in that market to extent its hold to home recharging (accounting for more than 80% of all recharging in Ireland) and public recharging. Our research has not uncovered evidence of conducts by ESB eCars such as land grabbing, bundling of retail electricity services with home or public recharging subscriptions, exclusive contracts, or restrictions to keep a closed network with limited interoperability and restrictions to multihoming.

Indeed, ESB eCars has signed a bilateral agreement with other CPO/eMSPs including with main rival CPO/eMSP EasyGo, allowing EasyGo's integrated eMSP access to ESB eCars' CPO network. It has also signed a roaming agreement with Gireve opening up its network to other eMSPs. However, detailed information on the terms of these agreements would be necessary to assess whether there is asymmetric access to the terms ESB eCars offers to others versus what it enjoys itself, on whether there are differential terms offered to smaller and larger competitors or to standalone eMSPs versus integrated CPO/eMSPs etc.

### **8.2.2. Italy**

Italy exhibits similar dynamics to Ireland in that there is a state-affiliated CPO that has managed to retain its market position with a share above 50% notwithstanding some entry events and this is particularly the case if one focusses on central and southern Italy. Arguably, the pattern is more concerning as, unlike Ireland, we do not see a persistent decline in Enel X's position vis-à-vis rivals.

Overall, the existence of a dense enough network of recharging points coupled with the particularly high share of recharging stations (80-90%) owned by Enel X in the majority of central and southern regions, raises concerns of local market tipping. Moreover, this concern is consistent with the fact that continuous entry by rival CPOs, some of which are as old as Enel X as shown in Figure 55, has not been enough to overturn the market picture concerning CPO concentration, particularly if one excludes northern Italy.<sup>774</sup>

Although Enel X has signed bilateral agreements opening up its CPO network to other eMSPs, including those of competing integrated CPO/eMSPs Be Charge and A2A, and also has a roaming agreement with roaming platform Hubeject (Table 23), data availability does not allow us to examine the terms of these agreements to draw conclusions on their effects on competition and the possible exercise of market power in the form of asymmetric terms and partial foreclosure.

### **8.2.3. Croatia**

The Croatian recharging sector appears to be competitive with several significantly sized CPOs as shown in Figure 43 and recent new entry in 2021 as shown in Figure 56. Therefore, no concerns over tipping or national market concentration currently arise.

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<sup>774</sup> This may be explained by the fact that many CPOs in Northern Italy are local players (e.g., providing electricity services in very specific regions within Italy) hence may not be interested in expanding into the Central/Southern regions.

### 8.2.4. Belgium

The Belgian recharging sector also exhibits features of effective competition with four sizable CPOs as shown in Figure 52 and continuous new entry most recently in 2019 as shown in Figure 57. Therefore, there are currently no indications of concern over national market concentration or tipping.

## 8.3. Unilateral exclusionary conduct

As discussed in Section 5.4.6. vertical linkages in principle present both efficiencies and foreclosure concerns which need to be considered in balance. We presented theories of harm through foreclosure of competitors by vertically integrated CPOs/eMSPs, vertically integrated energy providers/CPOs, linkages between CPOs and ICE fuel retailers, local authorities that act as CPOs, and vertically integrated OEMs/CPOs. However, even if such players exist in most countries, this is not enough to give rise to competition concerns as a dominant position is a prerequisite for the ability of foreclosure to exist.

Given the competitive landscape in Ireland, there are three main vertical Theories of Harm that are relevant: foreclosure concerns due to ESB eCars being a subsidiary of the state-owned DSO, foreclosure concerns due to the fact ESB eCars is also an integrated CPO/eMSP with a share above 50% of public recharging points, and foreclosure concerns due to local authorities acting as local CPOs.

Our research of the Italian EV recharging sector highlights that the most important concerns would be around vertical linkages of CPOs with firms operating in other levels of the electricity value chain, and with ICE fuel retailers. For example, apart from Enel X, Be Charge is owned by Eni which is considered one of the seven "supermajor" oil companies in the world, and also operates the largest share of ICE refuelling stations in Italy.

In Croatia, the second largest CPO is owned by the state-controlled electricity DSO, while the CPO Petrol is also the owner of a large network of ICE fuel stations.

In Belgium, the only relevant vertical linkages of interest we identify is around TotalEnergies' ownership of ICE fuel stations.<sup>775,776</sup>

We explore these potential concerns in more detail below.

### 8.3.1. Foreclosure of rival CPOs by the DSO

Overall, the four Member State in-depth assessments confirm that there are countries with prima-facie conditions for concerns on this dimension in that these are countries with a monopoly or near monopoly DSO who is also active downstream. The key question going forward will be whether regulatory provisions designed to prevent selective behaviour by DSOs to favour their downstream operations are effective at preventing anticompetitive effects.

#### **Ireland**

Since ESB eCars is a subsidiary of the sole DSO in Ireland there are concerns that the DSO would use its control of the electricity grid to prevent the installation of recharging points by rival CPOs, or otherwise increase their cost or limit the quality of service provided, in order to promote ESB eCars' recharging point network. However, as we documented in Section 5.4.2, there are regulations that govern the conduct of the DSO, and there is no evidence to suggest that ESB eCars is not respecting regulations

<sup>775</sup> According to TotalEnergies' website they are the leading retailer of petrol products, with approximately 550 service stations in Belgium in a total of approximately 3K implying a share of less than 20%. TotalEnergies, "TotalEnergies in Belgium"

<sup>776</sup> Statista, "Number of petrol stations in selected European countries at the end of 2021", August 2022

designed to assuage competition concerns. ESB has to abide by Directive 2014/94/EU regarding its control and maintenance of the distribution grid which introduced the requirement for DSOs to cooperate on a non-discriminatory basis with any subject installing recharging points, any rule on non-price discrimination poses obvious challenges in terms of implementation and monitoring.<sup>777</sup>

Being in a position of full value chain integration, and of high shares across areas in the vertical chain, ESB has been subject to the competition authority's scrutiny. For instance, in 2010 the Irish Competition Authority cleared the acquisition by ESB of Northern Ireland Electricity plc (NIE) and its subsidiaries and certain other subsidiaries from Viridian Capital Limited and Viridian Group Limited. As NIE owned the regulated electricity transmission and distribution systems, and operated the electricity distribution system in Northern Ireland, the acquisition strengthened ESB's control of the national electricity transmission and distribution system. The merger was cleared only subject to commitments.<sup>778</sup> Moreover, in 2021 a joint venture by ESB and Coillte Cuideachta Ghníomhaíochta Ainmnithe for developing and constructing renewable energy generation facilities was investigated by the Irish Competition Authority and approved under a number of legally binding commitments.<sup>779</sup> In addition to that, in Ireland ESB is subject to ringfencing rules, preventing foreclosure by the DSO.<sup>780</sup> Furthermore, the CRU introduced in Ireland a grid connection offer process that ensures fairness and transparency to all parties in accessing the grid.<sup>781</sup>

## **Italy**

As Enel X is a subsidiary of the main electricity producer in Italy, concerns may arise over the ability of Enel to foreclose rival CPOs in order to promote Enel X or help it retain its market position against competition. Enel has retained a strong position in Italian electricity supply and distribution controlling about 80% of electricity distribution connections implying foreclosure ability may exist.<sup>782</sup>

Our research has uncovered complaints about Enel's conduct that are aimed at preserving its local and global market position in retail electricity. In 2021, Italian antitrust authorities found that Enel may be in violation of the EU's antitrust laws due to accusations that it used its dominant position to keep new businesses from entering the market and getting customers to stay with Enel.<sup>783</sup>

However, no competition complaints have been brought forward so far based on our research in relation to Enel's local grid and eMobility operations as a CPO and owner of a recharging stations network. Moreover, Italy has introduced regulations to further deter foreclosure from DSOs; decree n.210 from 2021 makes it mandatory for DSOs to notify ARERA whenever a grid connection is denied to an EV recharging point. The notification must also include detailed plans for the expansion of grid capacity to enhance the connection of EV recharging points.<sup>784</sup>

## **Croatia**

Elen has the second largest national share of recharging stations and is the CPO with the first or second largest share of recharging stations in most regions of Croatia. As it

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<sup>777</sup> ESB has to abide by Directive 2014/94/EU(AFID) regarding its control and maintenance of the distribution grid which introduced the requirement for DSOs to cooperate on a non-discriminatory basis with any subject installing recharging points.

<sup>778</sup> CCPC, "Merger notifications - ESB/Northern Ireland Electricity", December 2022

<sup>779</sup> CCPC, "Merger notifications - ESB/Coillte", December 2022

<sup>780</sup> ESB Networks, "Independent Role of the DSO", September 2021

<sup>781</sup> Commission for Regulation of Utilities, "Enduring Connection Policy Stage 2 (ECP-2)", June 2020

<sup>782</sup> e-distribuzione. "Azienda"

<sup>783</sup> Courthouse News Services, [Court adviser eyes clarifying antitrust laws in Italy electricity dispute](#), December 2021

<sup>784</sup> Italian Official Legislative Journal, "Decree n. 210 from November 2021", November 2021

is owned by the state-controlled Hrvatska Elektroprivreda (HEP Group) group, which accounts for about 75% of electricity generation and 80% of electricity transmission and distribution, concerns may arise over its ability to foreclose CPO competitors through for example, lower quality of services by HEP Group in order to favour Elen.

### **Belgium**

This theory of harm is not relevant for Belgium as no CPO is vertically integrated with a DSO.

### **8.3.2. Foreclosure by integrated CPO/eMSPs of rival CPOs/eMSPs**

The main relevant concerns in the case of integrated CPOs/eMSPs are either through foreclosure of rival eMSPs by a dominant CPO, or foreclosure of rival CPOs through eMSP self-preferencing to shift demand to its affiliated CPO.

### **Ireland**

ESB eCars is an integrated CPO/eMSP with a strong CPO market position. The concern would be that ESB eCars restricts access of EasyGo and other CPO market entrants to its CPO network, or that it offers such access with unfavourable terms to increase rival CPOs' costs to favour its own integrated eMSP with the aim to increase its eMSP user network.

Although we do not have visibility into ESB eCars' bilateral agreements with rival eMSPs, we know that ESB eCars has such an agreement with its main competitor EasyGo, and that there have been no complaints about such conduct. However, as we pointed out above, detailed examination of the terms of these agreements would be needed to conclude whether they are reciprocal or not, or whether they are asymmetric across competitors (e.g., worse for EasyGo than for less significant rivals).

As eMSP multi-homing is more common, there is less concern over foreclosure by ESB eCars' eMSP of rival CPOs through self-preferencing.

In principle, as discussed above, ESB eCars' strong position in home recharging could be leveraged in the eMSP market, as discussed in Section 5.4.1, through the provision of home and public recharging packages. However, our research has not identified such examples.

### **Italy**

All market players in Table 23 are integrated CPO/eMSPs but Enel X is the only CPO with a market position that could potentially provide the ability to foreclose rivals. Although there are bilateral and roaming agreements between Enel X and eMSPs owned by its CPO competitors, we do not know if they amount to full and fair access by all rival eMSPs. Therefore, although full foreclosure is highly unlikely, we do not have access to the exact terms of these agreements that would allow us to investigate partial foreclosure concerns through the offering of disadvantageous terms to eMSPs integrated with rival CPOs in order to increase their costs.

### **Croatia and Belgium**

In both Croatia and Belgium, the competitive landscape is such that ability to foreclose is unlikely as all CPOs have shares of recharging stations below 35%, the market leader is closely followed by the second largest CPO, and several significant other CPOs are always present. Further evidence that recent market entry is taking place and has been eroding the leading CPOs' shares also implies that foreclosure concerns are highly unlikely.

### 8.3.3. Foreclosure of CPOs by local authority CPOs

#### *Ireland*

As discussed, Dun Laoghaire Rathdown County Council and Fingal County Council have installed recharging stations in 2018 and 2019 respectively. Although these local authorities operate as local CPOs, they offer recharging for free.<sup>785</sup> Even though the fact that these local authorities are not currently monetising recharging stations is an indication that they are less likely to try to prevent market entry, it is still important that local market contestability is guaranteed by regulatory interventions such as the introduction of local tenders for concessions that would allow private sector entrants to expand their network in these counties.

Furthermore, there is no evidence of local authorities giving preferential treatment to specific players in the allocation of State aid as per the Public Charge Point Scheme.<sup>786</sup> As discussed in Section 3.2.1, the provision of aid must abide by EU or national tendering rules, depending on the amounts, which ensure transparency and equal treatment.<sup>787</sup>

#### *Italy, Croatia and Belgium*

No local authorities act to our knowledge as CPOs in Italy, Croatia or Belgium at a scale that could give rise to significant concerns.

### 8.3.4. Foreclosure by integrated OEMs and CPO/eMSPs

Whereas IONITY operates an open network model, Tesla's network has been closed to other eMSPs in Ireland and Croatia. In Italy, Tesla is the third largest CPO and, although some recharging stations have opened up as part of a pilot scheme, others still remain closed.

However, Tesla is a small CPO by share of public recharging stations in all four selected Member States with shares of public recharging stations between 1% and 5%. Moreover, across Europe, Tesla accounted for only 7% of EV sales in 2021 (Figure 21). As discussed in Section 5.4.5 foreclosure concerns are only likely to be empirically relevant if the vertically integrated EV OEM and CPO/eMSP holds significant market power in the EV segment or the recharging segment (either because they account for a large proportion of recharging points or hold recharging points in key strategic locations). Therefore, no concerns likely arise for Tesla's conduct overall although advanced oversight is needed due to its control of key recharging locations or the majority of fast recharging points within an extended region (since the pilot began, Tesla now operates the largest 150 kW+ public recharging network in Europe).<sup>788</sup>

### 8.3.5. Foreclosure by ICE fuel stations

In Ireland, Circle K Ireland is the largest fuel and convenience retailer. Although it hosts IONITY rechargers, it has multiple CPO partnerships (e.g., with ESB eCars in Cork).<sup>789</sup>

In Italy, Be Charge is owned by Eni oil company that also operates the largest share of ICE refuelling stations in Italy.<sup>790</sup> In addition, Autostrade per L'Italia, which manages toll motorways, has created Free to X CPO that is rapidly expanding. However, they are required to run a competitive tender process and its network is open to all eMSPs and

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<sup>785</sup> CCMA EV Working Group, "Local Authority Electrification of Fleet and EV Charging Guidance Document", August 2021

<sup>786</sup> Sustainable Energy Authority of Ireland, "Electric Vehicle Public Charge Point Grant"

<sup>787</sup> Your Europe, "Public Tendering Rules", October 2022

<sup>788</sup> Teejay Boris, "Tesla Supercharger is Now the 'Largest 150 Kw+ Public Fast-Charging Network' in Europe", May 2022

<sup>789</sup> Zap Map, "Circle K Centra"

<sup>790</sup> TrueNumberts, "Surprise: gas stations increase (Eni always first)"



roaming providers. Although Enel X has partnered with McDonald's Italia to install recharging points in their car parks,<sup>791</sup> and with IP Gas Stations to install ultra-fast recharging points,<sup>792</sup> there is no indication to our knowledge that these agreements are exclusive. Moreover, as discussed, Italian law n. 118 from 2022 introduced an open, competitive, transparent and non-discriminatory public tender procedure for the selection of CPOs for recharging stations along highways.<sup>793</sup>

In Croatia, the CPO Petrol is also an owner of ICE fuel stations hence concerns may arise about closing its ICE fuel station network to other CPOs. As discussed in Section 7.3.6, Petrol has a share of about 10% of public recharging points but an increasing share of more than 20% as its network of ICE fuel stations is expanding.<sup>794</sup> Therefore, foreclosure concerns may arise over its ability and incentive to withhold access to rival CPOs or offer it with differential terms favouring its own CPO in its ICE fuel station network.

In Belgium, the CPO TotalEnergies is also an owner of ICE fuel stations and claims to be the leading retailer of petrol products. Therefore concerns may arise over its ability to close its ICE fuel station network to CPO competitors keeping it exclusively to its own recharging stations or provide access under discriminatory terms to competitors in order to favour its own CPO.<sup>795,796</sup>

## 8.4. Horizontal agreements and coordinated conduct

In Section 5.5 we presented examples of types of agreements that are common in the EV recharging sector and can present coordination concerns. Here we present examples of such agreements that our research has uncovered for the four in-depth analysis countries.

### 8.4.1. CPO collaboration agreements

There has been no evidence of a horizontal network expansion joint venture between ESB eCars and any of its competitors, or of any other relevant horizontal agreements in the EV recharging market in Ireland. Similarly, we have identified no relevant examples for Croatia or Belgium.

In Italy, Volkswagen (German OEM) partnered with Enel X in 2021 on a joint venture to deploy and operate more than 3k high power (ultra-fast) recharging points in Italy.<sup>797</sup> and during the same year the Italian Competition Authority (ICA) opened an investigation against a proposed joint venture between Enel X and Volkswagen, warning that it could reduce competition and hurt consumers. However, they ended up approving the joint venture without remedies concluding that no horizontal or vertical negative effects to competition would likely arise.<sup>798</sup> Crucially for the assessment, Volkswagen was considered as non-active in the CPO market in Italy (besides being part of the IONITY consortium) and there was a provision for non-discriminatory access to the created network for eMSPs competing with Enel X.

<sup>791</sup> Enel, "McDonald's Italia meets Enel X", November 2020

<sup>792</sup> Enel, "Enel X and IP: the first ultrafast charging stations of the European E-VIA FLEX-E project are now operational in Italy", January 2021

<sup>793</sup> Official Legislative Gazette of the Republic of Italy, "Law n. 188 for Market and Competition", August 2022

<sup>794</sup> Reuters, "Fuel retailer Petrol closes outlets in Croatia to protest price cap", December 2022

<sup>795</sup> According to TotalEnergies' website they are the leading retailer of petrol products, with approximately 550 service stations in Belgium in a total of approximately 3K implying a share of less than 20%. TotalEnergies, "TotalEnergies in Belgium"

<sup>796</sup> Statista, "Number of petrol stations in selected European countries at the end of 2021", August 2022

<sup>797</sup> Volkswagen AG, "Enel X and Volkswagen team up for electric mobility in Italy", July 2021

<sup>798</sup> Michele Giannino, "The Italian competition authority approves without conditions a joint venture in the sector for green mobility (Enel X / Volkswagen finance Luxembourg)", December 2021



Also in Italy, IONITY, which is a pure play on-route recharging company founded by a consortium of OEMs, signed an eMobility cooperation agreement with Enel X to install up to 20 IONITY recharging sites by the end of 2019. Enel provided IONITY with a turnkey solution whereby Enel X will scout the sites, procure, and install the recharging stations on each site, and maintain the stations.<sup>799</sup> To our knowledge, this agreement was not scrutinised by Italian CAs for possible unilateral effects.

In a relatively developed EV market like Italy that can support competition and private investment, there are stronger grounds for scrutiny of joint ventures for the expansion and sharing of recharging point networks calls as the benefits they provide in terms of total investment and consumer recharging network coverage are more limited as opposed to a counterfactual scenario in which all CPOs competed over their networks. Moreover, in the presence of high market concentration as in Italy the type and scope of information sharing allowed by these agreements would need to be carefully considered to assess the need for remedies.

#### **8.4.2. Agreements between integrated CPO/eMSPs**

Bilateral agreements between CPOs and eMSPs are prevalent as they allow for higher CPO network utilisation and broader eMSP coverage provision to consumers. As discussed in Section 5.5, the fact that most major CPOs operate through an integrated CPO/eMSP model gives a horizontal dimension to bilateral network access agreements between integrated CPO/eMSPs.

In addition, in January 2022 A2A signed an interoperability agreement with Enel X in Italy giving users of A2A's E-moving app and Enel's JuicePass app access to the two companies' recharging facilities. Likewise, Enel X and Be Charge have bilateral agreements in place to increase interoperability across the Member State. To our knowledge these reciprocal access agreements between two integrated CPOs/eMSPs were not scrutinised by Italian CAs for possible unilateral or coordinated effects.

Such agreements are common between major market players in Ireland, Italy, Croatia and Belgium. As discussed, when the risk of coordination and other competition concerns are assessed the extent of competition between the integrated players is important in terms of whether their proprietary networks are overlapping or not, which determines the extent to which their services are substitutes or complements. However, even if the networks were complementary, an agreement between two vertically integrated CPO/eMSPs with complementary networks could raise concerns over geographical market allocation. As these agreements are an essential feature of the EV recharging market, advanced monitoring of information exchange needs to be applied to alleviate coordination/collusion concerns in each market. Moreover, bilateral agreements between integrated CPO/eMSPs with high shares may need to be scrutinised to make sure they do not lead to collusive outcomes or come together with third party exclusionary conduct. In particular, this is relevant for the case of Ireland and Italy which feature high CPO market concentration, which all else equal, facilitates collusion and is also conducive to higher risk of unilateral effects and third-party exclusion.

#### **8.4.3. Agreements giving rise to "hub and spoke" collusion concerns**

The tables displayed in Section 7 show that agreements with roaming platforms are also prevalent in all four Member States. These agreements are vertical in nature and do not involve direct horizontal interactions between CPOs, eMSPs or integrated CPO/eMSPs, while they also provide consumer benefits by greatly increasing the network coverage available to consumers. However, we discussed how advanced monitoring of the type

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<sup>799</sup> Enel, "Enel teams up with IONITY to build the first network of ultra-fast 350 kW charging stations in Italy", May 2018

and scope of data aggregation and information sharing may be necessary to prevent “hub and spoke” collusion whereas the roaming platform could act as a “hub” for the exchange of strategic information.

## 8.5. EU public support and State Aid

In this section, we present summary data on each of the four Member States in turn and discuss whether there appears to be any correlation between the level of EU/national public support for EV recharging and the maturity of the sector, consistent with public funding having an important instrumental role in the ability of a country to surpass the “chicken and egg” issue we have discussed in Section 5.

Overall, the detailed data that we have collected for these four countries indicates that the existence of a state-owned CPO is not a prerequisite for a successful sector, that public funding can exacerbate sector concentration if it continues to flow to the first mover/sector leader and hence distort competition and crowd out private investment, and that public funding, although instrumental for kick starting the sector, is not on its own enough to take the sector all the way to maturity.

### 8.5.1. Ireland

The data in Ireland indicates that significant public support flowed to the state-owned CPO in order to kick off EV public recharging infrastructure in 2014. The fact that ESB was initially the only firm in the sector and subsequently one of only a few firms present may explain the flow of State aid to ESB. By comparison, privately-owned competitor EasyGo has entered the market with funding through a consortium of private investment. They have more recently taken part in the Apartment Charging Grant. Since entering the market, IONITY has used a 2017 CEF grant with a focus on on-route recharging, but they have used it to install only a few rechargers on highways so far. Overall, the Irish public recharging sector exhibits a level of EVs per recharging point that falls short of the EU target. Although there has been some recent private entry and investment and recent rapid growth of EV demand may make the sector even more attractive for private investment with the potential to increase competitiveness, the high concentration level highlights the importance that future public funding is allocated competitively to avoid the risk of strengthening existing leading positions.

**Table 42: Ireland segment statistics and public support<sup>800</sup>**

Segment Statistics	CPO concentration level	High
	Publicly owned CPO	Yes (ESB eCars - fully integrated utility)
	Public recharging points per 100k people	25
	EVs per recharging point	27
	EV % of total fleet	2.12%

<sup>800</sup> All the data used for this summary table have been presented and discussed in Section 7.1

Public Support and Regulation	State aid	<p>Public Charge Point Scheme: €5k grant per recharging point given to local authorities introduced in 2019. Focuses on slow recharging. Low utilisation of grants so far, with no allocation procedure having been specified</p> <p>Apartment Charging Grant: €0.6k grant per recharging point plus grant covering 60-90% of installation costs provided since 2022. Focuses on semi-public slow recharging. ESB eCars did not apply to be an eligible CPO for the scheme</p> <p>Irish Climate Action Fund Grant: €10m grant awarded to ESB eCars in 2018 via competitive tender. Supported the installation of 48 on-route ultra-fast recharging points along highways as well as 64 ultra-fast recharging points elsewhere. Also supported the deployment of 68 on-street fast recharging points and replacing 528 on-streets low recharging points</p> <p>CRU Pilot Project Grant: €25m grant provided by the CRU to ESB eCars in 2014 for the deployment of 1k on-street slow recharging points across Ireland</p>
	CEF (€m)	€6.5m grant provided in 2017 to a single project for the rollout of on-route ultra-fast recharging points. 0% of it went to public EV recharging leader. IONITY was the project coordinator
	EIB (€m)	0

### 8.5.2. Italy

The EV public recharging sector in Italy features high concentration and a level of EVs per recharging point that meets the EU target albeit due to low EV adoption. Since the beginning, the majority of EU public support (both CEF and EIB) has flown to the first-mover, Enel X, which is a publicly listed company but in which the Italian state is the largest shareholder. Public funds have predominantly flown to local authorities who then allocate the funds to CPOs for regional projects. However, we have limited visibility on the share of projects that have been allocated through competitive tendering or the overall share won by Enel X. Overall, although public funding seems to have been adequate to overcome the “chicken and egg” issue, there are prima facie indications of residual market failures. The fact that the first mover retains their sector leading position and that the sector still exhibits high concentration highlights the importance that future public funding is allocated competitively to avoid the risk of strengthening existing leading positions.

**Table 43: Italy segment statistics and public support<sup>801</sup>**

Segment Statistics	CPO concentration level	High
	Publicly owned CPO	<p>Yes</p> <p>The State is the majority shareholder of Enel with 24% of total shares</p>

<sup>801</sup> All the data used for this summary table have been presented and discussed in Section 7.2

	Public recharging points per 100k people	50
	EVs per recharging point	9
	EV % of total fleet	0.67%
Public Support and Regulation	State aid	<p>National Plan for Electric Vehicle Recharging Infrastructure: €28m in grants provided to regional authorities in 2018 for projects on the deployment of public EV recharging infrastructures. There is no visibility on which companies absorbed the funds</p> <p>Subsidiary measure for local authorities to incentivise the deployment of EV recharging infrastructure across the Lombard territory: €10m in grants provided in since 2021 to local authorities and public institutions in Lombardy for the installation of EV recharging points with any capacity</p> <p>National Recovery and Resilience Plan: €21m grant provided to Poste Italiane in 2022 for the installation of 5k on-street public recharging stations (approximately 10k recharging points). The CPO has yet to be selected via a public tendering procedure</p>
	CEF (€m)	€30.5m in grants provided to 11 different projects for the installation of public EV recharging points with different capacities (4 projects for ultra-fast, 2 fast ones and 5 with mixed levels of installed capacity). 52% of total grants went to public EV recharging leader. Grants were allocated in the period between 2016 and 2019.
	EIB (€m)	€95m in loans provided to three different firms for the installation of public of public EV recharging points with mixed capacities. 53% of total loans went to public EV recharging leader. Loans were provided in 2018 and 2019

### 8.5.3. Croatia

Croatia has used EU public funding at relatively low amounts, which since the beginning of the sector have benefited all CPOs. There is no indication that aid has flown to the state-owned firm as this firm no longer has a sector leading position and instead actively competes with several privately owned CPOs. State aid has been targeted at fast recharging infrastructure. Overall, the data seems consistent with a combination of public and private investment producing adequate recharging infrastructure at the current nascent state of EV adoption.

**Table 44: Croatia segment statistics and public support**<sup>802</sup>

Segment Statistics	CPO concentration level	Medium
	Publicly owned CPO	Yes (Elen – fully integrated utility)
	Public recharging points per 100k people	26
	EVs per recharging point	4
	EV % of total fleet	0.21%
Public Support and Regulation	State aid	FZOEU grant: €27k grant per recharging point introduced in 2016. Focuses on public fast EV recharging infrastructure
	CEF (€m)	€9.1m grants provided across five projects focusing on mixed levels of installed capacity. The public EV recharging leader received 10% of total grants. Other beneficiaries included Elen (32%), Petrol (44%) and Mol Group (14%). Grants were provided in 2016 and 2017
	EIB (€m)	0

#### 8.5.4. Belgium

The Belgian public recharging sector exhibits medium concentration at the national level with several privately owned CPOs present. There is relatively high EV adoption and adequate public recharging infrastructure based on the EC's targets albeit with indications of uneven regional distribution. State aid has been limited overall with incentives only present in the most developed region of Flanders, which has an advanced public tendering regime. Section 7.4.7 discusses regional dynamics in greater detail. CEF grants, which have been provided gradually since 2014, have not flown to the sector leader. Overall, although we lack good visibility of the EV sector's performance at the regional level, the data in Belgium is consistent with a developed and successful sector in Flanders<sup>803</sup> which has made use of both EU funding and State aid in a manner conducive to competition. Moreover, the Belgian competitive environment features the participation of non-Belgian firms such as Allego, TotalEnergies and IONITY with a multi-national European presence.

<sup>802</sup> All the data used for this summary table have been presented and discussed in Section 7.3

<sup>803</sup> Brussels is also a successful region but we have less visibility on the form of financing used.

**Table 45: Belgium segment statistics and public support**<sup>804</sup>

Segment Statistics	CPO concentration level	Medium		
	Publicly owned CPO	No		
	Public recharging points per 100k people	155		
	EVs per recharging point	11		
	EV % of total fleet	3.40%		
Region		Brussels	Flanders	Wallonia
Public Support and Regulation	State aid	0	Clean Power for Transport: public tenders for the installation of on-street recharging points  EV recharging grant: €1k grant per recharging point (€300k grant per project) to cover up to 20% of total purchase and installation costs. Focused on public on-street recharging	0
	CEF (€m)	€42m in grants provided to 7 projects for the installation of fast (3 projects), ultra-fast (3 projects) and mixed levels of capacity (1 project) public EV recharging infrastructure. 0% went to the public EV recharging leader. Beneficiaries included Allego (43% of the total), TotalEnergies (41%) and IONITY (16%). Grants were provided between 2014 and 2019		
	EIB (€m)	0		

<sup>804</sup> All the data used for this summary table have been presented and discussed in Section 7.4.

## 9. Conclusion

In order for countries across the EU27 + the UK to meet their ambitious Net Zero goals and obligations, a smooth and quick transition to electric vehicles will be crucial. A sufficiently dense, widespread, and publicly accessible recharging infrastructure network which people can trust and easily use will therefore be essential – something which can't be achieved without healthy competitive conditions. This will require a transformation of the mobility sector, with various ecosystem players (e.g., CPOs, eMSPs, local and national authorities, DSOs, etc.) needing to collaborate to ensure recharging infrastructure keeps pace with demand.

This report assessed the EV recharging market across EU Member States and the UK, providing a broad review of regulatory frameworks, public support, and business models to ultimately assess the competitive landscape. No one quite knows exactly how the sector will evolve; however, it is clear competition will be critical to stimulate innovation, lower prices, increase private investment, and improve the quality of the service.

Overall, the EV sector seems to be developing well, although the analysis highlights a significant level of heterogeneity across the region both in the evolution and current state of development of the sector. Although a range of competition concerns are relevant as the sector evolves, no evidence was uncovered of major competitive concerns in the current state of the sector. The evidence instead supports that countries exhibiting higher levels of concentration are generally markets in early phase and in expansion.



## Appendix A Country Summaries

*All numbers presented in the country overview tables were extracted from the European Alternative Fuels Observatory database on October 17<sup>th</sup> 2022 to standardise the data.*

*The colour coding in the EU27 + the UK Rank portion of the table is defined as: Red = lower quartile, Green = upper quartile, Amber = interquartile range*

*EIB loans were attributed to countries that beneficiary firms originate from. Conversely, due to the lack of data granularity on specific amounts allocated per country for CEF and Interreg grants, they have been equally distributed among recipient countries associated with a project that covers multiple Member States.*

*All information in the following summaries was collected up to November 2022 via a bottom-up analysis of relevant Member State specific databases, publications from governments or industry associations as well as Member State specific press articles that comment upon certain regulatory or competitive dynamics. Given the nascency of the industry, some data points vary in specificity based on the data available in the public domain.*

*Some cross-referencing to earlier footnotes/sources has been applied to sources in each country summary.*

## Austria

### Market overview

Austria's eMobility sector has been rapidly growing, with total EV adoption rising from approximately 11k to approximately 116k from 2016 to 2022 (a CAGR of 47%).<sup>805</sup> Moreover, Austria boasts one of the most extensive EV infrastructure networks in the EU27 + the UK, having deployed 226 recharging points per 100k people (only falling behind Luxembourg and the Netherlands).<sup>806</sup> The increase in recharging points between 2016 and 2022 has been proportional to the increase in EV adoption, making the country among the best performers in the EU in terms of EVs per recharging point (easily meeting the EU recommended ratio of 1 recharging point for every 10 EVs). In terms of EV penetration, Austria has made good progress between 2016 and 2022 – the EV penetration has risen from 0.2% to 2.1%, which is above the EU average of 1.6%.<sup>807</sup>

Key sector statistics	2016	2022	Country details	EU27 + UK rank
EV penetration – new sales (#)	5k	48.0k*	<b>84k</b> BEVs	<b>9<sup>th</sup> / 28</b> EVs as a % of total fleet
EV penetration – new sales (%)	1.5%	20.0%	<b>32k</b> PHEVs	
EV adoption – number of cars (#)	11.4k	115.9k		
EVs as % of total fleet (%)	0.2%	2.1%	<b>88%</b> Slow	<b>7<sup>th</sup> / 28</b> EVs per recharging point
Public recharging points (#)	2.0k	20.1k	<b>8%</b> Fast	
EVs per recharging point (#)	5.7	5.8	<b>4%</b> U-Fast	

Data from EAFO website | \*2021 data | NB: Minor rounding discrepancies | U-Fast: Ultra-Fast

### Regulatory overview

As stipulated by Directive 2014/94/EU, Austria pledged to install 4.8k public recharging points by 2020 in its NPF, a target which was then revised to 3.5k through their NIR (now surpassed, with approximately 8k recharging points installed). However, neither the NPF nor the NIR outlined the ambition for 2025 and 2030 and no other target has been published since. This is partially a result of Austria not having a national eMobility strategy, but rather opting for the sector to be driven by local authorities. For example, Vienna has a strategy in place (since 2016).<sup>808</sup> Nevertheless, several country-wide initiatives are in place. In 2018, the Austrian government passed a Climate and Energy Strategy named "Mission 2030" which also references eMobility throughout. Specifically, the strategy includes an "e-Mobility offensive" programme, which outlines national EV purchase subsidies and incentives as well as procedural simplifications for the installation of recharging points.<sup>809</sup>

Under the "e-Mobility offensive" initiative, the Austrian government provides financial support for the rollout of public EV recharging infrastructure. Subsidies are available and range from €2.5k for recharging points with a capacity up to 22kW (slow), to €15k for recharging points with a capacity lower than 100kW (fast) and up to €30k for DC recharging points with a capacity above 100kW (fast and ultra-fast).<sup>810</sup> Moreover, all recharging points must also be equipped with smart capabilities. Roaming is also

<sup>805</sup> European Alternative Fuels Observatory, "Statistics on infrastructure and fleet data for road vehicles: Austria summary", October 2022

<sup>806</sup> Ibid.

<sup>807</sup> Chiara Lodi et al. "Assessment of the Member States' Implementation Reports of the National Policy Frameworks under the Directive 2014/94/EU on the deployment of alternative fuels infrastructure", March 2021

<sup>808</sup> City of Vienna, "eMobility Strategy", February 2016

<sup>809</sup> Federal Ministries of Sustainability and Tourism and Federal Ministry of Transport, Innovation and Technology of Austria, "Mission 2030, Austrian Climate and Energy Strategy", September 2018

<sup>810</sup> Klima Energie Fonds, "E-mobility guidelines for companies, local authorities and associations", February 2022

incentivised, in fact to receive the grants CPOs must be open to entering into roaming agreements with any interested partner.<sup>807</sup>

The EV recharging sector is also regulated at the national level. Public recharging points are classified as commercial operating facilities, thus falling under trade regulation. Concerning recharging point installation, approval is not needed unless there are specific location risks (e.g., installation in hazardous areas).<sup>811</sup> Austria has also adopted EU regulations, transposing the EU AFID into national law. Based on it, the Austrian Infrastructure Deployment Act stipulates that CPOs must allow EV drivers to recharge without needing to enter into contractual obligations with an eMSP, thus enforcing ad hoc recharging and promoting interoperability.<sup>812</sup> In 2020, the government also introduced the Austrian Renewable Energy Expansion Act, which mandated the establishment of a public recharging point register.<sup>813</sup> The register has been made publicly available via the online platform Ladstellen.at and is overseen by the Federal Ministry for Energy, Mobility and Climate together with the energy regulator E-Control. The platform discloses recharging points location as well as their power capacity, opening hours and additional information to enhance consumer utilisation and experience.<sup>814</sup> Overall, the entirety of rules applying to EV recharging described above have been gathered under the "Federal law for the determination of uniform standards in infrastructure development for alternative fuels".<sup>815</sup>

Major policies and incentives	Description
Federal law for uniform standards <sup>812</sup>	Main legislative document, ensuring technical standards are met and a network interoperable with other EU Member States is developed
Austrian Renewable Energy Expansion Act <sup>810</sup>	Established public register of recharging points to increase visibility and promote a good consumer experience
e-Mobility offensive programme <sup>806</sup>	Recharging subsidies of €2.5k for AC (between 11kW and 22kW), €15k for DC lower than 100kW and €30k for DC above 100kW
CEF grants <sup>57</sup>	€7.7m to projects supporting the rollout of recharging infrastructure
EV purchase grants <sup>816</sup>	Grants up to €4k for BEV and €2k for PHEV
EV tax benefits <sup>76</sup>	New EVs are VAT and tax exempt when purchased and ownership

### Competitive dynamics

In Austria the EV recharging sector is populated by a plethora of different players, with more than 250 registered CPOs.<sup>817</sup> Twelve different CPOs have joined forces in Austria Association for e-Mobility (BEÖ) through a multi-lateral roaming agreement. The Association is made up of utility firms, and together they operate roughly 8k recharging points, accounting for approximately 40% of the sector.<sup>818</sup> Another key player is Smartics EnBW, a joint venture of Austria's largest electricity provider, EnBW (utility), and several OEMs including ABB, BMW and Siemens.<sup>819</sup> The firm focuses on fast and

<sup>811</sup> Government of Austria, "General information about electric cars and e-mobility"

<sup>812</sup> Telematics Wire, "Austria: Regulatory framework for charging infrastructure", May 2020

<sup>813</sup> Thomas Hamerl, Georg Gutfleisch, "New Rules for a Public Charging Point Register in Austria", June 2021

<sup>814</sup> E-Control, Federal Ministry of Transport, Innovation and Technology of Austria, "Ladstellen.at"

<sup>815</sup> Austrian Parliamentary Information System, "Consolidated federal law: Entire legal framework for establishing uniform standards for the development of infrastructure for alternative fuels", 2021

<sup>816</sup> Wallbox, "How to benefit from EV and EV Charging Incentives in Austria"

<sup>817</sup> Federal Competition Authority, "Sector inquiry into EV charging infrastructure: AFCA launches comprehensive market inquiry", May 2022

<sup>818</sup> Federal Association of Electromobility of Austria (BOE), "Association website"

<sup>819</sup> eCharge 4 Drivers, "Austria"

ultra-fast recharging along highways and in metropolitan areas, with a current network of around 500 recharging points.<sup>820</sup> Lastly, Tesla is also active in Austria, having deployed 34 recharging points as part of its Tesla Supercharger network.<sup>821</sup> Most firms, including all of those mentioned above, adopt an integrated business model, offering services both CPO and eMSP segments. Recharging point interoperability is well developed in Austria. Since 2017, BEÖ has created a roaming platform for the 12 member companies in collaboration with Hubeject, allowing EV drivers to access the shared recharging network via any of the 12 eMSP cards.<sup>822, 823</sup> On top of that, in 2019 BEÖ members signed a bilateral agreement with Smartics EnBW, opening their respective recharging networks to each other's clients.<sup>824</sup> Moreover, while the Tesla network had traditionally been reserved to the company's clients, since 2021 Austria has been one of the 13 European countries included in Tesla's pilot to make its recharging points accessible to all EV drivers.<sup>825</sup> Austria is also a member of the evRoaming4EU initiative along with Denmark, Germany and the Netherlands.<sup>826</sup> While the Austrian EV recharging market is fragmented, with many different players active, in 2021 the Austrian Federal Competition Authority (AFCA) launched a sector inquiry due to concerns that competition may be restricted or distorted in the sector, such as ensuring that innovative business models can form and that national monopolies do not form.<sup>827</sup> The results of this inquiry were recently released in November 2022 and highlighted that the market position of energy providers create a risk of distortions of competition, as well as 9 other findings found on the AFCA's website.<sup>828</sup>

Recharging market is highly fragmented (> 250 CPOs), largest firms active in both the CPO and eMSP segments.

Interoperability is a focus, some of the main CPOs established shared roaming platform with Hubeject.

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<sup>820</sup> Smartics EnBW, "Charging Network"

<sup>821</sup> Tesla, "Tesla Superchargers in Austria"

<sup>822</sup> European Commission, "Austria to create nationwide EV charging network", 2020

<sup>823</sup> Hubeject, "Hubeject connects eleven energy suppliers to create the largest Austrian charging network for electric vehicles", March 2017

<sup>824</sup> Federal Ministry of Climate Action, Energy, Mobility, Innovation and Technology, "A milestone for e-mobility", 2020

<sup>825</sup> Tesla, "Non-Tesla Supercharger Pilot", November 2021

<sup>826</sup> evRoaming4EU, "About the project"

<sup>827</sup> Federal Competition Authority, "AFCA starts a sector inquiry into electric vehicle charging sector in Austria", November 2021

<sup>828</sup> Federal Competition Authority, "AFCA presents results of sector inquiry into EV charging infrastructure: 10 recommendations for fair competition", November 2022

## Belgium

### Market overview

The EV market in Belgium is advanced relative to the EU average with the country's position driven mainly by the Flanders region through strong regionally led regulation and incentives.<sup>829</sup> The Belgian regulatory support is highly variable between Flanders, Brussels, and Wallonia, in addition to some legislation that covers the entire country. The Belgium EV market has grown to more than 200k vehicles, with more than 20% of new vehicle sales being EVs as of 2022.<sup>830</sup> The recharging segment has also grown at a similar rate rising from 1.6k to 17.8k between 2016 and 2022.<sup>831</sup> As a result, the EVs per recharging point ratio currently sitting at 11, which is in line with the EU recommendation of 10 EVs per recharging point.

Key sector statistics	2016	2022	Country details	EU27 + UK rank
EV penetration – new sales (#)	9.3k	70.4k*	<b>65k</b> BEVs	<b>5<sup>th</sup>/28</b> EVs as a % of total fleet
EV penetration – new sales (%)	1.7%	21.9%	<b>138k</b> PHEVs	
EV adoption – number of cars (#)	16.6k	203.4k		
EVs as % of total fleet (%)	0.3%	3.4%	<b>91%</b> Slow	<b>14<sup>th</sup>/28</b> EVs per re-charging point
Public recharging points (#)	1.6k	17.8k	<b>7%</b> Fast	
EVs per recharging point (#)	10.3	11.4	<b>2%</b> U-Fast	

Data from EAFO website | \*2021 data | NB: Minor rounding discrepancies | U-Fast: Ultra-Fast

### Regulatory overview

The Belgium regulatory space is regionally led through the three areas of Flanders, Wallonia, and Brussels, each with varying levels of policy and regulation. Flanders in particular, has a history of being the most developed out of the three areas, with 90% of Belgian rechargers situated in Flanders at the beginning of 2019.<sup>832</sup>

Regarding Flanders, the Flemish government laid out the Clean Power for Transport (CPT) action plan that outlined a target of 7.4k public recharging points in Flanders by 2020 which was achieved.<sup>833</sup> The Flemish government also established a target (as part of the CPT) to ensure that 7.5% of new vehicle registrations by 2020 were BEVs (100% by 2030),<sup>834</sup> as well as the goal of installing 6k public recharging points per year between 2021 and 2026.<sup>835</sup> Municipal areas within Flanders such as Ghent and Antwerp have extended industry tenders to develop public recharge points, for example, Total Energies (O&G) won a public tender from the Antwerp government to establish recharging points in the city until 2034.<sup>836</sup> The Flanders government provided a €4k BEV purchase incentive (scrapped in 2020),<sup>837</sup> but EVs remain exempt from registration taxes and ownership taxes,<sup>838</sup> and for recharging infrastructure, building and renovation permits are only granted if they consider groundworks for several electric vehicle recharging points, which took effect from March 2021.<sup>839</sup>

<sup>829</sup> European Alternative Fuels Observatory, "Belgium: Incentives & legislation"

<sup>830</sup> European Alternative Fuels Observatory, "Belgium: summary"

<sup>831</sup> Ibid.

<sup>832</sup> Statista, "Number of charging points in Belgium in 2019, by province,"

<sup>833</sup> Sam Nelson, "Flanders making progress towards clean transportation goals", June 2019

<sup>834</sup> Bruce Crumley, "Flanders may ban sales of non-EV new cars by 2027, 2030 for used", November 2021

<sup>835</sup> The Brussels Times, "Number of electric vehicles in Flanders has increased significantly", March 2021

<sup>836</sup> Nora Manthey, "Antwerp contracts TotalEnergie to expand EV charging network", September 2021

<sup>837</sup> European Alternative Fuels Observatory, "Statistics on infrastructure and fleet data for road vehicles: EU27", October 2022

<sup>838</sup> Wallbox, "Full List Of EV And EV Recharger Benefits In Belgium"

<sup>839</sup> Jason Spinks, "Charging points for EVs become mandatory for new buildings and major renovations", March 2021

In Brussels, the regulatory support for EV penetration and infrastructure development largely exists through tax breaks. Brussels has a target of 11k public recharge points by 2035 and aims to have a recharger located within 250 meters of every citizen's residence by 2022.<sup>840</sup> The local government has also stated that all Brussels public car parks (with ten or more parking spaces), must offer a recharge point in 5% of their spaces by 2025, and 10% by 2030.<sup>841</sup> Companies that provide destination recharging services are able to claim up to 13.5% reduction on recharging infrastructure investments, with maximum savings of up to €14k.<sup>842</sup>

Wallonia has been slower in the development of EV recharging infrastructure compared to Brussels and Flanders, with less than 300 rechargers installed in 2019. However, Wallonia has recently brought forward their 2030 target of 7k installed public recharging stations by 2025.<sup>843</sup> Wallonia has limited regulation in place but one example is the government purchase subsidy of up to €3.5k towards an electric vehicle.<sup>844</sup>

Major policies and incentives	Description
Flemish CPT Plan <sup>845</sup>	Strategy for rollout of EV rechargers
Regional tax incentives for EV ownership <sup>846</sup>	In Flanders, EVs are exempt from road and registration tax. In Brussels and Wallonia, EVs have lowest rate of ownership tax. In Brussels, a tax break of 13.5% for destination
EV recharging stations in parking lots <sup>847</sup>	Brussels government mandate that new parking lots with more than 10 parking spaces must have recharging stations
CEF grants <sup>57</sup>	€18m to projects supporting the rollout of recharging infrastructure

### Competitive dynamics

Belgium has a large number of CPOs in operation, some of the companies include Tesla (automotive OEM), IONITY (pure play backed by OEMs), Fastned (pure play), TotalEnergies (O&G), EVBox (pure play backed by utility), Allego (pure play), GreenFlux (pure play), NewMotion BE (pure play backed by O&G), and Vitae Mobility (pure play).<sup>848</sup> Some of these CPOs have won public tenders from the three governing regions, notably, Allego and TotalEnergies won public tenders with the Flemish government between 2017 and 2021 and have since commanded high shares in Flanders.<sup>849,850</sup> Similarly, Pitpoint (pure play acquired by TotalEnergies in 2017) has won public tenders from the Brussels government to install recharging infrastructure.<sup>851</sup> In Wallonia, currently no CPO has received significant government support compared to Flanders and Brussels. Regarding destination rechargers, in 2020, German discount retailer Lidl expanded the number of free fast rechargers on the parking lots of the Belgian supermarkets from 61 to 100.<sup>852</sup> The free recharging offering has been part of a global Lidl strategy to attract customers, and pledge investment in the EV market. Some markets, including the UK, have now moved towards a more sustainable pay as you charge model,<sup>853</sup> which Belgium may

<sup>840</sup> The Brussels Times, "Everyone in Brussels to live within 250m of an electric vehicle recharger by 2022", November 2021

<sup>841</sup> Nora Manthey, "All Brussels car parks must provide EV charging by 2025", October 2022

<sup>842</sup> Wallbox, "Full list of EV and EV Charger Benefits in Belgium", 2022

<sup>843</sup> Felix Bouland, "7 000 charging points in Wallonia by 2025", May 2021

<sup>844</sup> Ampeco, "The essential guide to ev and ev recharging incentives in Belgium"

<sup>845</sup> Sam Nelson, "Flanders making progress towards clean transportation goals", June 2019

<sup>846</sup> Wallbox, "Full List Of EV And EV Recharger Benefits In Belgium"

<sup>847</sup> Nora Manthey, "All Brussels car parks must provide EV charging by 2025", October 2022

<sup>848</sup> Niklas Wallner, "eMSP.OPERATION: Available Charge Point Operators", August 2022

<sup>849</sup> Allego, "Allego expands its network with 1,300 charging points in Flanders", January 2020

<sup>850</sup> Nora Manthey, "Antwerp contracts TotalEnergie to expand EV charging network", September 2021

<sup>851</sup> Brussels Electrical Vehicle Club, "Pitpoint/Total/Greenflux"

<sup>852</sup> Dieter Quartier, "Lidl adds 39 free fast rechargers to its Belgian supermarkets", February 2020

<sup>853</sup> Pod Point, "Lidl Pricing Update", October 2019

follow as EV uptake continues to increase. Several CPOs in Belgium also operate as an eMSP under a separate entity, such as BlueCorner as the CPO and BlueCorner NV as the eMSP.<sup>854</sup> Most of the above-mentioned CPOs do also operate as eMSP and in turn provide a charge card that provides access to their network, however some bilateral agreements are in place among players to ensure customers can recharge at their 'non-preferred' recharging partner location, such as Total Energies accepts eight different recharge cards from the other Belgian integrated CPO-eMSPs.<sup>855</sup> There is also a selection of different roaming networks that customers can use, such as BlueCorner, which provides a roaming service for a fee that consumers can use to access a wider network of rechargers.<sup>856,857</sup> In addition, eMIP, a French roaming platform pure play has operated in Belgium since 2017, with CPOs being able to apply to join the platform to improve visibility of their recharge points among the eMIP customer base.<sup>858</sup> Additionally, ChargeMap operates in Belgium who act as an eMSP through their recharging card and has a very active user forum to provide accurate and relevant information about recharging station quality, availability and location.<sup>859</sup>

Public support for EV recharging has been different between regions, with Flanders offering grants to support infrastructure deployment.

Most players offer CPO and eMSP service - interoperability enhanced with bilateral agreements / roaming hubs.

<sup>854</sup> Bluecorner, "Building a blue world"

<sup>855</sup> TotalEnergies, "Accepted Belgian charge cards"

<sup>856</sup> BlueCorner, "Building a Blue World", 2022

<sup>857</sup> Ibid.

<sup>858</sup> Piotr Majcher, "EV roaming with open standards - OICP and eMIP", April 2021

<sup>859</sup> Ask OTO, "The main networks and charging apps in Belgium", January 2021



## Bulgaria

### Market overview

The Bulgarian EV fleet and recharging market has lagged behind other EU countries, ranking last across the EU27 + the UK with only 50 EVs per 100k people (representing 0.1% of the total vehicle fleet).<sup>860</sup> Nevertheless, some progress has been made with EV penetration of new sales reaching approximately 3% as of October 2022 (compared to approximately 0.3% in 2016). Likewise, public recharging points have almost reached 1k, meeting the EU recommended ratio of 1 recharging point per 10 EVs (albeit skewed and not fully representative given the lack of EV adoption rather than the maturity of the EV infrastructure network).<sup>861</sup>

Key sector statistics			2016	2022	Country details			EU27 + UK rank
EV penetration – new sales (#)			0.0k	0.8k*	2.1k BEVs	1.4k PHEVs		28 <sup>th</sup> /28 EVs as a % of total fleet
EV penetration – new sales (%)			0.0%	3.1%				
EV adoption – number of cars (#)			0.3k	3.5k	68% Slow	26% Fast	6% U-Fast	4 <sup>th</sup> /28 EVs per re-charging point
EVs as % of total fleet (%)			0.0%	0.1%				
Public recharging points (#)			0.0k	0.9k				
EVs per recharging point (#)			14.6	4.0				

Data from EAFO website | \*2021 data | NB: Minor rounding discrepancies | U-Fast: Ultra-Fast

### Regulatory overview

Bulgaria does not have a well-developed eMobility regulatory framework in place, however since the EU wide 2035 ban on the sale of ICE vehicles was announced, increased focus has been placed on the sector. Borislav Sandov, Deputy Prime Minister for Climate Policy and Minister of Environment and Water, announced in April 2022 that the goal is to have 30,000 electric vehicles and 10,000 recharging stations in Bulgaria by 2026.<sup>862</sup> Nevertheless, some specific legislation and initiatives were already in place. In 2018, an inter-governmental work group was set-up to develop a strategy for the sector up to 2025, with an extended horizon of 2030. This led to several changes being introduced into national legislation, mainly aimed at promoting investments in the sector through advantageous tax requirements for EV owners and developers of infrastructure (the amended acts include the Local Tax and Fees Act, the Road Traffic Act, the Spatial Development Act, and the Ordinance for the Design of the Communication-Transportation System of the urbanised Territories).<sup>863</sup> However, these updates failed to stimulate the sector due to their limited scope. For instance, only Bulgarian government bodies were made eligible for EV subsidies (ranging between €10k and €20k, depending on the vehicle).<sup>864</sup>

Focusing on EV recharging, in April 2017 the Bulgarian government transposed Directive 2014/94/EU into law within Ordinance No 2 from 2004 on the planning and design of communication-transportation systems in urban territories.<sup>865</sup> This has been the major document regulating the technical parameters of the sector and provided the first definition of an EV (and associated infrastructure) in Bulgarian legislation. It also outlined EV parking standards for developers and, since 2019, it required new buildings and those undergoing major renovations to provide a minimum number of recharging

<sup>860</sup> European Alternative Fuels Observatory, "Statistics on infrastructure and fleet data for road vehicles: Bulgaria summary", October 2022

<sup>861</sup> European Alternative Fuels Observatory, "Statistics for road vehicles: Bulgaria vehicles and fleet", October 2022

<sup>862</sup> Borislav Sandov, "We are working on promoting electric mobility in Bulgaria", April 2022

<sup>863</sup> Denitsa Dudevska, Kostadin Sirlishtov "Electric Vehicle Regulation and Law in Bulgaria"

<sup>864</sup> Denis Balgaranov, "Electric car growth in Bulgaria - similar to the EU's, but without the subsidies", July 2022

<sup>865</sup> CMS, "Bulgaria adopts EU legislation developing alternative fuels infrastructure", May 2017

points.<sup>862</sup> Still, Bulgaria did not have a clear national strategy or plan to advance the EV recharging sector until recently. Announced in 2021 and approved in 2022, the national government drafted its 'Recovery and Resilience' plan outlining how Bulgaria will transition to a sustainable economy. This plan prompted the introduction of the target for 10k EV recharging points operational by 2026 (significantly higher than the NIR targets previously shared with the European Union).<sup>866</sup> Most recently, in November 2022, the Bulgarian Ministry of Energy announced approximately €70million pilot programme that aims to construct 200 fast recharging stations in Burgas, Bulgaria – by when is unclear at this stage.

To achieve these targets, the Bulgarian government announced cash incentives, and new tax deductions under the Operational Programme Environment 2021-2027 (EU co-funded).<sup>867</sup> The program will offer up to a €6.2k subsidy for the purchase of an EV (capped at 20% of purchase price for cars with a list price below €30k). Furthermore, Bulgaria's National Recovery and Resilience Plan provides some additional financial incentives for zero-emission vehicles.<sup>868</sup> Lastly, a special commission has been set up to simplify and improve regulation for the sector (including new financial support mechanisms) with a long-term plan expected in late 2022.<sup>869</sup>

Major policies and incentives	Description
Ordinance No 2 from 2004 (based on Directive 2014/94/EU) <sup>860</sup>	Major regulatory document for EV recharging in Bulgaria, outlining some technical standards and requirements for various ecosystem participants
National Recovery and Resilience Plan <sup>870</sup>	Passed in 2022, this plan outlined Bulgaria's path to an economy that can be 'future resilient'. The act called for electrification of the transport sector, which prompted later legislation to rollout incentives
Operational Programme Environment 2021-2027 <sup>864</sup>	EU co-funded, includes a measure to promote the replacement of old passenger vehicles with EVs, providing a subsidy of up to €6.2k per vehicle replaced
EV ownership tax benefit <sup>76</sup>	EVs are exempt from ownership taxes
Law to encourage eMobility and provide incentives to the sector (2022) <sup>866</sup>	This is under development and is expected to lead to an updated regulatory framework for the sector and increased financial support/incentives

### Competitive dynamics

While there are currently less than 1k recharging points in Bulgaria, several CPOs and eMSPs are present in the market. Eldrive (pure play) is the largest CPO in the country, operating more than 450 recharging points (approximately 50% share) with an additional 100+ available to their customers via bilateral and roaming agreements. They offer an integrated smart platform with an easy payment function via mobile app or RFID tag.<sup>871</sup> Other key players in the market include Fines Recharging (pure play backed by technology OEM ABB) and EVPoint (pure play) who provide eMSP services and give their customers access to a large international network of recharging points.<sup>872,873</sup> Moreover, Fines Recharging has recently expanded roaming options for its customers

<sup>866</sup> Nora Manthey, "Bulgaria targets installing 10,000 charging points", March 2022

<sup>867</sup> European Structural and Investment Funds Information Portal, "Pattern of the programmes, co-financed by the EFRD", April 2020

<sup>868</sup> European Commission, "Proposition for a Council Implementing Decision on the approval of the assessment of the recovery and resilience plan of Bulgaria – Annex", April 2022

<sup>869</sup> Michiel Modijefsky, "Bulgaria preparing law to promote electric vehicles", May 2022

<sup>870</sup> European Commission, "Recovery and resilience plan for Bulgaria" April 2022

<sup>871</sup> Eldrive, "Powering the future of mobility"

<sup>872</sup> Etien Yovchev, "Who Is Who in the Bulgarian Electric Vehicle Ecosystem", September 2020

<sup>873</sup> ABB, "ABB expands the EV charging network in Bulgaria with the first 120 kW rechargers in the country", March 2021

through a strategic partnership with Hsubject, promoting interoperability and openness of access.<sup>874</sup>

While the integrated model is by far the most popular in Bulgaria, specialised companies also exist. For instance, Ampeco is a start-up based in Sofia that provides a Software as a service (SaaS) management platform to enable recharging point operators to easily start and scale a network of stations.<sup>875</sup> At this stage of Bulgaria's eMobility journey, and as the government increases efforts to install recharging infrastructure across the country to meet the latest goal of 10k recharging points by 2026, it is crucial that the market continues to operate in a competitive manner.

Bulgaria's EV charging regulatory framework is not as advanced as other EU Member States. New legislation is expected to be announced.

Eldrive has approximately 50% share, however other players are looking to expand as new targets and incentives are being rolled out by the national government.

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<sup>874</sup> Hsubject, "Hsubject partners with Fines Charging to expand eRoaming options for electric car drivers in Bulgaria", August 2022

<sup>875</sup> Ampeco, "Our charging platform"

## Croatia

### Market overview

Croatia remains behind many EU Member States when it comes to EV adoption, with less than 4k EVs on its roads out of a total fleet of nearly 2m, representing a penetration rate of 0.2% and putting it amongst the lowest Member States in terms of EVs as % of overall fleet.<sup>876</sup> Similarly, the number of public recharging points is currently 1.1k, which equates to 3.7 EVs per recharge point, meeting the EU recommended ratio.<sup>877</sup> Croatia is also home to Rimac, the high-performance EV OEM and battery manufacturer backed by Porsche and Hyundai, that now has battery supply contracts with OEMs including Aston Martin and Koenigsegg.<sup>878,879</sup>

Key sector statistics	2016	2022	Country details	EU27 + UK rank
EV penetration – new sales (#)	0.1k	1.9k*	<b>3k</b> BEVs	<b>25<sup>th</sup>/28</b> EVs as a % of total fleet
EV penetration – new sales (%)	0.2%	7.1%	<b>1k</b> PHEVs	
EV adoption – number of cars (#)	0.3k	3.9k		<b>3<sup>rd</sup>/28</b> EVs per re-charging point
EVs as % of total fleet (%)	0.0%	0.2%	<b>64%</b> <b>28%</b> <b>7%</b> Slow Fast U-Fast	
Public recharging points (#)	0.2k	1.1k		
EVs per recharging point (#)	1.1	3.7		

Data from EAFO website | \*2021 data | NB: Minor rounding discrepancies | U-Fast: Ultra-Fast

### Regulatory overview

The Croatian EV industry started to form in 2015 when the first 150 EVs were registered, compared to other countries establishing fleets at the start of the decade. Since then, Croatia has followed a top-down approach to the development of its eMobility sector, whereby the government sets targets and rolls out incentive schemes to boost the sector.<sup>880</sup> Historically, Croatia has let the EU guide its eMobility market, aiming to meet the mandatory requirements shared in Directive 2014/94/EU.<sup>881</sup>

Following EU guidance, eMobility association Strujni Krug was established in 2019 as a non-profit designed to lead the development of an EV market in Croatia through development of specific Croatian regulation and by uniting CPOs to ensure openness of access for consumers.<sup>882</sup> They are backed by OEMs including Porsche, Ford, Tesla and Audi, along with oil major, Total<sup>883,884</sup> They are also part of the European association for eMobility (AVERE), whose guidance has been a key contributor to the country's overall strategy.<sup>885</sup> The national eMobility association Strujni Krug also believes that to achieve higher EV penetration, firstly the recharging infrastructure must be in place (depicted by the nation's strong performance in terms of EVs per recharge point, ranking third out of all EU27 Member States and the UK). They also believe that leveraging EU co-financing options is a good way to avoid relying solely on state funds and can significantly accelerate recharging deployment.<sup>879</sup> The midterm ambition is to then establish regulation specific to Croatia to build upon the EU foundation. Beyond this,

<sup>876</sup> European Alternative Fuels Observatory, "Statistics on infrastructure and fleet data for road vehicles: Croatia summary", October 2022

<sup>877</sup> Ibid.

<sup>878</sup> Automotive News Europe, "Rimac aims to follow Tesla with a move to 46 mm cylindrical battery cells", July 2022

<sup>879</sup> Mark Vaughn, "Did Porsche Just Take Over Rimac?", July 2021

<sup>880</sup> European Regional Development Fund, Emobility, "Report on EV charging pricing, regulatory framework and DSO role in the e-mobility development", August 2021

<sup>881</sup> Lauren Simmonds, "By European Union Standards, Croatian Charging Stations Must Increase", January 2022

<sup>882</sup> Electric Circuit, "Find out all the news from the world of electric mobility"

<sup>883</sup> Ibid.

<sup>884</sup> Electric Circuit, "Current Circuit Association"

<sup>885</sup> Avere the European Association for Electromobility, "Leading Electric Revolution"

Strujni Krug operates as an association for consumers to join and receive benefits including discounts on BEV vehicles rechargers and eMobility services such as insurance and leasing.<sup>886</sup>

Between 2018 and 2022, Croatia had strong financial incentives in place for the installation of public EV recharging, such as in 2018 when the Environmental Protection and Energy Efficiency Fund offered up to 40% co-financing for companies looking to set up EV recharging stations (limited to approximately €27k).<sup>879</sup> The fund was refreshed in 2020, providing approximately €1.3m more for the installation of public recharging stations, with a further €14m being provided in 2021 for energy efficient vehicles.<sup>887</sup> In the same announcement, they also mentioned that a separate fund will be announced in late 2022 geared specifically at the development of recharging infrastructure.<sup>888</sup> The country also received €11.3m from the CEF to develop recharging infrastructure.<sup>57</sup>

Croatia follows the market model whereby the DSO is not allowed to provide recharging services (under EU directive 2019/944), unlike countries such as Ireland, Italy and Slovenia who adopted this approach in early years of their development but have since looked to stride towards a more competitive, privately funded recharging development space.<sup>889</sup> Moreover, in the context of Article 39, The Electricity Market Act (Official Gazette, 22/13, 95/15, 102/15, 68/18) specifies the responsibilities of the DSO but does not explicitly state their eMobility role. It does however highlight provisions where the DSO is responsible for developing eMobility based on the need to strengthen the network to meet future mobility needs and facilitate overlaps between renewable energy systems and EVs, namely smart recharging and V2G.<sup>890</sup>

Major policies and incentives	Description
EV purchase incentives and tax benefits <sup>76</sup>	Once a year with limited funds of €9.3k for BEVs and € 5.3k for PHEVs, also no excise duties for the acquisition of an EV, and exemption from environmental ownership tax
Environmental Protection and Energy Efficiency Fund <sup>891</sup>	National co-financing facility with a history of funding allocated to EV purchases and recharging infrastructure build out. Up to 40% grant of the total costs for companies installing recharging stations, up to €27k
CEF grants <sup>57</sup>	€11m to projects supporting the rollout of EV recharging infrastructure

### Competitive dynamics

Croatia's eMobility sector is in a state of development with a healthy presence of CPOs that are operating approximately 1k public recharge points across the country. The largest players include Elen (utility/DSO), Petrol/OneCharge (O&G integrated utility), Hrvatski Telekom/espots (telecoms and MOON (pure play). Elen, Hrvatski Telekom, MOON and Petrol command more than 80% of the market collectively,<sup>892</sup> and Hrvatski Telekom hold approximately 30% themselves.<sup>893</sup> The Elen network operates rechargers on behalf of the state-owned power utility Hrvatska Elektroprivreda (HEP) which is also a DSO. Elen started its rollout in 2015, working closely with HEP to consider EV

<sup>886</sup> Strujni Krug, "eMobility Association", 2022

<sup>887</sup> Lauren Simmonds, "Croatian Government Incentives for Electric Vehicle Purchases Begin", May 2022

<sup>888</sup> Annie Tsoneva, "Croatia to provide 108 mln kuna (14 mln euro) incentives for purchase of energy efficient vehicles", June 2022

<sup>889</sup> European Parliament and European Council, "Directive (eu) 2019/944 of the European Parliament and of the Council of 5 June 2019 on common rules for the internal market for electricity and amending Directive 2012/27/EU", June 2019

<sup>890</sup> European Regional Development Fund, Emobility, "Report on EV charging pricing, regulatory framework and DSO role in the e-mobility development", August 2021

<sup>891</sup> Svetlana Jovanović, "Croatia to co-finance installation of EV charging stations in 2018", August 2018

<sup>892</sup> Current Circuit, "Rechargers for electric vehicles"

<sup>893</sup> Hrvatski Telekom, "Invest in e-charging stations"

recharging impacts to the grid and, until earlier this year, recharging on Elen-HEP recharge points was free.<sup>894</sup> However, now that EV penetration globally starts its journey to overtake ICE vehicles, HEP have introduced fees of approximately €0.36 for slow recharging (<22kW) and approximately €0.70 for fast recharging (>50kW).<sup>895</sup> Historically, the user experience in Croatia has been restricted due to EV users having limited access to all public recharge points as a result of requiring a separate applications to access networks of different players.<sup>889</sup> However, Strujni Krug have made strides to simplify the customer experience and enhance the openness of access across the nation. Specifically, through a joint initiative that includes the five largest CPOs with the ambition of cooperation to align on a common platform and on bilateral agreements that avoid access challenges including additional roaming costs.<sup>896</sup> Currently consumers must register and set up an account with each CPO, including downloading their respective eMSP application in order to access its recharging network. That being said, the presence of service provider PlugShare helps users identify recharge points across Croatia.<sup>897</sup> This will act as an interim solution until the work from Strujni Krug to unify the recharging experience for users is established (expected mid-2023).<sup>898</sup>

The introduction of the Strujni Krug association is expected to foster the creation of new market regulation that is specific to Croatia to achieve the EU targets.

The CPO Elen which operates on behalf of the state-owned power utility HEP Group as well as CPO Hrvatski Telekom both have around 30% shares.

<sup>894</sup> Zadar Tourist Board, "ELEN charging stations"

<sup>895</sup> Annie Tsoneva, "Croatia's HEP introduces fees for charging EVs at 31 stations on motorways", January 2022

<sup>896</sup> Res Croatia, "The Association "Electric Circuit" is working on a universal application for electric vehicle rechargers", October 2021

<sup>897</sup> Plugshare, "Charging map"

<sup>898</sup> Study interview, Croatian eMobility Association, November 2022



## Cyprus

### Market overview

Cyprus's government efforts in the sector have intensified recently, with several schemes set up to promote deployment of EVs – as of October 2022 Cyprus had approximately 900 EVs, rising quickly from approximately 80 in 2016. Moreover, while Cyprus has less than 100 EV recharging stations, a strong increase is expected in the coming years as new grants are rolled out and as legislation is simplified to promote private sector involvement.<sup>899</sup> Cyprus' low number of recharging points currently results in a relatively average EVs to recharge point ratio of 11.7 but does not meet the EU recommended target.

Key sector statistics	2016	2022	Country details	EU27 + UK rank
EV penetration – new sales (#)	0.0k	0.2k*	<b>367</b> BEVs	<b>26<sup>th</sup>/28</b> EVs as a % of total fleet
EV penetration – new sales (%)	0.3%	1.3%	<b>522</b> PHEVs	
EV adoption – number of cars (#)	0.1k	0.9k		<b>15<sup>th</sup>/28</b> EVs per re-charging point
EVs as % of total fleet (%)	0.0%	0.2%	<b>100% 0% 0%</b> Slow Fast U-Fast	
Public recharging points (#)	0.0k	0.1k		
EVs per recharging point (#)	2.3	11.7		

Data from EAFO website | \*2021 data | NB: Minor rounding discrepancies | U-Fast: Ultra-Fast

### Regulatory overview

The eMobility regulatory framework in Cyprus is slightly less developed than other EU Member States. However, the sector has advanced significantly since Directive 2014/94/EU was transposed into national law (National Policy Framework for the Development of the Market for Alternative Fuels in the Transport Sector). The NPF outlined initial targets for EV recharging infrastructure, aiming to install approximately 100 recharge points by 2020 but they failed to reach this, only deploying approximately 50.<sup>900,901</sup> It also outlined some initial interoperability and technical standards and called out areas of the sector where new legislative frameworks would be introduced (e.g., requiring new buildings to install EV rechargers).<sup>898</sup> Since then, targets have been updated with more ambitious plans defined by the Minister of Transport. Presently, Cyprus has set a goal of 36k EVs by 2030, including 25% of new vehicle registrations to be electric by 2030 (and 100% by 2035, in line with the latest EU guidance).<sup>902</sup>

To meet these goals, and support the Net Zero by 2050 target, generous incentives relative to other Member States have been set up (albeit mainly focusing on EVs rather than infrastructure). Leveraging EU funds, the Recovery and Resilience fund will invest €91.3m to advance sustainable transport in Cyprus from 2021 – 2026, including funding for building cycleways, and other forms of sustainable transport. In terms of EV recharging infrastructure, some highlights include a €200k fund to create a regulatory framework for interoperable and efficient recharging infrastructure and for the regulation of the relevant market and €6.8m for creation of EV infrastructure (€0.8m to install 10 fast recharging stations in public spaces, €4m grant for the installation of 1k

<sup>899</sup> Cyprus Mail, "All systems go for EV transition, more than 1,300 new registration this year", September 2022

<sup>900</sup> European Alternative Fuels Observatory, "Statistics on infrastructure and fleet data for road vehicles: Cyprus infrastructure", October 2022

<sup>901</sup> Republic of Cyprus Ministry of Transport, Communications and Works, Ministry of Energy, Commerce, Industry and Tourism, "National policy framework for the development of the market for alternative fuels in the transport sector and deployment of the relevant infrastructure pursuant to article 3 of directive 2014/94/EU", December 2019

<sup>902</sup> Financial Mirror, "'Generous' incentives to go electric", November 2021



recharge points in private/semi-public areas, €2m grant for recharging EVs using renewable energy sources).<sup>903,904</sup>

While this is a step forward, an appropriate legislative framework covering the location, licensing, and operation of EVs is expected and needed to ensure healthy development of the sector. The plan also includes €48.8m for supporting of EV adoption including one of the most attractive packages in the EU to encourage consumers to scrap their old ICE vehicle for a new electric one.<sup>905</sup>

Major policies and incentives	Description
National Policy Framework based on Directive 2014/94/EU <sup>898</sup>	Sets out national objectives and targets, guidelines, supporting actions and policy measures for the development of alternative fuels sector and deployment of the necessary infrastructure (submitted to the European Commission in November 2016)
Grant for public recharging development <sup>906</sup>	Over €4m to install 1k recharging stations by 2026 in public spaces (including 40 fast-recharging stations on motorways). Details are being finalised.
Installation of PV systems for EV recharging subsidies (focus on private/semi-public) <sup>907</sup>	As part of an approximately €2m fund meant to ensure EVs are charged using green energy, beneficiaries can receive €600 for the purchase and installation of a recharger, €450 to convert electrical systems from single to three phase, and €750/kWh for the purchase/installation of a battery (maximum grant per applicant of €2k)
EV purchase subsidies <sup>76</sup>	Purchase subsidies of up to €19k for BEVs and tax benefits including no taxes when purchasing an EV, and minimum tax rate during ownership

### Competitive dynamics

With the island boasting less than 100 public recharging stations, the publicly-owned Electricity Authority of Cyprus (EAC) is by far the most preeminent player accounting for almost all public rechargers and acting as an integrated CPO and eMSP (requiring consumers to sign up through the e-charge service increasing switching barriers).<sup>908</sup> While private sector involvement is slowly increasing, EAC's market pre-eminence is expected to continue in the short-term given the EAC has shared plans to add approximately 40 more stations to its network by the end of 2022.<sup>909</sup> In particular, the state-owned entity is the only player focusing on fast and ultra-fast recharging along motorways which could lead them to controlling a crucial dimension of the sector, ultimately generating anti-competitive effects.<sup>910</sup> Moreover, given the EAC's close alignment with the state of Cyprus could enable them to have a better understanding of the the Cyprus Recovery and Resilience fund including the process of accessing it (noting that current financial support is more tailored to private and semi-public recharging). Lastly, first-mover advantages have caused the most desirable locations (in terms of expected recharger utilisation rates) to be occupied by the EAC, raising

<sup>903</sup> Government of Cyprus, "Cyprus Recovery and Resilience Plan 2021-2026", May 2021

<sup>904</sup> Directorate General Growth, Ministry of Finance, "Grants Scheme for the installation of 1000 charging points for electric vehicles - 1st Call", November 2022

<sup>905</sup> European Commission, "Cyprus' recovery and resilience plan"

<sup>906</sup> Electrify, "Cyprus funds public charge points", November 2022

<sup>907</sup> RES and Energy Conservation Fund, "GRANT SCHEME FOR THE INSTALLATION OF PHOTOVOLTAIC SYSTEMS FOR CHARGING OF ELECTRIC AND PLUG-IN HYBRID VEHICLES (2022)", April 2022

<sup>908</sup> Electricity Authority of Cyprus, "E-charge"

<sup>909</sup> Electricity Authority of Cyprus, "Tender for the supply of 40 EV public charging stations", February 2022

<sup>910</sup> Elias Hazou, "EAC to increase number of car charging points", December 2021

questions as to whether it is worth it for private players to develop the network in locations where the commercial case is weaker.

In terms of private players, the EV recharging network is being bolstered by car distributors who offer public and semi-public recharging for their customers in their branches. Some of these distributors are offering recharging at no additional cost simply to increase foot traffic, while others seem to see it as a business opportunity to expand their services and create new revenue streams.<sup>911</sup> Porsche, through A.I. Motokinisi (their exclusive dealer in Cyprus) is the leading player in this field installing rechargers at hotels, airports, marinas and other key locations as early as March 2021 (first four Porsche rechargers installed at the Radisson Blu five-star hotel in Larnaca).<sup>912</sup> Nevertheless, their reach is still minimal and does not directly compete with the EAC given different target consumers and locations at the moment.

The state-owned EAC is significantly ahead, it acts as a CPO and eMSP, is involved across the energy value chain, and will continue investing in EV charging infrastructure leveraging government (and EU) public support.

Updated regulatory framework looking at interoperability and competition (and others) being developed.

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<sup>911</sup> Masis Der Parthogh, "Car importers bolster EV recharger network", July 2022

<sup>912</sup> KNews, "First Porsche electric car rechargers installed in Cyprus", March 2021

## Czechia

### Market overview

Czechia is amongst the lowest in terms of EV penetration, and while improvements have been made, with EV adoption rising from 2.1k in 2016 to 16.6k in 2022 (41% CAGR), this still only represents 0.2% of the total fleet.<sup>913</sup> Likewise, EV infrastructure deployment needs to accelerate, with less than 3k public rechargers currently available - a growth from ~400 in 2016. EV penetration is extremely low but there are already 6.3 EVs per recharge point, highlighting the need for continued infrastructure deployment to maintain uptake growth.

Key sector statistics	2016	2022	Country details	EU27 + UK rank
EV penetration – new sales (#)	339	6.4k*	<b>11k</b> BEVs	<b>22<sup>nd</sup>/28</b> EVs as a % of total fleet
EV penetration – new sales (%)	0.1%	2.7%	<b>6k</b> PHEVs	
EV adoption – number of cars (#)	2.1k	16.6k		<b>8<sup>th</sup>/28</b> EVs per re-charging point
EVs as % of total fleet (%)	0.0%	0.2%	<b>67%</b> <b>28%</b> <b>4%</b> Slow Fast U-Fast	
Public recharging points (#)	435	2.7k		
EVs per recharging point (#)	4.8	6.3		

Data from EAFO website | \*2021 data | NB: Minor rounding discrepancies | U-Fast: Ultra-Fast

### Regulatory overview

Czechia's authorities first started focusing on eMobility in 2015 when they issued a National Action Plan for Clean Mobility, setting a vision for the sector and highlighting some strategic objectives.<sup>914</sup> This plan transposed Directive 2014/94/EU into national law (through various legislations), ensuring the country would comply with EU requirements related to public EV recharging points. Moreover, it outlined a target to have 500k EVs and 35k public recharging stations on the road by 2030 and stated that new financial support mechanisms were needed to stimulate the sector.<sup>915</sup> However, in order for this ambitious goal to be met, regulators need to provide clearer guidance and the development of recharging infrastructure (the most cited barrier to EV adoption in the country) will need to accelerate significantly. This seems unlikely at the moment, with state-controlled energy group CEZ (the major player developing the network) only disclosing plans to add 500 additional recharging stations within their 2021 long-term strategy.<sup>916</sup>

Nevertheless, Czechia has some policies and incentives in place to increase the number of EVs on the road (albeit they have failed to stimulate deployment). For example, zero emission cars are exempt from paying registration tax, there is no road tax for BEVs, and a 50% reduction can be applied for PHEVs.<sup>917</sup> The Czech government has also offered some grants to aid the development of the recharging infrastructure. For example, they recently decided to support the penetration of EVs in the country by allocating a portion of the National Recovery Funds administered by the EU to develop 200 public recharging stations.<sup>918</sup> Furthermore, Czechia has used EU funding in the past to support EV recharging projects, such as when ČEZ received €2.5m to conduct a study and a real-life pilot deployment of multi-standard fast recharging points along the TEN-

<sup>913</sup> European Alternative Fuels Observatory, "Statistics on infrastructure and fleet data for road vehicles: Czech Republic summary", October 2022

<sup>914</sup> Ministry of Industry and Trade of the Czech Republic, "National Action Plan for Clean Mobility", December 2019

<sup>915</sup> Ibid.

<sup>916</sup> Tim Gosling, "Czech Support for eMobility Stalls", September 2021

<sup>917</sup> European Alternative Fuels Observatory, "Statistics on infrastructure and fleet data for road vehicles: Czech Republic Incentives & legislation", October 2022

<sup>918</sup> Claudia Patricolo, "Czech government to support scale-up of hydrogen and electric vehicles", June 2022

T Core Network. As part of this project, ČEZ deployed 60 fast rechargers at 60km intervals (29 locations) and one Battery Assisted Fast Recharging Site.<sup>919</sup> Lastly, Czechia provides State aid for EV recharging via the National Environment Programme 2015-2016, a measure implemented as per the GBER article 36.a and discussed in Appendix D.<sup>920</sup>

Major policies and incentives	Description
National action plan for clean mobility <sup>911</sup>	In 2015, the Czech government issued a plan for clean mobility (2020-2030) largely focused on eMobility
EV incentives <sup>76</sup>	Undefined purchase incentives for people buying EVs, including exemption from paying registration tax and exemption from ownership tax
National recovery plan <sup>915</sup>	Funds being used to install 200 public recharging points by the end of 2023
State support for public rechargers <sup>911</sup>	Aid in the form of permits to use state-owned land for placements of public rechargers, which can be allocated on a long-term basis or a rental basis
EIB loans <sup>61</sup>	€1m to projects supporting the rollout of EV recharging infrastructure
CEF grants <sup>57</sup>	€12m to projects supporting the rollout of EV recharging infrastructure

### Competitive dynamics

Czechia is in the early stages of EV adoption, with consumers being sceptical to buy an EV due to the high upfront costs and concerns around range anxiety as a result of limited recharging infrastructure.<sup>921</sup> This has led to a lack of private sector involvement in the sector, as companies have not been incentivised enough by market forces or government support to develop the necessary infrastructure (especially because expected utilisation rates make the payback period unattractive).<sup>922</sup> Nevertheless, with the recent EU ban on ICE sales by 2035, this is likely to change and could give rise to a more competitive market.

Currently, state-owned ČEZ (utility) is the largest EV recharging station provider in Czechia with approximately 1k installed recharging points, and accounting for approximately 80% of fast and ultra-fast rechargers across the country.<sup>923</sup> ČEZ (state-owned) is also a large electricity generator and distributor in the country, making them present across the EV recharging value chain and potentially enabling them to leverage their brand to attract EV drivers to their network. They provide an end-to-end solution for customers, acting as both the CPO and eMSP.<sup>924</sup> In 2021 they also entered into a roaming agreement with Hubeat to further expand options for users, cementing their position as the largest network in the country.<sup>925</sup>

Other players have also started to establish themselves including Pražská energetika (utility) and E.ON (utility), both of which act as integrated CPOs and eMSPs and with E.ON that also operates in neighbouring countries such as Austria and Germany as well as network of approximately 3k recharging stations across the UK and Europe.<sup>926</sup> For

<sup>919</sup> Innovation and Networks Executive Agency, "CEZ EV TEN-T Fast Charging Network", 2016

<sup>920</sup> European Commission, "Competition Policy State Aid Register: National Environment Programme 2015-2016", February 2022

<sup>921</sup> Tim Gosling, "Czech Support for eMobility Stalls", September 2021

<sup>922</sup> European Alternative Fuels Observatory, "Statistics on infrastructure and fleet data for road vehicles: Czech Republic Vehicles & fleet", October 2022

<sup>923</sup> CEZ Group, "ČEZ built a record 110 electric vehicle stations last year", March 2022

<sup>924</sup> CEZ Group, "Information on reduced prices for charging due to waiver of VAT.", November 2021

<sup>925</sup> Hubeat, "Hubeat partners with the Czech market leader ČEZ to expand eRoaming options for electric car drivers in Europe", April 2022

<sup>926</sup> E.ON Drive, "Recharging Map"

instance, in Prague, Pražská energetika and Škoda Auto (OEM) have signed an agreement to install 200 recharging points by 2025 with more plans expected (100 of which will be high-speed rechargers).<sup>927</sup> E.ON has instead partnered with Virta (pure play) focusing on the on-route, high-speed recharging segment.

Czechia needs to accelerate public EV rechargers deployment to meet its goals, and clearer regulation is seen as key enabler of that.

State-owned ČEZ is the largest supplier of rechargers in the country and have received grants from the EU and the Czech government to develop infrastructure.

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<sup>927</sup> Prague Morning, "Prague to have 100 new fast rechargers for electric cars by 2025", June 2022

## Denmark

### Market overview

EV penetration in Denmark is quite advanced with 134k EVs on the road; a significant growth from the 9.5k in 2016. This is also supported by a fairly expansive network of 10k recharging stations, also having risen significantly from 2.5k in 2016.<sup>928</sup> EV penetration is only 4.5% of the total fleet but this still ranks Denmark second amongst the countries assessed. The Danish government has committed to 775k EVs by 2030,<sup>929</sup> however, the recharging infrastructure in the country is not growing at the same rate and currently there are approximately 13 EVs per recharge point (slightly behind the EU recommended ratio of 10 to 1).<sup>930</sup>

Key sector statistics	2016	2022	Country details	EU27 + UK rank
EV penetration – new sales (#)	1.4k	65.3k*	<b>61k</b> BEVs	<b>2<sup>nd</sup>/28</b> EVs as a % of total fleet
EV penetration – new sales (%)	0.6%	30.5%	<b>73k</b> PHEVs	
EV adoption – number of cars (#)	9.5k	134.0k		
EVs as % of total fleet (%)	0.4%	4.5%		
Public recharging points (#)	2.5k	10.0k	<b>89%</b> Slow	<b>19<sup>th</sup>/28</b> EVs per re-charging point
EVs per recharging point (#)	3.8	13.4	<b>7%</b> Fast	
			<b>4%</b> U-Fast	

Data from EAFO website | \*2021 data | NB: Minor rounding discrepancies | U-Fast: Ultra-Fast

### Regulatory overview

While the Danish eMobility sector has not historically been up to speed with its neighbours Norway and Sweden, it has seen accelerated growth over the past couple of years. In 2020, Denmark passed the Climate Act<sup>931</sup> which sets a target to reach climate neutrality by 2050, and this was then amended in 2021 to include an emissions reduction target for 2025 of 50-54% compared to 1990. Within this overall goal, transport emissions are identified as a key component to achieve these targets.<sup>932</sup> In 2018, the Danish government announced that it would ban the sale of fossil fuel cars after 2030<sup>933</sup>, and to further support the growth of EVs, Denmark has also imposed tax cuts and cheaper parking for EVs.<sup>934</sup>

In 2020, the Danish government published the Climate Agreement for Energy and Industry which includes initiatives aimed at increasing the number of public recharging points. It stated that the funds allocated for Green Transport of €6.7m will support projects relating to recharging stations, heavy transport, and shipping.<sup>935</sup> Since March 2020 on the semi-public side, the construction of new residential properties and properties undergoing remodelling that have 10+ parking spaces must have parking spaces that are recharging station ready (civil works complete) and must have a recharging station in every fifth bay.<sup>936</sup> Denmark also provides State aid for EV recharging via different measures implemented as per the GBER article 36.a which are discussed in Appendix D.

<sup>928</sup> European Alternative Fuels Observatory, "Statistics on infrastructure and fleet data for road vehicles: Czech Republic summary", October 2022

<sup>929</sup> Reuters, "Denmark agrees deal to have 775,000 electric cars by 2030", December 2020

<sup>930</sup> Mario Davies, "Denmark's electric vehicle charge points", July 2022

<sup>931</sup> Danish Ministry of Climate, Energy and Utilities, "Climate Act", June 2020

<sup>932</sup> Grantham Research Institute on Climate Change and the Environment, "The Climate Act", 2020

<sup>933</sup> Mattia Marinelli et al. "Autonomously Controlled Distributed Rechargers", April 2020

<sup>934</sup> eMAG, "Funding of electromobility in Denmark"

<sup>935</sup> Danish Parliament, "Danish Climate Agreement for Energy and Industry 2020 – Overview", June 2020

<sup>936</sup> Dansk Revision, "About the Danish Audit Office - Get the best of both worlds"

Other incentives offered in Denmark include tax free recharging at offices, and housing associations have been given a total budget of €12.4m to allocate as grants that covers 25% of recharging points installation costs over the period from 2023 to 2025.<sup>937</sup> Denmark also offered a tax exemption for commercial recharging until 2019 where companies that supply EV recharging on a commercial basis could receive an electricity tax rebate of approximately €0.13 per kilowatt-hour.<sup>938,931</sup>

The Danish municipalities have developed independent plans as they continue to develop and incentivise recharging infrastructure, with the design being tailored based on some municipalities being more rural or urban.<sup>939</sup> However, there are a number of provisions for what municipalities can and cannot do when it comes to infrastructure development. For example, the municipality must not be in competition with private providers of electricity meaning that the municipality may not invest in cables. Some municipalities and two of the large players – E.ON (utility) and Clever (pure play) – are in support of a law to further accelerate the development of infrastructure which is currently under discussion but is currently more oriented to more nature and less pollution in cities, with little to no reference for EV recharging infrastructure.<sup>940</sup>

Major policies and incentives	Description
EV targets <sup>926</sup>	775k EVs on the road in 2030 and no sales of fossil fuel cars after 2030
EV ownership tax incentives <sup>76</sup>	Reduced tax costs when purchasing an EV, reduced ownership tax rates and cheaper parking rates
Climate agreement for energy and industry & green transport <sup>932</sup>	Several initiatives to increase the number of rechargers through funding provisions to local authorities for procurement and installation of on-street EV recharge points
Building requirements <sup>933</sup>	Starting from May 2020, all new homes, buildings undergoing major renovations, and non-residential properties will be required to include recharging infrastructure
Tax cuts for companies supplying public recharge points <sup>941</sup>	Tax exemption for companies providing commercial recharging could receive an electricity tax rebate of around €0.13 per kilowatt-hour until 2019
CEF grants <sup>57</sup>	€9m in grants were provided for EV recharging projects

### Competitive dynamics

Several companies operate in the Danish EV recharging market with the biggest actors being Clever (pure play) and E.ON (utility) who command a large portion of the market, followed by Spirii (pure play) with a smaller share.<sup>942</sup> A report published by the Danish Department of Transport suggests that E.ON and Clever together command almost 90% of the market, however these figures are under scrutiny as the overview is based on the number of recharging stations rather than recharging points.<sup>943</sup>

E.ON and Clever also signed an agreement in 2017 to develop hundreds of 150kW ultra-fast EV recharging points along key European motorways that will be situated every 120-180km to enable the full recharging of 400km range EV batteries within 20 to 30 minutes.<sup>944</sup> E.ON and Clever are also planning to include 350kW EV recharging points

<sup>937</sup> Monta, "EV news in Denmark: Updates to taxation schemes and more", July 2022

<sup>938</sup> Wallbox, "EV and EV Charger Incentives in Europe: A Complete Guide for Businesses and Individuals"

<sup>939</sup> Tessa Anderson, "Electric vehicles in Danish Municipalities: An Understanding of Motivations, Barriers, and the Future of Sustainable Mobility", February 2019

<sup>940</sup> Julius Petersen, "That's why you can't just get a recharger for the electric car close to your apartment", June 2021

<sup>941</sup> Monta, "EV news in Denmark: Updates to taxation schemes and more", July 2022

<sup>942</sup> Chargefinder, "Find charging stations on the map"

<sup>943</sup> Danish Ministry of Transport, Danish Ministry of Climate, Energy and Utilities, "Analysis of price structure for publicly available charging stations", June 2021

<sup>944</sup> E.ON, "E.ON and CLEVER cooperate on ultra-fast charging e-Mobility", July 2017



and other related services under their partnership.<sup>941</sup> The network is appointed as an EU flagship project and has received €10 million in funding from the European Commission.<sup>945</sup> In 2019, the two parties received the final approval from competition authorities for their joint venture.<sup>946</sup> This additional funding will help E.ON and Clever to further establish themselves across Europe. This being said, Tesla (OEM) and IONITY (pure play owned by OEMs) also operate fast rechargers in the Danish region.<sup>947</sup>

As aforementioned, Denmark has been slow to develop recharging infrastructure compared to its neighbours. The slow deployment of recharging infrastructure has been partially due to regulations preventing local authorities from deploying the wiring necessary for recharging stations, with some municipalities that have stated that it would be beneficial if these provisions were lifted, and the municipalities could increasingly support the recharging infrastructure moving forward.<sup>971,937</sup> Finally, similar to other European countries, the payment solutions for vehicle recharging have been sparse in the past, but Danish customers can now access a variety of recharge points via roaming, specifically the Danish government recently introduced the mandatory installation of card readers at public recharging points to enhance ad hoc accessibility.<sup>948</sup>

Denmark tries to maximise private sector involvement to deliver charging infrastructure but two large actors (E.ON and Clever) are leading the sector in the country.

E.ON and Clever received EU funding for an ultra-fast EV recharging project supporting their deployment of infrastructure.

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<sup>945</sup> Max Bernhard, "E.ON, Clever hook up for EU car-charging network", November 2017

<sup>946</sup> Ole Andersen, "E.ON and Clever get green light for charging station partnership", January 2019

<sup>947</sup> Chargefinder, "Find charging stations on the map"

<sup>948</sup> Jonathan Packroff, "Will paying for EV charging be as easy as refuelling petrol cars?", November 2022

## Estonia

### Market overview

Estonia's eMobility sector is relatively nascent, with only 2.9k EVs on the road which equates to 215 EVs per 100k people (compared to an EU average of 911), and a small recharging network of approximately 260 chargers.<sup>949</sup> Nevertheless, the proportion of EVs per recharger is not far from the level recommended by the EU Commission, 11 EVs per recharger instead of 10, but this is largely the result of the sector's very early-stage development.

Key sector statistics	2016	2022	Country details	EU27 + UK rank
EV penetration – new sales (#)	0.1k	0.7k*	<b>2.4k</b> BEVs	<b>19<sup>th</sup>/28</b> EVs as a % of total fleet
EV penetration – new sales (%)	0.3%	3.5%	<b>0.5k</b> PHEVs	
EV adoption – number of cars (#)	1.2k	2.9k		<b>13<sup>th</sup>/28</b> EVs per re-charging point
EVs as % of total fleet (%)	0.2%	0.3%	<b>22%</b> <b>73%</b> <b>5%</b> Slow Fast U-Fast	
Public recharging points (#)	0.4k	0.3k		
EVs per recharging point (#)	3.3	11.0		

Data from EAFO website | \*2021 data | NB: Minor rounding discrepancies | U-Fast: Ultra-Fast

### Regulatory overview

Regulatory support for EV recharging infrastructure in Estonia has gone through two major stages. In the early 2010s, Estonia attempted to become a global pioneer in recharging infrastructure by developing a country-wide network.<sup>950</sup> This national network was realised through the ELMO project, designed to deploy 165 recharge points with the help of Mitsubishi with the goal of having at least one public recharging station installed in each city with a population of more than 5k people.<sup>951</sup> At the same time, the government provided up to €18k in EV purchase subsidies to boost the eMobility sector.<sup>947</sup> Both incentive-schemes were funded through the €10M worth of CO<sub>2</sub> quota sales to Japan, yielding €12m in funding capital.<sup>947</sup> On top of that, between 2014 and 2020 Estonia also received €2.7M in grants from the CEF for projects on the rollout of EV recharging infrastructure.<sup>57</sup> Despite the considerable support, the eMobility momentum tapered off after 2014, once the funding pool was exhausted. This was also due to minimal EV cost decrease and customer general unwillingness to cover the cost-premium for EVs without any government support schemes in place.

To rejuvenate the eMobility sector, the Estonian government has made multiple regulatory moves that range from subsidies, convenience benefits and recharging station targets. One of the recent major policies included a €1.2m subsidy pool (released in 2020) leading to 232 EV purchases.<sup>952</sup> A subsequent funding round has been planned in the near-term future. Additionally, the government has strived to provide benefits to EV owners by introducing free city parking and use of public transport driving lanes.<sup>953</sup> Given the undertaken regulatory action, the government has reached 260 public recharging points and is on track to reach its target of 384 recharging points by 2025,

<sup>949</sup> European Alternative Fuels Observatory, "Statistics on infrastructure and fleet data for road vehicles: Estonia summary", October 2022

<sup>950</sup> Anna Ebers Broughel, Marko Viiding, "Estonian Experience with Electric Mobility: Is There a First-Mover Advantage with EVs?", January 2021

<sup>951</sup> Amsterdam Round Tables, "E Volution, Electric vehicles in Europe: gearing up for a new phase?", June 2014

<sup>952</sup> Baltic Times, "Estonia endorses EUR 1.2 mln in subsidy for purchase of 232 electric cars", June 2020

<sup>953</sup> Interreg Europe, "Free parking for EV-s and electric hybride cars", December 2018

as outlined in their EU National Policy Framework (although it was unable to meet its original target of 384 recharge points by 2020).<sup>954</sup>

Major policies and incentives	Description
ELMO project (2011-2013) <sup>948</sup>	Nation-wide recharging network development with 165 re-charging points set-up
EV purchase subsidies (2010s) <sup>947</sup>	Up to €18k in subsidies (average €16.5k) & supplementary to ELMO project
EV purchase subsidies (expired) <sup>949</sup>	In 2020 there was a €1.2m subsidy pool (232 EVs purchased), 2 <sup>nd</sup> funding round is due to be announced soon
Free parking & Use of bus lanes <sup>955</sup>	Incentivises EV purchases by providing convenience benefits
NPF target for 2025 <sup>956</sup>	384 Electric recharging points
CEF grants <sup>57</sup>	€3m in grants were provided for EV recharging projects

### Competitive dynamics

The EV recharging competitive landscape in Estonia is made up of both the public and private sector, with increasing activity and share in the latter space. On the public side, the government provides an integrated CPO & eMSP service (ELMO network) and accounts for a large share of the market. Nevertheless, the estimated share could be under or overestimated given the lack of data transparency and increasing installation rates amongst local businesses. Most, if not all government-run recharging stations were installed under the ELMO project which have to be retrofitted to integrate new technology rechargers.<sup>947</sup> Several local companies have already undertaken steps to ensure this hardware upgrade happens smoothly.

On the private side, Enefit VOLT is the largest public recharging provider and is a subsidiary of the limited energy company Eesti Energia. It currently owns and operates most stations across the country and provides an integrated CPO & eMSPs service.<sup>957</sup> Recently, Enefit VOLT has partnered with major fuel retailer Circle K to expand its service availability and continue growing its customer base.<sup>958</sup> At the same time, smaller businesses are making their way into the public EV recharging space. Elektrum Drive, which is a major service provider (integrated CPO & eMSPs) in Latvia, has already opened several recharging points in the biggest Estonian cities and is now looking to expand its recharging station portfolio in Baltic States.<sup>959</sup> Another private player Alexela (local fuel retailer) is providing an integrated CPO & eMSPs option to EV customers and currently hosts 11 recharging stations across the country.<sup>960</sup> Overall, the EV recharging business is starting to shift towards the private sector with Enefit VOLT emerging as the major recharging provider. In the near term, fuel retailers along with government run recharging points are expected to be the main competitors to Enefit VOLT.

Public EV charging is mostly, if not exclusively, operated by integrated CPOs/eMSPs  
Competition exists between the government and private business run EV recharging with an increasing share going towards the private sector (e.g., Enefit VOLT).

<sup>954</sup> European Alternative Fuels Observatory, "Statistics on infrastructure and fleet data for road vehicles: Estonia infrastructure", October 2022

<sup>955</sup> European Alternative Fuels Observatory, "Statistics on infrastructure and fleet data for road vehicles: Estonia incentives & legislation", October 2022

<sup>956</sup> European Alternative Fuels Observatory, "Statistics on infrastructure and fleet data for road vehicles: Estonia target tracker", October 2022

<sup>957</sup> Enefit Volt, "Charging map"

<sup>958</sup> Enefit Volt, "Enefit Volt and Circle K to double the number of joint charging stations", April 2022

<sup>959</sup> Elektrum, "Elektrum Drive in Estonia"

<sup>960</sup> Alexela, "Today, Alexela opened its charging stations for electric vehicles. To celebrate this, charging electric cars is free of charge until the end of the month", October 2021

## Finland

### Market overview

Coverage of the public recharging infrastructure is currently good in Finland, but there are regional disparities the highest level of availability of public recharging infrastructure being in southern and southwestern Finland.<sup>961</sup> Since 2016 Finland has grown its number of electric vehicles from 3.3k to 111.8k, ranking it amongst the front runners in the EU in terms of EV penetration in total fleet – now at 2.8%.<sup>962</sup> Recharging stations have also grown significantly from 0.9k to 6.0k but this has not been enough to maintain pace in terms of EVs per recharge point, which has risen from 3.7 (2016) to 18.6, one of the lowest rates of all Member States.

Key sector statistics	2016	2022	Country details	EU27 + UK rank
EV penetration – new sales (#)	1.4k	30.3k	<b>28k</b> BEVs	<b>6<sup>th</sup>/28</b> EVs as a % of total fleet
EV penetration – new sales (%)	1.2%	33.5%	<b>84k</b> PHEVs	
EV adoption – number of cars (#)	3.3k	111.8k		
EVs as % of total fleet (%)	0.1%	3.6%	<b>86%</b> Slow	<b>25<sup>th</sup>/28</b> EVs per re-charging point
Public recharging points (#)	0.9k	6.0k	<b>9%</b> Med	
EVs per recharging point (#)	3.7	18.6	<b>5%</b> Fast	

Data from EAFO website | \*2021 data | NB: Minor rounding discrepancies | U-Fast: Ultra-Fast

### Regulatory overview

Finland has passed arguably the world's most ambitious climate target into law. It aims to be the first developed country to reach Net Zero, in 2035, and net negative – absorbing more CO<sub>2</sub> than it emits – by 2040.<sup>963</sup> About one fifth of Finland's emissions come from transport, and the government has decided to cut transport emissions in half by 2030 (compared to 2005 levels), to be then eliminated by 2045.<sup>964</sup>

Currently Finland has two national acts guiding the national recharging infrastructure plan, both building upon EU legislation. Firstly, The Recharging Points Act implements the Energy Performance of Buildings Directive (2010/31/EU). It prescribes minimum requirements for constructing recharging points in new and extensively renovated residential and non-residential buildings. Specifically, non-residential buildings currently in use with more than 20 parking spaces are required to have at least one recharging point by December 31<sup>st</sup> 2024. Secondly, The Distribution Infrastructure Act implements Directive 2014/94/EU on the deployment of alternative fuels infrastructure. It promotes compliance of public recharging points with common technical specifications and the provision of adequate information to users on alternative fuels and their distribution.<sup>958</sup>

In March 2022, the Finnish Ministry of Communications and Transport developed options on the development of recharging infrastructure. The first option would be to enforce the current measures mentioned above, the second would progress the existing measures along with more targeted planning via a national working group, and the third option would enact a new law requiring service stations to construct recharging points.<sup>958</sup> The working group will assess the current status of distribution infrastructure, sufficiency of current measures and need for new measures including on smart recharging, and address any bottlenecks that hamper development. The group is

<sup>961</sup> Ministry of Transports and Communications of Finland, "Influence development of the electric car charging network", March 2022

<sup>962</sup> Ibid.

<sup>963</sup> Ministry of the Environment of Finland, "Finland's national climate change policy"

<sup>964</sup> Climate roadmaps 2035, "Low-carbon roadmap for the Finnish logistics and transport sector", 2021

expected to update the national programme, with actions through to 2030s, sometime in 2023.<sup>965</sup>

When it comes to subsidies and financial incentives, the Finnish Housing Finance and Development Centre provides subsidies for housing co-operatives, condominiums, and other similar organisations that build recharging points for their residents and visitors. Such organisations can apply for a subsidy to cover 35%, up to €90k, of the total expenses of purchasing and installing recharging points, on the condition that they build recharging points for at least five vehicles.<sup>966</sup> Furthermore, a refund of up to 35% of the total purchasing and installation costs for recharging infrastructure is available to companies that provide recharging and use electric vehicles. This refund can increase to 50% if at least half of the stations offer capacity of 11 kW or more.<sup>967</sup> Finally, CPOs can apply for a 30% subsidy for building > 11 kW public recharging stations and 35% subsidy for building > 22 kW fast recharging stations.<sup>968</sup> The Finnish state has also implemented a number of incentives to increase EVs on the road, including individuals receiving up to €2k when buying a new electric car as well as tax advantages for electric car owners.<sup>969</sup> Finland also provides State aid for EV recharging via its Transport Infrastructure Support 2022-2025 plan, which was implemented as per the GBER article 36.a and is discussed in Appendix D.<sup>970</sup>

Major policies and incentives	Description
Transport Emission Targets <sup>961</sup>	Finnish government decided to cut transport emissions in half by 2030 (compared to 2005 levels) and eliminate emissions by 2045
Subsidies for Organisations to Build Public Rechargers <sup>964</sup>	Subsidies (35%, or €90k, of the total expenses) for housing co-operatives, condominiums, etc. that build recharging points for residents and visitors
Subsidies for Companies Building Public Rechargers <sup>965</sup>	Refund of up to 35% of purchase/installation costs for recharging infrastructure (up to 50% depending on recharger capacity)
EV purchase incentives/tax benefits <sup>76</sup>	€2k purchase incentive for BEVs and no tax applied for EV purchase
CEF grants <sup>57</sup>	€3m in grants for deployment projects of recharging infrastructure

### Competitive dynamics

Finland's strategy in the sector has been to maximize private sector involvement to deliver recharging infrastructure, intervening where they deem necessary to set guidelines and provide incentives or grants to accelerate development. In Finland, Virta (pure play) and Fortum Charge & Drive (pure play subsidiary of utility) are the two main CPOs, however other smaller providers focusing on specific parts of the sector are also present.<sup>971</sup> For example, IONITY (pure play owned by OEMs) and Tesla (OEM) operate in Finland specialising on fast and ultra-fast recharging solutions.<sup>972,973</sup> Likewise, Neste (a major fuel retailer) is investing significantly to develop a fast public recharging network on highways, leveraging €3m in EU funding to build recharging points across

<sup>965</sup> Helsinki Times, "Working group to coordinate distribution infrastructure for new alternative transport fuels", May 2022

<sup>966</sup> Roope Vesa, "A model-based study on Finnish Electrified Vehicle Market", February 2019

<sup>967</sup> Eduskunta Riksdagen, "Board presentation HE 23/200", November 2021

<sup>968</sup> EAFO, "Statistics on infrastructure and fleet data for road vehicles: Finland incentives & legislation", October 2022

<sup>969</sup> Wallbox, "EV and EV Recharger Incentives in Europe: A Complete Guide for Businesses and Individuals"

<sup>970</sup> European Commission, "Competition Policy State Aid Register: Transport infrastructure support 2022-2025, high-power charging points and hydrogen refuelling points", May 2022

<sup>971</sup> Tesla Club Finland, "A tourist's guide to EV charging in Finland", July 2017

<sup>972</sup> Tesla, "Tesla Superchargers in Finland"

<sup>973</sup> IONITY, "Discover our network"

its service stations by 2025.<sup>974</sup> Nevertheless, Virta is currently the biggest actor in the market, operating the majority of recharge points in Finland's three biggest cities (i.e., Helsinki, Espoo, and Tampere).<sup>975</sup> Moreover, Virta offers a solution to launch, scale and operate commercial EV recharging services for different industries such as energy, oil, and real estate.<sup>161</sup> This business model, similar to recharging as a service, has made Virta the fastest growing recharging service provider in Europe.<sup>976</sup> It is also worth noting that the state of Finland is the majority owner of Fortum and while they primarily finance their operations via their generated cash flow and external funding (e.g., corporate bonds), it might be easier for them to break into the market as they have government backing to some extent (e.g., receiving a higher credit score because they are government supported and can therefore take out better loans).<sup>977</sup> Moreover, they operate a vast network in neighbouring countries (e.g., Norway where they have been competing since 2015) resulting in additional market power. Virta and Fortum Charge & Drive are also both end-to-end solutions, acting as integrated CPOs and eMSPs. Both companies operate the stations and provide networks through apps which customers can use to find free rechargers and pay for recharging.<sup>161,978</sup> Virta and Fortum Charge & Drive are both part of the Gireve and the Hubeject networks further extending options for users via roaming, thus promoting openness of access and optimizing the consumer experience.<sup>979, 980</sup>

Free market with two large players, Virta and Fortum Charge & Drive.

Fortum Charge & Drive is government-owned and has strong presence across Scandinavia.

<sup>974</sup> Ministry of Transport and Communications of Finland, "Finland receives EUR 21 million in EU funding for transport projects", April 2022

<sup>975</sup> Chargefinder, "Find charging stations on the map"

<sup>976</sup> Virta, "Virta leads the EV charging industry for the third year in a row on the Financial Times FT 1000 list", 2021

<sup>977</sup> Fortum, "List of Fortum's largest share-holders, updated monthly."

<sup>978</sup> Fortum, "Travelling and Charging"

<sup>979</sup> Gireve, "Interoperability of EV Charging", February 2020

<sup>980</sup> Hubeject, "Europe's charging network interchange is growing", October 2015



## France

### Market overview

As of October 2022, approximately 800k EVs were in France, rising from 2.5k in 2010.<sup>981</sup> This growth is expected to continue accelerating and by 2030 the government estimates 10m EVs will be deployed.<sup>982</sup> Likewise, the recharging infrastructure rollout is advancing, going from less than 1k in 2012 to approximately 66k public EV rechargers in 2022.<sup>983</sup> While the recharging sector has experienced significant growth, additional focus is needed to keep up with EV deployment as since 2016 EVs per recharge point have risen from 5.3 to 12.0 – now above the EU recommendation.

Key sector statistics	2016	2022	Country details	EU27 + UK rank
EV penetration – new sales (#)	29.5k	303.5k*	<b>485k</b> BEVs	<b>8<sup>th</sup>/28</b> EVs as a % of total fleet
EV penetration – new sales (%)	1.5%	17.7%		
EV adoption – number of cars (#)	79.3k	788.6k		
EVs as % of total fleet (%)	0.3%	2.3%		
Public recharging points (#)	15.0k	65.7k	<b>90%</b> Slow	<b>16<sup>th</sup>/28</b> EVs per re-charging point
EVs per recharging point (#)	5.3	12.0	<b>7%</b> Fast	
			<b>3%</b> U-Fast	

Data from EAFO website | \*2021 data | NB: Minor rounding discrepancies | U-Fast: Ultra-Fast

### Regulatory overview

France follows the EU ban on the sale of ICE vehicles by 2035 approved in 2022, which serves as an update to the country's original target set at 2040 by the French Law on Mobility Orientation.<sup>984</sup> While the country failed to deploy 100k public recharging stations by 2021 as foreseen in 2017, the pledge has been updated during the 2022 electoral campaign to 500k rechargers by 2027.<sup>985</sup>

To support the adoption of EVs, the government has increased its focus on the public recharging infrastructure network, for instance requiring all service areas of the motorway network<sup>986,987</sup> to be equipped with fast recharging stations by the beginning of 2023. Furthermore, EV recharging infrastructure deployment is also financed via the Advenir program, led by the eMobility National Association and set-up to provide financial support for the installation of 120k new recharging points by 2025 (applicable to private individuals, firms, and local communities).<sup>988</sup> The amounts provided vary depending on the type of project, for instance firms willing to install public rechargers on private parking slots can obtain up to €15k per recharging point.<sup>989</sup> At the same time, the d'Avenir Investment Plan provides grants for public recharger purchases of up to €3k for slow (<22 kW) rechargers, and up to €12k for fast (>22 kW) ones.<sup>990</sup>

The government has pledged €300m within the France 2030 investment plan<sup>991</sup> to develop ultra-fast (>150 kW) recharging stations. Similarly, €100m was committed for

<sup>981</sup> European Alternative Fuels Observatory, "Statistics on infrastructure and fleet data for road vehicles: France summary", October 2022

<sup>982</sup> Avere, "In august 2022, BEV and PHEV grew more than 18%", September 2022

<sup>983</sup> European Alternative Fuels Observatory, "Infrastructure and fleet data for road vehicles: France infrastructure", October 2022

<sup>984</sup> French Government, "Developing EVs", October 2022

<sup>985</sup> Raphaël Ebenstein, "EVs: why the goal of 100000 charging points wasn't achieved?", May 2022

<sup>986</sup> Legifrance, "Decree no 2021-153 of February 2021", February 2021

<sup>987</sup> Ministry of Economics, Finance and Industrial Sovereignty, "Supporting the deployment of fast recharging stations for EVs", 2021

<sup>988</sup> Advenir, "Programme presentation", 2016

<sup>989</sup> Advenir, "Project simulator"

<sup>990</sup> Ministry of the Ecological Transition and Ministry of the Economy and Finance of France, "Economic Study of the EV recharging infrastructure", April 2019

<sup>991</sup> Senate of France, "Deployment of recharging points on national territory", 2021



the same purpose within the stimulus package Recovery Plan<sup>988</sup>. Furthermore, from 2025 new non-residential buildings (including those undergoing large-scale renovation) as well as parking with more than 20 bays, will need to be equipped with recharging points<sup>992</sup>. Local authorities were also encouraged to develop infrastructure plans for the expansion of the recharging networks. These plans are financially supported by the state and partially cover network connection costs, and a guide was developed to support local institutions in accessing these schemes.<sup>988</sup> France provides State aid for EV recharging through its Scheme exempt from notification relating to investment aid for infrastructure for low- or zero-emission vehicles, which was implemented as per the GBER article 36.a, as discussed in Appendix D.<sup>993</sup>

Major policies and incentives	Description
Decree 2021-153 <sup>994</sup>	Fast recharger installation in all motorway's service stations by 1st Jan 2023
Advenir Program <sup>995</sup>	Grants up to €15k per recharging point to support the installation of 120k public and semi-public recharging points by 2025
D'Avenir Investment Plan <sup>987</sup>	Grants for public recharger purchases of up to €3k for slow rechargers, and up to €12k for fast ones
2030 investment plan <sup>988</sup>	€300m to develop high-capacity fast and ultra-fast recharging points
EV purchase incentives and tax benefits <sup>76</sup>	Up to €6k incentive for EV purchases and up to full exemption from EV purchase taxes
Plan de Relance <sup>988</sup>	€100m to develop high-capacity fast and ultra-fast recharging points in Covid recovery investment plan
EIB loans <sup>61</sup>	€88m to projects supporting the rollout of EV recharging infrastructure
CEF grants <sup>57</sup>	€21m to projects supporting the rollout of recharging infrastructure

### Competitive dynamics

EV recharging infrastructure in France was initially developed through state intervention, with a shift to a more liberalized and competitive market over time. Local authorities played a particularly active role, especially in areas with poor coverage from private market players due to less attractive commercial cases.<sup>987</sup> As a consequence, municipalities, individually or collectively through so-called energy syndicates, accounted for 70% of total public rechargers' ownership by 2018.<sup>987</sup> In contrast, in these early years of the industry, other actors such as OEMs, retail shop chains and parking companies played a minor role in recharging points' deployment.<sup>987</sup> Despite that, the market for CPOs later expanded, as 85% of local authorities today delegate recharger management to private market players.<sup>987</sup>

Overall, several market players provide CPO services, with some of them focusing only on the local level.<sup>996</sup> Firms from different parts of the energy industry entered the EV market in France. Utility company EDF has the largest share, through its subsidiary firm Izivia (previously Sodetrel until 2019).<sup>997</sup> However, major energy firms such as Total (O&G), Shell (O&G) and Bouygues Energies & Services (solutions provider) are also

<sup>992</sup> EDF, "Which obligations for recharging points?", June 2017

<sup>993</sup> European Commission, "Competition Policy State Aid Register: Scheme exempt from notification relating to investment aid for publicly accessible recharging or refuelling infrastructure for low- or zero-emission road vehicles", May 2022

<sup>994</sup> International Energy Agency, "Decree 2021-153 - establishing support to investments relating to rapid charging infrastructures for electric vehicles on major roads", June 2022

<sup>995</sup> Advenir, "Programme presentation", 2016

<sup>996</sup> Simone Käser, "France Needs More Charge Points for Growing EV fleet", February 2022

<sup>997</sup> Marine Godelier, Juliette Raynal, "EV: the battle of recharging stations is growing", September 2021

present in the market, together with sector-specific pure plays such as Freshmille, Fastned and Electra.<sup>998</sup> While some companies specialise on individual market segments (e.g., CPO Bump)<sup>999</sup>, others, such as Spie, cover the entire value chain from recharger manufacturing to CPO and eMSP services.<sup>1000</sup> The progressive affirmation of a competitive market, largely driven by the CPO segment, has been reflected in recharging infrastructure ownership trends. In fact, while initially developed for the most part by local authorities, recharging points are increasingly owned by private market actors to the point that firms including Total and Tesla (OEM) are among the largest infrastructure owners in the country.<sup>1001</sup> In France, both integrated firms and independent CPOs provide eMSP services. Within the first category, the largest CPOs in the country, including Izivia<sup>1002</sup>, TotalEnergies<sup>1003</sup> and Alizé<sup>1004</sup>, are active as an eMSP. At the same time though, firms such as Charge Map, Plugshare and Mango Mobilités provide pure eMSP services connecting different rechargers' networks.<sup>1005</sup> In conclusion, the large number of actors operating both in the CPO and eMSP segments suggests a healthy competitive environment in the French recharging market.

Market competition has risen since 2018, with an increasing number of players entering, together with a trend of shifting ownership from local authorities to private firms.

The country has a mix of integrated firms as well as companies focusing on individual segments.

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<sup>998</sup> Ibid.

<sup>999</sup> DIF Capital Partners, "DIF Capital Partners acquires a majority stake in French EV charging operator Bump", September 2022

<sup>1000</sup> Marine Godelier, Juliette Raynal, "EV: the battle of recharging stations is growing", September 2021

<sup>1001</sup> Ministry of Transport of France, "EV recharging infrastructure data"

<sup>1002</sup> Izivia, "Charging map app"

<sup>1003</sup> TotalEnergies, "Charging services app"

<sup>1004</sup> Alize, "Charging map app"

<sup>1005</sup> Drivalia, "where to charge your EV on the highway"

## Germany

### Market overview

Germany has a well-developed EV market with backing from an array of OEMs and utilities, having seen huge growth in the number of cars between 2016 and 2022, growing from 66.1k to 1.34m vehicles. Similarly, EV recharger quantity has also increased significantly since 2016, from 15.7k to 79k.<sup>1006</sup> Although this represents significant progress, the number of EVs per recharge point has also grown now reaching 17 – substantially more than the EU recommended figure. German EV penetration is currently on 2.6%, so further drive to ensure sufficient recharging infrastructure continues to be rolled out needs to be ensured.

Key sector statistics	2016	2022	Country details	EU27 + UK rank
EV penetration – new sales (#)	24.5k	673.8k	<b>702k</b> BEVs	<b>7<sup>th</sup>/28</b> EVs as a % of total fleet
EV penetration – new sales (%)	0.7%	21.5%	<b>639k</b> PHEVs	
EV adoption – number of cars (#)	66.1k	1.34m		
EVs as % of total fleet (%)	0.1%	2.6%		
Public recharging points (#)	15.7k	78.7k	<b>50%</b> <b>44%</b> <b>6%</b> Slow Fast U-Fast	<b>23<sup>rd</sup>/28</b> EVs per re-charging point
EVs per recharging point (#)	4.2	17.0		

Data from EAFO website | \*2021 data | NB: Minor rounding discrepancies | U-Fast: Ultra-Fast

### Regulatory overview

The German government has released multiple targets to drive the deployment of EV infrastructure. Specifically, 7-10m EVs need to be registered by 2030 and at least 75% of service stations along German highways are to be equipped with EV rechargers by 2026.<sup>1003</sup> To achieve these goals, the government has put forward €2.5b to develop recharging infrastructure and promote research within the segment.<sup>1007</sup> In 2019, the government declared that they would stimulate the EV recharging sector to develop 50k recharge points by the end of 2022 (this goal has been met and surpassed).<sup>1008</sup> From July 1<sup>st</sup>, 2023, the government have mandated some changes, namely that all recharge point payments can be done with either a credit or debit card (i.e., no prior membership/subscription is required)<sup>1004</sup>, also EV owners will be exempt from declaring the recharging costs as perks on their income tax<sup>1004</sup> and lastly, there will be free parking areas for EVs, which in turn will affect distribution of recharging stations.<sup>1009</sup>

Furthermore, federal government cash incentives for companies and municipalities purchasing public recharging stations include the following: €3k for purchasing recharging stations up to 22kW up to €12k for purchasing DC rechargers up to 100kW, and up to €30k for purchasing DC rechargers above 100kW. Further cash incentives are in place for the purchase of EV vehicles, which will indirectly increase demand for EV recharge points in the future.<sup>1004</sup> Initial cash incentives were introduced for both EV vehicles and EV rechargers in 2016, but a 2019 update increased the previous incentives on average by 30%.<sup>1006</sup>

Germany also provides State aid for EV recharging via different measures implemented as per the GBER article 36.a which are discussed in Appendix D.

<sup>1006</sup> European Alternative Fuels Observatory, "Statistics on infrastructure and fleet data for road vehicles: Germany summary", October 2022

<sup>1007</sup> European Alternative Fuels Observatory, "Statistics on infrastructure and fleet data for road vehicles: Germany Incentives & legislation", October 2022

<sup>1008</sup> Jonas Köster, "EV regulation: new initiatives on safety and charging infrastructure", November 2019

<sup>1009</sup> Manuel Balzer, "The Ultimate Guide to EV Incentives In Germany", June 2020

Major policies and incentives	Description
Recharging infrastructure targets <sup>1003</sup>	The German government has proposed to equip 75% of service stations with EV recharging points by 2026
Tax breaks <sup>1004</sup>	Only 0.25% of the gross cost of an EV purchase to a company must be listed as taxable income (as opposed to 1% of the gross cost of HGV's)
EV vehicle registration <sup>1010</sup>	The German federal government wants 7-10m EVs to be registered by 2030
EMobility Act <sup>1011</sup>	The German eMobility act will ensure free parking and bus lane use for EV passenger cars
Electrify fuel stations <sup>1004</sup>	Germany will require all gas stations to also offer EV recharging in the future
EV purchase incentives <sup>76</sup>	Up to €9k purchase incentives for EVs and exemption from vehicle ownership taxes
Recharging infrastructure grant <sup>1012</sup>	The German government plans to spend a total of €2.5b on the expansion of recharging infrastructure
Public transport funding <sup>1006</sup>	Private and municipal operators will receive €1.2b from the federal government to switch to electric buses and electric trucks
Manufacturer subsidies <sup>1006</sup>	The government announced plans to invest in 'new technologies, processes, and plants' for EV vehicles and recharging infrastructure
Batteries and infrastructure <sup>1004</sup>	€2.5b from the German federal government will be spent on battery cell production and the expansion of recharging infrastructure
CEF grants <sup>57</sup>	€17m to projects supporting the rollout of EV recharging infrastructure

### Competitive dynamics

EV public recharging competition is healthy on a federal level in Germany with multiple CPOs (40+) in operation, including the presence of global players such as Shell (O&G), Tesla (OEM), and Allego (pure play).<sup>894</sup> Furthermore, automotive manufacturers have begun to develop EV rechargers to couple with their new vehicles (such as Volkswagen, BMW, etc).<sup>1013</sup> In addition, there is a strong presence from German utilities such as EnBW, which is investing €100m into 60+ large fast recharging stations and 750+ smaller fast recharging sites.<sup>1014</sup> EnBW also announced in 2021 that they plan to develop the largest fast recharging site in all of Europe – with 52 recharging outlets.<sup>1015</sup> There is a highly integrated market structure between EMSPs and CPOs, with the two often operated by the same entity.

The financial incentives the German government released target small EV recharge point companies which could stimulate competition between the dozens of existing companies as well as bring in new players. Furthermore, a study conducted by the German transport authority in 2021 concluded that tools exist (e.g., making suitable public areas available and granting subsidies) from German competition law to make the market

<sup>1010</sup> Germany's move to EVs to affect thousands of workers, new study says (cnbc.com)

<sup>1011</sup> Federal Ministry for Economic Affairs and Climate Action, "Regulatory environment and incentives for using electric vehicles and developing a charging infrastructure"

<sup>1012</sup> Incentives and Legislation | European Alternative Fuels Observatory (europa.eu)

<sup>1013</sup> Volvo, "Volvo Group, Daimler Truck and the TRATON GROUP plan to pioneer a European high-performance charging network for heavy-duty trucks", May 2021

<sup>1014</sup> EnBW, "Europe's biggest fast charging station for all EVs: EnBW to build flagship site at Kamener Kreuz interchange", April 2021

<sup>1015</sup> Chris Randall, "EnBW to build largest public HPC park in Europe", April 2021

competitive in the event of a few entities dominating EV recharger share.<sup>1016</sup> The study further concluded that future allocation of state funds needs to be carried out in a non-discriminatory manner between EV recharging companies, in particular, the chosen size and structure are key factors in the development of competitive structures. With many different recharging companies for customers to choose from, most cater to all models of electric cars. However, Tesla only allows owners of Tesla vehicles to use most of their rechargers. Even the superchargers from Tesla, which allow recharging to non-Tesla vehicles, require downloading an app and creating an account with the company in order to access the equipment.<sup>1017</sup>

Contrary to the seemingly healthy EV recharger competition on a federal level, the municipal level across Germany does not hold the same scope of market players. The same study by the German transport authority concluded that little use was made of public tender procedures (particularly to enhance competition in the market) on the municipal level and that incentives are often 'awarded fully or for the most part to one and the same operator' in particular areas. Essentially, municipal areas are often led by small monopolies of EV recharging companies (such as the municipal utility). The study suggests a legal requirement from the German government that enhances competition would improve competitive conditions.<sup>1013</sup>

Competitive sector with 40+ participants, with incumbent utilities and oil and gas companies having a large share.

Strong OEM presence from the German automakers that have developed charging offerings and supported the market rollout approach.

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<sup>1016</sup> Bundeskartellamt, "Bundeskartellamt calls for more competition in the provision of charging electricity - Preliminary findings of sector inquiry into charging infrastructure", October 2021

<sup>1017</sup> Tesla, "EU charging"

## Greece

### Market overview

The Greek eMobility market is growing, with a significant rise in EVs deployed over the last few years – from 0.2k in 2016 to approximately 12k in 2022, facilitated by purchase incentives and other financial support mechanisms.<sup>1018</sup> EV recharging infrastructure has grown somewhat, from 33 recharging points to approximately 800 but this has not been sufficient to maintain the previously positive EVs per recharge point ratio (rising from 5.1 to 15.6 from 2016 to 2022). This view is reinforced by the latest EV and EV recharging data, with Greece ranking bottom 3 in terms of EV penetration of total fleet and in the bottom 25% in terms of EVs per recharge point.<sup>1019</sup>

Key sector statistics	2016	2022	Country details	EU27 + UK rank
EV penetration – new sales (#)	0.1k	7.0k*	<b>4k</b> BEVs	<b>25<sup>th</sup>/28</b> EVs as a % of total fleet
EV penetration – new sales (%)	0.1%	6.6%	<b>8k</b> PHEVs	
EV adoption – number of cars (#)	0.2k	11.9k		<b>20<sup>th</sup>/28</b> EVs per re-charging point
EVs as % of total fleet (%)	0.0%	0.2%	<b>77%</b> <b>21%</b> <b>2%</b> Slow Fast U-Fast	
Public recharging points (#)	33	0.8k		
EVs per recharging point (#)	5.1	15.6		

Data from EAFO website | \*2021 data | NB: Minor rounding discrepancies | U-Fast: Ultra-Fast

### Regulatory overview

According to Lease Plan, and as of 2020, Greece are one of the least prepared European countries for the rise of the sector even when considering the many incentives currently in place.<sup>1020</sup> In Greece, a legislative framework to govern eMobility was under development as early as 2014, however it was completed in a fragmented way leading to a non-integrated national market.<sup>1021</sup> Therefore, it was not until 2019 that well defined regulation and strategies were implemented through a combination of government initiatives (e.g., a National Inter-Ministerial Committee) and the EU EMOBICITY programme (designed to transfer best practise from across the EU). Specifically, based on EMOBICITY findings, the Committee set up the 1<sup>st</sup> National Plan for eMobility in 2020.<sup>1022</sup> This plan aimed to boost the uptake of eMobility in Greece, with a target of 1 in 3 new vehicles being electric by 2030. Moreover, Law 4710/2020 implements several incentives and called for the formation of a regulatory framework for EV infrastructure.<sup>1023</sup> Among other things, the adoption of this law required municipalities to install a minimum of 1 recharge point per 1k residents (expecting to contribute to deploying approximately 11k public rechargers by 2030).<sup>1020</sup> This was then complemented by municipalities' Recharging Plans for Electric Vehicles (CPEV), covering the distribution of recharge points and highlighting other local initiatives being pursued. While the development of these regional strategies was not legally mandated by the National government, 328 of 332 municipalities submitted proposals which are currently being reviewed by the 'Green Fund' (who will then provide funding for approved schemes, starting with a budget of €11m).<sup>1024</sup>

<sup>1018</sup> European Alternative Fuels Observatory, "Statistics on infrastructure and fleet data for road vehicles: Greece summary", October 2022

<sup>1019</sup> Ibid.

<sup>1020</sup> LeasePlan, "EV Readiness Index 2020", January 2020

<sup>1021</sup> European Committee of the Regions, "Electric mobility in national policy: the case of Greece", October 2020

<sup>1022</sup> Grantham Research Institute on Climate Change and the Environment, "Greece Laws and Policies"

<sup>1023</sup> Circular Synergy, "E-mobility in Greece", January 2021

<sup>1024</sup> Interreg Europe, "Greek funding programme for Electric Vehicle Charging Plans", March 2022



Since 2019, several financial support mechanisms for EVs and EV recharging have been enacted to support the sector and to meet the targets outlined in Greece's National Resilience and Recovery Plan (calling for 8k recharge points deployed by 2025).<sup>1025</sup> In 2020, €100m was dedicated to subsidising EV purchases, with grants up to €6k for both EVs and PHEVs. Additionally, full exemption from ownership and registration taxes were granted.<sup>1026</sup> These initial grants did expire in 2021, however a second round of funding (€50m) launched in 2022 covering up to 30% of the retail price of EVs.<sup>1027</sup> Focusing on EV recharging, the incentives are not as extensive, and Greece will need to significantly expand the size of its EV recharging network to maintain an operating environment conducive to rapid EV adoption. Presently, companies and apartment complexes can take advantage of special tax depreciation rates for the purchase and installation of EV rechargers (between 50% and 70%). Furthermore, some high-level goals were shared by the government including a promise to have all the country's main roads fully covered with EV infrastructure by the end of 2021.<sup>1023</sup> Lastly, Greece also provides State aid for EV recharging via its Loan Support Under the Recovery and Resilience Facility, which was implemented per the GBER article 36.a and is discussed in Appendix D.<sup>1028</sup>

Major policies and incentives	Description
Law 4439/2016 – Minimum technical standards <sup>1029</sup>	Transposed EU Directive 2014/94/EU into Greek regulation, providing minimum requirements for installation of public re-charging infrastructure
Law 4710/2020 - "Promotion of electric mobility and other provisions" <sup>1020</sup>	Creation of a regulatory framework for the recharging services market, first release of EV purchase incentives and urban planning regulations for recharging infrastructure, and updated national targets
EV purchase subsidies <sup>1030</sup>	€50 million fund electric transport, capped at 30% of the retail price of EVs. Extra subsidies for home recharging stations to follow in 2023.
"Greece 2.0" Resilience & Recovery Plan – 2021	Target for 8,000 recharging points to be installed at strategic urban and suburban locations by 2025 to support NECP target
EV purchase incentives and tax benefits <sup>76</sup>	Up to €6k purchase incentive (as cashback) for BEVs, as well as reduced registration taxes and ownership taxes for EV owners
Green Fund for EV municipal recharge point plans <sup>1021</sup>	€11m for municipalities to prepare recharging plans for EVs

### Competitive dynamics

While less than 1k public recharge points having been installed in Greece to this point, several players are already present in the market. Notable CPOs gathering up share include Evziin (pure play), Eneres (consulting & engineering company in partnership with pure play Virta), NRG (utility in partnership with software provider Driivz), and Protergia (utility), however given the nascency of the market only time will tell if one of them or a new entrant will end up as the leading EV recharging provider. Evziin, a specialised technology company acting as both a CPO and eMSP, is the first to enable international roaming by joining the Gireve network, thus beginning to create an open and interoperable network.<sup>1031</sup> Eneres, a Greece and Cyprus-based consulting and engineering company, was also one of the first players who established themselves,

<sup>1025</sup> Greek Government, "Greece 2.0 National Recovery and Resilience Plan", July 2021

<sup>1026</sup> Wallbox, "What You Should Know About EV Incentives In Greece"

<sup>1027</sup> Ekathimerini, "Second round of subsidies for EV purchase to launch Thursday", July 2022

<sup>1028</sup> European Commission, "Competition Policy State Aid Register: Loan Support Under the Recovery and Resilience Facility", March 2022

<sup>1029</sup> Official Legislative Gazette of Greece, "Law 4439/2016 - Official Gazette 222/A/30-11-2016 (Codified)", November 2016

<sup>1030</sup> Government of Greece, I move electrically

<sup>1031</sup> Gireve, "Greek Operator Evziin Opens To Roaming With Gireve", September 2020



deciding to focus on the destination recharging segment (installing over 300 rechargers at Metro supermarkets between 2020 and 2022). Moreover, they recently signed a deal with Ford (OEM) to provide CPO services at all Ford dealers in Greece.<sup>1032</sup> Meanwhile, established electricity & gas companies NRG and Protergia are also developing recharging networks and have shared plans to increase their presence across Greece.<sup>1033,1034</sup> Lastly, several other CPOs and eMSPs are emerging giving rise to healthy competition, with some acting as integrated players and others focusing on just one component of the value chain.<sup>1035</sup> In the future, as car rental and leasing companies transition to electric fleets and look to identify new revenue streams, they are also expected to play an important role in the evolution of recharging points.<sup>1020</sup>

To continue promoting new entrants in the sector, an important dimension that needs to be addressed relates to the licensing framework for new CPOs who want to invest in the sector. In particular, according to local media outlets, it takes approximately eight months for the licences to be approved which creates additional complexities for smaller companies interested in competing.<sup>1036</sup> Moreover, interesting competitive dynamics could emerge on the many Greek islands which are susceptible to the development of natural monopolies (especially smaller, less populated ones). It is therefore important that an effective strategy supports Greece's island-by-island decarbonisation plan advances, with the need for a competitive tender process and clear guidance from national agencies (part of this is being addressed via the Green Fund).<sup>1021</sup>

Several players are already present, even considering the industry is just kicking off.

Administrative processes to become a CPO and install charging stations are still perceived as too complex and time consuming.

Greek islands are prone to the development of natural monopolies.

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<sup>1032</sup> Virta, "ENERES – Growing the EV charging infrastructure in Greece"

<sup>1033</sup> Chargepoint, "Breakthrough in Greece: Protergia Charge joins has-to-be gmbh's client portfolio"

<sup>1034</sup> Driivz, "NRG and Driivz Team Up to Accelerate EV Charging in Greece", May 2022

<sup>1035</sup> Foteini Orfanou, "Embracing Electromobility in Greece: Review of good practices in the Region of Attica", October 2019

<sup>1036</sup> Fitch Solutions, "Greece's E-Mobility National Plan Is On Track, But Faces Risks", June 2022

## Hungary

### Market overview

Hungary has experienced notable electric vehicle growth since 2016, with almost 23k vehicles now deployed, up from 0.6k in 2016.<sup>1037</sup> However, even with this growth, EV penetration into the total fleet is still a minimal 0.5%, which ranks Hungary amongst the bottom half of Member States. Recharging points have also risen by approximately 3k, which has absorbed a significant amount of the EV uptake. As a result, EVs per recharging point are still significantly below the EU recommended 10 but have risen since 2016 from 3 to 6.6 per recharging point.<sup>1038</sup> Further focus is required to ensure recharging infrastructure does not fall behind further EV growth.

Key sector statistics	2016	2022	Country details	EU27 + UK rank
EV penetration – new sales (#)	0.2k	8.5k*	<b>12k</b> BEVs	<b>11k</b> PHEVs
EV penetration – new sales (%)	0.3%	10.9%		
EV adoption – number of cars (#)	0.6k	22.9k		
EVs as % of total fleet (%)	0.0%	0.5%		
Public recharging points (#)	0.2k	3.5k	<b>79%</b> Slow	<b>19%</b> Fast
EVs per recharging point (#)	3.0	6.6	<b>2%</b> U-Fast	

Data from EAFO website | \*2021 data | NB: Minor rounding discrepancies | U-Fast: Ultra-Fast

### Regulatory overview

The eMobility industry in Hungary kicked off in 2014 with the set-up of the eMobility Cluster Ányos Jedlik, a collection of the most influential market participants meant to act as an advisory body for the government as the sector's regulatory framework was developed. As of 2020, the cluster included over 40 members ranging from OEMs (e.g., Nissan, Porsche, Renault), energy utilities (e.g., E.ON, ELMU, MVM Hungarian Power Company), IT specialists (e.g., Qualyssoft), universities, and several municipalities.<sup>877</sup> However, the development of recharging infrastructure is lagging compared to the targets shared in Hungary's NIR (14.6k rechargers by 2025), suggesting further work is likely needed.<sup>1039</sup>

In 2016, the EU Alternative Fuels Infrastructure Directive was integrated into Hungarian law through several legislative stages, defining technical standards, and introducing the requirement of a license to participate in the market (obtained from the Hungarian Energy and Utility-regulating Bureau). This permit must be claimed 75 days before a station becomes operational, with additional details available within government Decree 273/2007.<sup>116</sup>

The AFI directive remained the major legislative reference for the sector in place until 2019, when the "Law" on Electromobility was introduced (a package of stipulations introduced in pre-existing laws). Some of the most important and impactful clauses include clear definitions of CPO and eMSP duties, requirements for shops to install electric car rechargers in accordance with the size of their parking space, the introduction of a 'green license' plate, and the passing of several tax benefits for EV drivers.<sup>116</sup> Lastly, 2019 also marked the discontinuation of free recharging in Hungary, somewhat demonstrating that the market achieved a certain degree of maturity.<sup>1040</sup>

<sup>1037</sup> European Alternative Fuels Observatory, "Statistics on infrastructure and fleet data for road vehicles: Hungary summary", October 2022

<sup>1038</sup> Ibid.

<sup>1039</sup> European Alternative Fuels Observatory, "Statistics on infrastructure and fleet data for road vehicles: Hungary target tracker", October 2022

<sup>1040</sup> Ármin Ferenci, "It's over! Free charging of electric cars to end soon in Hungary", July 2019

Moreover, several financial mechanisms to promote the sector have been set up over time. Support for EV infrastructure began in 2016 when the government issued 844 permits for municipalities to build EV recharging stations around the country as part of the Electric recharging station support scheme (through non-refundable grants totalling €4m).<sup>116</sup>

Furthermore, since July 2017 companies can also apply for pre-tax profit reduction for the installation of electric recharging stations.<sup>1041</sup> A wide array of direct EV incentives is also available, ranging from tax deductions to subsidies up to €7k for new purchases.<sup>1042</sup> In the upcoming funding period (stretching to 2027), it is estimated over €360m will be allocated to develop recharging infrastructure.<sup>116</sup>

Major policies and incentives	Description
eMobility Cluster 'Ányos Jedlik' <sup>1043</sup>	The leading advisory organisation in the field of eMobility in Hungary. Established in 2014, it has played a major role in shaping the nation's eMobility strategy and will continue to be an influential player in the sector
National Plan for the Development of recharging Infrastructure (2016) <sup>1044</sup>	Based partially on the AFID, Hungary outlined targets for various regions of the country, totalling to a minimum of 5.9k recharging points by 2030
The "Law" on Electromobility <sup>1077</sup>	Defines eMobility services and outlines the respective rules affecting services, licensing and reporting obligations for recharging. Comprised of several stipulations in existing legislative documents and government decrees
EV purchase incentives and tax benefits <sup>76</sup>	Up to €7.4k purchase incentives for EVs, and full purchase and ownership tax exemptions for EV owners
Electric recharging support scheme <sup>116</sup>	€4m was provided to municipal authorities across the country to build EV recharging stations and develop future strategies. Future funding to meet 2030 goals is expected to pass €360m
CEF grants <sup>57</sup>	€3m to projects supporting the rollout of EV recharging infrastructure

### Competitive dynamics

The CPO landscape in Hungary is rapidly changing, with several players across the value chain entering the market over the last few years. In 2017, the government set up e-Mobi (Electromobility Non-Profit Ltd.) and made it responsible for establishing public recharging infrastructure across the country. As a result, they have established themselves as the largest CPO in Hungary for some time now, accounting for approximately 30% of investments made in the sector as of 2021.<sup>116</sup> Recently e-Mobi was acquired by NKM Mobilitás Kft, owned by Hungary's largest energy utility MVM, cementing its position as the largest integrated CPO and eMSP network in Hungary but moving away from the public sector majority share.<sup>1045</sup> Moreover, through its network of roaming partners their customers now have access to over 1.5k recharge points.<sup>1046</sup> Another key network is controlled by ELMU (subsidiary of Innogy), who operates approximately 150 smart rechargers in Hungary.<sup>1047</sup> When focusing on the high-speed recharging segment instead, IONITY (pure play) remains one of the major players with

<sup>1041</sup> Ministry of Foreign Affairs of the Netherlands, "Smart and sustainable mobility market in Hungary", May 2019

<sup>1042</sup> Versinetic, "Incentives for Electric Vehicles and Charging – EU"

<sup>1043</sup> Emobility Atlas, "The Hungarian E-Mobility Cluster 'Ányos Jedlik'"

<sup>1044</sup> Hungarian Ministry of National Development, "National Policy Framework as of Directive on the rollout of the alternative fuels infrastructure", December 2016

<sup>1045</sup> Mobiliti, "Mobiliti's results in the field of e-mobility"

<sup>1046</sup> Mobiliti, "Mobiliti's charging service"

<sup>1047</sup> Mobility Network, "Charging station network"

20 high-capacity ultra-fast recharging stations spread across the country.<sup>970</sup> Lastly, oil and gas majors are becoming more active in the sector with Shell trying to position itself as a major recharging provider along highways and the MOL group having deployed rechargers through the EU funded Next-E project.<sup>1048</sup>

Destination recharging is also a focus in Hungary, with a significant portion of the market being developed at supermarkets given the statutory requirement for them to install rechargers in their parking lots (accounted for approximately 25% of investments in EV recharging in 2021).<sup>116</sup> For instance, Hungarian stop/shop (a popular retail complex) has installed 116 recharging stations across their locations (operated by Immofinanz)<sup>1049</sup> and Tesco (retailer) and Shell (O&G) recently partnered to bring EV recharging to 100 sites by 2025. While significant competition is present in the CPO and eMSP space, the country could benefit from further interoperability across networks, as consumers currently tend to be limited to recharging stations operated by the CPOs they are registered with.<sup>116</sup>

The charging sector was developed via state funded player e-Mobi, which was recently acquired by Hungary's largest utility signalling a shift in strategy.

The integrated CPO and eMSP model remain by far the most popular, however further integration of networks could improve consumer experience.

Future growth is expected via destination charging, as supermarkets and other commercial hubs are mandated to develop EV infrastructure.

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<sup>1048</sup> Next-E, "About the project"

<sup>1049</sup> Bence Gaal, "EV rechargers to be installed at Hungarian Stop Shop locations", December 2021

## Ireland

### Market overview

Ireland's electric vehicle rate of adoption and recharging infrastructure installation has lagged compared the rest of the EU. In 2011 Ireland's EV adoption started with 65 vehicles, which has since grown to almost 50k vehicles by 2022. These levels represent a relatively slow growth compared to the rest of the EU, but puts EV penetration at a relatively advanced 1.7%. Similarly, the development of recharging infrastructure has been slow, growing from 250 in 2012 to less than 2k in 2022, with no specific targets for future growth. Growth in number of recharging stations has not kept pace with EV uptake and as a result Ireland has one of the worst ratios of EVs to recharging points – almost three times (27.2) as high as the EU recommended ratio.

Key sector statistics	2016	2022	Country details	EU27 + UK rank
EV penetration – new sales (#)	0.7k	16.6k*	<b>26k</b> BEVs	<b>9<sup>th</sup>/28</b> EVs as a % of total fleet
EV penetration – new sales (%)	0.5%	19.7%	<b>22k</b> PHEVs	
EV adoption – number of cars (#)	1.8k	47.9k		
EVs as % of total fleet (%)	0.1%	2.1%		
Public recharging points (#)	1.0k	1.8k	<b>79%</b> Slow	<b>26<sup>th</sup>/28</b> EVs per re-charging point
EVs per recharging point (#)	1.9	27.2	<b>14%</b> Fast	
			<b>7%</b> U-Fast	

Data from EAFO website | \*2021 data | NB: Minor rounding discrepancies | U-Fast: Ultra-Fast

### Regulatory overview

In 2021, Ireland committed to a target of 190k EVs by 2025 and 945k by 2030 under their National Energy & Climate Action Plan.<sup>1050</sup> To support this, Ireland established the Zero Emissions Vehicles Ireland (ZEVI) in July 2022 to provide support, manage grants and incentives, and oversee the delivery plan of the EV Infrastructure Strategy.<sup>1051</sup> The ZEVI office is currently establishing itself and offers high-level advice to consumers, businesses and public bodies on EV adoption and infrastructure rollout. Until it is fully operational in 2023, the EV market will continue to be led by EU directives.

Ireland's EV Recharging Infrastructure Strategy 2022-2025, which supports the Climate Action Plan, aims to address the lacking policy and regulatory environment which presently caused an infrastructure rollout that falls behind targets. The Infrastructure Strategy sets out that a local authority strategy will be developed with the help of new frameworks, regulation, and investment, particularly making consideration for the needs and circumstances of each of the Ireland counties.<sup>1052</sup> The strategy also recognises the need to ensure recharging can be accessible to all regardless of health, age and income, but also considers the need to provide recharging solutions for those with no ability to recharge at home, as well as the need for an open and interoperable network that is simple to use. The strategy moves away from the public sector led market which until August 2020, meant that ESB eCars, part of the state-owned utility firm ESB, provided free public recharging to incentivise EV use. Interestingly some early local authority recharge points continue to offer free recharging due to a lack of billing capability.<sup>1049</sup> Public-led schemes have lacked success to date, illustrated by the Sustainable Energy Authority of Ireland (SEAI) €5k grant which is in place to rollout 200 recharge points annually, however only 33 recharge points were approved from 2020 until 2022.<sup>1049</sup>

<sup>1050</sup> Department of Transport of Ireland, "Government approves Electric Vehicle Policy Pathway Report", September 2021

<sup>1051</sup> Government of Ireland, "Zero Emission Vehicles Ireland"

<sup>1052</sup> County and City Management Association, Local Government Management Agency, Local Authorities Ireland, "Local Authority Electrification of Fleet and EV Charging Guidance Document", August 2021

Ireland is now moving towards a model in which private CPOs are responsible for installation, operation, maintenance, and customer support service for public recharge points. In 2022, the four local authorities of Dublin rolled out the first major local EV recharging infrastructure strategy which explores what infrastructure should be deployed and where, the number of recharging points needed, the level of investment that will be required over the next 10 years, and the roles the councils could play in the infrastructure rollout.<sup>1049</sup> This strategy builds upon best practise from areas such as London and Amsterdam to fund the installation of fast EV infrastructure at these locations to provide reliable accessible recharge points at public and private destinations to include hospitals, leisure facilities, cultural centres, hotels, etc.

Major policies and incentives	Description
EV infrastructure strategy <sup>1048</sup>	High-level strategy highlights some issues then after review and further consultation with stakeholders will lead to a detailed Implementation plan by 2023
Local authority EV Recharging Guidance Document <sup>1049</sup>	Provides additional guidance for local authorities with recharging space and potential business models
eSPSV Infrastructure Scheme <sup>1053</sup>	The eSPSV scheme encourages taxi drivers to choose EVs and supports installing dedicated taxi recharge points at major transport hubs nationwide
Public Charge Point Scheme - 2019 <sup>1054</sup>	SEAI scheme provides €5k per recharge point to support the development of on-street recharge points, the 2022 Infrastructure Strategy will look to further this
Climate Action Fund EV infrastructure delivery <sup>1048</sup>	In 2018, €10m was committed from the government's Climate Action Fund, which was matched by ESB, to help build out the ESB recharging network of 90 ultra-fast, 52 fast rechargers and 264 slow rechargers by 2023
EV purchase incentives and tax benefits <sup>76</sup>	Up to €5k purchase incentives for EVs, tax relief when purchasing the vehicle, and minimum rate ownership road tax for BEVs and a reduced rate for PHEVs
EU INTERREG 'FASTER' Programme <sup>1055</sup>	International joint initiative to install 40 50kW rechargers in Ireland and Northern Ireland funded through €6.4m from the EU's INTERREG VA by 2023
CEF grants <sup>57</sup>	€3m for the rollout of EV recharging infrastructure

### Competitive dynamics

The Irish market was kick-started off by the state-owned first mover utility ESB in 2011, when the company was supported by the regulator in developing recharging infrastructure throughout the country. This resulted in the conception of ESB eCars which remains the leading CPO. Since 2018, there has been a shift away from this one-firm environment, to one that is controlled by two players following the entry of EasyGo. Other pure plays such as ChargePoint, EVBox, has.to.be, IONITY (pure play owned by OEMs), Monta, Threeforce and Virta control the final 15%.<sup>1056</sup>

The introduction of the ZEVI should start to promote a healthier EV market that is developed with considerations for the local needs of Ireland. On the contrary, in the early years of the market, ESB eCars recharge points had low utilisation of <1%, and were only economically feasible through government support.<sup>1057</sup> However, public support has allowed ESB to gain an advantage allowing them to build out and optimise

<sup>1053</sup> Department of Transport, "Up to €25,000 for taxi drivers to buy Electric Vehicles", February 2022

<sup>1054</sup> Sustainable Energy Authority of Ireland, "Electric Vehicle Public Charge Point Grant"

<sup>1055</sup> Faster project, "The FASTER Project is led by East Border Region Ltd supported by 6 project partners and 15 associate partners."

<sup>1056</sup> CRA analysis: The 2022 picture was developed based on the data gathering methodology presented in Appendix F. The 2016 and 2021 pictures are based on desk-based research and CRA analysis which provides confidence on the market players ranking but not on the precise shares estimated.

<sup>1057</sup> CRA analysis – project interview with ESB stakeholder regarding Customer of 2030

their value chains and structures. While ESB's role as sole electricity DSO, being the only fully integrated utility in the country, might have raised concerns for fairness of access to grid for other CPOs, the Commission for Regulation of Utilities (CRU) has a connection offer process that ensures fairness, transparency, and timeliness.<sup>1058</sup> Nonetheless, this early government support for ESB, before the inception of other CPOs such as EasyGo in 2018, has helped ESB eCars to become the major player in the sector.<sup>1059</sup> On top of that, further to the initial support, in 2018, ESB received €10m funding from the government, which was matched by ESB, to install 400 rechargers by 2023.<sup>1056</sup>

Interoperability and the openness of access in consideration of the eMSP landscape is simplistic given the low number of players. The leading CPOs (ESB eCars and EasyGo) both have their own eMSP to give transparency of recharge point availability and to facilitate billing, each with discounted pricing and memberships. However, the e-roaming platform Gireve has partnerships with all Irish CPOs, allowing payment from a single RFID card or app.<sup>1060</sup> Interestingly, the larger CPOs have not signed an agreement with Hubeject, who are a leading roaming platform provider.

Market leader ESB received public support during the early years of the eMobility industry and in 2018, helping them roll-out EV charging across the island nation.

New entrants are expanding in the industry, while interoperability is widely available.

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<sup>1058</sup> Commission for Regulation of Utilities, "Enduring Connection Policy Stage 2 (ECP-2)", June 2020

<sup>1059</sup> Government of Ireland, "Electric Vehicle Charging Infrastructure Strategy 2022-2025", December 2021

<sup>1060</sup> Gireve, "Easygo.ie Partners With Gireve Roaming Platform As Emsp"



## Italy

### Market overview

Italy is one of the key EV markets in Europe, accounting for the 4<sup>th</sup> largest number of new EV registrations in 2021.<sup>1061</sup> The EV industry kicked off in 2011 with a fleet of ~100 cars, rising to over 260k by October 2022 – this growth is expected to continue and by 2030 it is estimated 6 million EVs will be deployed (68% implied CAGR).<sup>1062</sup> Likewise, the infrastructure rollout is accelerating (going from less than 1.5k rechargers in 2012 to over 30k in 2022), with the latest plans setting a target of 32k fast and ultra-fast rechargers by 2030.<sup>1063,1064</sup> While significant advancements in the sector have been made, Italy is lagging in terms of EV penetration with only 0.67% of all passenger cars on the road being electric in 2022 (EU average is 1.6%).

Key sector statistics	2016	2022	Country details	EU27 + UK rank
EV penetration – new sales (#)	2.8k	137.7k*	<b>134k</b> BEVs	<b>14<sup>th</sup>/28</b> EVs as a % of total fleet
EV penetration – new sales (%)	0.16%	9.06%	<b>133k</b> PHEVs	
EV adoption – number of cars (#)	8.6k	266.6k		
EVs as % of total fleet (%)	0.1%	0.7%		
Public recharging points (#)	2.1k	30.3k	<b>75%</b> Slow	<b>10<sup>th</sup>/28</b> EVs per re-charging point
EVs per recharging point (#)	4.15	8.81	<b>21%</b> Fast	
			<b>3%</b> U-Fast	

Data from EAFO website | \*2021 data | NB: Minor rounding discrepancies | U-Fast: Ultra-Fast

### Regulatory overview

In Italy, the first regulatory framework for eMobility was set in place in 2010, with several projects and public tenders designed to test various business models and competitive solutions, building the foundation for future policies enacted within the country.<sup>1065</sup> Today, the main legislative reference for recharging infrastructure is Decree 257 (16 December 2016), which was based on EU Directive 2014/94/EU (AFID).<sup>1066</sup> This outlines the minimum requirements for recharging infrastructure, including technical specifications and interoperability standards. It also distinguishes between slow (<22 kW) and fast (>22kW) recharging, with different incentives outlined for various capacity levels. For instance, the share financed by the state for the construction of recharging stations was historically 35% for slow AC recharging systems vs. 50% for DC recharging systems with a capacity greater than 50 kW (residential and semi-public).<sup>1067</sup> Moreover, it regulates the tariff mechanisms, structure, connection types, and other practical parameters of recharging stations.<sup>1068,1069</sup> At a national level, the National Plan for Electric Vehicle Recharging Infrastructure (PNIRE) guides recharger and vehicle deployment. The PNIRE, adopted in 2012 and updated over time, provided the first national targets for the public recharging sector, aiming to install up to 13k slow recharging points and up to 6k fast recharging points by 2020 (a ratio of approximately 1 public recharge-point for every 10 Evs).<sup>1061</sup> The PNIRE also defines criteria for where

<sup>1061</sup> European Environment Agency, "New registrations of electric vehicles in Europe"

<sup>1062</sup> Michael Nicholas, Sandra Wappelhorst, "Preparing Italy's charging infrastructure for rapid vehicle electrification", March 2022

<sup>1063</sup> European Alternative Fuels Observatory, "Statistics on infrastructure and fleet data for road vehicles: Italy summary", October 2022

<sup>1064</sup> Ministry of Transport and Infrastructures of Italy, "National Plan for EV recharging infrastructures", June 2016

<sup>1065</sup> European Regional Development Fund, Emobility, "Report on EV charging pricing, regulatory framework and DSO role in the e-mobility development", August 2021

<sup>1066</sup> UN Environment Programme, "Legislative Decree from 16 December 2016, no. 257 on implementing discipline of Directive 2014/94/EU of the European Parliament and of the Council of 22 October 2014 on the establishment of an alternative fuel infrastructure.", December 2016

<sup>1067</sup> Tiziana Manenti, Cristina Betti, "THE FUTURE OF E-CHARGING INFRASTRUCTURE: ITALY", April 2020

<sup>1068</sup> CSM, "Electric Vehicle Regulation and Law in Italy"

<sup>1069</sup> National Regulatory Authority for Energy Networks and the Environment (ARERA), "Electric Mobility"

public infrastructure should be deployed, starting from existing ICE fuel stations to strategic real estate locations (e.g., near supermarkets or malls). Moreover, it outlines the minimum requirements for public tenders (on top of the regulations stipulated in the Legislative Decree n.50 of April 8, 2016), which include technological interoperability, an adequate management software able to automatically feed data into central systems, and the ability for consumers to recharge without entering into a contract.<sup>1061</sup> Lastly, local authorities and municipalities play a crucial role as they must authorise the development of recharging points located on public land through a SCIA (certified reporting of start of activity). This includes a detailed project overview, technical specifications, and a copy of the request for connections to the distribution sector (exceptions apply).<sup>1064</sup> To reach these targets, in 2018, the PNIRE provided financial support through a €72m Ministry of Transport fund covering all stages of infrastructure development (with a cap of 50% of costs).<sup>1070</sup> Several other EV incentives have also been set up including tax benefits, commercial and private grants, subsidies and more (see table below). Notably, Italy's National Recovery and Resilience Plan has allocated €740m to develop the country's recharging infrastructure (covering up to 40% of the total installation cost).<sup>1071</sup> Italy also provides State aid for its "subsidiary measure for local authorities to incentivise the deployment of recharging infrastructure in the Lombard territory", which was implemented as per the GBER article 36.a and is discussed in Appendix D.<sup>1072</sup>

Major policies and incentives	Description
Tax incentives (semi-public) <sup>73</sup>	Tax credit up to €3k and capped at 50% of the installation and purchase cost of recharge points. A superbonus, allowing 110% tax deduction (2022-2023), 70% (2024) and 65% (2025) has also been set up
EV purchase incentives and tax benefits <sup>76</sup>	Up to €5k purchase incentives for EVs and a five-year exemption on ownership road taxes, followed by a 75% reduction for BEVs
Recovery and Resilience Plan (PNRR) <sup>1068</sup>	€740m fund of which €360m for non-urban EV infrastructure, €353m for EV infrastructure in urban centres
EIB loans <sup>61</sup>	€65m to projects supporting the rollout of EV recharging infrastructure
CEF grants <sup>57</sup>	€33m to projects supporting the rollout of EV recharging infrastructure

### Competitive dynamics

The Italian government has played an active role in the development of the EV recharging sector, emphasising the need to build an open and competitive market that will favour all ecosystem players (particularly the consumer). This focus was recently heightened as selection of CPOs on motorways via competitive tender has now been integrated into Italy's Annual Law for Competition (Article 12, 2021).<sup>1073</sup> However, some anti-competitive effects could have already materialised across the value chain, given major players control most of Italy's EV recharging market – pure play owned by utility Enel X accounts for approximately 55% of the sector, with other key players including Be Charge (owned by O&G firm Eni), Tesla (OEM), Duferco Energia (utility), IONITY (pure play owned by OEMs), and A2A (utility).<sup>1074</sup> Enel X's growth is particularly interesting, leveraging a loan from the EIB to build 14k recharging stations from 2018

<sup>1070</sup> Ministry of Foreign Affairs, "Opportunities and barriers for Dutch entrepreneurs in the Italian E-Mobility sector", May 2019

<sup>1071</sup> EconomiaCircolare.com, "From MITE 741 million euros for recharging electric cars. But there are also critical issues", May 2022

<sup>1072</sup> European Commission, "Competition Policy State Aid Register: Subsidiary measure for local authorities to incentivise the deployment of EV recharging infrastructure across the Lombard territory", March 2022

<sup>1073</sup> Italian Senate, "Annual law for market and competition 2021", February 2022

<sup>1074</sup> Pierluigi Sandonnini, "Which are the CPOs in Italy and which ones practice interoperability", April 2022

to 2022.<sup>1075</sup> Furthermore, in November 2021 the Italian Competition Authority (ICA) opened an investigation against a proposed joint venture between Enel X and Volkswagen, warning that could reduce competition and hurt consumers. The ICA ended up approving the joint venture, with the decision and its impacts to be discussed in the Italy in-depth assessment.<sup>1076</sup> Interoperability is also a major focus in the Italian market, and while CPOs often also act as an eMSP, consumers have access to most rechargers in the country via roaming hubs (e.g., Hubject has close to 100% coverage) and bilateral agreements (e.g., A2A partnered with Enel X in January 2022).<sup>1071</sup> The funding provided via the PNRR has received criticism, with beneficiaries having to meet requirements which seem to favour the larger players in the industry (e.g., CPOs must demonstrate they have been managing 50+ recharging stations for a minimum of 12 months). This may lead to companies like Enel X or Plenitude (born out of Eni) to gain a competitive advantage (requirements to apply are still to be finalised and will be updated every year, which could in turn both lead to competitive improvements or more restrictive constraints).<sup>1068</sup> More generally, after early pilots and in line with Electricity Directive 2019/944, the Italian regulator made it illegal for DSOs to own and operate recharging points given enough appetite from the private sector was demonstrated.<sup>877</sup> Instead, if a DSO wants to participate, they must do so via a vertically integrated subsidiary and must guarantee non-discriminatory cooperation with any CPO.<sup>1067</sup> Interesting market dynamics have also materialised along highways, where the sector has lagged, leading to Autostrade per L'Italia (Aspi) setting up 'Free to X' to develop over 100 recharging stations by 2023. Enel X is the major CPO and is partnering directly with existing highway service stations to install ultra-fast EV rechargers.<sup>1077</sup>

Enel X, main recharging player, received large EIB loan to kick off recharger deployment. It has close relations with the Italian distribution network and a strong partnership with Volkswagen covering the value chain.

The current set-up of the PNRR may favour the larger, more established CPOs.

<sup>1075</sup> European Investment Bank, "Italy: Electric cars - EIB supports Enel's plan for 14,000 new charging stations", July 2018

<sup>1076</sup> Michele Giannino, "the Italian competition authority approves without conditions a joint venture in the sector for green mobility (Enel X / Volkswagen finance Luxembourg)", December 2021

<sup>1077</sup> Carlo Ombello, "Italy's EV Charging Infrastructure Is About To Get A High-Power Boost", March 2021

## Latvia

### Market overview

The EV recharging landscape in Latvia is currently at a nascent level with has 2k EVs on the streets, with a total number of 0.6k installed public rechargers. Both EVs and recharging stations have steadily been rising since 2016, which has kept the number of EVs per recharge point low but EV penetration is still less than 1%.<sup>1078</sup> In fact, Latvia ranks second in EVs per recharge point amongst the EU-27 & UK, but the metric is somewhat skewed by both the low EV number and number of recharge points. Moving onwards, EV recharging in Latvia will become a more attractive investment as the utilisation rates of recharging points nearly doubled in 2021.<sup>1079</sup>

Key sector statistics	2016	2022	Country details	EU27 + UK rank
EV penetration – new sales (#)	0k	0.6k*	<b>1.6k</b> BEVs	<b>22<sup>nd</sup>/28</b> EVs as a % of total fleet
EV penetration – new sales (%)	0.3%	3.5%	<b>0.4k</b> PHEVs	
EV adoption – number of cars (#)	0.3k	2.0k		<b>2<sup>nd</sup>/28</b> EVs per re-charging point
EVs as % of total fleet (%)	0.0%	0.2%	<b>23% 75% 1%</b> Slow Fast U-Fast	
Public recharging points (#)	0.1k	0.6k		
EVs per recharging point (#)	3.7	3.3		

Data from EAFO website | \*2021 data | NB: Minor rounding discrepancies | U-Fast: Ultra-Fast

### Regulatory overview

The current regulatory framework and support towards EVs and their infrastructure development is at a nascent state relative to the EU-wide level. This has been mostly driven two factors. First, a lack of EV subsidies has caused limited interest in shifting away from ICE vehicles, hence EV infrastructure development across the country has not been a focus. For instance, the cumulative number of registered EVs has barely reached the 2k mark, which represents only 0.24% of the total fleet in Latvia. Second, the country has had a limited development of variable renewable energy infrastructure (wind and solar accounting only for 81MW<sup>1080</sup>), which arguably has decreased focus on transport electrification as a green supply is necessary to achieve the desired carbon footprint improvements. Nevertheless, even with the current energy supply a reduction of emissions could have been achieved by shifting to low-carbon transport.

To boost eMobility in Latvia, the government has taken multiple regulatory steps that range from tax benefits to subsidies for EVs and the associated recharging infrastructure. In 2015, the government passed a regulation to establish a national recharging infrastructure across the Trans-European TEN-T.<sup>1081</sup> This included a deployment target of 235 recharging stations by 2023, meant to serve the expected 747 EVs registered in Latvia. Committed capital included €8.34m funded jointly by the ERDF and State budget. The recharging infrastructure was developed by a state-run Road Traffic Safety Directorate (CSDD)<sup>1082</sup> which operates as an integrated CPO & eMSP. More recently, as international pressure has risen, the government announced an EV subsidy plan for new and used cars to remove some of the financial barriers to EV adoption. The subsidy plan includes a €4.5k grant for new cars and €2.3k grant for used

<sup>1078</sup> European Alternative Fuels Observatory, "Statistics on infrastructure and fleet data for road vehicles: Latvia summary", October 2022

<sup>1079</sup> Central Finance and Contracting Agency of Latvia, "Electric car charging network – 139 stations", December 2021

<sup>1080</sup> Directorate General for Energy, "Statistical pocketbook 2021", September 2021

<sup>1081</sup> Cabinet of Ministers of Latvia, "On Alternative Fuels Development Plan 2017-2020", April 2017

<sup>1082</sup> Ministry of Transport of Latvia, "Green light for electric vehicle charging infrastructure - 221 stations by 2020", March 2016

EV purchases over a 2-year period (2022 – 2024).<sup>1083</sup> However, no recent regulatory action has been pursued to further develop the recharging infrastructure.

The Latvian government has also attempted to boost EV adoption levels by providing multiple benefit schemes. EV owners are excluded from vehicle operation, company car and new car registration taxes.<sup>1084</sup> They are also eligible for local incentives such as the use of public transport lanes, free of charge entry into resort city Jurmala and free parking in Riga and Liepaja.<sup>1081</sup> These benefits are likely becoming more attractive to Latvians, who often require price subsidies to cover part or all of the EV cost premium.

Major policies and incentives	Description
Electromobility development <sup>1078</sup>	Plan to aid the uptake in EVs, construction of recharging station network.
EV Recharging Development <sup>1078</sup>	Target – 253 stations by end of 2023. Committed capital included €8.34m funded jointly by the ERDF and State budget.
Tax benefits <sup>1081</sup>	Exemption from vehicle operation, company car and registration taxes
Local incentives <sup>1081</sup>	Permission to use public transport lanes. Enter Jurmala without a fee
Free parking incentives <sup>1081</sup>	Parking is free of charge in Riga and Liepaja
EV purchase incentives and tax benefits <sup>1080,76</sup>	Up to €4.5k purchase subsidy and tax exemptions when buying a new BEV, including exemption from ownership road tax
CEF grants <sup>57</sup>	€3m to projects supporting the rollout of EV recharging infrastructure

### Competitive dynamics

The competitive landscape of the public EV recharging network in Latvia is dominated by two major integrated CPOs & eMSPs. The biggest integrated service provider is the state run CSDD which developed its recharging infrastructure under an ERDF backed project that was focused on network development across the TEN-T and adjacent roads. CSDD provides payment option through their own app e-mobi<sup>1085</sup>, but also cooperates with Mobilly (a pure eMSP player) to provide wider broader access to their recharging infrastructure. The second provider is also a state-owned electric utility company, Latvenergo, which provides its EV recharging service through its Elektrum brand. It currently hosts 35 recharging stations across the country and provides the payment service through its Elektrum Drive app.<sup>1086</sup>

CSDD and Elektrum Drive have also cooperated in the past to establish themselves as major market players and to involve other companies in the eMobility sector. In August 2022, they received legal permission from the State Competition Council to share their recharging infrastructure amongst their customer base.<sup>1087</sup> This enables CSDD or Elektrum Drive customers to use any of their recharging points whilst making payments through their original provider (CSDD or Elektrum Drive), thus promoting interoperability and limiting complexity of the consumer experience. Moreover, in 2020, Elektrum and CSDD signed a memorandum with 3 car sharing companies (Figsy, Carguru and CityBee) to make eMobility services even more accessible to their customer

<sup>1083</sup> Elektroauto, “The government conceptually supports subsidies for new and used electric cars”, August 2021

<sup>1084</sup> European Alternative Fuels Observatory, “Statistics on infrastructure and fleet data for road vehicles: Latvia incentives & legislation summary”, October 2022

<sup>1085</sup> E-mobi, “Welcome to the e-Mobi portal”

<sup>1086</sup> Elektrum, “Elektrum Drive charging stations – green energy for your electric car!”

<sup>1087</sup> Eng. LSM.lv, “Watchdog allows collaboration of electric car charging networks in Latvia”, August 2022

base.<sup>1088</sup> Based on their past track-record, both market players are expected to continue acting as the major recharging service providers in Latvia.

Nevertheless, private businesses are making their way into the EV recharging sector to provide greater competition. A state-wide fast-food chain Hesburger has set up 22 public recharging points across the country, and they are set to operate as an integrated CPO & eMSP.<sup>1089</sup> As such, the competition in EV recharging is limited to two major integrated providers but private sector involvement is likely to increase competition in the near to medium term.

CSDD and Elektrum (both state-owned integrated CPOs & eMSPs) dominate the public charging station market-share and have recently reached a cooperation deal (approved by the State Competition Council).

Lack of public support towards EV uptake and charging infrastructure development, especially as private sector involvement is expected to rise.

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<sup>1088</sup> Elektrauto, "The leading members of the industry agree on the promotion of electromobility in Latvia", October 2020

<sup>1089</sup> Delfi Bizness, "Pie 'Hesburger' plāno attīstīt elektromobilu uzlādes infrastruktūru", September 2022



## Lithuania

### Market overview

Electric vehicles have steadily grown in numbers in Lithuania over the past years, going from less than 200 in 2015 to almost 4k in 2022.<sup>1090</sup> Noticeably, EV market penetration among new vehicle registrations has increased even more, largely driven by BEVs that went from 0.15% in 2015 to almost 4% in 2022 but overall fleet penetration remains low, at 0.5%. Recharging infrastructure has undergone a similar upward trajectory, even though in much lower absolute numbers: recharging points grew from only 18 in 2015 to 170 in 2022.<sup>1091</sup> At current growth rates, Lithuania will not have sufficient chargers to accommodate the growing number of EVs, indicated by the increase in EVs per recharge point from 14.4 to 28.4 between 2016 and 2022.

Key sector statistics	2016	2022	Country details	EU27 + UK rank
EV penetration – new sales (#)	0.1k	1.2k*	<b>3k</b> BEVs	<b>18<sup>th</sup> / 28</b> EVs as a % of total fleet
EV penetration – new sales (%)	0.4%	4.2%		
EV adoption – number of cars (#)	0.4k	4.9k	<b>15%</b> <b>78%</b> <b>7%</b> Slow Fast U-Fast	<b>27<sup>th</sup> / 28</b> EVs per re-charging point
EVs as % of total fleet (%)	0.0%	0.5%		
Public recharging points (#)	0.0k	0.2k		
EVs per recharging point (#)	14.4	28.4		

Data from EAFO website | \*2021 data | NB: Minor rounding discrepancies | U-Fast: Ultra-Fast

### Regulatory overview

As set by the Law on Alternative Fuels,<sup>1092</sup> the Lithuanian government aims to reach 6k installed public recharging points by 2030,<sup>1089</sup> for an overall target of 60k installed recharging points by 2030 (including private ones).<sup>1096</sup> With a total estimated budget at €70m,<sup>1093</sup> the plan will be funded by the country's RRF as well as via the Sustainable Mobility Fund, which was established to support the development of alternative fuels infrastructure and vehicles by the aforementioned law.<sup>1094</sup> However, despite ambitions, the target is lower than the 11k public rechargers by 2030 pledged by the country in its NIR as of Directive 2014/94/EU.<sup>1095</sup> To further support the recharging infrastructure development, the government programme includes the deployment of one 600kW and two 150 kW recharging stations every 60km along TEN-T network roads (key EU transport routes) in each direction in line with proposed regulation by the European Commission repealing former Directive 2014/94/EU.<sup>1096</sup>

At the same time, the country's municipalities have planned to install a total of 5k slow, fast, and ultra-fast speed rechargers by 2030.<sup>1097</sup> While this allows local authorities with better knowledge of the territory to pick recharger locations, this raises issues since often these institutions lack the necessary know-how, potentially resulting in the ineffective allocation of rechargers, grid imbalances or in the installation of equipment

<sup>1090</sup> European Alternative Fuels Observatory, "Statistics on infrastructure and fleet data for road vehicles: Lithuania summary", October 2022

<sup>1091</sup> Ibid.

<sup>1092</sup> Ministry of Energy of the Republic of Lithuania, "The Law on Alternative Fuels has been passed: How the transport sector will change over the next decade", March 2021

<sup>1093</sup> International Energy Agency, "Economic Recovery and Resilience "New Generation Lithuania" / Green Transformation / Clean Transport", October 2021

<sup>1094</sup> Parliament of Lithuania, "Alternative Fuels Act", March 2021

<sup>1095</sup> Chiara Lodi *et al.* "Assessment of the Member States' Implementation Reports of the National Policy Frameworks under the Directive 2014/94/EU on the deployment of alternative fuels infrastructure", March 2021

<sup>1096</sup> European Commission, "Proposal for a Regulation of the European Parliament and of the council on the deployment of alternative fuels infrastructure, and repealing Directive 2014/94/EU of the European Parliament and of the Council", July 2021

<sup>1097</sup> Marius Monkevičius, "The government plans to switch to electric cars: it will expand the network of charging stations in institutions, with 5 million allocated for this purpose. Euros", August 2022



not suitable for the situation (e.g. tendency to install fast rechargers even when not needed).<sup>1098</sup> Lastly, in their 2021 National Energy and Climate Plan, Lithuania set the goal of reaching a market penetration for new and second-hand EVs of 10% of newly purchased vehicles by 2025, which is then to be increased to 50% by 2030.<sup>1099</sup>

To achieve its electric mobility goals, the Lithuanian government is supporting the sector via both direct and indirect measures. First, free recharging has been provided at 28 selected stations in the Vilnius area since 2018, in an agreement with EU institutions which is set to expire by the end of 2023.<sup>1097</sup> Moreover, subsidies are provided for the installation of rechargers as well as for the purchase of EVs; in a scheme lasting from 2022 to 2026, 80% of the total purchase and installation cost of public rechargers with a capacity between 7kW and 22kW, were covered by a government subsidy.<sup>1100</sup> Similarly, the Lithuanian Energy Agency (LEA) provides financial support for the installation of private rechargers.<sup>1101</sup> When it comes to EV purchases, a programme launched in 2020<sup>1102</sup> by the Environmental Project Management Agency (EPMA) offers refunds of €5k for the purchase of a new EV, and of €2.5k for a second-hand one.<sup>1099</sup> Additional EV ownership benefits include free parking in the main city centres.<sup>1103</sup> In addition to that, starting from 2023, at least one fast or ultra-fast recharger will need to be installed in every newly built or largely renovated gas station, as well as in railway stations, airports and seaports.<sup>1104</sup>

Major policies and incentives	Description
Recharger targets <sup>1096</sup>	Public recharging point targets: 4k by 2024 and 6k by 2030
Recharger subsidy <sup>1097</sup>	80% of total purchase and installation cost of public and semi-public recharging points (7-22 kW)
Free recharging programme <sup>1097</sup>	Covering 28 recharging points in Vilnius area over period 2018-2023
Mandatory recharging installation <sup>1101</sup>	Applies to new or renovated gas station, train stations, airports, and seaports from 2023
EV purchase incentives and tax benefits <sup>76</sup>	Up to €5k purchase incentive towards a new EV, and €2.5k for a second-hand one, as well as tax exemption when first registering the car
CEF grants <sup>57</sup>	€3m for projects supporting the rollout of EV recharging infrastructure

### Competitive dynamics

The EV recharging market is still nascent in Lithuania, with public institutions still playing a central role. To begin with, local authorities install recharging points and regularly act as CPOs.<sup>1105</sup> In fact, after having built roughly 150 recharging points by 2021, municipalities are expected to submit plans for the further development of recharging infrastructure until 2030, in an effort to be supported by the ERDF.<sup>1106</sup> On top of that, state institutions are also active as eMSPs, for instance, they provide a mobile application displaying all available public rechargers.<sup>1102</sup> As of now, visibility on market players in the EV recharging sector remains limited; in fact, until recently the disclosure

<sup>1098</sup> Tzvetozar Iolov, "Small Lithuanian town calls for better legislation guidelines to ease EV charging stations spread", August 2022

<sup>1099</sup> Gintarė Meškauskienė, "European Green Course: legal regulation of the electric car market", 2022

<sup>1100</sup> Remigijus Bielinskis, "Lithuania to end free electric car charging by late 2023", August 2022

<sup>1101</sup> Government of Lithuania, "45 million for the installation of private charging access points for electric cars. EUR support", September 2022

<sup>1102</sup> Environmental Project Management Agency of the Ministry of the Environment of the Republic of Lithuania, "Invitation under the measure "Encouraging the purchase of electric cars for natural persons", April 2020

<sup>1103</sup> Elektrinė, "Encouraging the Lithuanian government to buy electric car", October 2020

<sup>1104</sup> Ministry of Transport of the Republic of Lithuania, "Development of electric vehicle infrastructure"

<sup>1105</sup> Registration System for Public Charging Stations for Electric Vehicles, "Charging map"

<sup>1106</sup> Ministry of Transport of the Republic of Lithuania, "Development of electric vehicle infrastructure"

of data on public and private recharging points was not mandatory. However, CPOs are expected to provide information on the number and types of rechargers under operation by the end of 2022 via the Public and semi-public Electric Vehicle Recharging Access Information System.<sup>1107</sup> This measure is expected to promote competition in the market, enhancing consumer visibility on service providers as well as improving transparency on recharging tariffs.

Besides public institutions, some private market players are also present in Lithuania. The country raises few competition-related concerns in terms of market concentration, as different players control limited share. Among existing firms, the integrated business model appears to be the most common one. In fact, Ignitis ON (pure play),<sup>1108</sup> In Balance Grid (pure play),<sup>1109</sup> and the start-up, Elinta (pure play)<sup>1110</sup> are all active in Lithuania, covering the entire value chain from the sale of recharging infrastructure to the provision CPO and eMSP services. On top of that, supermarket chains as well as parking operators, also provide recharging for their clients. For instance, parking operator Unipark has installed rechargers in many of its facilities, acting also as a CPO and eMSP.<sup>1111</sup>

Nascent but fragmented market, with few private actors controlling limited shares.

Local authorities expected to remain central players, also as CPOs, in rollout of chargers up to 2030.

<sup>1107</sup> Ibid.

<sup>1108</sup> Ignitis, "Electric vehicle solutions"

<sup>1109</sup> F6S, "In Balance grid, UAB"

<sup>1110</sup> Patricia Allen, "Kaunas-based Elinta Charge gets €7 million boost for its EV charging solutions", July 2022

<sup>1111</sup> Unipark, "Electric vehicle charging station"

## Luxembourg

### Market overview

Electric vehicles have spread substantially in Luxembourg since 2015, with BEVs on the road rising from 0.6k to 9.6k (49% CAGR) and PHEVs from 0.3k to more than 10k (65% CAGR).<sup>1112</sup> Moreover, the country hosts around 1.8k publicly accessible recharging points, a figure that has grown from 0.2k in 2016.<sup>1109</sup> Although there has been significant recharger growth, the number of EVs per recharge point has still roughly doubled since 2016 indicating a lag vs EV uptake. This rapid growth has made Luxembourg a leader in eMobility with over 4% of passenger cars now being electric (4<sup>th</sup> best in the EU27 + UK).<sup>1113</sup>

Key sector statistics	2016	2022	Country details	EU27 + UK rank
EV penetration – new sales (#)	0.3k	9.4k*	<b>10k</b> BEVs	<b>4<sup>th</sup>/28</b> EVs as a % of total fleet
EV penetration – new sales (%)	0.6%	22.7%	<b>10k</b> PHEVs	
EV adoption – number of cars (#)	1.2k	19.7k		
EVs as % of total fleet (%)	0.3%	4.2%	<b>97%</b> Slow	<b>12<sup>th</sup>/28</b> EVs per re-charging point
Public recharging points (#)	0.2k	1.8k	<b>1%</b> Fast	
EVs per recharging point (#)	5.8	10.8	<b>2%</b> U-Fast	

Data from EAFO website | \*2021 data | NB: Minor rounding discrepancies | U-Fast: Ultra-Fast

### Regulatory overview

Before the EU-wide 2035 EV target was adopted, in 2020 Luxembourg had set the goal of reaching a 49% EV share by 2030.<sup>1114</sup> In addition, the country's National Policy Framework set the goal of reaching 1.6k public recharging points by 2020, 5k by 2025 and 10k by 2030.<sup>1115</sup> The 2020 target was not met, and according to the AFID database only approximately 1k public recharge points were installed by then.<sup>1116</sup>

To meet these ambitious goals, the government provides several forms of incentives and public support. In 2021, Luxembourg implemented a structured support program for the development of EV recharging infrastructure. With a total budget of €40m,<sup>1117</sup> 76% of which comes from the country's Recovery and Resilience Plan,<sup>1118</sup> the country implemented measures to cover both private and public rechargers. For both public and large-size private recharging projects, funds are allocated, following a public tender, to the initiatives with the lowest cost to installed capacity ratio.<sup>1119</sup> In both cases, total installed capacity must be above 175 kW while the provided grants cover 50% of the cost for public infrastructure, 40% for public points accessible only during working days and hours (semi-public), and 30% for private recharging stations.<sup>1116</sup> The government also provides financial support for the purchase of EVs through a programme created in 2020.<sup>1120</sup> Recently extended to 2024, the initiative offers €8k grants for the purchase of EVs with a battery capacity up to 150 kW and consumptions less than 200 Wh/km.<sup>1111</sup>

<sup>1112</sup> European Alternative Fuels Observatory, "Statistics on infrastructure and fleet data for road vehicles: Luxembourg", October 2022

<sup>1113</sup> Ibid.

<sup>1114</sup> Luxembourg, "Clever fueren: a major boost for electric mobility the 3,000€ subsidy for the most fuel-efficient cars has been renewed"

<sup>1115</sup> European Alternative Fuels Observatory, "Statistics on infrastructure and fleet data for road vehicles: Luxembourg", October 2022

<sup>1116</sup> Ibid.

<sup>1117</sup> Cordula Schnuer, "EU approves Luxembourg €40m electric vehicle scheme", March 2022

<sup>1118</sup> Cordula Schnuer, "Luxembourg a 'hallmark of the European spirit': Von der Leyen", June 2021

<sup>1119</sup> Chamber of workers of Luxembourg, "Charging infrastructure for electric vehicles", February 2022 Chamber of workers of Luxembourg, "Charging infrastructure for electric vehicles", February 2022 Chamber of workers of Luxembourg, "Charging infrastructure for electric vehicles", February 2022 Chamber of workers of Luxembourg, "Charging infrastructure for electric vehicles", February 2022

<sup>1120</sup> Restart Luxembourg, "New support measures to prepare for economic recovery", May 2020

Government authorities are also directly involved in the development of a public national EV recharging network. Following the update to the country's power sector regulation,<sup>1121</sup> the government published in 2016 a ministry regulation defining the allocation of recharging points in public parking areas and their distribution among different municipalities.<sup>1122</sup> Already included in the country's NIR with reference to the Directive 2014/94/EU, the plan was then translated into the "Chargy" initiative in 2017 aiming to develop 1.6k slow-speed recharging points in public parking spaces, service stations and peri-urban parking slots.<sup>1123,1124</sup> The project, which achieved 700 installed recharging stations with two recharging points each by the end of 2022, was later expanded to include the installation of ultra-fast rechargers with a 320kW capacity in the service stations along the highway's network, in an initiative denominated "Super Chargy".<sup>1125</sup>

Major policies and incentives	Description
Grants for EV rechargers' installation <sup>1116</sup>	Aid covering from 30% to 50% of project costs, depending on accessibility, with funds allocated via public tenders
EV purchase incentives and tax benefits <sup>76</sup>	Up to €8k purchase incentives towards new EVs as well as a reduced rate (50%) registration tax and a minimum rate for own-ership road tax
Support measures to achieve NPF targets <sup>1119</sup>	"Chargy" programme for the deployment of 1.6k public recharging points
CEF grants <sup>57</sup>	€6m for projects supporting the rollout of EV recharging infrastructure

### Competitive dynamics

The development of EV recharging infrastructure in Luxembourg, in the form of the aforementioned "Chargy" and "Superchargy" programmes, was mandated to the country's electricity TSO and DSO Creos Luxembourg S.A.<sup>1126</sup> Creos, together with its sister utility company Enovos Luxembourg S.A., selected the partners for the project via a European tendering process in 2016. The tender was won by a consortium between Engie Cofely Luxembourg (energy solutions provider owned by utility Engie) and Powerdale (pure play), where the former acted as CPO while the latter was entitled with the delivery of the infrastructure as well as of the internet application for the "Common Operator Platform", qualifying it as the eMSP.<sup>1127</sup> While the attribution of recharging infrastructure' developments to a single CPO and eMSP raises competition concerns, these were recently assessed through legislative updates. In fact, following the European directive number 2019/944, the DSO was prohibited, aside from few exceptional circumstances, from owning, developing, or operating public EV rechargers.<sup>1116</sup> As a result, both the slow and fast/ultra-fast public recharging networks were put on a tender, allowing the DSO to keep ownership only in absence of acceptable offers from private market actors.<sup>1128</sup>

Overall, accessibility to public recharging networks is guaranteed by the diverse payment options allowed, including credit card payments.<sup>1129</sup> Furthermore, the country

<sup>1121</sup> Chargy, "Legislation"

<sup>1122</sup> Official Legislative Journal of Luxembourg, "Ministerial regulation for a general plan for public infrastructure related to electric mobility", February 2021

<sup>1123</sup> Chiara Lodi *et al.* "Assessment of the Member States' Implementation Reports of the National Policy Frameworks under the Directive 2014/94/EU on the deployment of alternative fuels infrastructure", March 2021

<sup>1124</sup> Luxemborug, "Luxembourg accelerates electric mobility" Luxemborug, "Luxembourg accelerates electric mobility"

<sup>1125</sup> TRI, "The charging network will be extended to motorway service areas", August 2021

<sup>1126</sup> Chamber of workers of Luxembourg, "Infrastructure for electric vehicles recharging", December 2021

<sup>1127</sup> Engie, "ENGIE and Powerdale selected to provide Luxembourg with 800 public charging stations", August 2016

<sup>1128</sup> Trade Union of Luxembourgish cities and municipalities (SYVICOL), "AV22-08-Bill n°7876", March 2022

<sup>1129</sup> Chargy, "The Chargy network"

has a healthy competitive environment in the eMSP market segment. In fact, access to public rechargers is provided also via an RFID card named “mKaart” which can in turn be obtained by signing a contract with one of the many available private recharging service providers.<sup>1126</sup> The CPO market conditions from a competition standpoint are less evident. On the one hand, private market players such as Blue Corner (integrated CPO and eMSP) are active in the country, providing recharging stations outside of the “Chargy” network.<sup>1130</sup> On the other hand, the state-sponsored infrastructure accounts for the vast majority of installed public rechargers in Luxembourg (89%), with all stations originally assigned to the same CPO, raising questions concerning the fairness of competition during the early years of the industry (this risk has been mitigated and private operators for the network are being pursued).

Lastly, the regional distribution of EV recharging infrastructure is homogeneous in Luxembourg. Despite some areas having considerably higher than average recharging points numbers, that follows population’s density, making the median power available by municipality evenly distributed across the country.<sup>1127</sup>

The public charging network was originally developed by the state, however an initiative to privatize these stations, and to limit state control, is underway.

Several eMSPs are present in the market, ensuring openness of access.

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<sup>1130</sup> Blue Corner, “Our charging network”

## Malta

### Market overview

Malta has made significant improvements in the eMobility sector since 2016, jumping from a mere 138 EVs on the road to close to 3k, which has driven EV penetration up to close to 1%. Recharging infrastructure implementation has not grown at the same pace and the lack of recharging infrastructure is often cited as a major issue.<sup>1131</sup> In 2022, approximately 100 rechargers had been installed and, as a result, Malta has one of the worst EV to recharge point ratios (29.2) of all Member States. This number is expected to improve through the generous incentives outlined in the following section, with the Ministry of Transport planning to deploy over 1.2k recharging points in the next few years.<sup>1132</sup>

Key sector statistics	2016	2022	Country details	EU27 + UK rank
EV penetration – new sales (#)	0.0k	0.3k	<b>2k</b> BEVs	<b>13<sup>th</sup>/28</b> EVs as a % of total fleet
EV penetration – new sales (%)	0.1%	1.8%		
EV adoption – number of cars (#)	0.1k	2.9k	<b>1k</b> PHEVs	<b>28<sup>th</sup>/28</b> EVs per re-charging point
EVs as % of total fleet (%)	0.1%	0.9%		
Public recharging points (#)	0.0k	0.1k	<b>100%</b> Slow	
EVs per recharging point (#)	3.8	29.2		
			<b>0%</b> Fast	
			<b>0%</b> U-Fast	

Data from EAFO website | \*2021 data | NB: Minor rounding discrepancies | U-Fast: Ultra-Fast

### Regulatory overview

The Maltese government launched a National eMobility Plan in 2013, with the expansion of alternative fuels infrastructure noted as a key objective.<sup>1133</sup> However, historically, targets have been vague, and a more detailed implementation plan akin to other Member States was needed to accelerate the growth of the sector. Over the last 5 years, Malta has intensified its focus on EV and EV recharging regulation, promising to invest approximately €38m by 2026 towards the decarbonisation of transport through the EU's Recovery and Resiliency Funds.<sup>1134</sup> Moreover, the country committed to the EU's 2035 ICE ban, with government officials hinting at the possibility to push it forward even sooner.<sup>1135</sup> As early as 2016, incentives were already in place for both EVs (e.g., 125-150% tax deduction for company purchases, EV registration and tax benefits) and EV recharging (e.g., preferential home recharging electricity tariffs, €2k subsidy for companies interested in buying rechargers), however the recent publication of a national strategy for the provision of recharging infrastructure is expected to accelerate deployment across the island nation.

In August 2021, the National Policy for Electric Vehicles Public Infrastructure was published, aiming to establish a framework for interoperability of the network and to ensure seamless integration with the EU (by aligning with Alternative Fuels Infrastructure Directive which has been transposed into Maltese Alternative Fuels Order S.L.460.32 and the Electricity Regulations S.L. 545.34).<sup>98</sup> The National strategy consists of 18 different regulations, striving to enhance user experience by promoting openness of access and by harmonising payment methods.<sup>98</sup> Moreover, provisions concerning the electrical safety of infrastructure, pricing, metering, and data exchange have been outlined. This includes the need to provide ad hoc recharging without pre-established contracts or monthly service fees and for operators to be connected to at least one or

<sup>1131</sup> Robert Fenech, "Government's plan to get 9,000 EVs on Maltese roads has a major stumbling block: infrastructure", August 2021

<sup>1132</sup> Robert Fenech, "A look at the Government's plans to reach seemingly unattainable electric vehicle targets", June 2022

<sup>1133</sup> Malta National Electromobility Platform, "Malta National Electromobility Action Plan", November 2013

<sup>1134</sup> European Commission, "Malta's recovery and resilience plan"

<sup>1135</sup> Gwendolyn Green, "Opportunities in Malta's Emerging Electric Vehicle Infrastructure", June 2022



more eRoaming platforms (e.g., Hubject, E-clearing). However, perhaps the most impactful part of the policy is the planned liberalisation of the market, opening up to private investors. Through a liberalised market, CPOs will no longer need bilateral agreements with other operators but rather a simple authorisation from the Regulator for Energy and Water services (REWS).<sup>1136</sup>

To incentivise private market players into entering the sector, several incentives have been set up including cheaper procurement of electricity for CPOs through a regulated tariff (considered among the most competitive in Europe) and the ability to apply for a no-interest loan from the Malta Development Bank.<sup>75</sup> Moreover, businesses can receive a grant (up to €25k) to retrain personnel to be able to handle EV infrastructure and a multitude of incentives for the purchase of EVs are already in place.<sup>1137</sup>

Major policies and incentives	Description
National policy for electric vehicle public recharging infrastructure <sup>98</sup>	Liberalises the public recharging sector and regulates the future development of the industry by aligning national plans with Directive 94/2014/EU
Publicly Accessible Electric Vehicle Recharging Infrastructure Regulations, 2022 (LN 226 of 2022) <sup>1138</sup>	Made up of 18 different regulations, this document provides a holistic framework for the operation of public rechargers in Malta. Includes technical requirements, need to obtain authorisation from REWS, communication standards, minimum performance requirements, etc.
CPO authorisation form <sup>1133</sup>	REWS application for the granting, renewal, or transfer of an authorisation to act as an operator of public recharging infrastructure
EV tax benefits <sup>76</sup>	Minimum rate purchase tax, and minimum ownership road tax
Regulated electricity tariffs for CPOs <sup>1139</sup>	Cheaper electricity for EVs through a regulated tariff. Operators profit from recharging a premium fee on top of the fixed rate they pay to Enemalta (sole DSO)

### Competitive dynamics

The EV recharging industry in Malta is undergoing unprecedented change, with new laws and regulations designed to stimulate private investment. Specifically, a competitive and open market is being designed through minimum requirements for CPOs and eMSPs in line with EU guidance (e.g., price transparency, ability for consumers to switch providers, ad hoc recharging and roaming capabilities, etc.). However, since the legislation was recently enacted, the recharging network is still largely made up of government installations. While this is expected to change in the coming years, and regulation has been drafted to promote competition, a few potential concerns may materialise. For starters, the regulator has not specified whether the unit price of electricity will be consistent across all CPOs, or if government owned recharge points will receive preferential rates (as seen in the past).<sup>1140</sup> To incentivise private investment, it is imperative that the electricity price is consistent to ensure an equal playing field in the market. Likewise, the premium on top of the regulated tariff used by the government should be in line with private player tariffs to ensure they can compete with the public sector (especially during the initial years when the government will retain a leading position in the segment).

<sup>1136</sup> Regulator for Energy and Water Services, "Application for the Granting, Renewal or Transfer of an Authorisation to act as an operator of publicly accessible charging infrastructure", September 2022

<sup>1137</sup> European Alternative Fuels Observatory, "Statistics on infrastructure and fleet data for road vehicles: Malta incentives & legislation", October 2022

<sup>1138</sup> Government Gazette of Malta, "Electric Vehicle Charging Infrastructure Regulations", September 2022

<sup>1139</sup> Enemalta, "Charging of EV and Tariffs"

<sup>1140</sup> Malta Chamber of Small Medium Enterprises, "National Policy for Electric Vehicle Public Charging Infrastructure Position Paper", October 2021



According to the national policy for EV public recharging infrastructure, the distribution of recharge points will be defined through a spatial zoning assessment. This exercise will leverage local demographics (e.g., population density, number of registered EVs, etc.) to assign a certain number of recharge points to various zones in the country. While this approach will enable Malta to develop a well distributed network and to avoid recharging deserts, it may also lead to first movers like the government controlling the most lucrative locations thus discouraging new entrants into the market.<sup>1141</sup> From the eMSP point of view (who tends to be the same entity as the CPO for private players), the proposed regulation requires an interoperable platform supporting an Open Charge Point Protocol, thus being well set up to promote healthy competition within the sector.<sup>1135</sup> Presently, the main eMSP player remains Charge My Ride (pure play), who is the partner of the government operated recharging pillars.<sup>1142</sup> Lastly, the geographic nature of Malta (i.e., it being a small island) makes it prone to the birth of natural monopolies.

Currently public charging is dominated by government installations; however, the liberalisation of the sector is expected to bring in significant private investment.

As the distribution of recharge points is being defined through a spatial zoning assessment, the most lucrative locations may be controlled by first movers.

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<sup>1141</sup> Jessica Arena, "Electric car charging infrastructure to open up to the private sector", September 2022

<sup>1142</sup> Charge my Ride, "Home"

## Netherlands

### Market overview

Netherlands is a leading nation in terms of EV infrastructure development, with the highest number of public rechargers per capita and per square kilometre in the world.<sup>1143</sup> Having grown the number of EVs from 109k to 410.8k since 2016, Netherlands now boasts a strong 4.4% EV penetration in the overall fleet, sitting amongst the market leading Member States. Netherlands has also maintained growth of recharging infrastructure over this time, with the number of chargers growing from 25.7k to 100.1k. As a result, Netherlands number of EVs per recharge point has actually fallen from 4.2 to 4.1.<sup>1144</sup>

Key sector statistics	2016	2022	Country details	EU27 + UK rank
EV penetration – new sales (#)	22.8k	95.5k*	<b>262k</b> BEVs	<b>3<sup>rd</sup>/28</b> EVs as a % of total fleet
EV penetration – new sales (%)	6.0%	23.0%	<b>149k</b> PHEVs	
EV adoption – number of cars (#)	109.0k	410.8k		
EVs as % of total fleet (%)	1.3%	4.4%		
Public recharging points (#)	25.7k	100.1k	<b>95%</b> Slow	<b>5<sup>th</sup>/28</b> EVs per re-charging point
EVs per recharging point (#)	4.2	4.1	<b>3%</b> Fast	
			<b>2%</b> U-Fast	

Data from EAFO website | \*2021 data | NB: Minor rounding discrepancies | U-Fast: Ultra-Fast

### Regulatory overview

The Dutch rollout of EV recharging infrastructure is led by local municipalities and specific regions with the support of a nationally focused eMobility framework. Municipalities hold area-wide tenders where CPOs bid for the right to own, operate, and manage a wide array of rechargers within a specific area. The approach enables CPOs to operate in high demand locations which ensures profitable business models and minimises the need for subsidies.<sup>1140</sup> Since 2021, municipalities are required to develop a public recharging infrastructure strategy and must update their placement policy every two years. Additionally, EV users can request a public recharger online, enabling CPOs and municipalities to strategically expand the recharging infrastructure, resulting in high utilisation rates and healthy economics.<sup>79</sup> The latter approach has been more effective compared to deployment of rechargers in strategic locations defined without consumer inputs, highlighting the importance of a strategic and collaborative approach between service providers and end-users.<sup>1140</sup>

Conversely, the focus of the national government is to design effective frameworks and regulations that foster the overall development of eMobility across the country. This includes a favourable environment for private investment, interoperability for consumers and collaboration between key stakeholders led by the NKL. The NKL has been pivotal in shaping effective national recharging infrastructure and has developed a cohesive vision until 2030 which aims to: (1) deliver smart recharging, (2) price transparency, (3) open protocols, and (4) pathways for markets and innovation.<sup>79</sup> The government also facilitates EV market growth through a range of tax and purchase subsidy benefits. For example, since 2020 a purchase subsidy has been available for private EV customers worth €2k for used cars and €4k for new cars.<sup>1145</sup>

<sup>1143</sup> Guidehouse, “Lessons from the Dutch EV charging approach”, November 2021

<sup>1144</sup> European Alternative Fuels Observatory, “Statistics on infrastructure and fleet data for road vehicles: Netherlands summary”, October 2022

<sup>1145</sup> European Alternative Fuels Observatory, “Statistics on infrastructure and fleet data for road vehicles: Netherlands incentives & legislation”, October 2022

Government regulation and subsidies have been pivotal in shaping the leading EU-wide public recharging network. Overall, the allocated capital towards infrastructure development has already surpassed the €35m mark (since 2017) which largely explains the high recharge point to population metric (approximately 575/100k people).<sup>1146</sup> Additionally, a positive effect on recharging infrastructure development is created through the free of recharge installation policy. Under this regulation, residents of most municipalities (e.g., Amsterdam, Rotterdam, The Hague etc.) can request a free recharge point installation which enables the recharging infrastructure to keep pace with the EV adoption level. Finally, EV drivers who have a recharging card can access the public recharging stations for free and have to only pay for the consumed energy.

Given the successful and rapid development of the Dutch eMobility sector, the Netherlands has also become a global leader in technical standardisation and interoperability. This has been largely facilitated by the ElaadNL which monitors EV recharging infrastructure, ensures its connection with the electricity grid and ensures it can support smart recharging.<sup>1147</sup> ElaadNL was also a co-investor in the development of the Open Charge Point Protocol (OCPP), which outlines how communication should take place between the electric car recharge point and the back-office system and is now globally adopted.<sup>74</sup> Meanwhile, the eViolin partnership, a Dutch association of CPOs, allows recharging at any public recharge point in the Netherlands with a single recharging pass.<sup>74,79</sup> Netherlands also provides State aid for EV recharging via different measures implemented as per the GBER article 36.a which are discussed in Appendix D.

Major policies and incentives	Description
National Recharging Infrastructure Agenda <sup>79</sup>	Set of agreements between the various stakeholders forming a multi-year policy program (focus on high coverage, data-driven and accessible network & open and price-transparent <sup>1148</sup> market)
Uniform standards for recharging stations <sup>1149</sup>	NKL has developed a set of guidelines which details practical guidelines relating to hardware, software and data
Vision and policy guide - NKL <sup>79</sup>	Guidance for municipalities to shape effective policy
Infrastructure development <sup>1150</sup>	€5.7m & €30m investment plans to facilitate public recharging station development
Public recharging schemes <sup>1151</sup>	Free public recharge points installation and no infrastructure-use cost
EV purchase incentives and tax benefits <sup>76</sup>	Variable 'case-by-case' purchase incentives for EVs as well as a full exemption from new car purchase taxes, and full exemption from ownership road tax
Reduced energy tax rate <sup>74</sup>	Reduced energy tax rate for electricity in public recharging stations (2017-2020)
EIB loans <sup>61</sup>	€40m to projects supporting the rollout of EV recharging infrastructure
CEF grants <sup>57</sup>	€18m for project supporting the rollout of EV recharging infrastructure

<sup>1146</sup> Ministry of Economic Affairs of the Netherlands, "Vision on the charging infrastructure for electric transport", April 2017

<sup>1147</sup> ElaadNL, "About us"

<sup>1148</sup> ECISS, "Price Transparency", June 2020

<sup>1149</sup> NKL, "Uniform standards for charging stations", April 2018

<sup>1150</sup> Archyde, "The Dutch government is investing 30 million euros in installing many extra charging stations" – IT Pro – News, July 2020

<sup>1151</sup> Archyde, "The Dutch government is investing 30 million euros in installing many extra charging stations" – IT Pro – News, July 2020

<sup>1151</sup> Wallbox, "Everything You Need To Know About EV Incentives In The Netherlands"

### Competitive dynamics

The recharging market landscape in Netherlands is characterised as healthy and competitive given the evolved state of the eMobility sector across the country. The Dutch CPO market is highly competitive with companies bidding for tenders across cities, municipalities, and provinces. Notable major CPOs include Allego (pure play), GreenFlux (pure play), Last Mile Solutions (pure play), Fast Ned (pure play), Shell (O&G) and Vattenfall (utility) with many other operating throughout the country. It should also be noted that DSOs are not allowed to operate recharge points in the Netherlands.<sup>1152</sup>

The eMSP space is also competitive with a number of other pure plays – PowerD, Longship, Maxem, TandemDrive, XXImo – all operating within the same field. This competitiveness is facilitated by the open market which allows knowledge sharing between public and private stakeholders to form optimal market structures, policy, and regulation. The competitive and commercially oriented approach means that EV infrastructure has grown sufficiently to keep up with EV growth, requiring very limited government funding or market intervention and, hence, avoiding potential state aid concerns. The open market structure will continue to be a cornerstone to the overall market development. In the near to medium term, the Netherlands plan to develop a new ISO and smart recharging protocols, allowing interoperability from a technical perspective.<sup>1153</sup> Additionally, open access to dynamic data, price transparency and sustained open market structure form the further set of goals envisioned under by the National Recharging Infrastructure Agenda.

The EV charging industry is highly developed with healthy competition and is based on open market, smart charging, and interoperability principles.

Overarching regulatory framework is focused on knowledge sharing and collaboration between the government, municipalities, and service providers (CPOs & eMSPs) to develop a functional, accessible and consumer-supportive charging network.

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<sup>1152</sup> European Regional Development Fund, Emobility, “Report on EV charging pricing, regulatory framework and DSO role in the e-mobility development”, August 2021

<sup>1153</sup> Netherlands Enterprise Agency, “Mission Zero Powered by Holland”, May 2019

## Poland

### Market overview

Poland has a relatively underdeveloped EV market, ranking second to last across the EU27 + UK in terms of EVs as a percent of the total fleet.<sup>1154</sup> This limited EV fleet and recharging infrastructure growth is partially due to a lack of direction and funding from the federal government, complemented by a struggling utility industry. In 2016, only 0.8k EVs were driving on Polish roads, quickly rising to approximately 34k in 2022.<sup>1155</sup> This jump was associated with one of the highest CAGR in the sector across the EU, however this was largely skewed by a very small initial number of EVs.<sup>1152</sup> Likewise, EV infrastructure remains behind comparable EU markets, with less than 3k rechargers installed as of October 2022 for a country with a population approaching 38m people.<sup>1152</sup> This small number of chargers added has also resulted in the number of EVs per recharge point rising from 2.4 to 12.2 since 2016.

Key sector statistics	2016	2022	Country details	EU27 + UK rank
EV penetration – new sales (#)	0.3k	16.3k*	<b>16k</b> BEVs	<b>27<sup>th</sup>/28</b> EVs as a % of total fleet
EV penetration – new sales (%)	0.1%	5.4%	<b>18k</b> PHEVs	
EV adoption – number of cars (#)	0.8k	34.2k		<b>17<sup>th</sup>/28</b> EVs per re-charging point
EVs as % of total fleet (%)	0.0%	0.1%	<b>67%</b> <b>30%</b> <b>3%</b> Slow Fast U-Fast	
Public recharging points (#)	0.3k	2.8k		
EVs per recharging point (#)	2.4	12.2		

Data from EAFO website | \*2021 data | NB: Minor rounding discrepancies | U-Fast: Ultra-Fast

### Regulatory overview

The journey of EV regulation in Poland has been rocky and fragmented. In 2016, the government released an Electromobility Development Plan which set out a high-level framework for the transition of the transport sector to eMobility.<sup>1156</sup> The act outlined a plan to reach 1.0m EVs in Poland by 2025, seen by many as an overly ambitious vision considering that at the time there were less than 1k EVs in operation in the country. Moreover, in 2018 Polish authorities adopted the Act of 11 January 2018 on Electromobility and Alternative Fuels, transposing Directive 2014/94/EU of the European Parliament on the deployment of alternative fuels infrastructure. This was the first binding legislation regulating the sector, outlining minimal technical requirements and standards to align with the rest of EU Member States.<sup>1157</sup> Furthermore, this framework outlined some high-level targets for the sector, including a goal of 6.4k recharging stations, with a minimum of 400 fast rechargers, by 2020 (this was not met, with approximately 3k rechargers installed as of October 2022).<sup>1158</sup> This act was amended in 2021, bringing in additional focus on recharging infrastructure by facilitating the installation of rechargers in multi-family buildings, implementing Clean Transport Zones, and accelerating the installation of fast recharging stations.<sup>1159</sup>

No significant financial support was provided to achieve the targets of the Act on Electromobility and Alternative Fuels until 2021, when the Polish government started offering incentives to adopt EVs and EV recharging infrastructure via the Electromobility

<sup>1154</sup> European Alternative Fuels Observatory, "Statistics on infrastructure and fleet data for road vehicles: Poland summary", October 2022

<sup>1155</sup> European Alternative Fuels Observatory, "Statistics on infrastructure and fleet data for road vehicles: Poland summary", October 2022

<sup>1156</sup> Biznes Polska, "Poland's Stunning Electromobility Plans"

<sup>1157</sup> CSM, "Electric vehicle regulation and law in Poland"

<sup>1158</sup> Electric Vehicles Promotion Foundation, "AAQD Directive Revision Proposal", October 2022

<sup>1159</sup> PSPA, "Poland Drives eMobility", September 2022

financial support system.<sup>1156</sup> The government allocated €180.6m (870m PNL) for recharging station project incentives and an extra €210.0m (1.0b PNL) for other EV recharging infrastructure incentives.<sup>1160</sup> With these funds, Polish authorities anticipate the construction of over 17k recharging stations (though no development timeline has been agreed).<sup>1157</sup> These subsidies will be awarded to local governments, entrepreneurs, cooperatives, and housing communities.<sup>1157</sup> EV vehicle subsidies for consumers are also available with anywhere between €830.4 and €1.26k (4.0k and 6.0k PNL) awarded by the government depending on the make of the vehicle.<sup>1161</sup> Applications for funding will be verified in a non-discriminatory and transparent manner, the maximum aid to a single company is limited, and a significant part of the budget will be allocated to small and medium beneficiaries.<sup>1162</sup> Poland also provides State aid for EV recharging via its Aid for the green transformation of cities under the National Recovery and Resilience Plan implemented as per the GBER article 36.a which are discussed in Appendix D.<sup>1163</sup> Overall, the Polish government is still missing a comprehensive strategy and detailed regulation in the deployment of EV vehicles and EV recharging stations. Polish federal government subsidies are a good first step in the adoption of EVs and EV recharging stations, but further guidelines and strategy will be required to achieve the projected growth.

Major policies incentives	Description
National framework for alternative fuels infrastructure development policy (adopted in 2017) <sup>1154</sup>	Implemented EU regulations into the Polish legal order (Directive 2014/94/EU). It provides minimal standards for the sector and outlines some privileges for EV drivers, including an exemption from excise duty, tax privileges, reserved parking, use of bus lanes, and more
Act on eMobility and Alternative Fuels (adopted in 2018) <sup>1162</sup>	It creates a comprehensive legal framework by stimulating the development of eMobility and promoting the use of alternative fuels in the transport sector in Poland. This is also known as Poland's eMobility law
eMobility financial support System (adopted in 2021) <sup>1156</sup>	Creates financing instruments for the development of eMobility, introducing subsidies for the electric cars and recharging infrastructure (details below)
EV recharging incentives <sup>1157, 1156</sup>	Federal government has allocated nearly €420.0m (2b PNL) to recharge point construction incentives, which can be applied for by local governments, entrepreneurs, housing communities, and other communities
Support for EV recharging infrastructure <sup>1157</sup>	Up to 25% of eligible costs for 22 kW, 30% from 50 kW to 150 kW and 50% for more than 150 kW
EV purchase incentives and tax benefits <sup>76</sup>	Up to PLN 27k (€5.8k) as a purchase incentive towards a BEV, and exemption from registration taxes and a reduced ownership road tax rate
EIB loans <sup>61</sup>	€13m to projects supporting the rollout of EV recharging infrastructure
CEF grants <sup>57</sup>	€11m to projects supporting the rollout of EV recharging infrastructure

### Competitive dynamics

Competition is reasonably healthy, despite the nascent nature of the Polish EV recharging market. In terms of CPOs, in 2021 the Orlen (a major oil refiner and fuel retailer) and Energa's (focused on generation and distribution of electricity) partnership

<sup>1160</sup> Tax Knowledge Management Team, "Tax Alert: Support for the electric vehicle charging and hydrogen refueling infrastructure"

<sup>1161</sup> Clean Technica, "Poland's EV Market Is Quickly Catching Up With The Rest Of Europe", February 2022

<sup>1162</sup> European Commission, "State aid: Commission approves €173 million aid scheme for charging and refuelling stations for zero and low emission vehicles in Poland", October 2021

<sup>1163</sup> European Commission, "Aid for the green transformation of cities under the National Recovery and Resilience Plan", November 2022

accounted for the largest network with 763 recharging points installed (close to 30% share).<sup>1164</sup> The second largest player was Enea, another major energy company in Poland, with 441 recharging points. Elocity, a specialised EV corporation, also boasted an extensive network in 2021 with 349 rechargers. Greenway's (pure play) participation in the sector has also been crucial, being the major CPO in Poland until 2020 partially by leveraging a €3.5m European Commission grant in 2016 and a €17m investment from the EIB in 2019.<sup>1165</sup> Other important players to consider include the remaining major energy companies (e.g., Tauron, PGE, innogy) who together have deployed over 400 recharging points. Smaller pure play CPOs are also present in the market, including Revnet, EV+, Lotos, GO+, and many more.<sup>1161</sup> Unlike its neighbours, Poland instead sees little influence from the EV megalith Tesla (OEM) with only 7 superchargers in the country as of September 2022.<sup>1166</sup>

It is important to note that the most prevalent model for CPOs and eMSPs in Poland is a highly integrated one, meaning that the CPO often acts as the eMSP. For example, Orlen, Tauron, and Greenway all act as the eMSP for their recharge points and require customers to download an app to access their services.<sup>1167</sup> However, Greenway also offers a roaming service in 25 different European countries so that for a fee, customers can access recharging stations from other networks.<sup>1164</sup> Without paying this fee, customers must use multiple apps and accounts for the wide variety of competitors in the EV recharging market. Overall, competition in the Polish EV market is strong, with consumers enjoying a wide array of choices for both CPOs and eMSPs.

There are a wide variety of players in the market, ranging from major energy companies' subsidiaries to pure plays, with no CPO gathering more than a 30% share.

Greenway got an early start against the competition and received support from the EC and the EIB to kick start its deployment of chargers. This does not seem to have generated crowding-out effects as other competitors have now surpassed it.

<sup>1164</sup> Statista, "Number of e-car charging points in Poland from 2019 to 2021, by operators of electric car charging stations", July 2022

<sup>1165</sup> Aleksandra Lis, Rafał Szymanowski, "Greening Polish transportation? Untangling the nexus between electric mobility and a carbon-based regime", January 2022

<sup>1166</sup> Statista, "Number of e-car charging points in Poland in 2020, by operators and type of charging", July 2022

<sup>1167</sup> Zachary Shahan, "GreenWay Reaches 100 EV Fast Rechargers In Poland!", June 2019



## Portugal

### Market overview

Portugal's EV market is rapidly developing and the country has one of the highest EV sales penetration rates with new sales in 2022 making up 22.4% of overall car sales.<sup>1168</sup> High sales have driven the number of EV up to approximately 101k in 2022, a marked increase on the 4.2k on the road in 2016. Recharging infrastructure has also grown to 5.6k chargers in 2022 but has not kept pace with the rapid adoption of EVs, and therefore the number of EVs per recharge point has risen to 18 – this places Portugal among the lowest in terms of EVs per recharge point.<sup>1169</sup>

Key sector statistics	2016	2022	Country details	EU27 + UK rank
EV penetration – new sales (#)	1.8k	29.0k*	<b>54k</b> BEVs	<b>11<sup>th</sup>/28</b> EVs as a % of total fleet
EV penetration – new sales (%)	0.9%	22.4%	<b>47k</b> PHEVs	
EV adoption – number of cars (#)	4.2k	101.2k		
EVs as % of total fleet (%)	0.1%	1.7%		
Public recharging points (#)	1.3k	5.6k	<b>65%</b> <b>31%</b> <b>4%</b> Slow Fast U-Fast	<b>24<sup>th</sup>/28</b> EVs per re-charging point
EVs per recharging point (#)	3.2	18.0		

Data from EAFO website | \*2021 data | NB: Minor rounding discrepancies | U-Fast: Ultra-Fast

### Regulatory overview

Portugal's EV recharging market is strictly regulated and centrally steered by the state. Not only public licenses are required for the provision of both CPO and eMSP services, but the country is an exception in Europe with a centralised entity managing a national EV recharging network. The first relevant piece of legislation was passed in 2009, when the federal government approved the 'Resolution of Council of Ministers no. 20/2009' that outlined the programme for electric mobility in Portugal.<sup>1170</sup> Within this legal framework, the Decree-Law no. 39/2010 outlines the main principles for eMobility activities such as the standards of EV recharging infrastructure installation, and the provision of electric supply to EV rechargers.<sup>1167</sup> Further legislation, passed in 2015 and 2016, uses a framework for pricing tariffs, implementing infrastructure and equipment, and rules for installations of EVs in buildings.<sup>1167</sup> In addition, Portugal introduced three different EV public recharging point targets in its NIR under Directive 2014/94/EU, namely 2.2k recharging points installed by 2020, 15k by 2025, and 36k by 2030.<sup>1171</sup>

In Portugal all rechargers must be included in the National Electric Mobility Network. The network allows EV drivers to access any recharging point, regardless of the CPO, given the driver has a valid contract with any of the present eMSPs.<sup>1172</sup> The National Network is managed by the public company MOBI.E, which operates as Electric Mobility Network Managing Entity (EGME) monitoring the network's energy and financial flows.<sup>1173</sup> The CPO market in Portugal is regulated by the aforementioned Decree Law 39/2010, which states that private actors, assuming they satisfy a series of technical requirements, need a license to enter the market.<sup>1174</sup> CPO licenses last for 10 years and can be renewed or extended; however public authorities can issue public tenders for

<sup>1168</sup> European Alternative Fuels Observatory, "Statistics on infrastructure and fleet data for road vehicles: Portugal summary", October 2022

<sup>1169</sup> Ibid.

<sup>1170</sup> CSM, "Electric Vehicle Regulation and Law in Portugal"

<sup>1171</sup> Chiara Lodi *et al.* "Assessment of the Member States' Implementation Reports of the National Policy Frameworks under the Directive 2014/94/EU on the deployment of alternative fuels infrastructure", March 2021

<sup>1172</sup> MOBI.E, "An Universal Network"

<sup>1173</sup> MOBI.E, "Our Values"

<sup>1174</sup> Ministry of the Environment, Territory and Energy of Portugal, "Decree Law n. 39 2010", June 2014

new licenses if the CPO in place is not providing a satisfactory service.<sup>1171</sup> Companies can however apply for CPO licenses through the Directorate-General of Energy and Geology, and need to satisfy a series of technical, legal, and organisational requirements, as defined by Ordinance 241/2015.<sup>1175</sup> In a similar way, eMSPs are regulated in Portugal, their activity includes the bulk purchase of electricity which is then sold to EV drivers.<sup>1176</sup> In order to obtain the license to operate as an eMSP, firms need to already hold a CPO license and abide by the standards defined in Technical Regulation 2/MOBI.E/2020.<sup>1173</sup>

The Portuguese government does not provide either fiscal or financial incentives for the installation of EV recharging stations. Rather, the government has focused on the direct development of a public recharging network through MOBI.E,<sup>1177</sup> realising the goals of the country's Program for Electric Mobility.<sup>1178</sup> According to Resolution of the Council of Ministers 49/2016, MOBI.E had to follow a two-phase chargers deployment plan, with 1.2k recharging points distributed over 76 municipalities in the first phase, followed by further 400 points in the second one to cover the remaining municipalities.<sup>1175</sup> The Portuguese government provides cash incentives for EV purchasing, €3k for PHEV (for cars with prices up to €62.5k<sup>1179</sup>) and €6k for BEV.<sup>1174</sup>

Major policies and incentives	Description
Decree Law 39/1020 <sup>1171</sup>	Regulated EV recharging market introducing licenses for CPOs and eMSPs
Resolution of the Council of Ministers 49/2016 <sup>1175</sup>	Established the plan for the rollout of public recharging points to be conducted by MOBI.E. The goal was to install 1.6k recharging points covering all municipalities in the country
EV purchase incentives and tax benefits <sup>76</sup>	Up to €3k purchase incentive towards a BEV, as well as exemption from registration tax and ownership road tax for BEVs (less generous for PHEVs)
EIB loans <sup>61</sup>	€64m to projects supporting the rollout of EV recharging infrastructure
CEF grants <sup>57</sup>	€13m to projects supporting the rollout of EV recharging infrastructure

### Competitive dynamics

Despite the central role played by the state in developing the EV recharging market, a plethora of private market players are active both in the CPO and eMSP segments in Portugal.

As mentioned above, MOBI.E was mandated by the Council of Ministers with the installation and operation of approximately 1.6k public recharging points across all Portugal's municipalities.<sup>1175</sup> Despite its early commitment and active provision of both CPO and eMSP services,<sup>1169</sup> the public company did not acquire a leading position in the sector. In fact, MOBI.E operates only a limited share of the approximately 5.6k public recharging points across Portugal.<sup>1180</sup> The remaining rechargers within the National Electric Mobility Network,<sup>1181</sup> are operated by one of the 76 licensed CPOs.<sup>1182</sup> On top of market fragmentation, diversity among market players is also noticeable in the country.

<sup>1175</sup> MOBI.E, "How to be a Charge Point Operator"

<sup>1176</sup> MOBI.E, "Do you want to be an Electric Mobility Supplier?"

<sup>1177</sup> Wallbox, "How To Save Money When Buying an EV In Portugal"

<sup>1178</sup> Portuguese Legislative Gazette, "Resolution of the Council of Ministers number 49/2016", September 2016

<sup>1179</sup> European Alternative Fuels Observatory, "Statistics on infrastructure and fleet data for road vehicles: Portugal incentives & legislation", October 2022

<sup>1180</sup> MOBI.E, "Frequently Asked Questions"

<sup>1181</sup> MOBI.E, "Finding a charging point"

<sup>1182</sup> MOBI.E, "List of Suppliers and Operators"

In fact, both pure plays as well as major utility (e.g., Engie) and oil and gas firms (like Repsol) are active in the Portuguese EV recharging market. Similarly, while some firms specialise on the provision of specific CPO services (Power Dot concentrates for instance on destination recharging<sup>1183</sup>), other players cover instead more areas, from on-street recharging to on-route (e.g., Iberdrola<sup>1184</sup>). Alternatives to the public recharging network are limited, consisting mainly in the Tesla Supercharger and destination offering,<sup>1185</sup> as well as the private network offered by Chargesurfing (pure play).<sup>1186</sup>

While similar in terms of market fragmentation, the eMSP market segment is different from the CPO when it comes to overall level of competition. In fact, despite the market being divided between 23 registered eMSP service providers,<sup>1179</sup> Portugal's regulation only allows CPOs to apply for eMSP licenses, allowing only firms with an integrated business model to enter the market.<sup>1173</sup> As a result, market access might be limited to independent eMSP players.

The Portuguese market is fully regulated, with public licenses required for the provision of both CPO and eMSP services.

Despite the public firm MOBI.E being initially involved in the development of public recharging, the company did not retain a majority share position, with both CPO and eMSP segments being fragmented.

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<sup>1183</sup> Power Dot, "Pan European EV charging network"

<sup>1184</sup> Iberdrola, "Electric vehicle charging stations, keys to the future of sustainable mobility"

<sup>1185</sup> Tesla Club Portugal, "In Portugal you can charge the car using the Mobi.e network, the Tesla Destination recharger network and the Supercharger network."

<sup>1186</sup> Chargesurfing, "Your path to electric mobility!"

## Romania

### Market overview

Despite a slower diffusion than in other European countries, EV deployment is quickly gaining pace in Romania. While in 2016 the country had approximately 300 EVs, their number has grown by a factor of ten, to reach 20k EVs in 2022.<sup>1187</sup> More noticeably, EV market penetration is on the rise, with BEV's share of total new vehicle registrations having ballooned from 0.03% in 2015 to 6.1% in 2022, while the rate of PHEVs went from 0.05% to 3.68% over the same period.<sup>1188</sup> Recharging infrastructure deployment however has not progressed at the same rate with just over 1.5k public recharging points available, the country is among the worst performers in Europe in terms of rechargers per 100 km.<sup>1189</sup> This has also resulted in Romania's EVs to recharge point ratio (13) now surpassing the EU recommended level of 10.

Key sector statistics	2016	2022	Country details	EU27 + UK rank
EV penetration – new sales (#)	0.2k	9.4k*	<b>14k</b> BEVs	<b>20<sup>th</sup>/28</b> EVs as a % of total fleet
EV penetration – new sales (%)	0.2%	9.8%	<b>6k</b> PHEVs	
EV adoption – number of cars (#)	0.3k	19.8k		<b>18<sup>th</sup>/28</b> EVs per re-charging point
EVs as % of total fleet (%)	0.0%	0.3%	<b>64%</b> <b>33%</b> <b>3%</b> Slow Fast U-Fast	
Public recharging points (#)	0.1k	1.5k		
EVs per recharging point (#)	4.9	13.0		

Data from EAFO website | \*2021 data | NB: Minor rounding discrepancies | U-Fast: Ultra-Fast

### Regulatory overview

In its NPF submitted with reference to Directive 2014/94/EU, Romania set the target of reaching 292 installed public EV recharging points by 2020, and to then grow to 362 by 2030.<sup>1190</sup> Both objectives have been achieved ahead of schedule, the first by 2018 and the second two years later.<sup>1191</sup>

To support the deployment of EV recharging infrastructure, the Romanian government has implemented two consecutive programmes. After a first support scheme provided by the Romanian Environment Fund Administration stirred limited interest, due to the cap on aid posed at €200k per project,<sup>1192</sup> a further initiative was passed. Specifically, in 2020 the government launched a support scheme which uses public tenders to allocate a total of €53m to projects aimed at developing public EV rechargers in urban, suburban, and rural areas until 2025.<sup>1193</sup> The scheme builds upon a similar programme launched in 2018 as part of Romania's NPF, which provides grants for the deployment of recharging stations in major cities (with more than 50k inhabitants).<sup>1194</sup> Grants' size depends on recharging stations' capacity, €2.5k are provided for capacities below 22kW while above that threshold grants can go up to €30k.<sup>1195</sup> The programme was launched in 2020 by the Romanian Environmental Fund Administration and is partially funded via

<sup>1187</sup> European Alternative Fuels Observatory, "Statistics on infrastructure and fleet data for road vehicles: Romania summary", October 2022

<sup>1188</sup> Ibid.

<sup>1189</sup> Acea, "Electric cars: 10 EU countries do not have a single charging point per 100km of road", September 2021

<sup>1190</sup> European Alternative Fuels Observatory, "Statistics on infrastructure and fleet data for road vehicles: Romania target tracker", October 2022

<sup>1191</sup> European Alternative Fuels Observatory, "Statistics on infrastructure and fleet data for road vehicles: Romania summary", October 2022

<sup>1192</sup> Romania Insider, "Romanian Govt. to pay subsidies for e-vehicle charging stations", June 2019

<sup>1193</sup> Foo Chee, "EU approves Romanian plan to support EV charging stations", February 2020

<sup>1194</sup> Chiara Lodi *et al.* "Assessment of the Member States' Implementation Reports of the National Policy Frameworks under the Directive 2014/94/EU on the deployment of alternative fuels infrastructure", March 2021

<sup>1195</sup> European Alternative Fuels Observatory, "Statistics on infrastructure and fleet data for road vehicles: Romania incentives & legislation", October 2022

Interreg Europe under the e-MOPLI initiative that covers up to 80% of total costs per project.<sup>1196</sup>

Romanian authorities also provide grants for the purchase of EVs. In particular, the “Rabla Plus” programme offers among the highest subsidies for EV purchase in Europe with €11.5k for BEVs and €6.4k for PHEVs.<sup>1197</sup> The programme was first launched in 2017 and the Romanian government have confirmed it will still be in place through to 2024.<sup>1198</sup> The scheme also covers a zero-ownership road tax benefit.<sup>76</sup> Romania also provides State aid for EV recharging via its Local Fund - promotion of recharging infrastructure for electric vehicles under the National Recovery and Resilience Plan implemented as per the GBER article 36.a which are discussed in Appendix D.<sup>1199</sup>

Major policies and incentives	Description
Environment Fund Administration support scheme <sup>1189</sup>	Grants up to €200k per project, provided to EV recharger development initiatives
EV recharger subsidy <sup>1194, 1192</sup>	Grants for recharging installations, provided via public tender. Refund of €2.5k per recharging station with capacity below 22 kW and €30k for capacity above 22 kW
e-MOPLI project <sup>1193</sup>	Grants for EV recharging stations in main cities funded by Interreg Europe
EV purchase incentives and tax benefits <sup>76</sup>	Up to €11.5k for BEVs and €6.4k for PHEVs as well as a full exemption on ownership road tax for BEVs
CEF grants <sup>57</sup>	€11m to projects supporting the rollout of EV recharging infrastructure

### Competitive dynamics

Until a few years ago, the main driver behind the deployment of public EV recharging infrastructure in Romania were firms from the retail and hospitality sectors (i.e., destination recharging locations).<sup>1200</sup> While these actors still play a central role in recharger installations, in large part through partnerships with recharger manufacturers and CPOs,<sup>1201</sup> private actors focusing only on the recharging market are becoming increasingly relevant.<sup>1198</sup> As a matter of fact, both the CPO and the eMSP market segments see several active market players, signalling a condition of healthy competition. Firstly, specific projects have received support from EU institutions, namely within the CEF, Molgroup (O&G) and E.ON (utility) were selected to install and operate 40 fast recharging points in total.<sup>1045</sup> This being said, the largest CPO Renovatio (pure play), which operates twice as many recharging stations than its closest rival shows that the market remains largely fragmented and competitive.<sup>1198</sup>

Integrated firms providing both CPO and eMSP services appear to be the predominant business model in the country, inclusive of key pure play market actors such as: Renovatio, Enel X, EV Connect, EV-mag and Polyfazer. Some firms cover the entire value chain, from energy distribution, to recharger manufacturing to CPO and eMSP services, as can be seen in the case of E.ON that controls 17% of the electricity grid market in the country,<sup>1202</sup> or PlugPoint which is also a leading recharge point hardware manufacturer. Nonetheless, players focusing on specific market segments are also

<sup>1196</sup> Stelian Cîrnat, “Romania provides funds for the development of the electric vehicle charging network”, July 2020

<sup>1197</sup> Marius Tudor, “The e-car scenario in Romania”, October 2019

<sup>1198</sup> Economedica.ro, “The Government will launch the “Rabla Classic” and “Rabla Plus” programmes on 4 February”, January 2022

<sup>1199</sup> European Commission, “Competition Policy State Aid Register: State aid scheme “Support granted for the implementation of the Recovery and Resilience Plan within the Recovery and Resilience Mechanism - PNRR/2022/C10-Local Fund - promotion of recharging infrastructure for electric vehicles”, November 2022

<sup>1200</sup> Lidia Neagu, “What does the electric car market look like in Romania: what models are there and how many charging stations are available – analysis”, April 2020

<sup>1201</sup> Crina Dobarcean, “PlugShare study: What charging prices do the main players on the EV market in Romania practice?”, April 2022

<sup>1202</sup> E.ON, “Facts & Figures 2021”

present in the country. For instance, in installing fast and ultra-fast recharging stations as part of the European TEN-T transport network, Renovatio agreed to have Hrvatski Telekom providing eMSP services.<sup>1203</sup> Similarly, in developing a network of fast-recharging points in its filling stations, OMV Petrol partnered with Eldrive (pure play) as a CPO.<sup>1204</sup> Pure plays like Virta and eMSP firm Monta are also active in the Romanian market.<sup>1205</sup>

Overall, the Romanian market has healthy levels of competition both in the CPO and eMSP segments, especially considering its relatively small size. Nevertheless, while there is so far limited evidence of unfair behaviours, the integrated business model proper of all major players might in the future hinder the market entry of firms focusing specifically on the CPO or eMSP segments. In addition to that, despite having been approved by the EU European Commission under EU State aid rule, the implementation of the €53m subsidy scheme to 2025 should be closely monitored, ensuring the tendering process is conducted in a fair way and overweighing the potential distortions of competition the programme might bring about.

Despite its small size, the Romania EV charging sector sees healthy levels of competition in both the CPO and eMSP segments.

Competition concerns might emerge from the preeminence of integrated actors, some with large roles in electricity distribution already, and from the effects of a large government subsidy scheme.

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<sup>1203</sup> Balkan Green Energy News, "Network of fast charging stations for electric vehicles in Romania and Croatia", February 2018

<sup>1204</sup> Pablo Plaza, "OMV Petrom, Eldrive to install EV stations in Romania and Bulgaria", May 2020

<sup>1205</sup> Octopus, "Electroverse charging map"



## Slovakia

### Market overview

Slovakia is a nascent EV market with plenty of potential. It has only deployed 6.2k EVs as of 2022 but this is a large amount of growth since 2016, when only 0.4k EVs had been bought. EV penetration is amongst the lowest Member States, only having reached 0.2% so far.<sup>1206</sup> Moreover, while the table below shows Slovakia has the best ratio of EVs to recharging points across the markets assessed, this is partly skewed by an extremely low number of EVs having been deployed at this time but also indicates that there is significant recharging implementation in the country.<sup>1207</sup>

Key sector statistics	2016	2022	Country details	EU27 + UK rank
EV penetration – new sales (#)	0.1k	2.1k*	<b>3k</b> BEVs	<b>23<sup>rd</sup>/28</b> EVs as a % of total fleet
EV penetration – new sales (%)	0.1%	3.1%		
EV adoption – number of cars (#)	0.4k	6.2k	<b>75%</b> <b>20%</b> <b>5%</b> Slow Med U-Fast	<b>1<sup>st</sup>/28</b> EVs per re-charging point
EVs as % of total fleet (%)	0.0%	0.2%		
Public recharging points (#)	0.3k	1.9k		
EVs per recharging point (#)	1.1	3.2		

Data from EAFO website | \*2021 data | NB: Minor rounding discrepancies | U-Fast: Ultra-Fast

### Regulatory overview

Given Slovakia's strong economic dependence on the automotive sector, the national government began assessing the future of eMobility as early as 2015 when it published the 'Strategy for the development of electromobility in the Slovak Republic and its impact on the national economy of the Slovak Republic'.<sup>1208</sup> The policy, which remains in force in 2022 despite not being legally binding, outlined 16 potential measures to accelerate the development of the sector based on the experience of selected EU countries (Germany, Austria, Czechia, Hungary, and Poland).<sup>1209</sup> Amongst other topics and in the context of EV recharging, the strategy investigated simplifying the administrative process around recharge points, developing a national network of recharging centres, the role of local municipalities in deploying infrastructure, and the mandatory deployment of rechargers in new buildings and parking spaces.<sup>1210</sup>

In 2016, Slovakia transposed into law the National Policy Framework for the Development of Alternative Fuels Market, outlining a goal of deploying 35.0k EVs and 1.5k EV rechargers by 2030.<sup>1211</sup> This policy governs the technical parameters of recharging stations and ratified the first financial incentives for eMobility, including a 50% reduction of the registration fee for motor vehicles using alternative fuels.<sup>1212</sup> A few years later, in 2019, the 'Action Plan for the Development of Electromobility in the Slovak Republic' was released, significantly accelerating the growth of eMobility in Slovakia through increased financial support.<sup>1213</sup> This included a €5.0k subsidy for the purchase of a fully electric vehicle (€3.0k for PHEVs), an exemption from motor vehicle

<sup>1206</sup> European Alternative Fuels Observatory, "Statistics on infrastructure and fleet data for road vehicles: Slovakia summary", October 2022

<sup>1207</sup> Ibid.

<sup>1208</sup> International Energy Agency, "Strategy for the development of electromobility in the Slovak Republic and its impact on the national economy of the Slovak Republic", May 2019

<sup>1209</sup> CSM, "Electric Vehicle Regulation and Law in Slovakia"

<sup>1210</sup> Milan Chrenko, "Support for clean mobility in Slovakia", April 2018

<sup>1211</sup> European Alternative Fuels Observatory, "Statistics on infrastructure and fleet data for road vehicles: Slovakia target tracker", October 2022

<sup>1212</sup> Karol Hrudkay, Jaroslav Jaroš, "Framework for Electromobility in the Slovak Republic and Its Application at the Local Level", May 2020

<sup>1213</sup> E-mobility in Slovakia by 2030—End of oil dependency? - Zábajník - 2022 - IET Smart Cities - Wiley Online Library



taxes, and a simplified public recharger installation process.<sup>1209</sup> Furthermore, with regards to EV recharging infrastructure, a €2.5k to €5.0k subsidy was available for government organisations until 2020 (a renewal was expected in 2021-2022 but nothing has been published at the moment).<sup>1214</sup> Slovakia also provides State aid for EV recharging via its State aid scheme from the Slovak Republic's Recovery and Resilience Plan to support the construction of infrastructure for alternative fuels implemented as per the GBER article 36.a which is discussed in Appendix D.<sup>1215</sup>

Major policies and incentives	Description
Strategy of electromobility development and its effects on the Slovak economy <sup>1205</sup>	Initiates support and development of eMobility as a promising automotive industry. Formulates several possible objectives for electromobility development in the areas of economy, ecology and science and research but failed to set legally binding commitments (thus creating real change)
The National Policy Framework for the Development of Alternative Fuels Market <sup>1216</sup>	Based on EU regulation, this document provides an assessment of the current status of the market, outlines the first national targets (albeit very conservative), highlights some key measures to meet targets, and identifies areas where public recharging infrastructure is needed
Action plan of electromobility development in the Slovak Republic <sup>1209</sup>	Transformed policies into a plan, including: eMobility focus in all relevant national policies, long-term direct support for low-emissions vehicles, implementation of legal, technical and business environment, low-emission zones, accelerated depreciation of EVs and recharging stations, etc.
Key entities and their roles in developing the sector (list is non-exhaustive) <sup>1206</sup>	Office for Investments and Informatisation manages EU funds and is vital for the distribution of subsidies; Government and various Ministries publish policies and define subsidies; Municipal authorities shape local measures (e.g., parking standards); Slovak EV Association funded in 2012 provides a platform for effective communication between the private and public sectors
EV tax benefits <sup>76</sup>	Minimum rate tax for the purchase of a new EV and exemption from ownership road tax for BEVs and 50% for PHEVs
EIB loans <sup>61</sup>	€3m to projects supporting the rollout of EV recharging infrastructure
CEF grants <sup>57</sup>	€17m to projects supporting the rollout of EV recharging infrastructure

### Competitive dynamics

While the EV recharging market in Slovakia remains limited at the moment, several players are preparing to meet the forecasted growth. GreenWay, a Slovakian company specialised in EVs and present in several European countries, remains the major CPO in 2022 accounting for approximately 20% of rechargers.<sup>1217</sup> The second largest player is ZSE Slovakia, a utility part of the E.ON group, controlling approximately 10% of the market and focusing mainly on developing a network in Western Slovakia.<sup>1218</sup> Moreover, the two (who also act as eMSPs for their clients) have partnered, and now EV drivers signed up with either company can recharge seamlessly at both of the largest recharging networks in Slovakia (depending on the plan consumers have chosen, pricing also

<sup>1214</sup> European Alternative Fuels Observatory, "Statistics on infrastructure and fleet data for road vehicles: Slovakia incentives & legislation", October 2022

<sup>1215</sup> European Commission, "State aid scheme from the Slovak Republic's Recovery and Resilience Plan to support the construction of infrastructure for alternative fuels", November 2022

<sup>1216</sup> Chiara Lodi *et al.* "Assessment of the Member States' Implementation Reports of the National Policy Frameworks under the Directive 2014/94/EU on the deployment of alternative fuels infrastructure", March 2021

<sup>1217</sup> Greenway, "You need reliability abroad"

<sup>1218</sup> ZSE Drive, "Charging programs"

remains consistent across networks).<sup>1214</sup> The GreenWay network also enables international roaming, with more than 14,000 recharging stations available to its customers across 18 countries. Other players in the market include Tesla (OEM) with approximately 30 superchargers spread across the country and Hungarian oil and gas firm, MOL, which has rolled out some rechargers in Eastern Slovakia.<sup>894</sup> Overall, the integrated eMSP and CPO model is most prevalent in the Slovakian recharging market and Greenway, MOL, ZSE, and Tesla all act as their own eMSP.<sup>1214</sup> While there is no evidence of crowding-out effects in Slovakia, it is important to note that Greenway received €17m in 2018 from the EIB to kick-off development of its recharging network across several countries in Central and Eastern Europe (€2.55m was specifically allocated to Slovakia).<sup>1219</sup> The project consisted of approximately 419 slow recharging (< 22 kW) stations, 400 fast recharging (22kW – 50 kW) stations and the first ultra-fast recharging (> 150 kW) network of 44 stations deployed across Poland, Slovakia, and other CEE countries.<sup>1216</sup> Furthermore, they recently secured an investment of €85m in immediate and future growth financing from international infrastructure funds Helios Energy Investments and Generation Capital. The capital will be used to deploy more rechargers and expand the network, which could lead to them gaining further market power.<sup>1220</sup> Nevertheless, the vast number of other companies present and Greenway's focus on developing an open network seem to mitigate any potential anti-competitive effects.

Slovakia has a nascent EV industry but good competition within the installation of EV recharge points.

Interoperability across players gives consumer access to most of the Slovakian network.

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<sup>1219</sup> European Investment Bank, "Greenway EV charging network", October 2018

<sup>1220</sup> Gorazd Čad, "Trailblazing Slovakian company GreenWay leading e-mobility development", May 2022

## Slovenia

### Market overview

Despite steady growth in the last five years, eMobility in Slovenia still plays a minor role with only 6k BEVs and 1k PHEVs circulating in the country. Slovenia still only has an EV penetration rate of 0.6% but this will continue to rise in line with increasing sales of EVs (up to 4.8% of overall new car sales).<sup>1221</sup> When it comes to recharging infrastructure, Slovenia has experienced similar growth with 1.5k public recharging points installed as of October 2022 and this has kept Slovenia's ratio of EVs to public rechargers below 5 (the EU currently recommends a 10:1 ratio).<sup>1222</sup>

Key sector statistics	2016	2022	Country details	EU27 + UK rank
EV penetration – new sales (#)	0.2k	2.0k*	<b>6k</b> BEVs	<b>16<sup>th</sup>/28</b> EVs as a % of total fleet
EV penetration – new sales (%)	0.4%	4.8%	<b>1k</b> PHEVs	
EV adoption – number of cars (#)	0.5k	7.0k		
EVs as % of total fleet (%)	0.0%	0.6%		
Public recharging points (#)	0.5k	1.5k	<b>83%</b> <b>12%</b> <b>5%</b> Slow Fast U-Fast	<b>6<sup>th</sup>/28</b> EVs per re-charging point
EVs per recharging point (#)	1.1	4.6		

Data from EAFO website | \*2021 data | NB: Minor rounding discrepancies | U-Fast: Ultra-Fast

### Regulatory overview

In 2017, Slovenia pledged to end sales of new ICE vehicles by 2030, putting the country ahead of the analogous goal set by the EU for 2035.<sup>1223</sup> However, the country has only partially met its mid-term goals so far, failing to achieve the 12k EVs target but meeting the 1.2k public recharge points by 2020 objective set in accordance with the EU Strategy for Alternative Fuels in 2013. The next milestones to be achieved are, as defined by the Slovenian NPF, 7k and 22k public EV recharging points by 2025 and 2030 respectively.<sup>1224</sup>

To support the expansion of eMobility, Slovenian authorities provide financial incentives both for the purchase of EVs and for the installation of recharging units. Aside from exempting EV drivers from paying the annual vehicle duty tax and providing them with a 40% discount on VAT, EV purchases were until recently supported via a €4.5k grant provided by the Environmental Public Fund (Ecofund), which announced its suspension in January 2022.<sup>1039</sup> However, a further scheme has been introduced via the country's NPF, consisting of a €7.5k grant for the purchase of EVs.<sup>1221</sup> On top of that, since 2004, Ecofund included a loan scheme available for the purchase of EVs with a price lower than €40k.<sup>1225</sup> Similarly, Ecofund also provided loans for the installation of EV rechargers as well as grants for the expansion of recharging infrastructure in nature conservation areas.<sup>1226</sup> Furthermore, Slovenia's 2020 National Energy Efficiency Action Plan, published in 2017, put Ecofund and the Energy and Environment ministries in charge of financing and constructing 630 public recharging points.<sup>1223</sup> Lastly, since 2021 all new

<sup>1221</sup> European Alternative Fuels Observatory, "Statistics on infrastructure and fleet data for road vehicles: Slovenia summary", October 2022

<sup>1222</sup> Ibid.

<sup>1223</sup> E-Mopoli, "BSC: Progress of e-mobility in Slovenia 2022", January 2022

<sup>1224</sup> Chiara Lodi et al. "Assessment of the Member States' Implementation Reports of the National Policy Frameworks under the Directive 2014/94/EU on the deployment of alternative fuels infrastructure", March 2021

<sup>1225</sup> Matjaž Knez, "Sustainable transport, electric vehicle promotional policies, and factors influencing the purchasing decisions of electric vehicles: A case of Slovenia", 2017

<sup>1226</sup> Slovenian Government, "Slovenia National Energy Efficiency Action Plan", 2020

non-residential buildings, as well as those undergoing major renovations, must be equipped with semi-public rechargers.<sup>1227</sup>

A new reform on the deployment of alternative fuels infrastructure has also been announced by the Slovenian government, with the intention of creating a new public institution coordinating the transport and energy sectors. This updated reform is also expected to lead to the development of an additional 400 recharging points by the end of 2025.<sup>1228</sup>

Major policies and incentives	Description
Public EV recharging point targets <sup>1221</sup>	NPF sets target at 1.2k by 2020, 7k by 2025 and 22.5k by 2030
EV recharging market liberalisation <sup>1224</sup>	Electricity Supply Act which came into force in November 2021 ended the control of electricity suppliers over EV recharging infrastructure
EV purchase incentives and tax benefits <sup>76</sup>	Up to €4.5k purchase incentive for a new BEV, and minimum purchase tax rate for BEVs
Ecofund loans for EV purchase <sup>1222</sup>	Launched in 2004, cover EVs with price up to €40k
Public EV recharging installation <sup>1223</sup>	630 public recharging points developed by Ecofund and Energy and Environment ministries - 2020 National Energy Efficiency Plan
CEF grants <sup>57</sup>	€8m to projects supporting the rollout of EV recharging infrastructure

### Competitive dynamics

The Slovenian EV infrastructure market has recently been fully liberalised. As a matter of fact, the Slovenian Electricity Supply Act (which entered into force in November 2021) ended the restrictive control of electricity operators over recharging stations.<sup>1224</sup> Nevertheless, Elektro Ljubljana, one of the five companies that manage the distribution network in Slovenia for SODO (the sole DSO), remains by far the most significant player having installed approximately 440 rechargers.<sup>1229</sup> Moreover, they have shared plans to continue paving the way in the sector, including the deployment of an additional 50 recharging points by the end of 2022.<sup>1226</sup> Petrol, a Slovenian oil distribution company, has also been active in developing a public recharging network (starting as early as 2015 when they were selected by SODO as the integrated CPO and eMSP of the planned government network along highways).<sup>1230</sup> Presently, they operate approximately 260 recharging stations in Slovenia, Croatia, Serbia, and Montenegro with intentions to add an additional 1.3k to their existing portfolio in the coming years.<sup>1231</sup>

Furthermore, both Petrol and MOL group (an integrated oil and gas company) are present in Slovenia as part of the Next-E project, co-financed by the EU European Commission and aimed at the installation of recharging points along TEN-T core transport corridors in Eastern Europe.<sup>1045</sup> The NEXT-E project is a unique partnership of companies from the electricity and oil and gas sectors joining forces with OEMs to create an interoperable and non-discriminatory EV recharging network.<sup>1232</sup> This should set up the sector for the future, creating an open network designed with consumers at the

<sup>1227</sup> Dunja Jandl, Tamara Kosi, "Slovenia: Renewable Energy Trend Drives E-Mobility"

<sup>1228</sup> Government of Slovenia, "On the Road to a Green Transition – at the annual Slovenia's Recovery and Resilience Plan event", October 2022

<sup>1229</sup> Vladimir Spasić, "Slovenia's DSO to install 50 e-rechargers for EVs", September 2022

<sup>1230</sup> European Regional Development Fund, Emobility, "Report on EV charging pricing, regulatory framework and DSO role in the e-mobility development", August 2021

<sup>1231</sup> Cee Energy News, "Slovenia's Petrol opens a new multi-standard EV charging station", December 2021

<sup>1232</sup> Zsófia Biró. "MOL is expanding its electric recharger network", February 2021

centre of it. As part of it, both companies are providing an integrated service and act as both the CPO and eMSP of their rechargers. The same applies to smaller players in the market, such as Plan-net PP, which cover all segments of the recharging value chain.<sup>1233</sup> At the same time, some pure play firms focusing on the eMSP and roaming segments (e.g., Chargemap and Placetoplug) only are also active in Slovenia, increasing consumer options and creating healthy competition.<sup>1234,1235</sup>

Despite the early market entry of Elektro Ljubljana and Petrol in the mid-2010s, competition seems to be developing in a healthy manner as the sector matures, also due to the NEXT-E project.

The integrated business model is the predominant one in the country, both among start-ups specialised on EV charging and for large energy provider firms.

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<sup>1233</sup> Polnile, "Charging stations for electric vehicles"

<sup>1234</sup> Chargemap, "One single card. The very best charging experience. Every day or when travelling."

<sup>1235</sup> Placetoplug, "Charging map"

## Spain

### Market overview

Spain's eMobility sector is lagging compared to other Member States, with only 177k EVs and 17k rechargers on the road in 2022 (a CAGR of 63% and 29% respectively since 2016).<sup>1236</sup> This places Spain's current EV fleet penetration at less than 1% but with EVs now making up 11.9% of new car sales, this figure is expected to accelerate. Due to the lagging growth rate of EV infrastructure, the number of EVs per recharge point has now surpassed the EU recommended level of 10. While significant improvements have been made since the birth of the industry, the Spanish government has recognised this is an area where further support is needed, committing to investing billions over the next decade.<sup>1237</sup>

Key sector statistics	2016	2022	Country details	EU27 + UK rank
EV penetration – new sales (#)	11.7k	169.7k*	<b>80k</b> BEVs	<b>15<sup>th</sup>/28</b> EVs as a % of total fleet
EV penetration – new sales (%)	0.3%	11.9%	<b>97k</b> PHEVs	
EV adoption – number of cars (#)	9.6k	177.4k		
EVs as % of total fleet (%)	0.0%	0.7%	<b>72%</b> <b>25%</b> <b>3%</b> Slow Fast U-Fast	<b>11<sup>th</sup>/28</b> EVs per re-charging point
Public recharging points (#)	3.6k	16.9k		
EVs per recharging point (#)	2.6	10.5		

Data from EAFO website | \*2021 data | NB: Minor rounding discrepancies

### Regulatory overview

The Spanish government, like most in Europe, has recognised the need to transition to sustainable mobility. As a result, regulation and subsidies within the sector have been updated and enhanced periodically since 2016. The Integrated National Energy and Climate Plan 2021-2030 (PNIEC) outlines the latest targets, with Spain looking to deploy 5m EVs and 500k rechargers by 2030 (in line with EU guidance of 1 recharger for every 10 EVs).<sup>1238</sup> EU Directive 2014/94 was also transposed into Spanish Law through Royal-Decree Law (RDL) 639/2016, later being integrated into the National Action Plan. This transposition into Spanish law proved to be extremely successful, leading to several incentives and subsidies being set-up and significantly accelerating the deployment of recharging infrastructure (see table below).<sup>1239</sup> Another significant piece of legislation which had profound impacts on the sector is the RDL 15/2018, which liberalised the provision of energy recharging services in Spain.<sup>1240</sup>

Throughout 2021 and 2022 this legislative framework was updated, applying further emphasis on infrastructure rollout. RDL 29/2021 outlines some of these major updates, for instance requiring all non-residential buildings with 20+ parking spaces to install a minimum number of recharging stations starting from January 1, 2023. Furthermore, it builds upon Law 7/2021 on Climate Change and the Energy Transition, which requires state highway operators with contracts in place as of 22 May 2021 to install at least one EV recharging point.<sup>1241</sup> This legislative update was also designed to simplify the process of deploying recharge points. Since it was published, recharge points with a capacity

<sup>1236</sup> European Alternative Fuels Observatory, "Statistics on infrastructure and fleet data for road vehicles: Spain summary", October 2022

<sup>1237</sup> International Energy Agency, "Spain mobility stimulus - Program to promote electric and sustainable mobility (MOVES Plan)", April 2022

<sup>1238</sup> Spanish government, "Integrated National Energy and Climate Plan 2021-2030", June 2020

<sup>1239</sup> José Anarte, "The future of e-charging infrastructure: Spain", Mar 2020

<sup>1240</sup> Grantham Research Institute, "Royal Decree-law 15/2018 on urgent measures for energy transition and consumer protection", 2018

<sup>1241</sup> Spain National Legislative Gazette, "Royal Decree-Law 29/2021, of December 21, which adopts urgent measures in the energy field to promote electric mobility, self-consumption and the deployment of renewable energies", December 2021



lower than 250kW no longer need a permit from public administrations to be installed (instead a simple “declaración responsable” outlining compliance with applicable regulation is all that is necessary).<sup>1236</sup> Lastly, RDL 29/2021 enables local governments to approve tax rebates for EV recharging infrastructure and it introduced new sanctions for distribution companies to ensure they appropriately respond to access and connection requests. In 2022, RDL 184/2022 was the major regulation passed regarding EV infrastructure and it builds upon the EV recharging services provisions contained in article 48 of the Electricity Sector Law. Among other topics, it outlines the obligations for CPOs, eMSPs and distribution companies, general principles for the provision of recharging services, minimum requirements for interoperability, and reporting obligations for various players involved.<sup>1238</sup> Moreover, the Spanish government approved a preliminary draft of the Sustainable Mobility Law (SML) in March 2022.<sup>1242</sup> The SML urges national and regional administrations to co-operate, for instance now requiring cities with 20-50k residents to develop a sustainable urban mobility plan (which must be updated every 5 years). To support this, a National Sustainable Mobility System is being set up to facilitate co-operation between different government administrations.<sup>1239</sup> Furthermore, a guide has been developed by Red Eléctrica de España (REE) to support local authorities in advancing the eMobility sector.<sup>1243</sup> Finally, the new regulation promotes the implementation of recharging points by private players, thereby signalling a shift in the sector to be more market-led. Spain also boasts some of the most generous EV incentives in Europe, largely through the Efficient and Sustainable Mobility Incentives Program (MOVES) which was first adopted in 2019 with a budget of €45m (this was increased to €100m for the MOVES II scheme and recently to €400m with the potential to increase to €800m as part of the MOVES III scheme).<sup>1244</sup> Spain also provides State aid for EV recharging via different measures implemented as per the GBER article 36.a (Appendix D)

Major policies and incentives	Description
Liberalisation of the sector (RDL 15/2018) <sup>1237</sup>	Accelerate the transition to a decarbonised economy, including opening up the provision of recharging infrastructure to the private market
Promoting eMobility (RDL 29/2021) <sup>1238</sup>	Includes a series of urgent measures to eliminate regulatory barriers that hinder the accelerated deployment of eMobility, including recharging
Promoting eMobility (RDL 184/2022) <sup>1238</sup>	Regulates the sector, defining the main parties involved (CPO/eMSP), their obligations, and the need to enter into interoperability agreements
EV purchase incentives and tax benefits <sup>76</sup>	Up to €7k for BEVs and €5k for PHEVs as well as an exception from vehicle registration tax, and a reduction of 75% for ownership road taxes
Infrastructure Subsidies part of MOVES plan <sup>1241</sup>	Individuals and companies can receive up to 70% and 30% of the cost of public or private rechargers respectively. An additional 10% is granted to those registered in municipalities with fewer than 5k inhabitants
EIB loans <sup>61</sup>	€85m to projects supporting the rollout of EV recharging infrastructure
CEF grants <sup>57</sup>	€30m to projects supporting the rollout of EV recharging infrastructure

<sup>1242</sup> Carla Giaume, “Spanish Sustainable Mobility Law makes progress”, June 2022

<sup>1243</sup> Spanish Municipalities Federation, “eMobility guide for local entities”, February 2019

<sup>1244</sup> Energy Nordic, “Plan MOVES III: Grants for electric cars and charging points”, July 2022



## Competitive dynamics

The latest update to Spanish regulation focuses on increasing transparency (e.g., location of rechargers and prices) to create a level playing field and improve consumer experience by defining clear obligations for both CPOs and eMSPs. These changes have been approved by the Spanish National Markets and Competition Commission, citing that they will boost activity in the sector thus improving competition.<sup>1245</sup> Nevertheless, some potential concerns remain due to the disparate nature of bureaucracy and administrative procedures across geographies. Specifically, local councils retain the power to authorise installations in much of the country, each with wholly different regulations, criteria, and processing times.<sup>1246</sup> This complex picture tends may limit small firms' ability to expand into new regions, somewhat decreasing their aptitude to compete with major players. This may have contributed to Endesa X (utility subsidiary of O&G) and Iberdrola (utility) gaining substantial market power, accounting for approximately 40% of public rechargers by the end of 2021.<sup>1247,1248</sup> Industry groups like the Business Association for the Development and Promotion of Electric Vehicles have called for a unified administrative framework to resolve this problem.<sup>1243</sup> Furthermore, the EIB supported Endesa X through a €45m loan to kick start its public recharging rollout in Spain, potentially giving it an unintentional competitive advantage.<sup>1249</sup> However, this does not seem to be case given the market is still fairly competitive and similar loans are now being provided to smaller players like Wenea (pure play). Moreover, private sector players continue to enter the market (e.g., in July 2022, Shell (O&G) acquired 100% of Cable Energía to expand its EV recharging network to Spain and Portugal).<sup>1250,1251</sup> In terms of eMSPs, the leading approach within the market remains the integrated model (e.g., Endesa X acts as the CPO of its recharge points and through the JuicePass (pure play) recharge app it also acts as the eMSP), however pure eMSPs are also present creating to a competitive and open market.

Complex and diverse regulation across regions of Spain can sometimes create complexities and barriers for smaller companies trying to expand into new areas of the country.

One of the major players in the sector (Endesa X) received a large loan from the EIB early on (similar loans have since been made available to other players).

<sup>1245</sup> Cadena de Suministro, "Competition validates the future regulations that will regulate electric vehicle recharging points", June 2021

<sup>1246</sup> Transport and Environment, "Electric vehicle charging point deployment plan for Spain", February 2021

<sup>1247</sup> Iberdrola, "The electric vehicle value chain in Spain will be sustainable thanks to Iberdrola", May 2022

<sup>1248</sup> Endesa, "Endesa X opens their first hub of ultra-fast 350 kW rechargers in a strategic site for European mobility, ", February 2022

<sup>1249</sup> Electrify, "Endesa receives EIB funding for charging network", July 2020

<sup>1250</sup> Electrify, "Wenea to build 470 fast rechargers in Spain", January 2021

<sup>1251</sup> Shell, "Shell acquires 100% of cable energia to expand ev charging network to Spain and Portugal", July 2022

## Sweden

### Market overview

The number of EVs in Sweden has grown drastically since 2016, rising from 26.4k to 363.4k in six years and has resulted in Sweden having the strongest EV fleet penetration percentage of all Member States – currently at 6.4%.<sup>1252</sup> The recharging infrastructure sector has not seen the same rate of growth, with a current 21.8k chargers installed.<sup>22</sup> Sweden is currently behind the EU target of 10 cars per recharging point,<sup>1253</sup> with a national average of approximately 18 cars per recharger. Thus, the Swedish government is currently developing strategies to accelerate the rollout of recharging infrastructure across the country.

Key sector statistics	2016	2022	Country details	EU27 + UK rank
EV penetration – new sales (#)	13.2k	135.3k*	<b>134k</b> BEVs	<b>1<sup>st</sup>/28</b> EVs as a % of total fleet
EV penetration – new sales (%)	3.60%	52.74%	<b>133k</b> PHEVs	
EV adoption – number of cars (#)	26.4k	363.4k		
EVs as % of total fleet (%)	0.6%	6.4%	<b>75%</b> <b>21%</b> <b>3%</b> Slow Fast U-Fast	<b>22<sup>nd</sup>/28</b> EVs per re-charging point
Public recharging points (#)	2.7k	21.8k		
EVs per recharging point (#)	9.72	16.7		

Data from EAFO website | \*2021 data | NB: Minor rounding discrepancies | U-Fast: Ultra-Fast

### Regulatory overview

In 2018, Sweden committed to a 70% reduction in emissions by 2030 (2010 base year) from the domestic transport sector.<sup>1254</sup> The rollout of EVs is a large part of this commitment and Sweden is forecasted to have 2.6m EVs by 2030.<sup>1255</sup> Further emphasised by Volvo, Sweden's largest automotive OEM who have announced that they will no longer sell ICE vehicles after 2030,<sup>1256</sup> with the Swedish parliament also discussing the banning of fossil fuel cars sales after 2030, with some parties asking for it to be moved forward to 2025.<sup>1257</sup> To aid the transition, a variety of incentives and subsidies have been put in place to increase the use of EVs including tax breaks, among other policies.<sup>1258</sup>

To continue developing the recharging infrastructure, the Swedish government published their electrification strategy in 2022 which included a call to develop a recharging specific infrastructure plan.<sup>1251</sup> This plan started being developed in July 2022 and hopes are that it will increase recharging points across the country. In the meantime, there are policies and grants enforced by the government to support the rollout of recharging infrastructure. Since May 2020, all new or remodelled residential buildings with more than 10 parking spaces must establish recharging stations for electric cars (20% of spaces should have a recharger) or prepare for the installation of recharging stations to all parking spaces in the future (i.e., prepare civil works). Furthermore, buildings that are not residential buildings with more than 20 parking spaces must have at least one recharging point for electric vehicles by January 2025, even if they are not being remodelled.<sup>1259</sup> Since 2021, companies, organisations, and

<sup>1252</sup> European Alternative Fuels Observatory, "Statistics on infrastructure and fleet data for road vehicles: Sweden summary", October 2022

<sup>1253</sup> Elbilsstatistik, "Sweden's national statistics for electric cars and charging infrastructure"

<sup>1254</sup> General Secretary of the government of Sweden, "Goals for transport policy"

<sup>1255</sup> Stockholm Chamber of Commerce, "Electric cars on the rise", October 2020

<sup>1256</sup> Volvo Car Sweden, "Volvo Cars must be fully electric by 2030", March 2021

<sup>1257</sup> Per Mattsson, "The parties in the Riksdag: Then we want to ban petrol, diesel and hybrid cars", June 2022

<sup>1258</sup> Swedish Transport Agency, "Five-year tax exemption"

<sup>1259</sup> Fastighetsägarna, "Charging points for electric cars"

landlords that install public recharging stations can receive grants of 50% of the cost (up to €1.4k per recharging point).<sup>1260</sup>

Moreover, since 2015 the Swedish Environmental Protection Agency has offered a grant that can provide support for public recharging where there is a need for more recharging stations. Companies and organisations can receive up to 70% of the CAPEX cost.<sup>1261</sup> Finally, there is a similar grant reserved for fast rechargers in rural areas. The support for the expansion of public recharging stations, which is managed by the Swedish Transport Administration, has been ongoing since 2020 and €4.55m per year is added to the fund. The support can finance the entire investment cost of the fast recharger for the company or organisation developing it.<sup>1262</sup> Sweden also provides State aid for EV recharging via different measures implemented as per the GBER article 36.a which are discussed in Appendix D.

Major policies and incentives	Description
National action program for recharging infrastructure <sup>1251</sup>	In July 2022, the government ordered a national plan on re-charging infrastructure to be developed
Ladda Bilen <sup>1257</sup>	Companies, organisations, and landlords that install public re-charging stations can receive grants of 50% of the cost (max €1.4k)
EV purchase incentives and tax benefits <sup>76</sup>	Up to 70k SEK (€6.5k) purchase incentive for BEVs and 44k SEK (€4k) for PHEVs as well as low annual road tax for BEVs and PHEVs
Rural fast recharging <sup>1259</sup>	Financial support for development of fast rechargers in rural areas
CEF grants <sup>57</sup>	€9m for projects supporting the rollout of EV recharging infrastructure

### Competitive dynamics

Sweden tries to maximize its private sector involvement to deliver recharging infrastructure, but the state will intervene where they see necessary to set guidelines and provide incentives or grants to accelerate development. In general, the competition in Sweden is healthy, and while there are four main providers, there are many smaller market actors.

The four main providers of recharge points in Sweden include Recharge Infra (subsidiary of Fortum), Vattenfall InCharge (subsidiary of utility), E.ON (utility), and Mer (owned by Statkraft).<sup>1263</sup> However, there are also a number of smaller providers including Circle K and OKQ8 (gas stations) and regional energy suppliers Göteborg Energi, Skellefteå Kraft, and Kraftringen which offer public recharging solutions.<sup>1264</sup> When it comes to fast rechargers, Tesla (OEM) and IONITY (pure play owned by OEMs) are the two main actors in the country. However, it is worth noting that three of the top four providers are government owned companies with the state of Finland being the majority owner of Fortum, the state of Norway being the owner of Statkraft, and Vattenfall being wholly owned by the Swedish state.<sup>974, 1265, 1266</sup> While these companies primarily finance their operations by own generated cash flow and external funding (e.g. corporate bonds), it might be easier for them to break into the market as they have government backing to

<sup>1260</sup> Swedish Environmental Protection Agency, "Load the car"

<sup>1261</sup> Swedish Environmental Protection Agency, "Charging for the public - public charging infrastructure"

<sup>1262</sup> General Secretary of the government of Sweden, "Control means for charging infrastructure", May 2021

<sup>1263</sup> Mer, "About Mer"

<sup>1264</sup> Chargefinder, "Find charging stations on the map"

<sup>1265</sup> Statkraft, "About Statkraft UK"

<sup>1266</sup> Vattenfall, "Corporate governance"

some extent (e.g. receiving a higher credit score because they are government supported and can therefore take out better loans).

Sweden also lends itself to smaller energy companies providing recharge points locally. For example, in Skellefteå, Skellefteå Kraft owns a majority of the approximately 20 recharge points available, whilst this could be limiting to some EV users, small towns with a low number of recharge points do not naturally lend themselves to a competitive landscape. Conversely, Gothenburg is a large city with a wide selection of CPO operating in a competitive way.

Moreover, while Sweden has not contracted one company to provide large numbers of rechargers, there are smaller tenders, e.g., Stockholm Parkering (the largest parking company in Stockholm owned by the City of Stockholm) offering a tender for 10k recharge points with discussions ongoing as to whether all 10k recharge points can go to a single CPO. Finally, in the electrification strategy published by the government earlier in 2022, they stated that a uniform payment solution will be put in place to ensure that customers easily can gain access to more recharging options. The government intends to continue the dialogue with the recharging industry to achieve industry-wide standards for payment solutions as soon as possible. This will increase openness of access for consumers and reduce loyalty to the major players.<sup>1267</sup>

Competition is healthy in Sweden, although state owned entities continually emerge as the top providers of charging infrastructure.

Uniform payment solutions, something that has not existed in the past, will reduce loyalty to the major players and increase choices for consumers.

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<sup>1267</sup> General Secretary of the government of Sweden, "Goals for transport policy"

## United Kingdom

### Market overview

The UK is a leader in the eMobility transition, experiencing accelerating EV adoption and infrastructure rollout supported by well-developed policies and regulation. As of October 2022, there were approximately 800k EVs on the road (compared to 85k in 2016) – this growth is expected to continue and by 2030 the government estimates 10m EVs will be deployed.<sup>1268</sup> Likewise, the recharging infrastructure rollout is accelerating (going from less than 12.2k in 2016 to approximately 50k in 2022) with 600 rechargers being installed every month (100 of which are ultra-fast).<sup>1269</sup> Although significant, this pace of rollout is not sufficient to keep pace with the rate of EV adoption being observed in the UK.

Key sector statistics	2016	2022	Country details	EU27 + UK rank
EV penetration – new sales (#)	88.3k	710.2k*	<b>420k</b> BEVs	<b>10<sup>th</sup>/28</b> EVs as a % of total fleet
EV penetration – new sales (%)	1.5%	21.7%	<b>357k</b> PHEVs	
EV adoption – number of cars (#)	85.3k	777.0k		
EVs as % of total fleet (%)	0.3%	2.1%		
Public recharging points (#)	12.2k	47.4k	<b>81%</b> <b>16%</b> <b>3%</b> Slow Fast U-Fast	<b>21<sup>st</sup>/28</b> EVs per re-charging point
EVs per recharging point (#)	7.0	16.4		

Data from EAFO website | \*2021 data | NB: Minor rounding discrepancies | U-Fast: Ultra-Fast

### Regulatory overview

In 2020, the UK committed to phase out the sale of new diesel and petrol cars by 2030.<sup>1267</sup> Alongside this, a 2035 target for all cars and vans to have zero exhaust emissions was published, including pledges to accelerate the nation's EV infrastructure rollout.<sup>1270</sup> As a result, the EV industry continues to grow, and the government has shifted efforts to creating the necessary policy and regulatory frameworks to advance the development of a national EV infrastructure network.

In 2021, the National EV Infrastructure Strategy was published, defining the vision for the sector, including stakeholder responsibilities and areas where support will be provided to reach approximately 300k public rechargers by 2030.<sup>1267</sup> The strategy outlines how market barriers will be loosened to allow the more developed parts of the market (e.g., home recharging) to further develop. For instance, building regulation was introduced in summer 2022 mandating all new homes with parking spaces to have chargepoints installed.<sup>1271</sup> Moreover, increased focus has been placed on apartment buildings through the updated EV Chargepoint Grant and the Workplace Chargepoint Scheme.<sup>1272</sup> In 2022, policies to increase recharger reliability and to improve consumer experience (e.g., ensuring people can easily locate rechargers by opening data access) were also passed.<sup>1273</sup> The UK is also pushing local authorities to develop their own EV strategies and rollout plans. To support them, a Local Authority Toolkit was recently published, and practical guidelines are under development covering the entire process, from procurement to operation.<sup>1274</sup> These are designed to promote competition, for instance by avoiding long contract lengths and running a well-designed award process.

<sup>1268</sup> European Alternative Fuels Observatory, "Statistics on infrastructure and fleet data for road vehicles: UK summary", October 2022

<sup>1269</sup> UK Government, "Taking charge: the electric vehicle infrastructure strategy", March 2022

<sup>1270</sup> Department for Business, Energy & Industrial Strategy of the UK, "The ten point plan for a green industrial revolution", November 2020

<sup>1271</sup> UK Government, "Infrastructure for the charging of electric vehicles", January 2022

<sup>1272</sup> Office for Zero Emission Vehicles, "Workplace Charging Scheme: guidance for applicants", November 2021

<sup>1273</sup> Department for Transport of the UK, "The consumer experience at public chargepoints", March 2022

<sup>1274</sup> Department for Transport of the UK, "Transport decarbonisation: local authority toolkit", April 2022

Lastly, the Department for Transport and Ofgem (the UK electricity regulator) have been collaborating to ensure EV infrastructure is well integrated into future energy systems. As part of this, smart recharging minimal requirements were mandated in June 2022.<sup>84</sup> In terms of the overarching legislative framework, two major laws exist to enforce initiatives within the sector: AFID<sup>1275</sup> (covering technical specifications and consumer experience at an EU level) and the Automated and Electric Vehicles Act 2018<sup>1276</sup> (covering recharging provision and consumer experience at a national level). To reach these ambitious targets, the funding schemes and grants highlighted in the table below have been set up. The UK government has also committed to reviewing this approach by 2023 as they recognise the regulatory environment needed will change as mass adoption of EVs occurs. To do so, a Future of Transport Regulatory Review was conducted in 2021 with additional consultations ongoing.<sup>1273</sup>

Major policies & incentives	Description
Consumer experience regulatory updates <sup>1270</sup>	Covers roaming and pricing transparency, open data requirements, minimum availability and performance standards, and interoperability
EV smart recharge points regulations 2021 <sup>84</sup>	Technical and security requirements, incl. smart functionality to participate in load shifting and grid services (relevant to all future rechargers)
Grant and Workplace Re-charging Scheme <sup>1269</sup>	Provide eligible applicants with support towards the upfront costs of the purchase and installation of EV recharge points (~75% contribution)
On-street Residential Chargepoint Scheme <sup>1277</sup>	Provides local authorities funding for the procurement and installation of on-street EV chargepoint infrastructure to meet residents' needs.
£450m local EV Infrastructure Fund (LEVI) <sup>1278</sup>	Rollout of larger-scale chargepoint infrastructure projects, including local ultra-fast hubs and larger on-street schemes not captured by ORCS
£950m Rapid (ultra-fast) Recharging Fund (RCF) <sup>1279</sup>	Enhancing grid capacity to meet demand of 6k fast, open access chargepoints across major roads by 2035 (~2.5k expected by 2030)
£422m Recharging Infrastructure Investment Fund <sup>1280</sup>	Catalysing rollout of robust and diversified public recharging infrastructure
CEF grants <sup>57</sup>	€5m for projects supporting the rollout of EV recharging infrastructure

### Competitive dynamics

In general, the UK is trying to maximise private sector involvement to deliver recharging points where they are commercially viable, with interventions reserved for when there is a clear market failure. As a result, a competitive market has developed with no player controlling more than 17% of the market and close to 50 CPOs currently operating.<sup>1281</sup> As of summer 2022, Ubitricity (pure play) was the major player operating (5,552 rechargers or 16.7% share), followed by PodPoint (pure play with 4,426 rechargers or 13.3% share), Bp pulse (pure play owned by O&G) (2,707 rechargers or 8.1% share), and Charge Place Scotland (pure play with 1,904 rechargers or 5.7% share). The rest of the market is instead fragmented, with no other player controlling over 5% of the

<sup>1275</sup> UK National Archives, "The Alternative Fuels Infrastructure Regulations 2017"v

<sup>1276</sup> UK National Archives, "Automated and Electric Vehicles Act 2018"

<sup>1277</sup> Office for Zero Emission Vehicles, "On-Street Residential Chargepoint Scheme guidance for local authorities", April 2022

<sup>1278</sup> Office for Zero Emissions Vehicles, "Apply for local electric vehicle infrastructure (LEVI) pilot funding", March 2022

<sup>1279</sup> Office for Zero Emissions Vehicles, "Rapid charging fund", September 2021

<sup>1280</sup> Infrastructure and Projects Authority, "Charging Infrastructure Investment Fund", July 2018

<sup>1281</sup> Zap Map, "EV Charging Statistics 2022"



market.<sup>1278</sup> While some aspects of the recharging infrastructure have developed well, others are lagging and present potential competition concerns. Specifically, competition along motorways has been lacking, with Gridserve (pure play) holding long-term exclusive contracts accounting for approximately 66% of motorway service stations (valid until 2026).<sup>1282</sup> As a result, in 2020 these locations were not kept up to standard and ranked last in terms of EV drivers' satisfaction.<sup>1283</sup> This is being addressed by the RCF fund, designed to stimulate competition by guaranteeing a minimum of 6k ultra-fast rechargers on motorways by 2035 (hence keeping prices down and quality of service high).<sup>1284</sup> Additional regulatory guidance is needed outside of urban centres, where low utilisation rates discourages new entrants and give rise to recharging deserts. In such locations, further analysis is needed as local monopolies and infrastructure sharing may prove to be the best way forward (however, the holistic impacts on consumers and competition trade-offs must be understood). Moreover, as EV recharging is not one of the statutory obligations assigned to local authorities, their limited involvement today has hampered the rollout and clearer roles must be defined to promote competition.<sup>1285</sup> This has caused regional disparities in the UK, highlighting that on-street recharging may require further government support (e.g., in July 2022 London had 116 public recharge points per 100k people, compared to less than 20 in Merseyside). Furthermore, the nature of on-street recharging (with consumers needing to recharge close to their home and thus becoming somewhat price insensitive) increases the risk of local monopolies developing and therefore further oversight could prove beneficial. To address, a mandate requiring all local authorities to publish long-term EV infrastructure strategies is being considered as part of the Future of Transport Regulatory Review.<sup>1286</sup>

Long-term exclusivity contracts (highways) distorting market impacting service quality / competitiveness (CMA).

Additional support for local authorities is needed to ensure even distribution of recharge points.

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<sup>1282</sup> Matt Allan, "Gridserve to surrender monopoly on motorway EV charging", March 2022

<sup>1283</sup> Zap Map, "Revealed: UK electric vehicle charge point networks ranked"

<sup>1284</sup> Office for Zero Emissions Vehicles, "Rapid charging fund"

<sup>1285</sup> Competition and Markets Authority, "Electric vehicle charging market study"

<sup>1286</sup> Department for Transport of the UK, "Future of transport regulatory review: modernising vehicle standards", November 2021



## Appendix B Study structure and project approach

The study is divided into four main phases of work, with a competition lens maintained throughout the project to ultimately highlight possible antitrust and State aid concerns in the sector.

**Figure 58: Study guiding framework**



### **Regulatory and policy assessment across the EU27 + the UK**

First, a broad review of regulatory frameworks (including legislative proposals) and competitive models across the EU27 + UK was conducted. A systematic approach was taken for each country, building a strong knowledge base on the topic to effectively evaluate competitive dynamics in the competition law analysis. This included an overview of EU wide legislation (see Section 3.1), a macro-level analysis across markets (see Section 3.2), and a more detailed assessment of each Member State and the UK (see Appendix A). Specifically, for each market the report outlines major policies, national strategies, targets, and available incentives or other forms of public funding relevant to the sector. Moreover, a discussion on the competitive conditions for CPOs and eMSPs (with a focus on openness of access, interoperability, and the major players) is provided.

### **Business model evaluation across markets**

To complement the regulatory overview, and holistically assess the competitive landscape, the report then dives into the various business models adopted by key ecosystem participants (i.e., CPOs and eMSPs). This includes a top-down analysis of the dynamics, barriers, and levels of vertical integration within the EV recharging infrastructure sector and a detailed evaluation of the strategies adopted by specific players in the sector. Overall, emphasis was placed on identifying where different types of CPOs and eMSPs participate in the market (e.g., on-street vs. destination recharging), whether they operate at a regional, national, or EU level, how frequently CPOs perform eMSP services and vice versa, the overall level of interoperability across networks and the evolution of business models over time as the sector matured.

### **Member State in-depth assessment**

Next, the issues highlighted through the regulatory and business model reviews were looked at in more detail in four European markets. A thorough selection process was conducted to identify the most representative countries that would support the aims of this study. Specifically, the ambition was to evaluate different regulatory framework characteristics, competitive models, and levels of public support across Europe. The

selection process is available in Appendix A and includes several phases of analysis to determine the most relevant dimensions to categorise the Member States. As part of it, macroeconomic, regulatory, and industry data for each Member State was considered. Italy, Belgium, Ireland, and Croatia were ultimately selected as they offer the opportunity for assessment of the broadest range of competition typologies, themes, challenges, and concerns (more details on each country and how the analysis was conducted are available in Section 7).

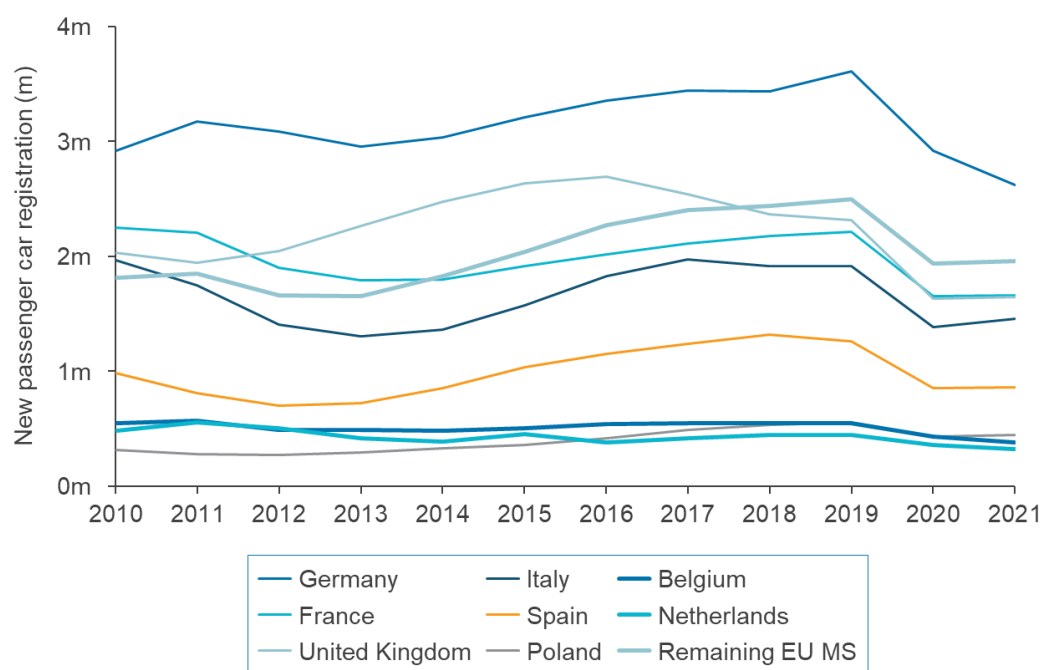
### ***Competition law analysis***

Finally, after building an understanding on the sector and assessing regulatory frameworks, the findings were applied to conduct a comprehensive competition law analysis. Specifically, the report outlines competitive constraints and instances where antitrust and/or public support concerns may be materialising across the EU. This covered the substitutability of different business models and an assessment of market power across the value chain (including considerations of public support and whether that has impacted the power balance within the industry). Moreover, emphasis was placed on countries which have been shown to be lagging in terms of competition in the past. Finally, this context was leveraged to produce a taxonomy of antitrust theories of harm and an analysis of which are likely to be most salient.

## Appendix C Supporting data

### Total vehicle sales by market

**Figure 59: New passenger car registrations across the EU27 + UK<sup>1287</sup>**



<sup>1287</sup> Acea, "Overview – Electric vehicles: tax benefits & purchase incentives in the European Union (2022)", September 2022

**NIR EV recharging targets****Table 46: EV public recharging installation targets by country**<sup>1288</sup>

Country	EU Level NIR Targets		
	2020	2025	2030
Austria	3.5k	N/A	N/A
Belgium	7.3k	35.4k	94.5k
Bulgaria	0.3k	2.0k	5.0k
Croatia	0.5k	0.6k	0.8k
Cyprus	0.0k	0.1k	0.1k
Czechia	1.3k	6.2k	19.0k
Denmark	5.4k	9.8k	29.4k
Estonia	0.4k	0.4k	N/A
Finland	2.0k	N/A	25.0k
France	35.0k	N/A	N/A
Germany	43.0k	N/A	1m
Greece	2.0k	4.0k	10.0k
Hungary	1.5k	14.6k	35.0k
Ireland	1.0k	1.1k	1.2k
Italy	13.7k	N/A	117.0k
Latvia	0.4k	0.5k	0.5k
Lithuania	0.3k	0.3k	15.1k
Luxembourg	1.6k	5.2k	10.3k
Malta	0.4k	N/A	N/A
Netherlands	50.0k	N/A	N/A
Poland	6.4k	N/A	N/A
Portugal	2.2k	15.0k	36.0k
Romania	0.3k	N/A	0.4k
Slovakia	0.8k	1.5k	3.0k
Slovenia	1.2k	7.0k	22.3k
Spain	10.0k	17.0k	N/A
Sweden	9.0k	N/A	N/A
UK	12.8k	175.0k	535.0k
<b>Total EU27</b>	<b>199.4k</b>	<b>120.7k</b>	<b>142.5k</b>

<sup>1288</sup> EurLex, "Commission Staff Working Document, Detailed Assessment of the Member States Implementation Reports on the National Policy Frameworks", March 2021

## Appendix D Regulatory and policy analysis supporting material

The material in this appendix supports the summary in Section 3, Regulatory and policy analysis across EU27 + the UK.

### Key EU legislation

Directive 2014/94/EU: Regulation on the rollout of EV recharging infrastructure (22/10/2014)

Directive 2014/94/EU (also referred to as the Alternative Fuels Infrastructure Directive or AFID) has been, since its approval in 2014, the main policy tool regulating the rollout of EV recharging infrastructure. However, in its original version this legislation did not set binding targets for rechargers' installation, rather it made suggestions for an indicative number of 1 recharging points per 10 EVs.<sup>1289</sup> The decision on infrastructure' deployment was left to Member States, resulting in an actual rollout of rechargers defined by each Member State's National Policy Frameworks (NPF), not on track with the 1m recharging points by 2025 target mentioned above.<sup>1290</sup> In fact, the Directive 2014/94/EU imposed, on Member States, the submission by November 2016 of an NPF including rechargers' deployment targets as well as related support measures. On top of that, Member States were asked to report on the implementation of their NPFs via a National Implementation Report (NIR) to be submitted by November 2019 and every three years thereafter. The European Commission was then tasked with the assessment of Member States' NIRs, in order to report periodically to the European Parliament via working document; the last iteration of which was released in February 2022.<sup>1291</sup> Besides that, Directive 2014/94/EU established standards in terms of recharging connectors and accessibility. In fact, it was mandated for alternating current (AC) rechargers to be equipped with a Type 2 connector, while high-capacity direct current (DC) rechargers were to have a Combo 2 type of connector. Furthermore, Directive 2014/94/EU established that recharging points should always be accessible on an ad hoc basis (i.e., without any subscription or contract with the eMSP). However, Member States were tasked with deciding how to implement this norm, resulting, according to the European Court of Auditors, in very different approaches across the EU.<sup>1287</sup> Lastly, the Directive 2014/94/EU stipulated that the recharging prices should be transparently communicated and easily comparable among providers.

Proposal for a Regulation on alternative fuels infrastructure, repealing Directive 2014/94/EU (14/07/2021) (AFIR)

The proposal for a regulation on alternative fuels infrastructure introduces mandatory targets for EV recharger rollouts: namely, at least 1kW of public recharging capacity per BEV in the country and 0.66kW per PHEV should be installed in each Member State. Moreover, rules concerning the deployment of rechargers along Trans-European Transport Network (TEN-T) core networks were also introduced, such as the deployment of 300kW recharging pools (i.e., areas equipped with one or more EV recharging stations) with at least one 150kW recharging station every 60km in both directions by December 2025, to be upgraded to a total of 600kW with at least two 150 kW stations by December 2030. The same provision applies to the TEN-T comprehensive network, with the only difference being that the deadlines are moved respectively to 2030 and 2035. While this norm applies to light-duty vehicles, similar targets were included for

<sup>1289</sup> European Parliament, "DIRECTIVE 2014/94/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 22 October 2014 on the deployment of alternative fuels infrastructure", October 2014

<sup>1290</sup> European Court of Auditors, "Infrastructure for charging electric vehicles: more charging stations but uneven deployment makes travel across the EU complicated", May 2021

<sup>1291</sup> Chiara Lodi *et al.* "Assessment of the Member States' Implementation Reports of the National Policy Frameworks under the Directive 2014/94/EU on the deployment of alternative fuels infrastructure", March 2021

heavy-duty vehicles too. In terms of interoperability, the proposal focuses on *ad hoc* recharging. In fact, payment by credit card, either via card reader or contactless, should be universally implemented by 2027 for all rechargers with a capacity higher than 50kW; for capacities below 50 kW instead, only newly installed rechargers will need to abide by that rule starting by the enter-into-force date of the regulation. In addition, price transparency is increased by mandating CPOs to display unit price per session, per minute and per kWh. The proposal also expands on the previous Directive 2014/94/EU by mandating that all rechargers be digitally connected and capable of smart recharging. Member States will still need to submit a NPF as well as periodic reports outlining its developments. Lastly, the proposal adopts the same technical requirements for recharging connectors defined in Directive 2014/94/EU. The European Parliament adopted its position on draft proposal on October the 19<sup>th</sup> 2022, which will be followed by trialogue negotiations between the European Commission, the European Parliament, and the European Council.<sup>1292,1293</sup>

#### Directive 2018/844/EU: Energy Performance of Buildings (30/05/2018)

Directive 2018/844/EU introduced the mandatory installation of EV recharging points in non-residential buildings that are either newly built or undergoing major renovations. In particular, one recharging point must be deployed if such buildings have more than 10 parking spaces. The provision for residential buildings is instead limited to the installation of ducting infrastructure; that refers to the installation of the electric wiring needed to make a parking bay suitable for installing EV recharging points at a later point in time.<sup>1294</sup>

#### Proposal of the European Commission for a Directive amending Directive 2018/844/EU on the Energy Performance of Buildings (15/12/2021)

The proposal makes the installation of ducting infrastructure mandatory for all new non-residential buildings as well as for those undergoing major renovations. Furthermore, the threshold number of parking bays, above which non-residential buildings must install at least one recharging point, is lowered from 10 to 5. The same threshold also applies to office buildings, which should be equipped with at least one recharging point every two parking spaces. On top of that, in alignment with the proposed Alternative Fuels Regulation, all installed recharging points must be smart and, when appropriate, capable of bidirectional recharging.<sup>1295</sup>

Update to Regulation 2019/63: strengthening the CO<sub>2</sub> emission performance standards for new passenger cars and new light commercial vehicles in line with the Union's increased climate ambition (14/07/2021)

By 2035, the updated regulation on CO<sub>2</sub> emissions performance standards for vehicles will restrict the sale of all ICE-powered passenger cars and light commercial vehicles in the Union.<sup>1296</sup>

#### Directive 2019/944/EU: common rules for the internal market for electricity (5/06/2019)

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<sup>1292</sup> Jonathan Packroff, "EU parliament adopts targets for EV charging infrastructure", October 2022

<sup>1293</sup> European Commission, "Proposal for a Regulation of the European Parliament and of the council on the deployment of alternative fuels infrastructure, and repealing Directive 2014/94/EU of the European Parliament and of the Council", July 2021

<sup>1294</sup> Official Journal of the European Union, "Directive (Eu) 2018/844 Of The European Parliament And Of The Council Of 30 May 2018 Amending Directive 2010/31/Eu On The Energy Performance Of Buildings And Directive 2012/27/Eu On Energy Efficiency", May 2018

<sup>1295</sup> European Commission, "Proposal for a Directive of the European Parliament and the Council o the energy performance of buildings", December 2021

<sup>1296</sup> European Commission, "Proposal for a Regulation of the European Parliament and of the Council amending Regulation (EU) 2019/631 as regards strengthening the CO<sub>2</sub> emission performance standards for new passenger cars and new light commercial vehicles in line with the Union's increased climate ambition", July 2021

Directive 2019/944/EU is relevant for the EV recharging market as it imposes rules on the Distribution System Operator's (DSO) involvement in the provision of recharging services. More precisely, the DSO is forbidden from owning, developing, managing, or operating EV recharging points. Some exceptions exist including that it does not apply if a public tender to find a private market player proves unsuccessful, as private players are not awarded a right to perform those activities or could not deliver them in a timely manner and at a reasonable cost, in which case the DSO might carry on providing these services under strict supervision from the regulator. Other prerequisites to allow the DSO to be active in EV recharging include that the regulatory authority has approved the tendering procedure *ex ante* and that the DSO operates recharging points on the basis of third-party access. Were the DSO to be awarded the concession to operate, public consultations to verify the possibility of privatising the network are to be carried every five years.<sup>1297</sup>

### **Connecting Europe Facility**

Created in 2013, the Connecting Europe Facility (CEF) aims at financing trans-European networks in the transport, energy, and digital sectors. When it comes to transport, the Facility focuses on projects of common interest, as well as on adapting the TEN-T network to both civilian and military uses.<sup>1298, 1299</sup> With a total budget of €25.8b, the CEF aims at realising the EU's transport policy, focusing on cross-border projects and areas lacking infrastructure, with the overall goal of completing the TEN-T Core Network by 2030, and the related Comprehensive Network by 2050.<sup>1300, 1301</sup>

Since its inception, the CEF's support for transport-related projects has been regulated by Regulation 1316/2013; the regulation classified as eligible those proposals that implemented the TEN-T Core and Comprehensive Networks, as well as those that supported projects of common interest by contributing to delivering freight transport services and implementing safe and secure infrastructure.<sup>1302</sup> The CEF periodically publishes calls for proposals, with project proposals that can be presented by Member States, International Organisations and public or private bodies with the approval of their respective Member States.<sup>1303</sup>

Proposals were collected via yearly public calls, each stating its funding objectives and priorities. However, there have been historically limited explicit mentions of EV recharging, with the calls rather referring to sustainable transport, as was for instance the case for the 2016 call.<sup>1304, 1305</sup> Within the emphasis on the decarbonisation of the transport sector in Europe mentioned at the beginning of this section, in 2021 a specific instrument for alternative fuel infrastructure was created within the CEF. The Alternative Fuels Infrastructure Facility (AFIF) was established in cooperation with the EIB, with the aim of making €1.5b of grants available by the end of 2023 for the rollout of alternative

<sup>1297</sup> Official Journal of the European Union, "Directive (EU) 2019/944 of the European Parliament and of the Council of 5 June 2019 on common rules for the internal market for electricity and amending Directive 2012/27/EU", June 2019

<sup>1298</sup> European Parliament and European Council, "Regulation (EU) no 1316/2013 of the European Parliament and of the Council of 11 December 2013 establishing the Connecting Europe Facility, amending Regulation (EU) No 913/2010 and repealing Regulations (EC) No 680/2007 and (EC) No 67/2010", December 2013

<sup>1299</sup> European Parliament and European Council, "Regulation (EU) 2021/1153 of the European Parliament and of the Council of 7 July 2021 establishing the Connecting Europe Facility and repealing Regulations (EU) No 1316/2013 and (EU) No 283/2014", July 2021

<sup>1300</sup> EUR Lex, "Summary of Transport Legislation"

<sup>1301</sup> European Climate Infrastructure and Environment Executive Agency, "About the Connecting Europe Facility"

<sup>1302</sup> European Parliament and European Council, "Regulation (EU) no 1316/2013 of the European Parliament and of the Council of 11 December 2013 establishing the Connecting Europe Facility, amending Regulation (EU) No 913/2010 and repealing Regulations (EC) No 680/2007 and (EC) No 67/2010", December 2013

<sup>1303</sup> Assembly of European Regions, "Connecting Europe Facility: New call open", September 2022

<sup>1304</sup> Innovation and Networks Executive Agency (INEA), "Calls"

<sup>1305</sup> Innovation and Networks Executive Agency, "2016 CEF Transport Calls for Proposals", October 2016



fuel infrastructure along TEN-T networks.<sup>1306</sup> AFIF provides grants to selected projects, which are mandated to take on a parallel loan from the EIB.

AFIF projects are divided between preparatory ones, referring for instance to studies, and works application, aimed instead at the rollout of infrastructure on a larger scale. While preparatory projects can receive grants for up to 50% of their total cost, grant percentage is limited to 30% for works initiatives (unless cross-border, in which case the threshold is at 50%). Electric recharging infrastructure are however generally eligible for a 30% grant.<sup>1307</sup> In order to be eligible, proposers must be legal entities, either public or private, established in one of the Member States. Furthermore, applicants must have stable and sufficient resources to realise the proposed project to be awarded the grants. Applicants' capacity is valued based on disclosed financial indicators, including but not limited to profit and loss, account balance, and audited accounts for financial year, as well as parameters like dependency on EU funding, deficit, and revenues in previous years. Financial checks are not conducted for public entities.<sup>1308</sup> EV recharging infrastructural projects eligible for grants usually refer, as in the case of the ongoing as of October 2022 CEF 2 Transport - Alternative Fuels Infrastructure Facility - Cohesion envelope (CEF-T-2021-AFIFCOEN) call, to recharging stations with installed capacity above 150 kW to be installed along TEN-T roads.<sup>1309</sup>

A relevant example of CEF project is NEXT-E, an initiative financing the rollout of 222 fast-recharging points and 30 ultra-fast recharging ones across 6 East European countries, namely Croatia, Czechia, Hungary, Romania, Slovakia, and Slovenia. With a total budget of approximately €19m, NEXT-E is aimed at creating a fast-recharging network across these Member States, allowing EV drivers to move seamlessly from one country to the other. The project is relevant not only because is the fifth largest one, in terms of budget, financed by the CEF in the period from 2014 to 2020, but also because it focuses on a region that is less developed in terms of recharging infrastructure rollout.<sup>1310</sup>

As of November 2022, the grants dispersed by the CEF are as follows.

**Table 47: CEF grants for EV recharging 2014-2020<sup>1311</sup>**

#	Project	Country	Recipient	Loan (m€)	Description
1	FAST-E (DE/BE)	Belgium, Germany	Allego GmbH, Allego BVBA, DB Energie GmbH, Renault SAS, Nissan West Europe SAS, Volkswagen AG, hy-SOLUTIONS GmbH, Innogy SE, BMW, Envia Mit-teldeutsche Energie AG	7.3	Deployment of 181 multi-standard fast rechargers in Germany and 40 in Belgium.

<sup>1306</sup> European Investment Bank, "Europe's alternative fuels infrastructure getting a boost from new EIB and European Commission support", October 2021

<sup>1307</sup> Jeroen Plantinga, "CEF 2 Transport call 2022 open for applications in September", July 2022

<sup>1308</sup> Connecting Europe Facility, "Call for proposals", September 2021

<sup>1309</sup> Single Electronic Data Interchange Area (SEDIA), "Alternative Fuel Infrastructure Facility - Works - Zero Emissions"

<sup>1310</sup> Innovation and Networks Executive Agency, "NEXT-E", 2016

<sup>1311</sup> Innovation And Networks Executive Agency, "CEF Transport Projects". CEF projects were identified by filtering the direct extract from the Innovation And Networks Executive Agency and by then applying search terms "recharging", "charging", "EV", "charger" and "recharger".

#	Project	Country	Recipient	Loan (m€)	Description
2	Multimodal eMobility connectivity for the Öresund Region (MECOR)	Denmark, Sweden	Clever A/S, Öresundskraft AB	1.0	Installed 30 semi-fast recharging sites in Denmark and 30 semi-fast recharging sites in Sweden, with a total number of 119 recharging stations and 238 recharging outlets for road vehicles.
3	GREAT (Green Region for Electrification and Alternatives fuels for Transport)	Denmark, Germany, Sweden	Region Skåne, E.ON Denmark A/S, E.ON Sverige AB, E.ON Biofor Sverige AB, FordonsGas Sverige AB, Technical University of Denmark, Department of Transport (DTU-TRA), Renault SAS, Nissan West Europe SAS, E.ON Energilösningar Aktiebolag (AB)	4.3	Deployment of 69 triple standard quick rechargers and one LNG station, over 900 km of the Scandinavian-Mediterranean Corridor and the Core road network.
4	UNIT-E	Belgium, France, Italy, United Kingdom	Electricite de France SA, Renault SAS, Nissan West Europe SAS, Porto Antico di Genova spa, ABB spa, Istituto Internazionale delle Comunicazioni, Ecole nationale des Ponts et Chaussées BMW France SA	1.7	Installation of 38 fast recharging stations, including 23 in Belgium, 4 in Italy, 4 in France and 6 in the UK.
5	FAST-E (SK\CZ)	Czechia, Slovakia	Západoslovenská energetika, a.s., E.ON Česká republika, s.r.o. (E.ON CZ).	2.1	Deployment of 29 multi-standard fast rechargers.
6	EV Fast Recharging Backbone Network Central Europe	Czechia	ČEZ, a. s.	1.9	Installation of 42 multi-standard fast recharging stations, some of them including battery storage.
7	EAST-E	Croatia, Czechia, Slovakia	Západoslovenská energetika, a.s., E.ON Česka republika, Hrvatska elektroprivreda d.d., GO4, s.r.o.	5.9	The Action foresees the deployment of 62 recharging supply points along TEN-T Core Network Corridors: 57 multi-standard 50 kW fast rechargers (27 in Croatia, 20 in Slovakia, and 15 in the Czechia), of which 13 intermodal locations, and 5 AC high power rechargers at intermodal locations in Slovakia.

#	Project	Country	Recipient	Loan (m€)	Description
8	ULTRA-E	Austria, Belgium, Germany, Netherlands	Allego BV, Allego GmbH, Allego België, Audi ag, Verbund ag, Bayerische Motoren Werke Aktiengesellschaft AG, Bayern Innovativ - Bayerische Gesellschaft für Innovation und Wissenstransfer mbH, Renault sas, Magna Steyr, Engineering AG & Co KG, Magna Steyr Fahrzeugtechnik AG & Co KG	5.9	Deployment of 22 ultra-fast rechargers (150-300 kW) on TEN-T Corridors.
9	CIRVE Project	Spain, Portugal	IBIL, Gestor De Carga De Vehículo Eléctrico, S.A., Iberdrola Clientes SAU, Endesa Energía S.A., Sociedad Unipersonal, Gestión Inteligente De Cargas S.L., EDP Comercializadora, S.A.U., Asociación de Empresas Para el Desarrollo e Impulso del Vehículo Eléctrico, Centro para a Excelência e Inovação na Indústria Automóvel - CEIIA, Renault SAS, EDP Clientes S.A.	1.8	Installation of 58 recharging points located (40 in Spain, 18 in Portugal).
10	EVA+ (Electric Vehicles Arteries in Italy and Austria)	Austria, Italy	Enel SpA, VERBUND AG, Renault sas, Volkswagen Group Italia S.p.A., BMW Italia S.p.A., Nissan Italia S.R.L	4.1	Installation of 200 multi-standard fast rechargers.
11	CIRVE_PT	Portugal, Spain	MOBIE, S.A., CEIIA - Centro Para a Excelência e Inovação na Indústria Automóvel, Petroleos de Portugal - Petrogal, S.A.	1.3	Deployment of 58 multi-standard quick recharging points located (40 in Spain, 18 in Portugal).
12	NCE-FastEvNet	Poland, Slovakia	GreenWay Infrastructure, s.r.o.	3.3	Deployment of 10 multi-standard fast recharging stations for electric vehicles (EV) in Slovakia and 75 in Poland.
13	CEZ EV TEN-T Fast Recharging Network	Czechia	ČEZ, a. s.	2.5	Deployment of 60 fast recharging points at an interval no longer than 60 km (on 29 locations) and one Battery Assisted Fast Recharging Site (BAFCS) with three additional Fast recharging points, connected to an energy storage system and a source of renewable energy.

#	Project	Country	Recipient	Loan (m€)	Description
14	High speed electric mobility Across Europe	Denmark, France, Germany, Italy, Sweden, UK	Clever a/s, E.ON se, Renault s.a.s., Nissan Center Europe gmbh	9.7	Installation of 150 ultra-recharging sites along eight TEN-T Core Network Corridors.
15	BENEFIC	Belgium, Netherlands	Flemish Government, Brussels Capital Region - Brussels Mobility, Kingdom of the Netherlands - Ministry of Infrastructure and Water Management	7.6	Deployment of alternative fuel infrastructure in line with the respective NPFs as of Directive 94/14/EU.
16	E-VIA – FLEX-E mobility in Spain, France, Italy	France	Enel X S.r.l., Enel SpA, Verbund AG, Ibil Gestor de Carga de Vehículo Eléctrico, s.a., EDF sa, Renault sas, Nissan West Europe s.a.s., Enedis - sa	3.3	Deployment of 14 Ultra-Fast Recharging Stations (150 kW - 350 kW).
17	Comprehensive fast-recharging corridor network in southeast Europe	Croatia, Romania	Renovatio Asset Management SRL, Hrvatski Telekom d. d.	3.4	Installation of 71 multi-standard fast rechargers (50 kW DC and 22 Kw AC), 50 in Romania and 21 in Croatia and 7 multi-standard ultra-fast rechargers (minimum 150 kW DC), 6 in Romania and 1 in Croatia.
18	NEXT-E	Croatia, Czechia, Hungary, Romania, Slovakia, Slovenia	Západoslovenská energetika, a.s., Hrvatska Elektroprivreda d.d. (HEP d.d.), MOL Magyar Olaj- és Gázipari Nyilvánosan Működő Részvénytársaság (MOL Plc.), E.ON Česká republika, s. r. o., E.ON Energiakereskedelmi Kft. (Ltd.), PETROL d.d., Ljubljana, E.ON Energie Romania S.A., Petrol, d.o.o. (Petrol Croatia), Slovnaft a.s., MOL Česká republika, s.r.o., MOL Romania Petroleum Products SRL (MOL Romania), Tifon d.o.o. (MOL Croatia), MOL Slovenija, trgovsko podjetje d.o.o. (MOL Slovenia), BMW Vertriebs GmbH, Nissan Sales Central and Eastern Europe KFT	188	The Action will deploy a pilot network of 222 multi-standard fast recharging points and 30 ultra-fast recharging stations. It will be developed along 4 TEN-T Core Network Corridors

#	Project	Country	Recipient	Loan (m€)	Description
19	URBAN-E: e-Mobility, Infrastructure and Innovative Intermodal Services in Ljubljana, Bratislava and Zagreb	Croatia, Slovakia, Slovenia	Petrol d.d., Ljubljana, Západoslovenská energetika, a.s., GO4, s.r.o., GoOpti, d.o.o., Mestna občina Ljubljana, Petrol, d.o.o., Zagreb, Capital City of the Slovak Republic Bratislava name in Slovak: Hlavné mesto Slovenskej republiky Bratislava, Slovenske Železnice – Potniški Promet d.o.o., City of Zagreb	3.8	Deployment of 167 recharging points, of which 144 AC and 23 stations with multi-standard AC/DC fast rechargers.
20	LEM project – pilot implementation of electromobility along the TEN-T base network	Poland	Lotos Paliwa Sp. z o.o.	0.4	Installation of 12 fast recharging stations on the Gdynia–Warsaw route (A1 and A2 motorways).
21	NCE-AdvancedEvNet	Poland, Slovakia	GreenWay Infrastructure s.r.o.	6.2	Deployment of ultra-fast rechargers of up to 350kW (10 in Poland, 3 in Slovakia), fast recharging stations of 40-50kW (60 in Poland), normal recharging stations (7-22kW) (50 in Poland, 20 in Slovakia) and 10 battery assisted recharging systems to cover peak demand (in Poland).
22	EUROP-E: European Ultra-Charge Roll Out Project - Electric	Austria, Belgium, Denmark, France, Germany, Ireland, Italy, Netherlands, Poland, Portugal, Spain, Sweden, United Kingdom	IONITY, Bayerische Motoren Werke Aktiengesellschaft, Daimler, Ford of Europe GmbH, Volkswagen AG, Mercedes-Benz AG	39.1	Creation of an interoperable pan-European high-speed recharging network that is capable of accommodating the re-recharging needs of both existing (50 kW) and future (350 kW) long distance electric mobility. The Action is embedded in a Global Project that encompasses 1500 ultra-recharging sites in 13 European countries by 2026.

#	Project	Country	Recipient	Loan (m€)	Description
23	Central European Ultra Re-charging	Austria, Czechia, Italy, Romania, Slovakia	Verbund ag, GreenWay Infrastructure s.r.o., OMV Petrom Marketing S.R.L., Enel X s.r.l., Pražská energetika, a. s., Renovatio Asset Management SRL	6.1	Deployment of ultra-fast recharging stations (up to 350 kW).
24	MEGA-E: Metropolitan Greater Areas - Electric	Belgium, Denmark, Estonia, Finland, France, Germany, Latvia, Lithuania, Luxembourg, Netherlands, Poland, Sweden	Allego BV, Mega-E Recharging B.V	29.3	Deployment of 202 ultra-fast recharging stations (up to 350 kW) and 39 multi-modal e-hubs allowing UC and/or intermodality with e-taxi, e-car sharing, e-logistics or e-buses.
25	MULTI-E: Multiple Urban and Long-distance Transport Initiatives – Electric and CNG	Croatia, Italy, Slovakia, Slovenia	Petrol, Slovenian Energy Company d.d., Ljubljana, NOMAGO Storitve mobilnosti in potovanj d.o.o., Arriva Dolenjska in Primorska, družba za prevoz potnikov, d.o.o., Mestna občina Koper (Municipality of Koper), Západoslovenská energetika, a.s., Municipality of Celje	12.9	Purchase of 12 e-bus acquisition and re-charging infrastructure deployment, launch Mobility-as-a-Service (MaaS) e-vehicle fleets (920) with supporting infrastructure and IT platform, deploy publicly accessible electric and Compressed Natural Gas (CNG) recharging networks for a variety of urban and corridor travel needs with 16 CNG stations, 24 Ultra Chargers, 349 AC rechargers, 5 recharging hubs and 6 e-bus recharging stations, for a total of roughly 1,000 supply points.
26	CORRIDOR	France	IZIVIA	4.8	Installation of 200 electric vehicle fast-recharging points.
27	CRE8: Creating the station of the future	Italy	Kuwait Petroleum Italia S.p.A.	3.1	Creation of 32 multi-product stations through the installation of 31 CNG, 5 LNG and 26 Electric Fast rechargers.
28	AMBRA-Electrify Europe	Italy, Romania, Spain	Enel X. S.r.l.	14.1	Deployment of 3.1k electric vehicle re-charging stations on 6 TEN-T Core Networks Corridors.

#	Project	Country	Recipient	Loan (m€)	Description
29	REMETBUS 2 Rotterdam	Netherlands	ROTTERDAMSE ELEKTRISCHE TRAM N.V.	3.3	Deployment of 24 opportunity and 50 overnight recharging stations, as well as the introduction of 105 ZEBs.
30	ISM - Iberdrola Smart Mobilit	Spain, Portugal	Iberdrola Clientes, S.A.	13.4	Deployment 592 recharging stations with 2,339 either high power (350 kW-150 kW) or fast (50 kW, 43 kW) recharging points. 416 recharging stations and 1,690 recharging points will on the TEN-T Core Network and 176 recharging stations with 649 recharging points on the TEN-T Comprehensive Network.
31	Development of a network of alternative fuel technology in the Atlantic and Mediterranean corridors across Spain	Spain	Repsol Comercial de Productos Petroliferos S.A.	3.3	Installation of 427 EV recharging stations.
32	Project Everest	Spain	NORDIAN CPO, SL.	7.3	Deployment of 256 electric vehicle (EV) High Power Recharging points (HPC) with 100-150kW capacity.
33	Development of a network of alternative fuel technology in the Atlantic and Mediterranean corridors in Spain & Portugal	Portugal, Spain	Repsol Comercial de Productos Petroliferos s.a., Repsol Portuguesa, lda.	1.8	Instalaltion of 183 recharging stations, including 165 (DC 50kW, CHAdemo, AC 43kW) and 18 (150 kW).



#	Project	Country	Recipient	Loan (m€)	Description
34	Installation of 160 High technology re-charging points to boost electromobility in the Iberic Peninsula corridors	Portugal, Spain	EDP Comercial - Comercialização Energia, S. A., EDP Clientes S.A.	1.4	Deployment of 160 fast recharging points (minimum 50kW).
35	Total High Power Re-charging	Belgium, France, Germany, Luxembourg, Netherlands	TotalEnergies Marketing Services	17	Deployment of 326 HPC stations on TEN-T Core and Comprehensive networks with one recharging station located at least every 150 km.
36	MALTES	France	Proviridis SAS	3.6	Deployment of 12 multi-energy stations, 5 of these bio natural gas (BioNGV), liquefied and/or compressed, and hydrogen while 7 only BioNGV. Also 57 electric recharging points (150 - 350 kW).
37	EV Re-charging Italy	Italy	Be Charge s.r.l.	5.4	Deployment of 550 electric fast re-chargers.
38	EV Stations 2.0 – Building up the next generation infrastructure for Electric Vehicles	Italy	Italiana Petroli S.p.A.	3.7	Deployment of 90 fast recharging stations (50 kW) and 90 ultra-fast recharging stations (from 150 kW up to 350 kW).
39	Development of smart e-recharging services in Italy	Italy	Duferco Energia SpA	2.1	Installation of 420 re-charging points.

#	Project	Country	Recipient	Loan (m€)	Description
40	A2A E-moving network infrastructure	Italy	A2A EMobility SRL	1.7	Installation of 552 recharging points with a capacity of at least 50kW, across the urban nodes of the TEN-T Core Network on sections of the Rhine-Alpine, Scandinavian-Mediterranean and Mediterranean Corridors.

### **European Investment Bank**

The European Investment Bank (EIB) is the lending arm of the European Union, covering the provision of loans.<sup>1312</sup> The EIB promotes the Union's priorities and mainly focuses on areas such as climate and environmental sustainability, infrastructure, cohesion and development.<sup>1313</sup> The loans the bank offers to private market players are characterised by attractive pricing, thanks to the EIB's advantageous funding conditions on the market, and long financing terms, with project finance that can reach maturity beyond 30 years.<sup>1314</sup> Traditionally a supporter of the transport sector in the EU, in 2022 the EIB updated its Transport Lending Policy to align it with its Climate Bank Roadmap as well as with the EU's Sustainable and Smart Mobility Strategy.<sup>45</sup> The updated policy prioritises investment in sustainable transport, with particular concern for the deployment of alternative fuels infrastructure when it comes to road mobility.<sup>1315</sup> Concerning EV recharging, the new Transport Lending Policy mentions it as an investment priority area for urban and extra-urban mobility, as well as for fleets in the logistics sector.<sup>1316</sup> The main advancement the updated policy brings about is a more detailed focus on alternative fuels infrastructure, while the policy's former version referred to projects' environmental sustainability in broader terms.<sup>1317</sup>

As stated in the TFEU article 309, the EIB focuses on the provision of financing for less-developed areas within the EU, as well as for those projects that either enhance the EU's internal market or are of common interest to multiple Member States.<sup>1318</sup> While there is no limitation for firms to apply for EIB loans, neither in terms of company size nor credit rating, larger firms interact with the EIB directly while financing to small and medium enterprises (SMEs) is provided via intermediate lending partners (i.e. local banks).<sup>1319</sup> The economic soundness of a project is then considered in financing decisions, together with project's technical and environmental data, for provision of financing that can cover up to 50% of the initiative's total costs.<sup>1320, 1321</sup>

The loans dispersed by the EIB are as follows.

<sup>1312</sup> European Investment Bank, "Projects' Eligibility"

<sup>1313</sup> European Investment Bank, "Our Priorities"

<sup>1314</sup> European Investment Bank, "Loans for the private sector"

<sup>1315</sup> European Investment Bank, "EIB approves new Transport Lending Policy for a safe, secure, accessible, green and efficient mobility system", July 2022

<sup>1316</sup> European Investment Bank, "Transport Lending Policy 2022", July 2022

<sup>1317</sup> European Investment Bank, "EIB Transport Lending Policy", December 2011

<sup>1318</sup> European Investment Bank, "Statute and other Treaty provisions", March 2020

<sup>1319</sup> European Investment Bank, "What we offer"

<sup>1320</sup> European Investment Bank, "Applying for an EIB loan – Application Documents", September 2013

<sup>1321</sup> European Investment Bank, "Frequently Asked Questions"

**Table 48: EIB loans for EV recharging 2014-2022<sup>1322</sup>**

#	Market	Recipient	Loan size (m€)	Description	Signature date
1	Czechia	Greenway EV Recharging Network (edp)	1	Expansion of Greenway's fast and ultra-fast recharging network across Central and Eastern Europe.	October 2018
2	France	EMobility high power recharging stations	80	Installation of 500 recharging stations with capacity between 150 kW and 350 kW in service stations along the TEN-T network	December 2020
3	France	Eurofideme 4 fund	8	Financing of equity fund investing in, among others, EV recharging infrastructure.	October 2018
4	Italy	EV Smart e-recharging Network	20	Loan to Duferco Energy for the Installation of 1.8k recharging stations.	February 2022
5	Italy	EV Recharging Italy (fm)	25	Loan to Be Charge for the deployment of 6.9k recharging stations with capacity higher than 22kW.	December 2019
6	Italy	Enel Open Power	20	Financing of ENEL's Group electric vehicles recharging network throughout Italy over the period 2018-2022.	July 2018
7	Poland	Greenway EV Recharging Network (edp)	13	Expansion of Greenway's fast and ultra-fast recharging network across Central and Eastern Europe.	October 2018
8	Portugal	Galp EV Sustainable Recharging Network	64	Installation of 5.5k recharging points.	October 2021
9	Slovakia	Greenway EV Recharging Network (edp)	3	Expansion of Greenway's fast and ultra-fast recharging network across Central and Eastern Europe.	October 2018
10	Spain	Project Everest – Wenea (fm)	50	Installation of fast and super-fast recharging stations along highways, in measure of at least one per 100km.	December 2020

<sup>1322</sup> European Investment Bank, "Financed Projects", data collected as of November 2022

#	Market	Recipient	Loan size (m€)	Description	Signature date
11	Spain	Endesa EV Sustainable Recharging Network	35	Deployment of 4k recharging stations.	July 2020
12	The Netherlands	Allego BV	40	Quasi-equity investment in Allego BV.	Allego 2018

## Interreg Europe

Interreg Europe is a project co-financed by the EU and aiming at the reduction of disparities in economic development and quality of life levels across European regions.<sup>1323</sup> First launched in 1990 as the European Territorial Cooperation (ETC), Interreg is currently in its fifth programming period, going from 2021 to 2027 for which a total budget of €379m has been provided. Aimed at public authorities and business support organisations, including development agencies, Interreg provides grants to fund projects across 7 thematic areas scoping from smart innovation to social and governance issues. EMobility is covered under the “More Connected Europe” banner, with the goal of supporting sustainable mobility and TEN-T Networks, as well as under the “Greener Europe” banner which covers zero-carbon urban mobility.<sup>1324</sup> Primarily focused on policy improvement, Interreg has during the current phase supported projects addressing EV recharging only within the “Greener Europe” area. For example, the EV Energy initiative aims at implementing policies supporting EV recharging deployment in urban areas and has financed the deployment of 20k recharging points across 3 Dutch provinces.<sup>1325,1326</sup> As of October 2022, no project has been implemented within the “More Connected Europe” area.<sup>1327</sup> During the previous phase from 2014 to 2020, 21 of Interreg projects involved the installation of recharging points, for a total budget of €10m. Sometimes co-financed by the ERDF (for a total of €17m), these projects were developed in cooperation with local authorities, such as ministries and municipalities, as well as universities and research centres, with limited involvement of companies.<sup>1328</sup> For example, with a budget of €6.4m the Faster project is deploying 73 ultra-fast recharging stations across Ireland, Northern Ireland and Scotland during the period from 2014 to 2023. The initiative is led by the East Border Region, a local authority serving people across Ireland and Northern Ireland and supported by six other local authorities and institutions.<sup>1329</sup>

The grants dispersed by Interreg Europe are as follows.

**Table 49: Interreg Europe grants for EV recharging (2014-2020)**

#	Project	Market	Recipient	Grant (m€)	Description
1	CAR (seed)	Poland Denmark Lithuania Sweden	Municipality of Bastad, Foundation of Energy Saving Industrial Development Centre South PVA-MV AG	0.1	Deployment of pilot projects in-stalling EV re-charging infrastructure
2	CGTN	Hungary Slovakia Romania Ukraine	Town of Michalovce Municipality of Baia Mare Municipality of Nyíregyháza Ivano-Frankivsk City Council Charitable Foundation "Teple Misto"	0.3	Installation of public EV re-charging infrastructure in selected cities

<sup>1323</sup> European Commission, “Cross-border cooperation: the EU Interreg programme celebrates 30 years of bringing citizens closer together”, February 2020

<sup>1324</sup> Interreg Europe, “What is Interreg Europe?”

<sup>1325</sup> Interreg Europe, “Electric Vehicles for City Renewable Energy Supply”, January 2017

<sup>1326</sup> Interreg Europe EV Energy, “20,000 new charging points in 3 Dutch provinces”, January 2020

<sup>1327</sup> Interreg Europe, “Interreg Europe”

<sup>1328</sup> Keep EU, “Search results-project view”

<sup>1329</sup> Interreg Faster, “Our Partners”

#	Project	Market	Recipient	Grant (m€)	Description
3	DTP1-454-3.1 eGUTS	Slovenia Slovakia Austria Hungary Serbia Romania Czechia	Transport Research Centre The Romanian Sustainable Energy Cluster South-Transdanubian Area- and Economic Development Nonprofit Ltd Research Burgeland GmbH City of Zadar Municipality of Velenje University of Maribor Center of Excellence for Renewable Energy, Energy Efficiency and Environment Transport Research Institute J.S.Co. YARDO Institute	1.5	Installation of 5 public and free EV recharging stations across selected cities
4	Deeldezoon	Belgium Netherlands	Zuidtrant - 2 Zonnova BV i.LECO ZuidtrAnt cvba Over Morgen PARKnCHARGE Buurauto bv Mijndomein Energie b.v. Ecopower cv	1.9	Installation of public EV recharging stations in neighborhoods across border regions
5	E-mission in the Ore-sund Region	Denmark Sweden	Avdelingen för stadsutveckling och klimat, Malmö stad City of Helsingborg City of Copenhagen The Capital Region of Denmark Öresundskraft AB	0.9	Installation of public EV recharging infrastructure on both sides of the Oresund strait
6	E.VE.C R.I.	Greece Bulgaria	Centre for Research and Technology-Hellas (CERTH) Alliance of Producers of Ecological Energy-BG BULGARIAN ELECTRIC VEHICLES ASSOCIATION	2.9	Deployment of shared territorial EV recharging stations
7	FASTER	United Kingdom Ireland	East Border Region Ltd	5.7	Installation of 73 recharging stations across Ireland, Northern Ireland and Scotland
8	Green-Wheels	Hungary Slovakia Romania Ukraine	KIÚT Regional Development Association First Contact Center - Michalovce Factory of Investment Projects	0.8	Deployment of public EV recharging infrastructure to support cross-border mobility

#	Project	Market	Recipient	Grant (m€)	Description
9	Kontaktloos Laden	Germany Netherlands	Alwin Otten GmbH De Roo Drymer Emsland GmbH Emsland Moormuseum Emsland Touristik GmbH Green Dino B.V. INTIS Klaver Bikemotion BV Partner Provincie Groningen Partner provincie Drenthe RKT Solar Tizin Mobile Witec Fijnmechanische Techniek BV	0.8	Installation of inductive EV re-charging stations publicly accessible
10	Mobi-Tour	Italy Slovenia	MUNICIPALITY OF CAORLE Comune di Lignano Sabbiadoro ISTITUTO DI SOCIOLOGIA INTERNAZIONALE DI GORIZIA	1.1	Deployment of public EV re-charging infrastructure via 5 pilot projects
11	NemoNet	Slovakia Austria	Gemeinde Jois Mesto Modra Municipality of Purbach	1.2	Deployment of pilot projects installing EV re-charging infrastructure
12	EVcc	Hungary Croatia	Government of Baranya County City of Koprivnica University of Pécs Regional Energy Agency North	0.2	Installation of one public EV recharging station within a pilot project
13	Green Inter-e-Mobility	Greece Republic of North Macedonia	University of Western Macedonia - Dept.of Electrical Engineering	0.9	Installation of 4 solar-powered public EV re-charging stations
14	SMISTO	Italy Switzerland	Agenzia del trasporto pubblico del bacino di Como, Lecco e Varese(Como) Cantone TicinoDipartimento del territorio (Bellinzona) Commissione regionale dei trasporti del Mendrisiotto e Basso Ceresio(Mendrisio) Gestione Governativa Navigazione Laghi (Como) Regione Lombardia - DG INFRASTRUTTURE, TRASPORTI E MOBILITA' SOSTENIBILE( Milano) Società Navigazione del Lago di Lugano(Lugano)	1.4	Installation of two public EV recharging stations

### European Regional Development Fund

Aimed at addressing regional imbalances across the EU, the European Regional Development Fund (ERDF) has a broad spectrum of objectives among which there is the provision of basic transport infrastructure as well as the support for the low-carbon



transition, including in eMobility.<sup>1330</sup> With a total budget of €200b for the period from 2014 to 2020, the ERDF provided funding via grants as well as loans, guarantees and equity investments.<sup>1331</sup> While the ERDF does not have a specific focus on eMobility, the topic is addressed by several projects across the fund's different thematic concentrations (the ones for the 2014-2020 period were innovation and research, digital agenda, support for SMEs and low-carbon economy).<sup>1332</sup> As a matter of fact, the installation of EV rechargers was sometimes included in projects aimed at improving local air quality, as in the cities of Sofia and Varna in Bulgaria, as well as in initiatives in support of the low-carbon economy, as in the case of Malta where the EV recharging network was expanded via ERDF funding.<sup>1333,1334,1335</sup> Furthermore, as it emerged from the regulatory and competitive overviews in Appendix A, ERDF funds supported the deployment of EV recharging infrastructure in smaller municipalities. That was for instance the case in different East European countries including Lithuania, Latvia, and Slovenia. In Lithuania for example, 17 municipalities used ERDF funds to install a total of 56 recharging stations in the period from 2014 to 2020.<sup>1336</sup> Lastly, ERDF co-financed projects on EV recharging from Interreg Europe for a total estimated budget of €17m over the period from 2014 to 2020.<sup>1337</sup>

### **Recovery and Resilience Facility**

The Recovery and Resilience Facility (RRF) was launched in February 2021 to implement the NextGenerationEU programme aimed at enhancing the union's financial recovery from the Covid-19 pandemic.<sup>1338,1339</sup> A total budget of €724b, €338b of which in grants and €386b in loans, are to be disbursed to Member States which are required to submit a national recovery and resilience plan each including a plan of reforms and investments.<sup>1340</sup> The national plans need to follow country specific recommendations provided by the EU Commission.<sup>1341</sup> Overall, the RRF addresses issues as the green transition, digital transformation and smart and sustainable economic growth all of which are related to eMobility. In addition to that, the European Commission strongly encouraged Member States to include "Recharge and Refuel" as a flagship area to devote investments to. "Recharge and Refuel" refers to sustainable mobility and it explicitly mentions EV recharging as one core aspect.<sup>1342</sup> In line with the Commission's indication, different Member States included public EV recharging in their national plans, including Croatia, Belgium, Bulgaria, Czechia, Germany, Greece, Italy, Lithuania, Luxembourg, Portugal, Slovakia and Spain.<sup>1343</sup> Italy for instance has allocated €740m in grants to cover up to 40% of the installation costs for recharging stations. Going from

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<sup>1330</sup> European Parliament and European Council, "Regulation (eu) no 1301/2013 of the European Parliament and of the Council of 17 December 2013 on the European Regional Development Fund and on specific provisions concerning the Investment for growth and jobs goal and repealing Regulation (EC) No 1080/2006", December 2013

<sup>1331</sup> Fi Compass, "The European Regional Development Fund / Cohesion Fund"

<sup>1332</sup> European Commission, "European Regional Development Fund 2014-2020", 2014

<sup>1333</sup> European Commission, "Kohesio: discover EU projects in your region - Implementation of activities to improve ambient air quality in Sofia Municipality by purchasing and supplying electric vehicles for road transport — electric buses and trolleybuses", October 2019

<sup>1334</sup> European Commission, "Kohesio: discover EU projects in your region - Environmentally friendly transport for Varna", November 2019

<sup>1335</sup> European Commission, "Kohesio: discover EU projects in your region - SMITHS: Introduction of Sustainable Multi Intermodal Transport Hubs across Malta and Gozo", March 2016

<sup>1336</sup> Ministry of Transport of the Republic of Lithuania, "Development of electric vehicle infrastructure"

<sup>1337</sup> CRA Analysis of data from Keep.EU, "Project view"

<sup>1338</sup> European Commission, "Recovery and Resilience Facility"

<sup>1339</sup> European Commission, "Recovery plan for Europe"

<sup>1340</sup> European Commission, "Recovery and Resilience Scoreboard"

<sup>1341</sup> European Commission, "2022 European Semester: Country Specific Recommendations / European Commission Recommendations" May 2022

<sup>1342</sup> European Commission, "NextGenerationEU: European Commission presents next steps for €672.5 billion Recovery and Resilience Facility in 2021 Annual Sustainable Growth Strategy", September 2020

<sup>1343</sup> European Commission, "Recovery and Resilience Facility Scoreboard, Country Overview"

2022 to 2024, the initiative is aimed at supporting the deployment of recharging infrastructure evenly across the country, with the installation focused on existing fuel refilling stations.<sup>1344,1345</sup>

### **EU public support by country**

**Table 50: EU public support by Country**

Country	EU public support <sup>1346</sup>		
	EIB loans (2014-2022)	CEF grants (2014-2020)	Interreg grants (2014-2020)
Austria	€0.0m	€7.7m	€0.8m
Belgium	€0.0m	€18.4m	€1.0m
Bulgaria	€0.0m	€0.0m	€0.1m
Croatia	€0.0m	€11.3m	€0.1m
Cyprus	€0.0m	€0.0m	€0.0m
Czechia	€1.0m	€11.8m	€0.2m
Denmark	€0.0m	€9.2m	€0.5m
Estonia	€0.0m	€2.7m	€0.0m
Finland	€0.0m	€2.7m	€0.0m
France	€87.5m	€20.7m	€0.0m
Germany	€0.0m	€17.2m	€0.4m
Greece	€0.0m	€0.0m	€0.6m
Hungary	€0.0m	€3.1m	€0.6m
Ireland	€0.0m	€3.0m	€2.8m
Italy	€65.0m	€33.2m	€1.3m
Latvia	€0.0m	€2.7m	€0.0m
Lithuania	€0.0m	€2.7m	€0.0m
Luxembourg	€0.0m	€6.1m	€0.0m
Malta	€0.0m	€0.0m	€0.0m
Netherlands	€40.0m	€17.6m	€1.4m
Poland	€13.4m	€10.8m	€0.0m
Portugal	€63.5m	€12.6m	€0.0m
Romania	€0.0m	€10.8m	€0.5m
Slovakia	€2.6m	€16.6m	€1.1m
Slovenia	€0.0m	€7.6m	€0.8m
Spain	€85.0m	€29.5m	€0.0m
Sweden	€0.0m	€9.2m	€0.5m
United Kingdom	€0.0m	€5.1m	€2.8m
<i>Total</i>	<i>€358.0m</i>	<i>€272.2m</i>	<i>€15.5m</i>

### **National EV recharging incentives**

National State aid to EV recharging has traditionally been provided according to the TFEU. In particular, Article 107.3.c has been often advocated for the provision of State

<sup>1344</sup> This was extracted directly from the Keep.EU database. Additional funds may have also been committed.

<sup>1345</sup> EconomiaCircolare, "From MiTE 741 million euros for recharging electric cars. But there are also critical issues", May 2022

<sup>1346</sup> Grants from CEF and Intereg sources are often supporting projects that span multiple Member States and the data does not specify precisely how the grant is allocated between Member States, these projects are in turn modelled uniformly as if each Member State receives an equal share of the grant

aid to the sector.<sup>1347</sup> According to this, Member States notified State aid measure to the European Commission, as their implementation was conditioned to the Commission's approval. An exemption to that has been article 56 of the GBER, which exempted smaller amounts of State aid for local infrastructures from the notification process to the European Commission.<sup>1348</sup> Such exemption was granted only for projects fulfilling specific criteria, with aid amounts remaining below GBER thresholds.

Furthermore, in May 2021, the GBER was revised to allow, with the introduction of Article 36.a, State aid to public recharging for road vehicles to be directly implemented by Member States, for projects complying with GBER thresholds and criteria. The exemption granted Member States the capacity to provide State aid to the sector without needing to first notify the European Commission. The measure was introduced to support Member States in accelerating sustainable and digital transitions while enhancing economic recovery following the coronavirus pandemic.<sup>1349</sup> As per Regulation 2021/1237/EU of July 2021 (GBER) article 36.a, the exemption concerns State aid aimed at supporting the deployment of public recharging infrastructures, covering purchase and installation costs (up to 100% of total eligible costs), to be awarded via a competitive bidding process. Furthermore, article 36.a specifies that State aid is presumed to be necessary when the BEV adoption rate is below 2% of the total vehicle fleet.<sup>1350</sup>

In January 2022, the European Commission provided a Communication on the new Guidelines on State aid for Climate, Environmental protection and Energy (CEEAG).<sup>1351</sup> The CEEAG regulates State aid which is not exempted as per the GBER and which is provided to specific sectors in the areas of environmental protection and energy. In particular, Section 4.3.2 regulates aid for the deployment of EV recharging infrastructure, defining the conditions under which, and the way in which, it can be provided.<sup>1352</sup>

As at December 2022, 35 State aid measures to EV recharging were found.<sup>1353</sup> These included both aid complying with the thresholds and criteria set by article 36.a of the GBER as well as aid exceeding those thresholds and thus provided under article 107.3.c of the TFEU (in line with Section 4.3.2 of the CEEAG as of January 2022). As discussed above, State aid has sometimes been provided to EV recharging before the introduction of article 36.a of the GBER in May 2021, under article 56 of the GBER. 27 State aid schemes were implemented under Article 36.a of the GBER. Out of these, 21 involved the deployment of EV recharging infrastructure, while 6 were focused on other alternative fuel infrastructure.<sup>1354</sup> These State aid schemes are reported in Table 51. While some of them focus solely on EV recharging, others encompass more areas, such

<sup>1347</sup> Official Journal of the European Union, "Consolidated Version Of The Treaty On The Functioning Of The European Union - Part Three: Union Policies And Internal Actions - Title VII: Common Rules On Competition, Taxation And Approximation Of Laws - Chapter 1: Rules On Competition - Section 2: Aids Granted By States - Article 107 (Ex Article 87 Tec)", May 2008

<sup>1348</sup> Official Journal of the European Union, "Commission Regulation (EU) 2021/1237 of 23 July 2021 amending Regulation (EU) No 651/2014 declaring certain categories of aid compatible with the internal market in application of Articles 107 and 108 of the Treaty (Text with EEA relevance)", July 2021

<sup>1349</sup> European Commission, "State aid: Commission widens scope of General Block Exemption Regulation", July 2021

<sup>1350</sup> Official Journal of the European Union, "Commission Regulation (EU) 2021/1237 of 23 July 2021 amending Regulation (EU) No 651/2014 declaring certain categories of aid compatible with the internal market in application of Articles 107 and 108 of the Treaty (Text with EEA relevance)", July 2021

<sup>1351</sup> Official Journal of the European Union, "Communication from the Commission – Guidelines on State aid for climate, environmental protection and energy 2022", February 2022

<sup>1352</sup> Ibid.

<sup>1353</sup> All data were retrieved from the European Commission Competition Policy State Aid Register. All State aid implemented under article 36.a (for the years 2021 and 2022) and 56 (for the years from 2016 to 2022) of the GBER was considered, filtering for measures under article 56 to select only those aimed at EV recharging. State aid provided under the TFEU was considered for the period from 2016 to 2022, selecting that aimed at EV recharging by applying search terms "recharging", "charging", "EV", "charger" and "recharger"

<sup>1354</sup> European Commission, "Competition Policy, State Aid Register"

as the Greek “Loan Support Under the Recovery and Resilience Facility”. Overall, all the annual budgets displayed below, as displayed on the European Commission State Aid Register, do not exclusively refer to EV recharging but might sometimes include State aid to other sectors.<sup>1355</sup> Moreover, the following table displays other State aid measures focused on public EV recharging and implemented between 2016 and 2022.

**Table 51: State aid measures for publicly accessible EV recharging infrastructures in the EU27 + the UK (2016-2022)**<sup>1356</sup>

#	Member State	Measure name	Annual Budget	Legal basis	Dates
1	Czechia	National Environment Programme 2015–2026	CZK 1.8m (€0.1m)	Art. 36.a GBER <sup>1357</sup>	April 2015 – December 2026
2	Czechia	State aid scheme in supporting the construction of publicly accessible recharging and refuelling stations for vehicles running on alternative fuels in Czechia <sup>1358</sup>	€8m	Art. 107.3.c TFEU	2017 – 2023
3	Denmark	Charging Stations for Electric Vehicles <sup>1359</sup>	DKK 60m (€8m)	Art. 107.3.c TFEU	2020 - 2022
4	Denmark	Charging Stations for Electric Vehicles	DKK 64m (€9m)	Art. 36.a GBER	March 2022 – March 2023
5	Denmark	Support scheme for Publicly Accessible Charging Stations for Electric Vehicles on Private Areas	DKK 49m (€7m)	Art. 36.a GBER	October 2022 – December 2025
6	Denmark	Support scheme for alternative fuels infrastructure for commercial transport	DKK 59m (€8m)	Art. 36.a GBER	June 2022 – December 2025

<sup>1355</sup> European Commission, “Competition policy, State Aid Register: investment aid for publicly accessible recharging infrastructures for zero and low emissions vehicles”

<sup>1356</sup> All data were retrieved from the European Commission Competition Policy State Aid Register as at December 2022. All State aid implemented under article 36.a (for the years 2021 and 2022) and 56 (for the years from 2016 to 2022) of the GBER was considered, filtering for measures under article 56 to select only those aimed at EV recharging. State aid provided under the TFEU was considered for the period from 2016 to 2022, selecting that aimed at EV recharging by applying search terms “recharging”, “charging”, “EV”, “charger” and “recharger”. Missing information on dates and legal basis was not available from the data source mentioned above. All data can be found at European Commission, “Competition policy, State Aid Register: investment aid for publicly accessible recharging infrastructures for zero and low emissions vehicles”

<sup>1357</sup> All data on State aid measures implemented as per art. 36.a of the GBER were retrieved from: European Commission, “Competition policy, State Aid Register: investment aid for publicly accessible recharging infrastructures for zero and low emissions vehicles”

<sup>1358</sup> European Commission, “Competition Policy State Aid Register: State aid scheme in supporting the construction of publicly accessible recharging and refuelling stations for vehicles running on alternative fuels in Czech Republic”, November 2017

<sup>1359</sup> European Commission, “Competition Policy State Aid Register: Charging stations for electric vehicles”, January 2021

#	Member State	Measure name	Annual Budget	Legal basis	Dates
7	Denmark	Deployment of recharging infrastructure for electric vehicles along the Danish state roads	DKK 500m (€67m)	Art. 36.a GBER	July 2022 – December 2030
8	Finland	Transport infrastructure support 2022-2025, high-power charging points and hydrogen refuelling points	€28m	Art. 36.a GBER	May 2022 – December 2025
9	France	Scheme exempt from notification relating to investment aid for publicly accessible recharging or refuelling infrastructure for low- or zero-emission road vehicles	€130m	Art. 36.a GBER	February 2022 – December 2023
10	Germany	Thuringia: Guideline of the Free State of Thuringia to promote electromobility – E-Mobil Invest	€1.5m	Art. 36.a GBER	April 2022 – December 2023
11	Germany	Funding Guidelines for Electric Vehicle Charging Infrastructure in Germany <sup>1360</sup>	€83m		2017 – 2022
12	Germany	Federal aid scheme for the acquisition of light and heavy commercial vehicles with alternative, climate-friendly propulsion systems and ancillary EV charging facilities <sup>1361</sup>	€127m	Art. 107.3.c TFEU	December 2021 – December 2024
13	Germany	Charging infrastructure for e-mobility in Germany <sup>1362,1363</sup>	€75m		2017 – 2021
14	Germany	Publicly accessible charging infrastructure for electric vehicles in Germany <sup>1364</sup>	€100m		2021 – 2025
15	Germany	Schleswig-Holstein programme for e-mobility charging stations <sup>1365</sup>	€6m	Art 56 GBER	2020 – 2022

<sup>1360</sup> European Commission, "Competition Policy State Aid Register: Charging infrastructure for e-mobility in Germany"

<sup>1361</sup> European Commission, "Competition Policy State Aid Register: Federal aid scheme for the acquisition of light and heavy commercial vehicles with alternative, climate-friendly propulsion systems and ancillary EV charging facilities", December 2021

<sup>1362</sup> European Commission, "Competition Policy State Aid Register: Charging infrastructure for e-mobility in Germany", March 2017

<sup>1363</sup> European Commission, "Competition Policy State Aid Register: Modification to SA.46574 - Charging infrastructure for e-mobility in Germany", December 2020

<sup>1364</sup> European Commission, "Competition Policy State Aid Register: Publicly accessible charging infrastructure for electric vehicles in Germany", August 2021

<sup>1365</sup> European Commission, "Competition Policy State Aid Register: Schleswig-Holstein programme for e-mobility charging stations", August 2020

#	Member State	Measure name	Annual Budget	Legal basis	Dates
16	Germany	Model project for the further development of urban development funding mobility stations as part of the model project Erfurt Southeast	€200k	Art. 36.a GBER	November 2022 <sup>1366</sup>
17	Germany	FRL Urban renewal	€20m	Art. 36.a GBER	March 2022 – December 2023
18	Greece	Loan Support Under the Recovery and Resilience Facility	€140m	Art. 36.a GBER	February 2022 – December 2023
19	Italy	Subsidiary measure for local authorities to incentivise the deployment of EV recharging infrastructure across the Lombard territory	€3m	Art. 36.a GBER	December 2021 – December 2023
20	Ireland	Electric Vehicle Public Charge Point Grant <sup>1367</sup>	€1m	Art. 56 GBER	September 2019 – December 2024
21	Luxembourg	Aid scheme for the deployment of charging infrastructures <sup>1368</sup>	€10m	Art. 107.3.c TFEU	2022 – 2025
22	Netherlands	Zwolle Smart Charging Plaza 2022	€85k	Art. 36.a GBER	N/A
23	Netherlands	Subsidy scheme co-financing European programs 2021-2027 Noord-Brabant	€13m	Art. 36.a GBER	September 2022 – December 2023
24	Netherlands	Groupcharge App: Efficient charging for Corporate EV-fleets <sup>1369</sup>	€0.9m	Art. 56 GBER	2019
25	Netherlands	Green Deal for Electric Vehicle Charging Infrastructure <sup>1370</sup>	€8m	Art. 107.3.c TFEU	2015 – 2018

<sup>1366</sup> End date not available

<sup>1367</sup> European Commission, "Competition Policy State Aid Register: Electric Vehicle Public Charge Point Grant", September 2019

<sup>1368</sup> European Commission, "Competition Policy State Aid Register: Aid scheme for the deployment of charging infrastructures", June 2022

<sup>1369</sup> European Commission, "Competition Policy State Aid Register: Groupcharge App: Efficient charging for Corporate EV-fleets", September 2019

<sup>1370</sup> European Commission, "Competition Policy State Aid Register: Green Deal for Electric Vehicle Charging Infrastructure", January 2017

#	Member State	Measure name	Annual Budget	Legal basis	Dates
26	Poland	Aid for the green transformation of cities under the National Recovery and Resilience Plan	PLN 523m (€110m)	Art. 36.a GBER	November 2022 – June 2024
27	Poland	Development of a recharging infrastructure for electric vehicles and hydrogen refuelling stations <sup>1371</sup>	PLN 800m (€173m)	Art. 107.3.c TFEU	2022 – 2025
28	Romania	State aid scheme "Support granted for the implementation of the Recovery and Resilience Arrest Plan within the Recovery and Resilience Mechanism - PNRR/2022/C10-Local Fund - promotion of recharging infrastructure for electric vehicles"	RON 237m (€48m)	Art. 36.a GBER	April 2022 – December 2026
29	Romania	Development of a charging infrastructure for plug-in hybrid and purely electric vehicles <sup>1372</sup>	RON 250m (€8m)	Art. 107.3.c TFEU	2020 – 2025
30	Slovakia	State aid scheme from the Slovak Republic's Recovery and Resilience Plan to support the construction of infrastructure for alternative fuels	€10m	Art. 36.a GBER	October 2022 – June 2026
31	Spain	TRTEL - Aid for the transformation of passenger and freight transport fleets of private companies that provide road transport services: Implementation of electric vehicle recharging (MRR)	€29m	Art. 36.a GBER	January 2022 – December 2023
32	Spain	TRTEL - Support Program for Sustainable and Digital Transport: M9. Actions to support the implementation of alternative fuel refuelling infrastructure for heavy vehicles on the road network (MRR)	€750k	Art. 36.a GBER	April 2022 – December 2025

<sup>1371</sup> European Commission, "Competition Policy State Aid Register: Development of a recharging infrastructure for electric vehicles and hydrogen refuelling stations", November 2022

<sup>1372</sup> European Commission, "Competition Policy State Aid Register: Development of a charging infrastructure for plug-in hybrid and purely electric vehicles", March 2020



#	Member State	Measure name	Annual Budget	Legal basis	Dates
33	Sweden	Government support for the expansion of public charging stations for rapid charging of electric vehicles	SEK 50m (€5m)	Art. 36.a GBER	December 2023 <sup>1373</sup>
34	Sweden	Government support for the expansion of public charging stations for rapid charging of electric vehicles	50m SEK (€5m)	Art. 36.a GBER	July 2015 – December 2023
35	United Kingdom	Grant for City of York electrical chargepoints <sup>1374</sup>	GBP 1.35m (€1.54)	Art. 56 GBER	2020

In addition to the State aid measures reported in the table above, desk-based research was also conducted to support the development of the country summaries in Appendix A of this document. This desk-based research identified other public support measures directed at EV recharging throughout the EU27 + the UK depicted in Table 52. The two tables are based upon two different research methodologies;<sup>1375</sup> therefore whilst these measures are mostly different and do not overlap with the measures summarised in Table 51, due to the availability of data in the public domain, a full comparison between GBER and TFEU measures and the public support measures reported in Member State articles is challenging. Accordingly, these two summaries have been kept separate given the GBER and TFEU measures are comparable with regard to amounts and dates, whereas the measures from the national sources have less overall specificity and therefore comparability but provide useful context to the situation in each Member State.

As it can be seen in Table 52 below, different measures were implemented, scoping from grants to tax exemptions and tax reductions.

<sup>1373</sup> Start date not available

<sup>1374</sup> European Commission, "Competition Policy State Aid Register: Grant for City of York electrical chargepoints", June 2021

<sup>1375</sup> While the data that informed Table 51 findings were all retrieved from the European Commission Competition Policy State Aid Register, data presented in Table 52 were collected via the desk-based research underpinning the country summaries of the EU27 + the UK included in Appendix A, which relied on publicly available information from different sources (such as local and national authorities websites, newspapers, etc.)

**Table 52: Examples of other national incentives for EV recharging infrastructure 2016-2022**<sup>1376</sup>

Member State	Measure Name <sup>1377</sup>	Description
Austria	e-Mobility offensive programme <sup>1378</sup>	Recharging subsidies of €2.5k for AC (capacity between 11kW and 22kW), €15k for DC with capacity lower than 100kW and €30k for DC with capacity above 100kW
Belgium	Tax incentives <sup>1379</sup>	In the Brussels region, a tax break of up to 13.5% is offered to firms for investment in destination recharging services up to €14k
Bulgaria	N/A	
Croatia	Environmental Protection and Energy Efficiency Fund <sup>1380</sup>	Up to 40% grant of the total costs for companies installing EV recharging stations, up to €27k
Cyprus	Grant for public recharging development <sup>1381</sup>	Over €4m to install 1k recharging stations by 2026 in public spaces (including 40 ultra-fast recharging stations on motorways), details are being finalised
Czechia	National Recovery Plan <sup>1382</sup>	Funds being used to install 200 public recharging points by the end of 2023
Denmark	Tax cuts for companies supplying public recharge points <sup>1383</sup>	Tax exemption for companies providing commercial recharging could receive an electricity tax rebate of around €0.13 per kilowatt-hour until 2019
Estonia	ELMO project (2011-2013) <sup>1384</sup>	Nation-wide recharging network development with 165 recharging points set-up
Finland	Subsidies for Companies Building Public Rechargers <sup>1385</sup>	A refund of up to 35% of the total purchasing and installation costs for recharging infrastructure (can increase to 50% depending on recharger capacity)

<sup>1376</sup> Measures extracted as part of the country summary research in Appendix A of this study, due to the infancy of the sector, the data available in the public domain is not of the same level as detail for each Member State, in addition due to the way articles are cited within the European Commission Competition Policy State Aid Register as well as the various sources identified within the research in appendix A, some minor overlaps in funding may be present

<sup>1377</sup> N/A signifies that no national State aid measures were identified through governmental, industry specific or national press articles as part of the country summary research in Appendix A

<sup>1378</sup> Federal Ministries of Sustainability and Tourism and Federal Ministry of Transport, Innovation and Technology of Austria, "Mission 2030, Austrian Climate and Energy Strategy", September 2018

<sup>1379</sup> Wallbox, "Full List Of EV And EV Recharger Benefits In Belgium"

<sup>1380</sup> Svetlana Jovanović, "Croatia to co-finance installation of EV charging stations in 2018", August 2018

<sup>1381</sup> Electrive, "Cyprus funds public charge points", November 2022

<sup>1382</sup> Claudia Patricolo, "Czech government to support scale-up of hydrogen and electric vehicles", June 2022

<sup>1383</sup> Monta, "EV news in Denmark: Updates to taxation schemes and more", July 2022

<sup>1384</sup> Amsterdam Round Tables, "E Volution, Electric vehicles in Europe: gearing up for a new phase?", June 2014

<sup>1385</sup> Eduskunta Riksdagen, "Board presentation HE 23/200", November 2021

France	D'Avenir Investment Plan <sup>1386</sup>	Grants for public recharger purchases of up to €3k for slow rechargers, and up to €12k for fast ones
	Advenir Program <sup>1387</sup>	Grants up to €15k per recharging point to support the installation of 120k public and semi-public recharging points by 2025
Germany	Recharging infrastructure grant <sup>1388</sup>	Grants of €3k for purchasing recharging stations up to 22kW up to €12k for purchasing DC rechargers up to 100kW, and up to €30k for purchasing DC rechargers above 100kW
Greece	N/A	
Hungary	Electric recharging station support scheme <sup>1389</sup>	€4m was provided to municipal authorities across the country to build EV recharging stations and develop future strategies
Ireland	Climate Action Fund EV infrastructure delivery <sup>1390</sup>	In 2018, €10m was committed from the government's Climate Action Fund, matched by ESB, to help build out the ESB recharging network of 90 ultra-fast rechargers, 52 fast rechargers and 264 slow rechargers by 2023
	Public Charge Point Scheme <sup>1391</sup>	SEAI scheme provides €5k per recharge point to support the development of on-street recharge points
Italy	National Plan for the Installation of EV recharging infrastructure (PNIRE) <sup>1392</sup>	Provides funds to finance eMobility initiatives across municipalities including on the rollout of public EV recharging infrastructure
Latvia	EV recharging deployment <sup>1393</sup>	Target – 253 stations by end of 2023. Committed capital included €8.34m funded jointly by the ERDF and State budget.
Lithuania	Recharger subsidy <sup>1394</sup>	80% of total purchase and installation cost of public and semi-public recharging points (7-22 kW)

<sup>1386</sup> Ministry of the Ecological Transition and Ministry of the Economy and Finance of France, "Economic Study of the EV recharging infrastructure", April 2019

<sup>1387</sup> Advenir, "Programme presentation", 2016

<sup>1388</sup> European Alternative Fuels Observatory, "Statistics on infrastructure and fleet data for road vehicles: Germany Incentives & legislation", October 2022

<sup>1389</sup> Ministry of Foreign Affairs of the Netherlands, "Smart and sustainable mobility market in Hungary", March 2021

<sup>1390</sup> Department of Communications, Climate Action & Environment, "Climate Action Fund Call for Applications clarifications", September 2018

<sup>1391</sup> Sustainable Energy Authority of Ireland, "Electric Vehicle Public Charge Point Grant"

<sup>1392</sup> EconomiaCircolare.com, "From MiTE 741 million euros for recharging electric cars. But there are also critical issues", May 2022

<sup>1393</sup> Cabinet of Ministers of Latvia, "On Alternative Fuels Development Plan 2017-2020", April 2017

<sup>1394</sup> Remigijus Bielinskis, "Lithuania to end free electric car charging by late 2023", August 2022

Luxembourg	Grants for EV rechargers' installation <sup>1395</sup>	Projects with total installed capacity above 175 kW covering 50% of total cost for public recharging points and 40% for public points accessible only during working days and hours (semi-public)
Malta	N/A	
Netherlands	Public recharging point schemes <sup>1396</sup>	Free public recharge points installation and no infrastructure-use cost
	Reduced energy tax rate <sup>1397</sup>	Reduced energy tax rate for electricity in public recharging stations (2017-2020)
Poland	Support for EV recharging infrastructure (both public and private) <sup>1398</sup>	Up to 25% of eligible costs for 22 kW, 30% from 50 kW to 150 kW and 50% for more than 150 kW
Portugal	N/A	
Romania	EV recharger subsidy for urban, suburban and rural areas <sup>1399</sup>	Grants for recharging installations, provided via public tender. Refund of €2.5k per recharging station with capacity below 22 kW and €30k for capacity above 22 kW.
Slovakia	N/A	
Slovenia	Public EV recharging installation <sup>1400</sup>	630 public recharging points developed by Ecofund and Energy and Environment ministries according to 2020 National Energy Efficiency Plan
Spain	Infrastructure Subsidies part of MOVES plan <sup>1401</sup>	Individuals and companies can receive up to 70% of the cost of public rechargers. An additional 10% is granted to those registered in municipalities with fewer than 5k inhabitants.
Sweden	Ladda Bilen <sup>1402</sup>	Companies, organisations, and landlords that install public recharging stations can receive grants of 50% of the cost (max €1.4k)
UK	On-Street Residential Chargepoint Scheme <sup>1403</sup>	Funds up to 60% of total eligible costs up to £7.5k per recharging point or up to £13k per recharging point including grid connection costs

<sup>1395</sup> Chamber of workers of Luxembourg, "Charging infrastructure for electric vehicles", February 2022 Chamber of workers of Luxembourg, "Charging infrastructure for electric vehicles", February 2022

<sup>1396</sup> Wallbox, "Everything You Need To Know About EV Incentives In The Netherlands"

<sup>1397</sup> Dutch Ministry of Economic Affairs, "Vision on the charging infrastructure for electric transport", April 2017

<sup>1398</sup> Tax Knowledge Management Team, "Tax Alert: Support for the electric vehicle charging and hydrogen refueling infrastructure"

<sup>1399</sup> Marius Tudor, "The e-car scenario in Romania", October 2019

<sup>1400</sup> Slovenian Government, "Slovenia National Energy Efficiency Action Plan", 2020

<sup>1401</sup> Energy Nordic, "Plan MOVES III: Grants for electric cars and charging points", July 2022

<sup>1402</sup> Swedish Environmental Protection Agency, "Load the car"

<sup>1403</sup> Office for Zero Emission Vehicles, "On-Street Residential Chargepoint Scheme guidance for local authorities", April 2022

**National EV purchase incentives****Table 53: EV purchase incentives across the EU27 + the UK (2022)**<sup>1404,1405</sup>

Country	Purchase Incentives
Austria	Bonus (until the end of 2022) for new cars with fully electric range of $\geq 50$ km and gross list price of $\leq €60$ k (€3k for BEVs; €1.25k for PHEVs). Additional incentives granted by provinces and communities.
Belgium	35% deduction of investment in new BEVs and in related recharging infrastructure. In Brussels, up to €15k to replace 3 N1 vehicles/year for small companies.
Bulgaria	N/A
Croatia	Incentive scheme (once a year, limited funds): €9.3 for BEVs; €5.3k for PHEVs.
Cyprus	Up to €12k to scrap and replace a vehicle emitting $>50$ g CO <sub>2</sub> /km and costing $\leq €80$ k. Up to €19k to buy a BEV plus €1k to scrap an old car.
Czechia	Purchase incentive of low- and zero-emission vehicles for state and local government bodies.
Denmark	N/A
Estonia	N/A
Finland	Subsidy of €2k to purchase/lease a new BEV (M1 & M1G), provided value is less than or equal to €50k (2018-2023).
France	EV subsidy up to €6k (dependant on list price and emissions), also a scrappage scheme in place of up to €5k.
Germany	EV subsidy up to €9k for BEVs and €6.75k for PHEVs (dependant on list price).
Greece	Up to €6K in cashback from BEV's net retail price (NRP). Max NRP to receive incentive is €50k. Extra €1k if car (under 10 years old) is scrapped.
Hungary	EV subsidy of €7.35k for gross price of up to €32k.
Ireland	EV subsidy of up to €5k for BEVs; and PHEVs (dependant on emissions); and up to €3.8k for BEV vans. (2021 data)
Italy	EV subsidy up to €3k (€5k with scrappage) for an M1 EV (dependant on list price and emissions).
Latvia	N/A
Lithuania	Subsidy of up to €2.5k for used M1 EV; €5k for new M1 electric vehicle under six months from the first registration (2021 data)

<sup>1404</sup> Acea, "Overview – Electric vehicles: tax benefits & purchase incentives in the European Union (2022)", September 2022<sup>1405</sup> Additional detail provided in Appendix A – Country Summaries

Luxembourg	Subsidy up to €8k for BEVs and €2.5k for PHEVs (dependant on kWh and emissions).
Malta	N/A
Netherlands	Subsidy scheme for small or compact BEV car, new or used. Arbitrary depreciation of environmental investments scheme for BEV cars equipped with solar panels.
Poland	Subsidy for individuals and legal persons purchasing BEVs (M1).
Portugal	Subsidy of €3k for a new BEV (M1) (dependant on listing price and limited to one per person).
Romania	Renewal scheme of up to EU 6.4k for a PHEV (dependant on emissions) and €11.5 for a BEV.
Slovakia	N/A
Slovenia	Subsidy of up €4.5k for BEVs.
Spain	Incentive scheme (2021-2023) of up to €7k for BEVs and €5k for PHEVs (dependant on scrappage).
Sweden	Subsidy of SEK 70k for BEVs and up to SEK 44.4k for PHEVs (dependant on emissions). Price cap to receive a bonus at SEK 700k for a new EV (M1).
UK	35% subsidy (£3k max) and additional tax benefits

**Table 54: EV tax benefits across the EU27 + the UK (2022)<sup>1406</sup>**

Market	Tax Benefits
Austria	VAT exemption for BEVs and zero-emission cars when purchased (also applies to company cars) and during ownership.
Belgium	Minimum tax rate (Brussels and Wallonia) and exemption for BEVs (Flanders) when purchased and during ownership plus 6% VAT (instead of 21%) for electricity consumption.
Bulgaria	Tax ownership exemption for EVs.
Croatia	No excise duties for EVs when purchased and exemption from special environmental tax during ownership.
Cyprus	Purchase tax exemption for EVs when purchased and minimum rate during ownership (dependant on emissions).
Czechia	BEVs exempt from registration charges when purchased. During ownership, BEVs exempt from road tax and road toll (dependant on emissions) with reduction of depreciation period (10 to 5 years). Reduction of the taxable amount for BEVs and PHEVs for company cars.
Denmark	Purchase benefits for zero- and low-emission EVs (deduction in registration and taxable value). Taxes on ownership are based on CO2 emissions; zero-emission EVs pay minimum semi-annual tax rate.
Estonia	N/A
Finland	Zero-emission cars are exempt from registration tax when purchased. For company cars, deduction of €170/month from taxable value for BEVs with recharging of EVs at workplace exempt from taxable value (2021-2025).
France	When purchased, exemption (50% or total) for EVs in regions and from the mass-based malus for BEVs and PHEVs (dependant on range). Exemption from CO2-based tax component for cars (dependant on emission) for company cars.
Germany	During ownership, 10-year exemption for BEVs registered until 2030/12/31 and exemption from annual circulation tax for cars depending on emissions. For company cars, reduction of the taxable amount for BEVs and PHEVs.
Greece	When purchased reduction in RT for PHEVs (dependant on emissions). During ownership, tax exemption for cars (dependant on emissions) and personal income presumption system exemption for BEVs. For company cars, exemption of the benefit in kind tax for BEVs and PHEVs (depending on emissions and NRP).
Hungary	Tax exemption for BEV and PHEV cars during purchase and ownership (also applies to company cars).
Ireland	When purchased, for BEVs up to €40k in relief and exempt from NOx tax. During ownership, minimum rate for BEVs and reduced rate for PHEVs

<sup>1406</sup> Acea, "Overview – Electric vehicles: tax benefits & purchase incentives in the European Union (2022)", September 2022



	(dependant on emissions). For company cars, 0% of benefit in kind for the first €50k for BEVs.
Italy	During ownership, five-year exemption for BEVs from first registration and after 75% reduction of the tax rate applied to equivalent petrol vehicles (BEVs only).
Latvia	When purchased, exemption from registration costs for BEV vehicles (first registration). During ownership, exemption for M1 (dependant on emissions). For company cars, minimum rate for BEVs.
Lithuania	Exemption from purchase taxes for EVs (first registration only) and company cars for EVs older than six months, with scrappage scheme in place.
Luxembourg	When purchased, only 50% of administrative tax. Minimum rate per year for zero emission cars during ownership. Monthly benefit in kind (dependant on emissions) for company cars.
Malta	When purchased and owned, minimum tax rate for vehicles (dependant on emissions).
Netherlands	Exemption from all taxes for zero-emission cars (purchased and owned) plus 50% tariff for PHEVs (owned). Minimum rate for zero- emission company cars with a cap for BEVs.
Poland	Exemption from purchase taxes for BEVs and PHEVs (dependent on emissions). During ownership, depreciation benefits for BEVs and cars emitting certain amount.
Portugal	When purchased, complete exemption for BEVs and 75% reduction PHEVs for (dependant on range and emissions). During ownership, exemption for BEVs. For company cars, exemption for BEVs and reduction for PHEVs (dependant on range and emissions). VAT deduction for BEVs and PHEVs.
Romania	Exemption from purchase taxes for electric vehicles.
Slovakia	When purchased, €33 for BEV registration charge, and BEVs or PHEVs are depreciated for two years. Exemption for BEVs during ownership.
Slovenia	Minimum additional tax rate for BEVs when purchased.
Spain	When purchased, 'special tax' exemption for cars emitting below an amount and VAT exemption for BEVs, PHEVs emitting below an amount in Canary Islands. During ownership, reduction of 75% for BEVs in main cities. For company cars, use of a company car for private purposes considered as an in-kind payment and thus included in personal income tax (reduction for BEVs and PHEVs dependant on list price).
Sweden	When owned, low annual road tax for zero-emission cars and PHEVs. For company cars, the private use of a company car is taxed on benefits.
UK	Exemption from Vehicle Excise Duty among other benefits

## Appendix E Member State in-depth assessment selection process

The selection was based on an approach to identify the most representative markets that will support the aims of this study. To do so, a top-down analysis of markets was conducted to highlight countries with different regulatory framework characteristics, competitive models and levels of public support.

### Shortlist process

First, each nation's regulatory and market typologies were defined based on their competitive model and regulatory focus. These were formulated by gathering CPO shares and assessing key trends within the regulatory space at an EU, national and regional level. outlines the levels and definitions for each category, with additional context provided beneath it.

**Table 55: Competitive and regulatory dimensions**

	Competitive Model	Regulatory Focus
<b>Classification</b>	Monopoly: 1 to 2 market players with high market share	Regional / Municipal
	Oligopoly: 3 to 4 firms with a high market share	National (Government)
	Competitive: 5 or more firms with reasonable share distribution	EU

The competitive model classification was used to define the competitive nature of the market through a high-level assessment of CPO/eMSP shares and the number of players across the EV recharging value chain (with particular emphasis on eMSPs and CPOs). The regulatory focus was instead used to determine which body is the driving force within the EV recharging market. To conclude, both macro and micro dynamics were considered. At a micro-level, the classification looked at technical regulation relating to data sharing, hardware, software and payment options for the consumer (assessing how different regulatory framework characteristics may impact competition and openness of access). The macro level analysis instead focused on policy, regulation, investment, and infrastructure targets that relate directly to the installation of recharge points (e.g., is EU regulation such as the Alternative Fuels Infrastructure Directive leading the development of the sector or are national strategies and incentives acting as the main drivers). Next, the EV market maturity of each country in terms of EV infrastructure, EV penetration, and level of public support was assessed, and each was classified as developed, in-development or nascent as depicted in Figure 60 below.

**Figure 60: Member States selection**<sup>1407</sup>

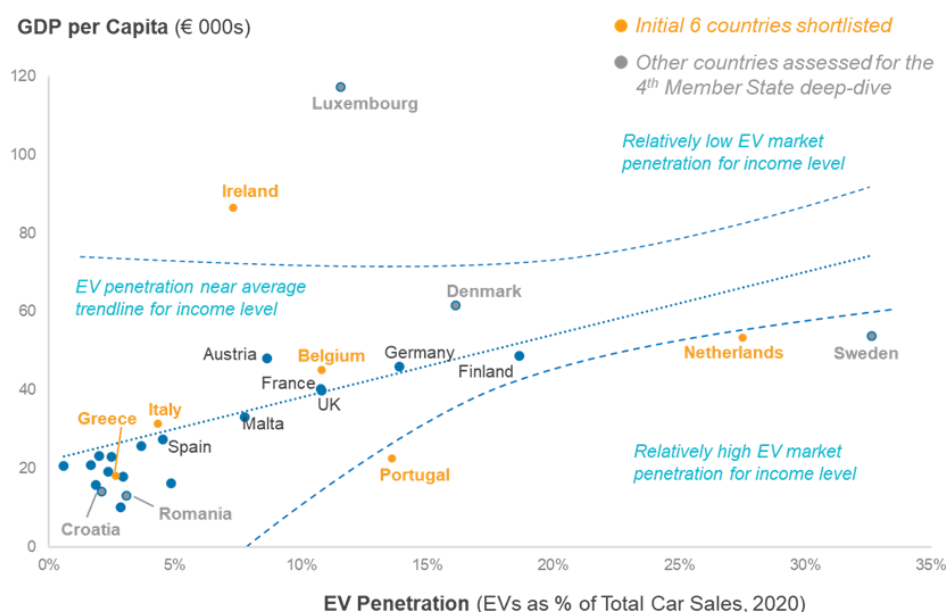
	Market maturity / countries	Total charge points (2021)	Total number of EVs (2021)	EV penetration (2021)	EVs per charge point (2021)	Level of public support (EV targets/goals)	EV Incentives (purchase; €)	EV Infrastructure Support
<b>Developed</b>	<b>Netherlands</b>	90,284	381,327	30%	4.2	100% EV Proposal	9,000	High
	<b>France</b>	37,128	785,245	18%	21.1	100% Low CO2 Proposal	6,000	High
	<i>Germany</i>	59,410	1,268,821	26%	21.4	100% EV Ambition	4,000	High
	<i>United Kingdom</i>	39,034	777,031	19%	19.9	100% EV Ambition	3,500	High
	<b>Italy</b>	23,543	266,603	9%	11.3	EV / Energy Targets	6,000	Medium
	<b>Sweden</b>	25,197	325,975	45%	12.9	2030 ICE Ban Proposal	7,000	Medium
<b>In Development</b>	<b>Belgium</b>	13,695	179,113	18%	13.1	50% EV Target	0	High
	<i>Austria</i>	13,110	106,402	20%	8.1	None	3,000	Medium
	Spain	10,480	159,234	8%	15.2	100% EV Ambition	3,000	High
	Finland	5,497	99,911	31%	18.2	EV Ambition	5,000	Medium
	<b>Denmark</b>	5,752	122,536	34%	21.3	100% EV Ambition	2,000	Low
	<b>Portugal</b>	4,124	93,579	20%	22.7	100% EV Target (2050)	3,000	Low
	Poland	2,811	29,248	4%	10.4	EV Ambition	0	Medium
	Hungary	2,541	19,579	7%	7.7	None	7,350	Low
	Czechia	2,189	15,128	3%	6.9	None	0	Low
	<b>Luxembourg</b>	1,782	17,893	21%	10.0	None	8,000	Medium
<b>Nascent</b>	<b>Ireland</b>	1542	37,552	16%	24.4	100% EV Target	5,000	Medium
	Slovakia	1367	5,654	3%	4.1	None	0	Medium
	<b>Croatia</b>	1730	3,310	4%	1.9	None	9,333	Low
	Slovenia	1309	6,432	4%	4.9	100% Low CO2 Target	7,500	Low
	<b>Romania</b>	1161	16,723	8%	14.4	None	10,000	Medium
	Estonia	385	2,680	3%	7.0	None	0	Low
	Latvia	420	1,727	4%	4.1	None	0	Low
	<b>Greece</b>	514	10,103	7%	19.7	30% EV Target	6,000	Medium
	Bulgaria	531	3,256	2%	6.1	None	0	Low
	Lithuania	207	4,401	1%	21.3	None	5,000	Low
	Malta	98	2,758	2%	28.1	None	0	Medium
	Cyprus	57	889	2%	15.6	None	0	Low

Germany, Austria, and the UK were *excluded* given existing reports being developed.  
Countries in **Bold** further considered in more detail during next round of screening

With these categories, we identified two of the most representative markets from each grouping that included a variety of dimensions to form a representative sampling for each category. However, as part of the screening process, we also considered additional countries that would also provide diversity of potential competitive challenges and could be included as the 4th Member State – these included Sweden, Denmark, Luxembourg, Croatia, and Romania.

In addition to the selection criteria, we also evaluated macro-economic drivers. We contrasted individual country income levels against EV adoption to identify trends and to ensure diversity of countries being selected. The initial six countries selected were found to also provide a representative sample with this economic lens as can be seen in Figure 61 below.

<sup>1407</sup> This table was part of an initial analysis prior to the report being developed and more accurate information has been gathered for each Member State since

**Figure 61: Member States comparison**

### Analysis of country groupings

In order to identify a diverse group of countries that provides the most interesting basis for the competition law analysis, we assessed the groups across multiple categories. For each category, distinct levels were defined, and each country was assessed independently based the definitions seen in Table 56.

**Table 56: Categories and definitions used to assess the most comprehensive and informative Member State in-depth assessment options**

Competition		Regulation and incentives			Market maturity		Macro factors
Competitive model (weighted x2)	Regulatory focus	Public Support (EV targets)	EV purchase incentives	Recharging infrastructure support	EV market adoption	EVs per recharge point	Economic status (GDP)
Monopoly	Municipal	100%	None	High	≥ 15%	≥ 15	≥ €40k
Oligopoly	National	Partial	≤ €5k	Medium	5 to 15%	5 to 15	€21k to €40k
Competitive	EU	None	> €5k	Low	≤ 5%	≤ 5	≤ €21k

With the above definitions, and the analysis presented earlier in the section, Figure 62 portrays how we came to a decision on the recommended Member States. A tick (✓) is used when each Member State proposed was classified differently, a line (~) is used when two are classified differently, a cross (×) is used when all Member States proposed fall under the same classification.

**Figure 62: Member State diversity of categories for several option groupings**

Member state deep-dive options		Competition		Regulation and incentives			Market maturity		Macro drivers	Total Score
		Competitive model <sup>1</sup>	Regulatory focus	Public support (EV targets)	EV purchase incentives	EV infra. support	EV market adoption	EVs per charge point	Economic status (GDP)	
Possible classifications & definitions		• <i>Monopoly</i> • <i>Oligopoly</i> • <i>Competitive</i>	• <i>Municipal</i> • <i>National</i> • <i>EU</i>	• <i>100%</i> • <i>Partial</i> • <i>None</i>	• <i>None</i> • <i>≤ €5k</i> • <i>&gt; €5k</i>	• <i>High</i> • <i>Medium</i> • <i>Low</i>	• <i>≥ 15%</i> • <i>5 to 15%</i> • <i>≤ 5%</i>	• <i>≥ 15</i> • <i>5 to 15</i> • <i>≤ 5</i>	• <i>≥ €40k</i> • <i>€21k to €40k</i> • <i>≤ €21k</i>	
1	Italy, Belgium, Ireland, Croatia	~	~	✓	✓	✓	✓	✓	✓	15
2	Netherlands, Italy, Portugal, Ireland	✓	~	~	~	✓	~	✓	~	13
3	Italy, Belgium, Ireland, Portugal	✓	~	~	✓	✓	~	~	~	13
4	Italy, Luxembourg, Ireland, Croatia	✓	✗	~	~	~	✓	✓	✓	13
5	Italy, Belgium, Ireland, Greece	~	✓	~	✓	~	~	~	✓	12
6	Italy, Belgium, Poland, Greece	~	✓	✗	~	~	✓	~	✓	11
7	France, Netherlands, Denmark, Greece,	~	✓	~	~	✓	~	~	~	11
8	France, Denmark, Luxembourg, Croatia	~	✗	~	~	✓	~	✓	~	10

Scoring: ✓ = 2 pts, ~ = 1 pt, ✗ = 0 pts

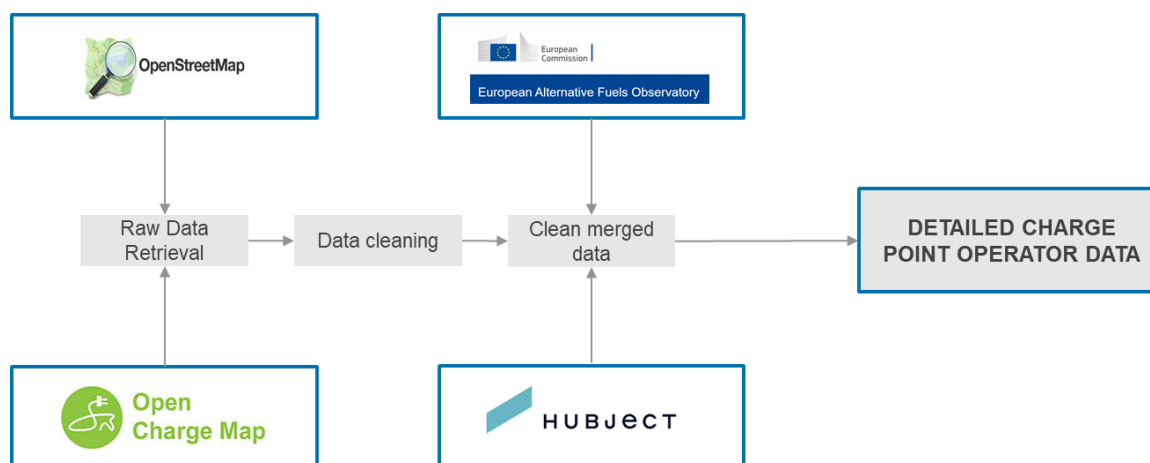
■ Recommended option 
 ■ Alternative option 
 ■ Other groupings evaluated
<sup>1</sup> – Competitive model given 2x weighting in line with Commission's request

As depicted above, no grouping is perfect and provides 100% coverage for each category, however Option 1 (Italy, Belgium, Ireland, and Croatia) enables the assessment of the broadest range of competition typologies, themes, challenges, and concerns and was therefore selected.

## Appendix F In depth assessments data gathering

As depicted in Figure 63, several data sources were triangulated, enabling the report to assess the comprehensive picture in each selected Member State.

**Figure 63: Overarching data gathering and cleaning approach**



The primary data source being used within this analysis was the proprietary data procured from leading roaming provider, HUBJECT. The data enables a within country analysis, but also a comparison between the four selected markets, starting from Q1 2021 to Q3 2022. The following was included:

- lists of CPOs and eMSPs active in each market, providing an overview of market size and evolution which allows for an assessment of the levels of vertical integration;
- number of recharging points per power cluster for the top 10 CPOs, allowing us to construct market shares and concentration indices, which supports the market power assessment to identify the market shares of players and further assess the level of market concentration;
- occupancy rate per power cluster for the top 10 CPOs, which indicates the utilisation of recharging points to give a more meaningful impression of market share to further refine the analysis of market power; and
- efficiency per power cluster for the top 10 CPOs, specifically kWh delivered by a recharging point as a function of maximum kWh possible, which will inform the quality of service for the consumer and asset efficiency for CPOs.

Although the in-depth analysis of the proprietary data helped build the initial picture in each market, it did not provide 100% coverage. Therefore, the proprietary data was complemented with other publicly available information to achieve a level of granularity deemed appropriate for a full understanding of competition issues within the selected countries (i.e., no roaming provider has perfect coverage across the EU27 + the UK). For this purpose, an in-house software tool was developed to extract recharge point data from publicly available platforms (specifically Open Street Map and Open Charge Map). The tool was used to collate individual recharging point information including geographic location and operator. This geographic element is particularly relevant as it enables a granular assessment of market size and concentration at the local level, allowing for a more detailed inquiry of potential regional competition issues that may be emerging. The data was then compared against the publicly available figures from the European Commission's Alternative Fuels Observatory, the purchased proprietary data, and the insights from the country summaries to ensure the quantum of recharging

points is representative. Any overlapping data entries (recharging points with the same latitude and longitude) were also removed. Overall, this data gathering methodology provided more granular data to support the market assessment and competitive analyses.



## Appendix G In-depth assessments rechargers per 100k people

**Table 57: Public recharging points per 100k people in Ireland, Italy, Croatia, and Belgium split by region or county or province (October 2022)<sup>1408</sup>**

Ireland		Italy		Croatia		Belgium	
County	Rechargers per 100k people	Region	Rechargers per 100k people	County	Rechargers per 100k people	Province	Rechargers per 100k people
Wexford	99	Aosta Valley	363	Lika-Senj	124	East Flanders	259
Kilkenny	84	Trentino Alto Adige	208	Zagreb city	58	Antwerp	238
Galway	59	Emilia Romagna	82	Istria	53	West Flanders	233
Westmeath	50	Tuscany	73	Primorje-Gorski-Kotar	51	Flemish Brabant	176
Wicklow	48	Piedmont	72	Karlovac	35	Limburg	163
Clare	47	Umbria	64	Virovitica-Podravina	34	Brussels	133
Kildare	46	Liguria	63	Šibenik Knin	33	Waloon Brabant	83
Sligo	41	Veneto	60	Zadar	33	Namur	76
Louth	41	Lombardy	51	Split-Dalmatia	33	Luxembourg	75
Donegal	39	Marche	49	Dubrovnik-Neretva	28	Liège	36
Waterford	39	Molise	45	Varaždin	24	Hainaut	26
Roscommon	36	Calabria	44	Međimurje	20		
Tipperary	35	Abruzzo	44	Požega-Slavonia	19		
Laois	35	Friuli Venezia	41	Brod-Posavina	15		
Carlow	34	Basilicata	39	Zagreb	15		
Limerick	33	Sardinia	35	Krapina-Zagorje	12		
Longford	30	Lazio	34	Sisak Moslavina	9		
Kerry	30	Apulia	29	Vukovar-Srijem	9		
Mayo	28	Sicily	27	Osijek-Baranja	9		
Cork	28	Campania	8	Bjelovar-Bilogora	9		
Cavan	26			Koprivnica-Križevci	5		
Offaly	26						
Meath	25						
Leitrim	25						
Dublin	24						
Monaghan	22						
Country totals							
Ireland	35	Italy	50	Croatia	26	Belgium	155

<sup>1408</sup> CRA Analysis based on the methodology described in Appendix F

## Appendix H Industry interviews

**Table 58 Industry Interviews**

#	Market	Company	Role	Synopsis <sup>1409</sup>
1	Belgium	DSO	Fleet manager and public affairs	Market overview of the recharging sector in the Flanders region of Belgium. Detailed description of the DSO's role in the industry both previously, where it was involved in the tendering process for public concessions, as well as currently, where its role is limited at ensuring grid connection.
2	Belgium	Integrated CPO & eMSP	Head of Public Affairs & Communication	Discussion on competition in the Belgian market, touching upon other Member States. The historical evolution of the company was provided, including how business models changed over time and where they believe the industry needs to improve (regulation, competition, and standards)
3	Croatia	Roaming provider	CPO and eMSP expert	Discussion on the Croatian market with insights on the types of CPOs and eMSPs operating in the country with particular attention given to market players like Hrvatski Telekom, Petrol and HEP. Discussion also focused on Croatia's Next E motorway networks and how it has provided incentives to certain players in the country.
4	Croatia	National eMobility Association	Secretary General	Detailed overview of the Croatian market and discussion on specific topics on CPOs and eMSP such as the main market players and market evolution, current market shares, different business models, and competitive dynamics. Given the market's nascent state, there is not a particular competition concern currently. This discussion also included Public support measures present in the country, though noted as insufficient to support market growth. The EV industry association's role and main projects were also discussed in length.
5	EU	European OEM Association	Mobility and Sustainable Transport Director	Discussion on OEMs' role in the EV industry, including a high-level depiction of the industry with particular attention on key challenges such as the low attractiveness of the market, the need for more Public support measures, both in the short- and long-term, and the misalignment between EV adoption and recharging infrastructure rollout.
6	Ireland	Competition Authority in Ireland	Representative	Market overview of Ireland's EV recharging sector, no particular competition concerns currently. Nevertheless, a potential concern that may arise with regards to Public support measures, especially at the local level.

<sup>1409</sup> The details expressed within each discussion are solely the interviewee's opinions and do not necessarily reflect the company's or the European Commission's beliefs and findings

7	Italy, Belgium	Roaming provider	CPO and eMSP expert	Discussion on Italy's market that included case studies from France, Belgium and the Netherlands, an overview of the main market players and interoperability levels in Italy as well as general insights on the industry.
8	Italy	Energy regulatory authority	E-Mobility Officer	Discussion on regulatory elements and the role of the DSO in the sector with key insights on business models and the competitiveness of market players.

## Appendix I Author and company details

### *Company details*

Charles River Associates (NASDAQ: CRAI) is a leading global consulting firm with over 1,000 professionals across 22 offices that offers economic, financial, and strategic expertise to major law firms, corporations, accounting firms, and governments around the world. CRA was founded in the US in 1965, and our wholly-owned UK subsidiary was established in 2000. This report was a joint product of CRA's Energy and Competition practices, bringing in cross-sector expertise to holistically assess sector dynamics

**CRA's European Competition Practice** applies its expertise in economic theory, empirical analysis and data science to respond to the key issues in each competition case and provide concrete answers to complex questions. In parallel, we help handle the practicalities of dealing with competition cases, using our experience in data processing to take the pressure off our clients and streamline the process for them. The rigorous nature of our approach means that the analysis we submit to the competition authorities and courts is persuasive and credible. A key part of this is building a team with the right expertise and experience. Our teams include PhD-trained economists who apply the most relevant economic tools to analyse and address potential competition concerns. We also draw on the knowledge and experience of our extensive network of academic associates including former Chief Economists at several competition agencies.

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## **Abstract**

This report evaluates potential competition issues in the provision of publicly accessible recharging infrastructure and related services for electric vehicles (EVs) across the EU27 + UK. It develops a taxonomy of possible competition concerns and collates evidence on whether there are existing or potential future anticompetitive effects.

It begins with a background on the EV public recharging sector evolution, industry dynamics, regulatory initiatives, and public support. It provides an overview of the sector value chain, participants, business models, and pricing structures. A taxonomy of possible competition concerns around unilateral and coordinated conducts, and potentially public funding distortive effects is then developed. Lastly, an in-depth assessment is conducted for a broadly representative subset of countries (Ireland, Italy, Croatia and Belgium) to assess whether there is *prima facie* evidence of anticompetitive effects.

Overall, the analysis highlights a significant level of heterogeneity across the region both in the evolution and current state of development of the sector. Although a range of competition concerns are relevant as the sector evolves, no evidence was uncovered of major competitive concerns in the current state of the sector. Evidence instead supports that countries exhibiting higher levels of concentration are generally markets in early phase and in expansion.





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