EVCONSULT

Technical report

Comparative Analysis of Urban Charging Infrastructure

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Executive summary

The transition to zero-emission urban mobility is accelerating across Europe, and battery-electric vehicles risk being adopted faster than the public charging networks meant to support them. For cities the task is no longer simply to install more charge points; they must ensure that charging is affordable, equally distributed across neighbourhoods, efficiently used, and integrated into dense urban environments where public space is scarce and competing demands are high. This report examines the current state and projected development of public and semi-public charging infrastructure in four major European cities: Greater London, Warsaw, Paris and Madrid. The focus lies on passenger cars and light commercial vehicles (vans), the vehicle groups expected to place the greatest pressure on urban networks through 2030 and 2035.

The four cities start from very different positions. Paris and Greater London already operate large, mature networks with high availability and installed capacity, while Madrid and Warsaw work from a much smaller base and therefore face a far steeper relative growth trajectory. They have also pursued different strategies: Paris and London rely on dense networks of lower-power AC charging woven into residential neighbourhoods, whereas Madrid and Warsaw lean more heavily on high-power DC charging and strategic hubs. The latter approach supports fast and corridor charging well, but risks leaving affordable residential charging underserved in dense areas where many residents depend on public infrastructure. Even the mature networks remain spatially uneven, concentrated in central, commercially attractive districts, and utilisation varies markedly. London has the most balanced utilisation, Paris shows very high use of on-street AC charging, and Madrid's comparatively low levels suggest either a mismatch between placement and demand or an earlier stage of market development.

An important finding is how similar the patterns become across all four cities once urban form is taken into account. Historic centres such as Westminster (Greater London), Centro (Madrid) and Śródmieście (Warsaw) become charging hotspots, because residents, commuters and visitors all compete for the same limited capacity, while suburban districts, despite large projected electric fleets, generate relatively modest public demand thanks to (private) home charging. Modelling more efficient use of infrastructure, greater workplace and destination charging, and lower private vehicle ownership shows that these measures can meaningfully reduce future requirements, yet in no scenario do they remove the need for significant expansion beyond today's installed base.

The conclusion is that the future charging challenge cannot be met by installing more charge points alone. Spatial distribution, utilisation, affordability, interoperability and long-term coordination matter just as much. Policy should therefore focus on stronger coordination between municipalities, grid operators and charging operators; on data-driven infrastructure planning; on balancing high-power hubs with widespread neighbourhood charging; on improving affordability and interoperability; and on embedding charging infrastructure within broader urban mobility and spatial planning strategies.

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List of abbreviations

AC = Alternating Current
AFIR = Alternative Fuels Infrastructure Regulation
BEV = Battery Electric Vehicle
CPO = Charge Point Operator
CV = Coefficient of Variation
DC = Direct Current
DSO = Distribution System Operator
EPBD = Energy Performance of Buildings Directive
EVSE = Electric Vehicle Supply Equipment
kW = Kilowatt
kWh = Kilowatt hour
MSP = Mobility Service provider
MW = Megawatt
OCPI = Open Charge Point Interface
PHEV = Plug-in Hybrid Electric Vehicle
PPP = Purchasing Power Parity

1. Introduction

The transition to zero-emission urban mobility is accelerating across Europe, and battery-electric vehicles risk being adopted faster than the public charging networks meant to support them. For cities, the task is no longer simply to install more charge points. They must ensure that charging is affordable, equitably distributed across neighbourhoods, efficiently used, and integrated into dense urban environments where public space is scarce and competing demands are high.

This report examines the current state and projected development of public and semi-public charging infrastructure in four major European cities: Greater London, Warsaw, Paris and Madrid. It focuses on passenger cars and light commercial vehicles (vans), the vehicle groups expected to place the greatest pressure on urban charging networks through 2030 and 2035, while accounting for the complementary role of home and workplace charging.

The analysis follows a dual-track approach. A stock-taking exercise first establishes a comparable baseline of each city's existing infrastructure across a set of agreed indicators, drawing on the Eco-Movement charge point database. A high-level modelling exercise then forecasts the charging infrastructure each city will require for widespread electrification of its passenger car and van fleet under three future scenarios.

The aim is twofold. First, the report offers a consistent basis for comparing urban charging infrastructure across different European contexts. Second, it translates these findings into practical, evidence-based recommendations for cities, policymakers and Clean Cities partners on how charging infrastructure can be rolled out more efficiently, equitably and sustainably.

2. Methodology

This chapter describes the methodology used to assess and compare the public charging infrastructure in Greater London, Paris, Madrid and Warsaw. The methodology is divided into three parts:

1. Data collection, harmonisation and editing.
2. Analysis of the existing network in the four cities
3. Predictive modelling for 2030 and 2035 for the four cities.

2.1 Data collection and editing

2.1.1 Data collection

Charging infrastructure data was primarily sourced from Eco-Movement (global platform for EV charge point data). The following Eco-Movement datasets were used for each city:

- Connectors: contains connector ID data, operator data, address data (city, street, postal code and coordinates), power type data and activity data.
- Utilisation: contains different power types and categories of chargers, their average utilisation for each hour and each day of the week for Q2 2025 to Q1 2026 and the number of connectors (EVSEs) on which the utilisation is measured.
- Pricing: contains pricing schemes from all the CPOs and MSPs active in the cities.

Eco-Movement datasets rely on third-party inputs, which means there are differences in definitions, coverage and update frequency. The data reflects the situation as reported in February 2026.

City data such as population, registered vehicles and income levels was collected from official governmental sources where possible. For each city the most important data sources were:

- Greater London: ONS census (2021), London Datastore (2024) [1]
- Warsaw: Panorama Warsaw (2024)[2]
- Paris: INSEE (2023)[3], Apur (2025)[4]
- Madrid: Estudio sociodemográfico Madrid (2025)[5], DGT (2025)[6]

2.1.2 Spatial alignment and district definition

An important step in the analysis was choosing the spatial units across cities. Each city uses different administrative subdivisions, which makes finding an equal spatial level for all the cities impossible. The analysis was hence conducted at the following levels:

- Greater London: borough level (32 boroughs and the City of London)
- Warsaw: district level (18 districts)
- Paris: arrondissement level (20 arrondissements)
- Madrid: district level (21 districts)

This ensured that charging infrastructure, population and income data could be compared on a spatial level within cities. This approach is less effective for inter-city comparison as the districts, boroughs and arrondissements differ in size, population and characteristics.

To conduct the analysis, the Eco-Movement connector datasets had to be linked to the corresponding subdivision. The coordinates in the connector data from Eco-Movement of Greater London, Warsaw and Madrid were used to determine the correct borough/district (in Paris the postcodes are already aligned with the arrondissement level). The utilisation and pricing datasets are aggregated at the city level.

2.1.3 Data harmonisation

Due to the differences between data sources, a harmonisation step was required. This included:

- Standardising prices to € per kWh
- Scaling income data to relative values to enable comparison across cities
- Grouping charger types and power ranges into consistent categories

2.1.4 EVTools data analysis & presentation

EVTools software was used to analyse the Greater London dataset and surface actionable insights through the EV Maps web application.

The EVTools data processing software identified data quality issues, including missing (for example, around 4,040 charge points were missing in the outer boroughs of Greater London) and duplicate charge points (for example, a double registered DC charging station with 38 connectors x 240 kW at 36 Rue Friant in Paris) across multiple datasets. Charge points were enriched and linked to their corresponding Greater London Boroughs, enabling efficient processing and user-level filtering prior to further analysis.

Data at both the Greater London and borough level is available in EVTools. Users can view, filter, edit, and compare datasets within a geographic interface, including forecasted charging demand, existing charge stations, and utilisation rates. EVTools is also able to incorporate data from areas outside the scope of this assignment, including local authorities (cities, regions, municipalities) in France, Spain, and Poland.

[1] https://data.london.gov.uk/dataset
[2] https://warszawa.stat.gov.pl/en/publications/others/panorama-of-warsaw-districts-in-2023,1,20.html?pdf=1
[3] https://www.insee.fr/en/statistiques
[4] https://www.apur.org/en/open-data-maps/open-data
[5] https://datos.madrid.es/dataset/300087-0-indicadores-distritos
[6] https://nap.dgt.es/en/dataset

2.2 Stocktaking

Firstly, the collected data was used to determine the current state of the charging networks in each of the four cities through a stocktaking exercise. The purpose of this exercise is not only to compare the size of the charging networks, but also to understand how these networks function in practice, how evenly infrastructure is distributed, how intensively it is used and how accessible it is from both a spatial and economic perspective.

2.2.1 Indicators

A set of six indicators were selected for the stocktaking in each city:

1. Charging infrastructure availability: the number of charge points (total and per 1,000 residents) were determined on a district level.
2. Charging capacity per capita: the cumulative charging capacity in kW (total and per 1,000 residents) on a district level.
3. Charging speed distribution: composition of the chargers in technology (AC 1-phase, AC 3-phase and DC) and speed (<50 kW, 50–150 kW and >150 kW) on the district level.
4. Socio-Economic Distribution of Charging Infrastructure: the relation between charger availability and the relative income level on a district level.
5. Charging utilisation: utilisation rates (in %) per hour of the day and by location category (on street, parking, along motorway and other) and power category (≤ 50 kW, >50 – 150 kW and >150 kW) on a city level.
6. Charging cost & affordability: comparison of ad-hoc prices (€/kWh) (incl. VAT) from the largest AC and DC charge point operators on a city level. The ad-hoc prices were adjusted with PPP for a fairer affordability comparison.

By combining these indicators, the analysis provides a more complete view of how charging infrastructure performs, rather than only looking at absolute numbers of charging points.

2.2.2 Comparing the cities

To compare the charging infrastructure within cities and across cities, the coefficient of variation (CV) is used, defined as the ratio of the standard deviation to the mean across districts. As a normalized measure of dispersion, the CV allows for comparison between cities with different absolute levels of infrastructure while also showing the equality of the distribution within cities.

A higher CV indicates a more uneven distribution, with strong disparities between well-served and underserved districts, while a lower CV reflects a more balanced allocation. By controlling for scale, the CV makes a focused comparison of spatial equity across cities possible.

2.2.3 Risks and limitations

For the stocktaking the following risks and limitations were noted:

- **City comparability**: Greater London, Warsaw, Paris, and Madrid differ substantially in boundaries, population, and urban characteristics, which complicates direct inter-city comparison. For instance, Paris encompasses only the inner city, whereas Greater London includes both inner and outer (suburban) boroughs. For a more like-for-like comparison, Greater London would e.g. need to be compared with the Métropole du Grand Paris. The administrative units were chosen because political competences and responsibility for charging infrastructure lies, at least partially, with these government levels.
- **Data quality**: despite cleaning efforts applied to the Eco-Movement dataset, duplicates and misclassified charge points may remain (for example, private charge points incorrectly labelled as public or semi-public). The dataset also includes DC charge points intended for

electric trucks, which cannot be distinguished from those serving cars or vans in the datasets (only by individual analysis, for example with street level imagery).

2.3 Modelling exercise

The modelling exercise estimates the future public charging demand from battery-electric (BEV) passenger cars and light commercial vehicles (vans) for 2030 and 2035, at the district level across the four cities. The base inputs are the registered vehicle data per district and the EV adoption rates; combined with several further inputs and assumptions, these are used to project the number of public charge points required.

The scope is limited to BEVs. Plug-in hybrids (PHEV) are excluded. Other vehicle types like heavy commercial vehicles (trucks, coaches and buses), taxis, ride-hailing vehicles and powered two-wheelers are also out of scope, as they represent a small share of the total fleet and follow different charging dynamics and needs.

Within this scope, the public charging demand from passenger cars and vans is split across three user groups: residents, commuters and visitors.

2.3.1 Model inputs

The following main inputs were used for the modelling exercise:

- **Registered cars:** registered passenger car data per district served as the base input for the model.
- **EV adoption for passenger cars:** EV adoption forecasts for the total passenger car fleet were made for all the four cities.
- **EV adoption for vans:** a uniform EV adoption forecast for the total van fleet was made for all the four cities.
- **Relative income level per district:** the relative income of each district was derived from income datasets (district income level divided by city average income level).
- **Vans per district:** in the absence of data on the number of vans per district, this was estimated from the number of registered cars per district.

To conduct the modelling exercise at district level, assumptions were required for the following parameters:

- **District typology**: each district was assigned to one of six typologies reflecting its city characteristics.
- **User group parking ratio:** the share of parking attributable to residents, commuters and visitors.
- **Public-private parking ratio:** the proportion of parking in each district located in publicly accessible parking spaces versus private spaces. Because the model is intended to support local governments, only publicly accessible parking is considered.
- **Charge points per EV ratio:** a charge points per EV ratio was determined for each user group, based on EVConsult's expert knowledge and data from projects in the Netherlands.
- **AC-DC ratio:** As charging demand can be met by either AC (slow charging) or DC (fast charging), an assumption was made about the balance between the two technologies in 2030 and 2035.
- **Double use factor:** a double use factor is used to correct for the partial overlap in charge point use between user groups.

The values of the used inputs and assumptions are presented in Appendix A.

2.3.2 Model steps
The modelling exercise follows these steps for each district:
1. **EVs per district**: the number of EVs per district in 2030 and 2035 is estimated based on the current registered passenger car fleet per district, the number of vans derived from the passenger car fleet, the EV adoption rate and the relative income level per district.
2. **EVs per user group per district**: the EVs per district from step 1 are assumed to be from the user group residents. With the user group ratio, the numbers of EVs from the user groups visitors and commuters are derived from the number of EVs of residents.
3. **EVs per user group per district dependent on public parking:** the number of EVs per user group dependent on public charging is determined through the public-private parking ratio
4. **Public (AC-)charge points per user group per district**: with the charge points per EV ratio, the number of required public charge points per user group are determined.
5. **Public (AC-)charge points per district**: the double use factor is used to correct for the partial overlap in charge point use between user groups (a user in district A might not be modelled as charging at home in district B but only needs to charge once).
6. **Split to AC and DC charge points**: based on the assumed AC-DC ratio, the public charging demand is split between AC (11 kW) and DC (50+ kW) charge points.

The output of the modelling exercise is a set of projected numbers of public AC and DC charge points required in each district for each city for both 2030 and 2035. The output can also be compared to the AFIR[7] target of 1.3 kW per registered BEV.

The detailed modelling steps, exact formulas and full results can be found in the provided model.

2.3.3 High Efficiency and High Efficiency + Modal Shift scenarios
Two additional scenarios are used to provide insight into the potential impact of measures to reduce the overall number of charge points required. These are the following:
- High Efficiency scenario: this scenario assumes a gradual shift from residential charging towards more (private) workplace and destination and opportunity charging.
- High Efficiency + Modal Shift scenario: in addition to the High Efficiency scenario, the total number of passenger cars is reduced by 10% to simulate a shift towards other forms of urban mobility (increased use of public transport, walking, cycling and shared mobility solutions).

The values of the used inputs and assumptions of the two scenarios are presented in Appendix A.

2.3.4 Sensitivity analysis
The modelling outcomes depend heavily on a number of assumptions that, in the absence of consistent city-level data, were based on expert judgement and Dutch and European benchmarks rather than on local measurements. A sensitivity analysis was therefore carried out to test how robust the projected charge point numbers are to variation in the two assumptions with the greatest influence on the results: the charge points per EV ratio and the double use factor. Both act as direct multipliers on the projected demand, so even modest changes in their values can shift the output materially. By varying each within a plausible range, the analysis shows how much confidence can be placed in the projections and which assumptions most strongly drive the outcomes.

2.3.5 Risks and limitations
For the modelling exercise the following risks and limitations were noted:
- **Blunt methodology**: the modelling approach is designed to function with limited input data for four different cities. This general approach can produce some notable outlier results or

[7] AFIR (Alternative Fuels Infrastructure Regulation) is an EU regulation, in force since 2024, that sets binding minimum targets for the rollout of EV charging and other alternative-fuel infrastructure across member states.

ignore some unique district characteristics. A city-specific methodology based on the available data could reduce the number of outliers and improve the accuracy of the results.

- **Reliance on assumptions**: the exercise leans heavily on assumptions due to a lack of consistent city-level data. Although the assumptions were sense-checked by experts with local knowledge, this could still lead to outliers.
- **Not all vehicle types included**: the projections do not include public charging demand from commercial vehicles such as taxis, ride hailing vehicles, buses, coaches and trucks. These charge points are included in the installed base (sourced from Eco-Movement data), as are charge points along the motorways. Any comparison between the installed base and the projections will therefore give an incomplete picture. This applies particularly to DC charge points, where a meaningful share of installations is expected to provide opportunity charging for these vehicles.

Non-uniform input data: input datasets (like registered cars or income level) vary per city in type, unit, and moment of measurement, which limits direct comparability.

2.4 Policy recommendations

Our policy recommendations draw on three sources. First, we combined the results of the stocktaking and modelling exercises to identify where current charging networks fall short and where the strongest future pressure is likely to emerge. Second, we reviewed the charging policies already in place across the four cities, to see what is working well and where gaps remain. Third, we drew on our own experience from charging infrastructure projects in the Dutch market, which offers practical lessons on what works when scaling charging in dense urban environments.

Bringing these three inputs together, we arrived at a set of general policy recommendations. These are meant to be broadly applicable across the four cities rather than tailored to any single one, reflecting the common patterns that emerged from the analysis. Where local circumstances differ significantly, they should be read as a starting point for further, city-specific work.

3. Stocktaking

This chapter analyses the current state of public charging infrastructure in Greater London, Warsaw, Paris and Madrid. The results of the stocktaking for the following six key indicators are presented:

1. Charging Infrastructure Availability
2. Charging Capacity per Capita
3. Charging Speed Distribution
4. Socio-economic Distribution of Charging Infrastructure
5. Charging Utilisation
6. Charging Cost and Affordability

Together, these indicators provide insight into the maturity of each charging ecosystem and help identify challenges that are likely to influence future infrastructure deployment and policy choices.

To keep a clear overview of the data in this review, each of the indicators is explained, followed by an overall comparison between the four cities and then a comparison between the districts within each of these four cities.

3.1 Indicator 1: Charging Infrastructure Availability

The first indicator measures the number of public and semi-public charging points per 1,000 residents. This provides a population-normalised view of charging availability.

3.1.1 Overall comparison between cities

The analysis shows major differences in charging availability between the four cities. Paris clearly has the highest charging density, followed by London, while Madrid and especially Warsaw lag behind.

City	*Charging points per 1,000 residents*	*Total charging points*
Paris	5.28	11,157
Greater London	3.23	29,391
Madrid	0.97	3,420
Warsaw	0.50	924

Table 1: Current number of chargers per city per 1,000 inhabitants

Paris stands out as the most densely equipped charging network relative to population size. London also shows relatively strong availability, although infrastructure is spread across a much larger urban area. Madrid and Warsaw currently remain at a substantially earlier stage of infrastructure deployment, reflected through significantly lower numbers of charging points per 1,000 residents

3.1.2 Spatial distribution within cities

Paris and London show the strongest internal contrasts. In Paris, central arrondissements such as the 8th, 1st and 7th arrondissement contain exceptionally high charger densities, while outer eastern districts remain significantly less equipped. London shows a similarly uneven pattern, with inner boroughs such as Hammersmith & Fulham and Wandsworth strongly outperforming outer boroughs such as Bromley and Barking & Dagenham.

Madrid presents a more moderate pattern, with fewer extreme peaks but generally low provision across most districts. Warsaw shows relatively low infrastructure levels across almost all districts, with only limited local concentrations.

To better compare these internal differences, the coefficient of variation (CV) was used as an inequality indicator.

City	Coefficient of variation (CV)	Interpretation
Paris	1.22	Very high spatial inequality
Greater London	1.01	High spatial inequality
Warsaw	0.90	Spatial inequality
Madrid	0.75	Most balanced, but still uneven

Table 2: Chargers per 1000 residents CV value per city

The results demonstrate that high infrastructure availability does not necessarily imply equitable access. Paris and London combine relatively mature charging networks with substantial spatial disparities. By contrast, Madrid appears more balanced, although this largely reflects consistently low infrastructure provision rather than an optimised distribution strategy.

3.2 Indicator 2: Charging Capacity per Capita

While the previous indicator focuses on the number of charge points, this indicator examines total installed charging power per 1,000 residents. This provides insight into the potential throughput of the network and the extent to which cities are deploying higher-capacity charging infrastructure.

3.2.1 Overall comparison between cities

City	Installed capacity (kW per 1,000 residents)	Total installed capacity
Paris	58.7	124 MW
Greater London	52.3	475 MW
Madrid	39.8	140 MW
Warsaw	28.3	53 MW

Table 3: Current charging capacity per city per 1,000 inhabitants

The overall ranking remains broadly similar to the previous indicator: Paris and London maintain the strongest position, while Warsaw shows the lowest installed capacity. However, the differences between cities become smaller when measured in charging power rather than number of charge points. This suggests that although Madrid and Warsaw have relatively few charge points, the chargers that are installed are on average significantly higher powered. London and Paris, by contrast, rely more heavily on large networks of lower-power AC infrastructure.

3.2.2 Spatial concentration of charging capacity

The district-level analysis again reveals strong internal differences. Madrid shows some of the strongest concentration effects, with districts such as Villa de Vallecas, Centro and Barajas containing very high installed capacity levels, while many residential districts remain weakly equipped. Warsaw also shows strong inequality despite its smaller overall network. London appears comparatively balanced in terms of capacity distribution, while Paris combines very high overall capacity with clear centre–periphery inequalities.

City	Coefficient of variation (CV)	Interpretation
Warsaw	1.29	Strong concentration within limited network
Madrid	1.19	Capacity concentrated in specific hubs
Paris	1.01	High capacity but uneven distribution
Greater London	0.83	Most balanced capacity distribution

Table 4: Charging capacity per 1000 residents CV value per city

One particularly important finding is that Madrid has a larger total installed charging capacity than Paris despite having far fewer charge points. This reflects Madrid's stronger focus on higher-power charging technologies.

From a policy perspective, this distinction matters. A network dominated by high-power charging may support fast throughput and corridor traffic but does not automatically provide adequate residential charging accessibility. The findings therefore support later recommendations aimed at balancing high-power charging hubs with widespread lower-power neighbourhood charging infrastructure.

3.3 Indicator 3: Charging Speed Distribution

The third indicator analyses the technological composition of the charging networks, covering both the type of technology and the charging power levels deployed.

Three technology types are distinguished: AC 1-phase, AC 3-phase and DC. AC 1-phase is slow charging from a single grid wire at the lowest power (typically up to 7.4 kW), and is common for on-street and home charging. AC 3-phase uses three wires to deliver more power (11–22 kW). Both rely on the vehicle's onboard charger to convert AC to DC, which caps the charging speed. DC charging performs that conversion within the station itself, bypassing the onboard limit and enabling much higher speeds (mostly 50 kW to 350+ kW). Charging power is grouped into three categories: <50 kW, 50–150 kW and ≥150 kW.

In the following tables the percentage represents the ratio of installed technology and power within each city.

Technology	*Madrid*	*London*	*Paris*	*Warsaw*
AC 1-phase	38.25%	77.72%	84.05%	0.65%
AC 3-phase	38.95%	15.04%	11.90%	63.42%
DC	22.81%	7.24%	4.04%	35.93%

Table 5: Technology mix by city

Charging power distribution	*Madrid*	*London*	*Paris*	*Warsaw*
≤ 7.4 kW	33.1%	77.3%	80.3%	0.6%
<50 kW	45.4%	16.0%	18.1%	65.8%
50–150 kW	14.33%	3.59%	0.61%	20.13%
≥150 kW	7.19%	3.10%	0.95%	13.42%

Table 6: Charging power distribution by city

The results show two clearly different charging strategies emerging across the cities. Paris and London rely heavily on low-power AC charging infrastructure. Paris in particular stands out because of its very large number of single-phase AC chargers, which resemble household-style charging solutions integrated into dense urban streetscapes.

Warsaw and Madrid show a different profile, with much larger shares of DC, fast and ultra-rapid charging infrastructure. In Warsaw, this likely reflects the relatively recent development of the network, where newer installations are more often focused on higher-power technologies.

Madrid occupies an intermediate position. Its network contains a substantially larger share of higher-power charging than London or Paris, while still maintaining a significant AC charging base.

These differences are highly relevant from a policy perspective. High-power charging infrastructure supports fast turnover and long-distance mobility, but it is also substantially more expensive to install and operate. Overreliance on DC charging may therefore create affordability challenges for residents who depend on public charging for daily overnight charging.

3.4 Indicator 4: Socio-Economic Distribution of Charging Infrastructure

The fourth indicator explores whether charging infrastructure distribution correlates with district-level income patterns. The objective is to assess whether higher- or lower-income areas are systematically better served by public charging infrastructure and whether socio-economic inequalities may emerge in access to electric mobility.

Figures 1, 2 and 3 compare relative income levels with charger availability across all districts in Madrid, London and Paris. Due to a lack of data on the income levels in districts Warsaw has been excluded from this indicator.

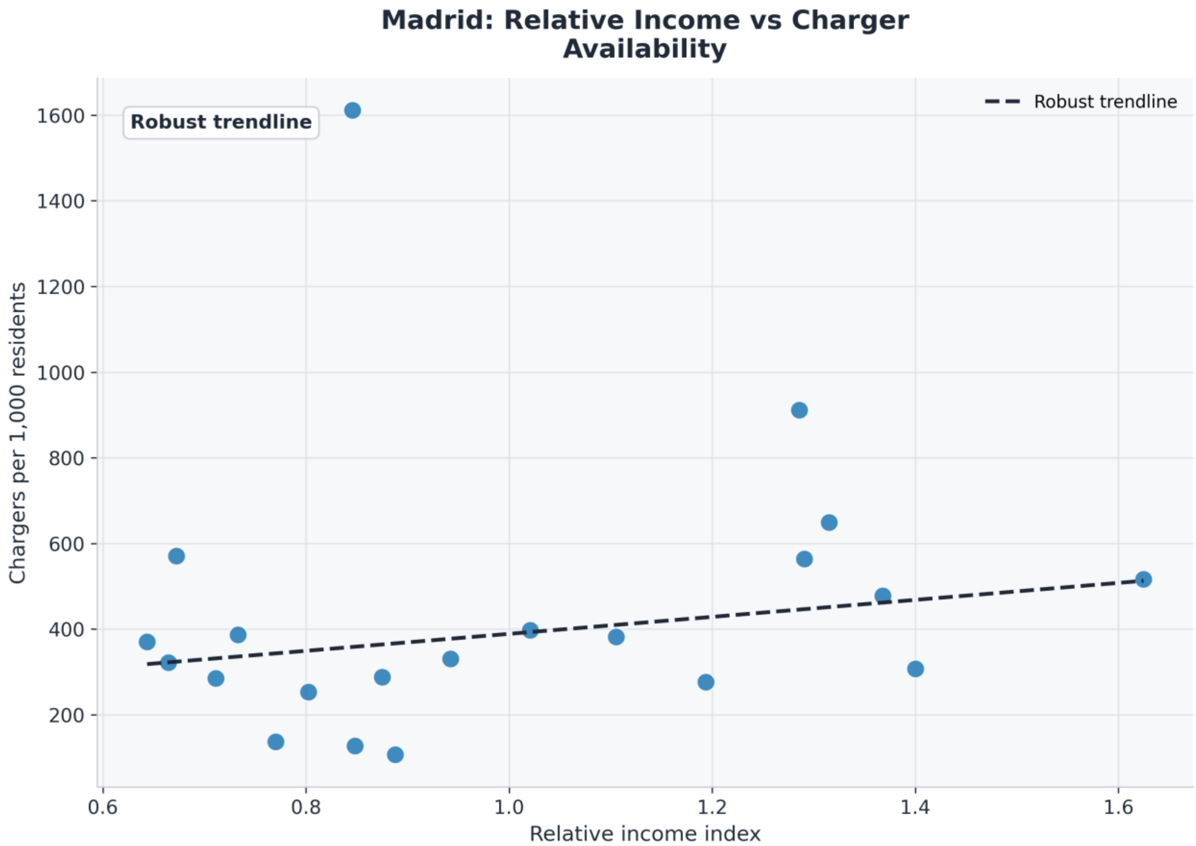

Figure 1: Relative income vs charger availability in Madrid

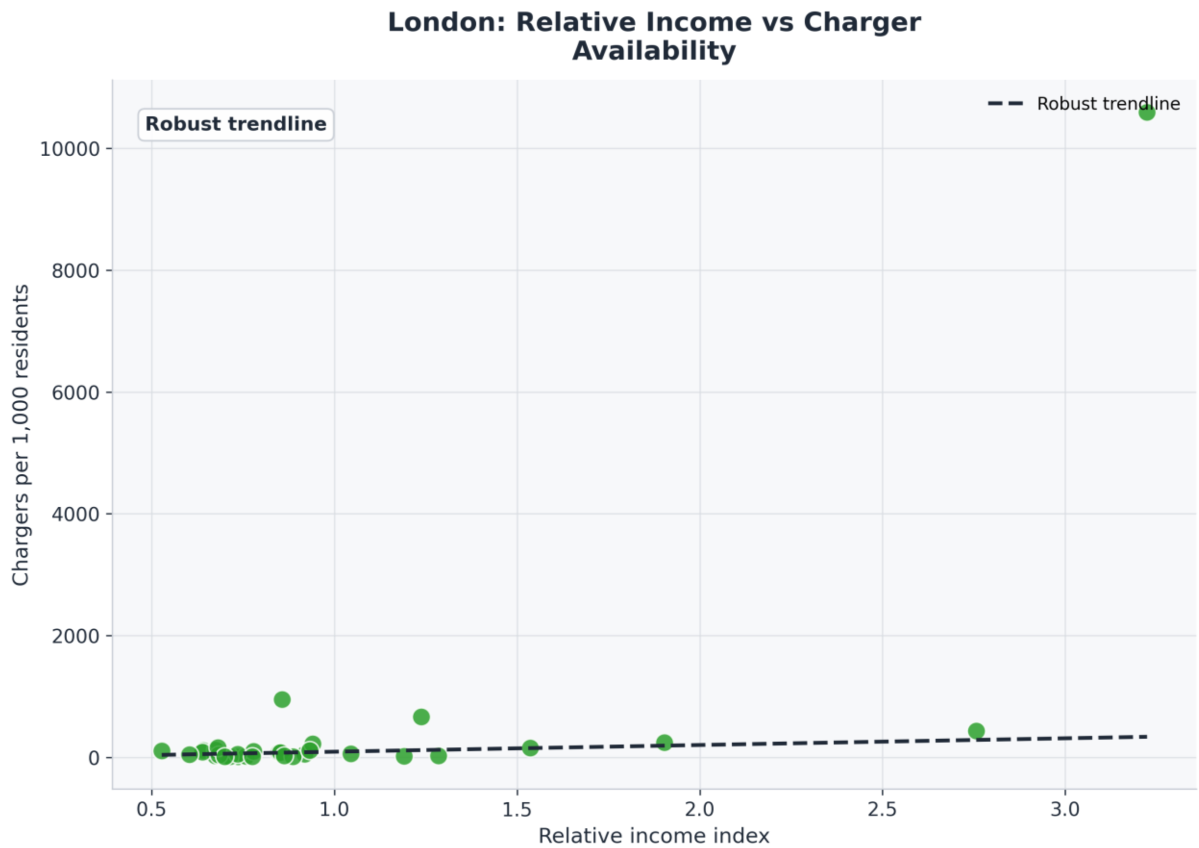

Figure 2: Relative income vs charger availability in London

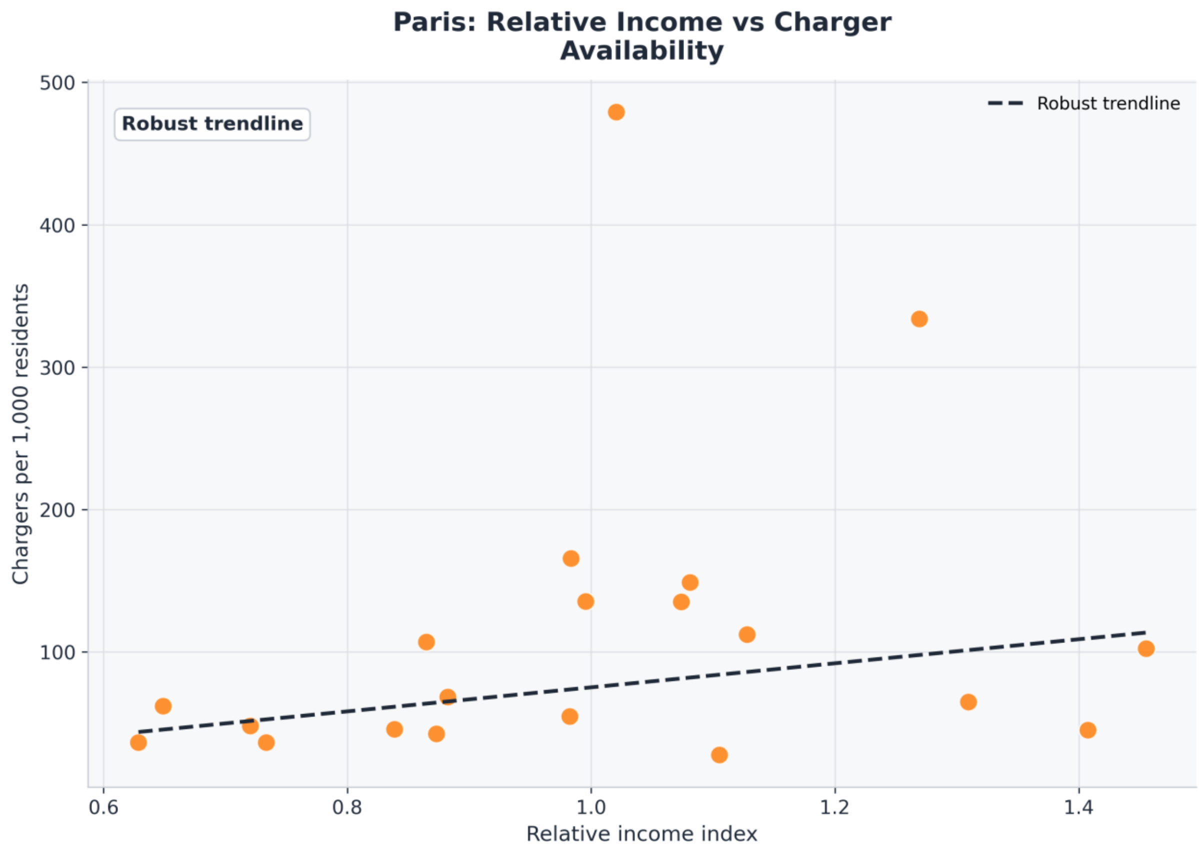

Figure 3: Relative income vs charger availability in Paris

Figures 1, 2 and 3 all show a weak positive relationship between relative income and charger availability. The robust trendline slopes upward slightly, indicating that districts with higher relative income levels tend to have somewhat greater charger availability per 1,000 residents. However, the relationship remains highly dispersed and should therefore be interpreted cautiously.

The large spread of data points demonstrates that income alone does not explain infrastructure distribution. Districts with similar income levels often show very different charging availability outcomes. This suggests that charging deployment is influenced much more strongly by other local urban characteristics such as population density, housing typologies, parking availability, grid capacity, commercial attractiveness or municipal policy priorities.

Figures 1, 2 and 3 also highlight substantial differences between cities. London shows the widest dispersion and several extreme outliers, indicating strong local clustering effects. Some London boroughs combine only moderately above-average income levels with exceptionally high charger densities, reflecting the importance of dense urban environments and commuter functions rather than income alone. Paris and Madrid show somewhat more structured distributions, with a slightly clearer tendency for higher-income districts to have greater charger availability. Nevertheless, the relationship remains partial rather than systematic, with substantial overlap between lower- and higher-income districts.

Overall, the analysis suggests that income level is not the primary driver of charging infrastructure distribution. Instead, charging infrastructure appears to follow broader urban mobility patterns and spatial characteristics. High charger densities are frequently concentrated in central mixed-use districts.

3.5 Indicator 5: Charging Utilisation

The fifth indicator shows how intensively charging infrastructure is used. Utilisation rates provide insight into the maturity and efficiency of charging networks and help identify whether infrastructure deployment aligns with actual charging demand. Table 7 shows the utilisation by charging power category.

Utilisation by speed category	***0 – ≤22 kW***	***>22 – ≤150 kW***	***>150 kW***
Greater London	16.5%	21.9%	21.0%
Warsaw	15.2%	10.5%	20.5%
Paris	29.7%	7.4%	21.9%
Madrid	7.1%	5.9%	11.9%

Table 7: Total utilisation percentages per charging speed category

The utilisation patterns reveal major differences in network maturity between the cities. London appears to have the most balanced utilisation profile, with relatively stable demand across multiple charger categories. Paris stands out because of the strong utilisation of lower-power public urban charging infrastructure. Madrid shows the lowest utilisation levels overall. This may indicate a combination of earlier-stage EV adoption, overcapacity in some segments or a mismatch between current infrastructure placement and actual charging demand. This finding is particularly important for future policy recommendations.

In addition to utilisation by charging power category, utilisation was also analysed by location type. Table 8 compares average utilisation rates for on-street charging, motorway locations, parking facilities and other urban charging environments.

Utilisation by location type	On street	Along motorway	Parking	Other
Madrid	8.1%	8.1%	6.0%	7.7%
Greater London	16.5%	26.2%	15.5%	24.0%
Paris	35.0%	-	11.9%	9.4%
Warsaw	14.7%	-	12.0%	13.4%

Table 8: Utilisation by location type

The table shows that utilisation patterns differ strongly depending on the urban function of charging locations. London records the highest utilisation across most categories, particularly along motorways and in the "other" category (charge points not assigned to a specific location type). This suggests a relatively mature and intensively used charging ecosystem in which multiple charging functions are well utilised. Paris stands out because of the very high utilisation of on-street charging. Madrid shows consistently low utilisation across all location types, generally between 6% and 9%. Warsaw shows moderate and relatively balanced utilisation levels across the available categories, suggesting a more even match between infrastructure deployment and current charging demand.

Overall, the table highlights that charging performance is strongly influenced by urban context and mobility behaviour. Different urban environments require different charging solutions.

3.6 Indicator 6: Charging Cost and Affordability

The final indicator compares average and PPP-adjusted ad hoc charging prices (including VAT) for AC and DC charging of the four largest CPO within each of the four cities.

City	*Average AC (€ / kWh)*	*Average DC (€ / kWh)*	*PPP-adjusted AC (€ / kWh)*	*PPP-adjusted DC (€ / kWh)*
Madrid	0.381	0.48	0.44	0.55
Paris	0.46	0.55	0.51	0.62
Warsaw	0.48	0.64	0.61	0.81
Greater London	0.62	0.93	0.60	0.90

Table 9: Charging prices for both AC and DC per city

London clearly emerges as the most expensive charging market, particularly for DC charging. Madrid appears to be the most affordable market, while Paris and Warsaw have an intermediate position. When adjusting for PPP, the differences across cities diminish and AC charging in Warsaw becomes as expensive as in London. Across all cities, DC charging consistently commands a significant price premium over AC charging.

However, affordability should be interpreted carefully. Lower charging prices do not necessarily imply stronger market maturity or healthier business cases. Particularly in Madrid, relatively low prices may partly reflect immature markets, government interventions like subsidies or operators competing aggressively for market share despite uncertain profitability.

From a policy perspective, the findings reinforce the importance of balancing affordability and commercial viability. If public charging becomes too dependent on high-power DC charging, user costs may rise significantly. Maintaining a robust base of affordable residential AC charging infrastructure is therefore likely to remain essential for equitable EV adoption, particularly for households without access to private parking.

4. Modelling Exercise

This chapter presents the results of the modelling exercise carried out for Greater London, Warsaw, Paris and Madrid. The objective of the model is not to predict an exact number of future charge points, but to estimate the scale, spatial distribution and type of charging infrastructure that may be required to support the electrification of passenger cars and light commercial vehicles (vans) towards 2030 and 2035.

The modelling focuses on public charging infrastructure. It combines current charging infrastructure data, vehicle registrations, socio-economic indicators, assumptions regarding EV adoption, public charging dependency and charging behaviour. The analysis therefore provides insight not only into the total infrastructure volumes required, but also into where future charging infrastructure demand is likely to emerge and why. The modelling outcomes will support later policy recommendations in this report.

4.1 City level projections

The most important outcomes for each city are presented, that will later be referred to in the policy recommendations.

The modelling results demonstrate that all four cities require substantial public charging expansion towards 2030 and especially towards 2035. However, the scale differs between cities. A quick overview is presented in Table 10, containing AC and DC charger projections for 2030 and 2035.

City	*Current AC*	*Current DC*	*2030 AC*	*2030 DC*	*2035 AC*	*2035 DC*
Greater London	27,264	2,127	56,855	2,369	94,439	3,935
Warsaw	592	332	5,356	223	23,317	972
Paris	10,706	451	10,743	448	23,473	978
Madrid	2,640	780	13,985	583	35,838	1,493

Table 10: Charger projections for 2030 and 2035

Several more global patterns can be drawn from the analysis. The strongest infrastructure pressure consistently emerges in dense mixed-use urban areas with limited access to private parking. In these areas, residents, commuters and visitors all compete for public charging capacity. This creates substantially higher charging demand relative to the projected EV fleet size than in suburban districts with greater home charging availability.

Secondly, the modelling highlights major differences in market maturity between the four cities. London and Paris benefit from a relatively mature charging ecosystem and a substantial installed base. Nevertheless, even these cities require large-scale expansion towards 2035. Warsaw and Madrid, by contrast, currently operate from a much smaller infrastructure base and therefore face a significantly larger relative scaling challenge.

The results therefore indicate that future charging policy should not focus solely on total infrastructure volumes. Equally important is the spatial distribution of infrastructure and the integration in areas where future public charging dependency is expected to be highest.

4.2 District level projections

The district-level projections presented in this chapter focus on AC charge point infrastructure. The installed base and the 2030 projections are not directly comparable: the projections are expressed in standardised 11 kW AC charge points, whereas the installed base comprises a range of charger types (from 2.3 kW to 22 kW). This difference in definition should be kept in mind when interpreting the comparison.

The model also projects DC charge point demand, but these figures cannot be fairly compared with the DC installed base, because the installed base also includes DC charge points serving trucks, taxis and local motorway locations.

The results of the projections for both AC and DC charge points in 2030 and 2035 on a district level are presented in Appendix B.

4.2.1 Greater London

The table below presents the installed base of AC charge points as of 2026, the projection for 2030 and the target progress of the boroughs in London.

District	Typology	Installed base	Projection 2030	Target progress
City of London	1. Historic centre	39	491	7.9%
Westminster	1. Historic centre	688	4,227	16.3%
Camden	2. Classic inner district	665	2,124	31.3%
Islington	2. Classic inner district	787	1,448	54.4%
Kensington & Chelsea	2. Classic inner district	780	2,682	29.1%
Hackney	3. Mixed-use urban district	400	1,502	26.6%
Hammersmith & Fulham	3. Mixed-use urban district	2,913	2,056	100.0%
Lambeth	3. Mixed-use urban district	2,343	2,304	100.0%
Southwark	3. Mixed-use urban district	1,186	2,018	58.8%
Tower Hamlets	3. Mixed-use urban district	2,330	1,639	100.0%
Wandsworth	3. Mixed-use urban district	2,986	2,305	100.0%
Brent	4. Transit-hub	1,704	2,293	74.3%
Croydon	4. Transit-hub	600	2,684	22.4%
Ealing	4. Transit-hub	1,130	2,692	42.0%
Greenwich	4. Transit-hub	778	1,845	42.2%
Haringey	4. Transit-hub	157	1,634	9.6%
Hounslow	4. Transit-hub	2,034	2,241	90.8%
Lewisham	4. Transit-hub	345	1,909	18.1%
Merton	4. Transit-hub	338	1,517	22.3%
Newham	4. Transit-hub	310	1,830	16.9%
Waltham Forest	4. Transit-hub	1,893	1,889	100.0%
Barking & Dagenham	5. Residential suburbia	89	1,061	8.4%
Barnet	5. Residential suburbia	652	1,900	34.3%
Bexley	5. Residential suburbia	155	668	23.2%
Bromley	5. Residential suburbia	24	787	3.0%
Enfield	5. Residential suburbia	329	1,579	20.8%
Harrow	5. Residential suburbia	250	1,193	21.0%
Havering	5. Residential suburbia	113	551	20.5%
Kingston upon Thames	5. Residential suburbia	354	720	49.2%
Redbridge	5. Residential suburbia	508	1,237	41.1%
Richmond upon Thames	5. Residential suburbia	108	1,016	10.6%
Sutton	5. Residential suburbia	92	706	13.0%
Hillingdon	5. Residential suburbia	184	2,109	8.7%

Table 11: Installed AC charge points (2026) & projections (2030) – Districts Greater London

The main findings from the London borough-level analysis are:

- Mixed-use urban districts are progressing the fastest with installing AC charging infrastructure. The boroughs like Hammersmith & Fulham, Lambeth, Tower Hamlets and Wandsworth already have reached their 2030 projections.
- Residential suburban boroughs in Outer London generally face the greatest shortfall against their 2030 projections. Bromley and Barking & Dagenham stand out with very few AC charge points installed. In contrast, boroughs like Kingston upon Thames, Redbridge and Barnet are performing comparatively well.
- Classic inner district boroughs have similar projections as the mixed-use urban district boroughs. However, they are somewhat lagging behind in charge point installation. This

might be caused by difficulties in finding suitable locations in the older and denser street layouts.

- The City of London and the City of Westminster are comparatively lagging on their 2030 projection. The very high projection from the City of Westminster could be due to a high number of registered cars in the area while also having a high commuter and visitor EVs parking pressure.

In general, Greater London benefits from an early-mover advantage and already has a significant charging ecosystem. Despite this, the projected scale-up requirement remains extremely large, with the strongest future pressure emerging in the historic centre and residential suburbia boroughs.

4.2.2 Warsaw

The table below presents the installed base of AC charge points as of 2026, the projection for 2030 and the target progress of the districts in Warsaw.

District	Typology	Installed base	Projection 2030	Target progress
Śródmieście	1. Historic centre	75	1,391	5.4%
Ochota	2. Classic inner district	36	295	12.2%
Żoliborz	2. Classic inner district	3	173	1.7%
Wola	3. Mixed-use urban district	117	263	44.5%
Praga-Południe	3. Mixed-use urban district	18	548	3.3%
Wilanów	3. Mixed-use urban district	11	24	45.0%
Mokotów	3. Mixed-use urban district	64	715	8.9%
Ursus	5. Residential suburbia	10	70	14.3%
Praga-Północ	4. Transit-hub	25	275	9.1%
Ursynów	4. Transit-hub	41	398	10.3%
Bemowo	5. Residential suburbia	10	332	3.0%
Białołęka	5. Residential suburbia	30	101	29.6%
Bielany	5. Residential suburbia	35	328	10.7%
Rembertów	5. Residential suburbia	1	12	8.1%
Targówek	5. Residential suburbia	29	274	10.6%
Wawer	5. Residential suburbia	21	22	97.6%
Wesoła	5. Residential suburbia	2	5	41.1%
Włochy	3. Mixed-use urban district	64	131	48.8%

Table 12: Installed AC charge points (2026) & projections (2030) – Districts Warsaw

The main findings from the Warsaw district-level analysis are:

- The districts of Wola (financial district), Śródmieście (centre), Mokotów (business district) and Włochy (airport) have a relatively high number of charge points installed, which may reflect the specific activities or functions of these districts.
- Residential suburban districts have very few public charge points. However, not all residential districts are expected to have strong public charging demand. For example, for Wesoła and Wawer the estimated share of private parking is very high.
- The greatest challenge lies with transit-hub districts and some mixed-use urban districts, which currently have few charge points installed but high projected demand in 2030.
- Śródmieście is by far the strongest outlier in Warsaw in terms of projected demand, reflecting the strong commuter and commercial function of the city centre.

In general, Warsaw is a relative latecomer in terms of EV adoption and installation of AC charging infrastructure and rollout has focused more on DC charge points compared to other cities. Therefore, the city faces a major long-term scaling challenge.

4.2.3 Paris

The table below presents the installed base of AC charge points as of 2026, the projection for 2030 and the target progress of the arrondissements in Paris.

District	Typology	Installed base	Projection 2030	Target progress
1st Arrondissement	1. Historic centre	318	393	80.9%
2nd Arrondissement	1. Historic centre	262	282	92.9%
3rd Arrondissement	1. Historic centre	82	117	69.8%
4th Arrondissement	1. Historic centre	198	121	100.0%
5th Arrondissement	1. Historic centre	272	414	65.6%
6th Arrondissement	1. Historic centre	170	414	41.1%
7th Arrondissement	2. Classic inner district	746	509	100.0%
8th Arrondissement	3. Mixed-use urban district	1,640	706	100.0%
9th Arrondissement	3. Mixed-use urban district	413	747	55.3%
10th Arrondissement	3. Mixed-use urban district	571	396	100.0%
11th Arrondissement	3. Mixed-use urban district	252	578	43.6%
12th Arrondissement	4. Transit-hub	380	581	65.4%
13th Arrondissement	3. Mixed-use urban district	373	649	57.5%
14th Arrondissement	4. Transit-hub	622	621	100.0%
15th Arrondissement	2. Classic inner district	635	835	76.1%
16th Arrondissement	2. Classic inner district	948	872	100.0%
17th Arrondissement	3. Mixed-use urban district	1,658	768	100.0%
18th Arrondissement	3. Mixed-use urban district	542	641	84.5%
19th Arrondissement	3. Mixed-use urban district	384	546	70.3%
20th Arrondissement	3. Mixed-use urban district	240	552	43.5%

Table 13: Installed AC charge points (2026) & projections (2030) – Districts Paris

The main findings from the Paris arrondissement-level analysis are:

- Paris consists almost entirely of a large, continuous city centre, without the residential suburbia or industrial fringe districts found in the other cities. As a result, a relatively dense public charging network is already present across all districts.
- Some districts, such as the 8th and 17th arrondissements, have considerably more charge points installed than their 2030 projection requires. This is largely attributable to high concentrations of low-power charge points in public parking garages. A lot of these are even domestic style plug charge points instead of dedicated EV charge points.
- Other districts, such as the 6th, 9th, 11th and 20th arrondissements, lag behind their 2030 projection. The modelling exercise did not, however, identify a clear cause for this.

Overall, Paris already operates one of the most mature urban charging networks in Europe. As the stocktaking shows, the city continues to rely heavily on lower-power AC charging, and the strongest pressure remains concentrated in dense inner-city areas with limited private parking.

4.2.4 Madrid

The table below presents the installed base of AC charge points as of 2026, the projection for 2030 and the target progress of the districts in Madrid.

District	Typology	Installed base	Projection 2030	Target progress
Centro	1. Historic centre	278	1,520	18.3%
Retiro	2. Classic inner district	74	648	11.4%
Salamanca	2. Classic inner district	285	1,403	20.3%
Chamberí	2. Classic inner district	122	756	16.1%
Arganzuela	3. Mixed-use urban district	108	677	16.0%
Tetuán	3. Mixed-use urban district	112	733	15.3%
Latina	3. Mixed-use urban district	49	756	6.5%
Carabanchel	3. Mixed-use urban district	61	853	7.2%
Usera	3. Mixed-use urban district	47	558	8.4%
Ciudad Lineal	3. Mixed-use urban district	122	982	12.4%
Chamartín	4. Transit-hub	222	1,072	20.7%
Moncloa-Aravaca	4. Transit-hub	180	453	39.7%
Fuencarral-El Pardo	5. Residential suburbia	223	377	59.1%
Moratalaz	5. Residential suburbia	6	248	2.4%
Hortaleza	5. Residential suburbia	123	283	43.5%
Villaverde	5. Residential suburbia	23	375	6.1%

Vicálvaro	5. Residential suburbia	66	221	29.9%
San Blas-Canillejas	5. Residential suburbia	267	445	60.0%
Puente de Vallecas	6. Industrial fringe	44	1,102	4.0%
Villa de Vallecas	6. Industrial fringe	97	431	22.5%
Barajas	6. Industrial fringe	131	92	100.0%

Table 14: Installed AC charge points (2026) & projections (2030) – Districts Madrid

The main findings from the Madrid district-level analysis are:

- Both the historic centre and the classic inner districts are expanding only slowly.
- Mixed-use urban districts lag the most on average in reaching their projections, clearly setting Madrid apart from cities like Greater London and Warsaw.
- The residential suburbia districts differ widely among themselves. Fuencarral-El Pardo and San Blas-Canillejas are halfway to their 2030 projections, whereas Moratalaz and Villaverde have very few AC charge points installed and lag considerably behind. The modelling exercise does not identify a clear cause for this difference.
- The industrial fringe districts also show a large contrast, this time between Puente de Vallecas and Barajas. Puente de Vallecas has a very large projection while that of Barajas is very small. This is caused by a large residential neighborhood in Puente de Vallecas, which therefore could also be classified as a residential suburbia district. Barajas is clearly an airport district with very limited residential homes.

Overall, Madrid's EV market remains at an early stage of development, both for EV adoption as well as the EV charging infrastructure. Future expansion pressure for AC charge points will be mostly in mixed-use urban districts. The earlier stocktaking exercise indicates that the current network could absorb some short-term growth (currently low utilization), but that major expansion will become necessary soon.

4.3 High Efficiency and Modal Shift scenarios

In addition to the base scenario, the High Efficiency and High Efficiency + Modal shift scenarios were modelled. The results on district level are presented in Appendix C.

The results show that both scenarios can significantly reduce future infrastructure requirements compared to the base scenario. In Greater London, for example, the High Efficiency scenario reduces projected AC charging demand in 2035 from 94,439 charge points to around 74,080 charge points (-21.6%), while the combined High Efficiency + Modal Shift scenario reduces demand further to approximately 66,672 charge points (-29.4% from base scenario). Similar reductions are visible across Warsaw, Paris and Madrid. However, even under the most optimistic assumptions, all four cities still require substantial charging infrastructure expansion compared to today's installed base. This highlights two important conclusions:

1. Efficiency improvements and modal shift policies can meaningfully reduce infrastructure pressure and investment requirements.
2. Such measures cannot fully replace the need for large-scale charging deployment.

The results therefore support integrated policy approaches in which charging infrastructure rollout is combined with broader urban mobility strategies aimed at reducing private vehicle dependency and improving overall transport efficiency.

4.4 Sensitivity analysis

The sensitivity analysis on the charge point per EV ratios shows a proportional effect: adjusting the ratios by −10% and +10% changes the projected number of charge points by the same −10% and +10%. This is because the ratios are applied relatively late in the model formulas, where they act as a direct multiplier on demand.

The double use factor has a more limited effect. Adjusting it by −20% and +20% changes the projected number of charge points by only 2.7% to 3.1% at the city level, and by a somewhat wider range of 0.3% to 6.9% at the district level. The fact that a 20% adjustment produces such a modest change suggests that the results are driven less by the overlap between user groups and more by the size of the dominant user group within each district.

4.5 General conclusions

The modelling exercise points to several overarching conclusions. All four cities require a substantial scale-up of public charging by 2030 (and even more by 2035). Relative to their current installed base, Warsaw and Madrid face the steepest growth trajectory. London and Paris start from a more mature position but still face significant pressure in districts like residential suburbia with limited off-street parking.

Without proactive intervention, the spatial inequalities in charging availability identified in the stocktaking are likely to persist or widen, particularly between historic centres, mixed-use districts and residential suburbia. Higher infrastructure efficiency and modal shift policies could meaningfully reduce future demand but still require substantial deployment.

5. Policy Recommendations

The stocktaking and modelling exercise show that the challenge for cities is not only to increase the number of charge points, but also to improve how charging infrastructure is planned, distributed and used. Across all four cities, major differences exist between districts in charger availability, utilisation and affordability.

The recommendations below build directly on the findings from Chapters 3 and 4. Rather than introducing completely new policy directions, they focus on practical measures that can help cities improve both the rollout and use of charging infrastructure. Some of these measures may already exist to some extent in the analysed cities. However, assessing the current implementation status of individual measures was outside the scope of this project. This does not reduce the relevance of the recommendations, as they are based on the main challenges and patterns identified in the analysis.

5.1 Existing policy directions

The four cities already use a combination of regulation, infrastructure policy and financial incentives to support EV adoption and charging infrastructure rollout. However, the maturity of these approaches differs strongly between cities.

All four cities have implemented some form of low-emission zone or vehicle access restriction. However, the scope and ambition of these measures differ considerably, with Greater London applying the most comprehensive regulatory framework, followed by Paris and Madrid, while Warsaw is at an earlier stage through its Clean Transport Zone programme. These policies are important drivers behind the strong EV growth projected in Chapter 4.

At the same time, the four cities increasingly integrate charging infrastructure into broader climate and mobility strategies. This includes local rollout targets, public charging programmes and sustainable mobility plans. However, the stocktaking analysis showed that infrastructure deployment remains uneven. Paris and London already have relatively large charging networks but also show the highest spatial inequalities between districts. Madrid and Warsaw still have smaller and more concentrated charging networks, often focused on specific high-demand locations.

Several cities also combine regulation with financial incentives. Madrid, for example, supports EV uptake through subsidies, parking benefits and support schemes for taxis and logistics operators. Greater London combines charging policy with wider transport regulation; until the end of 2025 it also offered electric vehicles a full Congestion Charge exemption, though from January 2026 this was replaced by a partial discount (25% for cars, 50% for vans) as EV adoption grew.

Overall, the comparison shows that most cities are now moving towards a more mature phase in which network efficiency, spatial distribution and long-term coordination become increasingly important.

5.2 Strategic governance and collaboration

The modelling exercise demonstrates that future charging demand will concentrate strongly in dense mixed-use and historic centre districts with high public charging dependency, such as Westminster, Centro, Śródmieście and several central Paris arrondissements. Managing this growth requires stronger coordination between municipalities, grid operators and private charging operators.

One important step is the development of shared data and planning ecosystems. Cities should invest in digital mapping tools, open data platforms and urban charging dashboards that combine charging data, utilisation levels, grid constraints and projected charging demand. The strong spatial

inequalities identified in Chapter 3 show that infrastructure deployment is currently not always aligned with future demand patterns.
Data sharing between municipalities, Distribution System Operators (DSOs) and Charge Point Operators (CPOs) is therefore essential. Open standards such as OCPI[8] and AFIR-related data requirements can support this process by enabling consistent exchange of utilisation, pricing and availability data across stakeholders.

The modelling exercise results also call for a more proactive planning approach. Rather than relying primarily on individual charge point requests, cities should increasingly move towards area-wide planning and concession models. This becomes particularly relevant in more mature markets where charging infrastructure saturation increases and optimisation of existing infrastructure become more important than purely reactive expansion.

Long-term concession areas can also help cities steer deployment towards neighbourhoods that are currently underserved. The stocktaking showed that high charger densities are often concentrated in commercially attractive central districts, while outer residential districts remain less equipped. Without stronger public coordination, these inequalities are likely to persist.

5.3 Regulatory and operational measures

The stocktaking analysis shows that utilisation, accessibility and spatial distribution differ strongly between cities and districts. This indicates that the effectiveness of charging infrastructure depends not only on the number of charge points installed, but also on how efficiently the network is managed.

A more data-driven deployment strategy can significantly improve network efficiency. The High Efficiency scenario in Chapter 4 showed that better utilisation and a shift towards more efficient charging behaviour can reduce future infrastructure requirements substantially. Cities should therefore increasingly use utilisation data and occupancy thresholds to guide future rollout decisions.

One possible approach is to define operational expansion triggers. For example, municipalities could require operators to install additional charging capacity once average utilisation in a neighbourhood exceeds a predefined threshold over a longer period. Several Dutch cities and municipalities already apply similar approaches using historical charging data.

At the same time, cities should continue improving interoperability and price transparency. The analysis identified highly fragmented operator landscapes, particularly in Paris and London. Although the actual number of active operators may be lower because of data coding differences, the results still suggest a complex market structure for users. Without clear interoperability standards and transparent pricing, fragmented markets may reduce ease of use and weaken consumer confidence.

Parking regulation will also become increasingly important as charging demand grows. The modelling exercise showed that future infrastructure pressure will become particularly strong in dense urban districts where public space is limited. Dedicated EV charging parking spaces, active enforcement against non-charging vehicles and minimum EV-ready parking requirements can help ensure that installed infrastructure is used effectively.

Finally, cities should streamline permitting procedures for charging infrastructure deployment. Faster coordination between municipalities, DSOs and operators can significantly reduce installation lead times and lower overall system costs.

[8] OCPI (Open Charge Point Interface) is an open protocol that lets EV charging networks exchange data

5.4 Financial and investment models

The modelling exercise shows that all four cities require major charging infrastructure expansion towards 2035. London alone may require more than 94,000 AC charge points under the base scenario, while Madrid and Warsaw face particularly large relative growth challenges compared to their current installed base.

Such large-scale deployment will require substantial private investment. Long-term concession models can help create investment certainty for charging operators while allowing municipalities to maintain stronger strategic control over network development. Larger concession areas may also create operational scale advantages, particularly for maintenance, grid integration and network management.

At the same time, cities should avoid purely market-driven deployment patterns. The stocktaking analysis showed that commercially attractive districts already tend to attract disproportionate charging investment. Blended financing approaches can help address this imbalance by linking profitable high-utilisation locations to less profitable residential districts within broader concession structures.

Price transparency also remains essential. Indicator 6 showed major differences in charging costs between cities, with London emerging as the most expensive market and DC charging consistently significantly more expensive than AC charging. Although the exact causes differ between cities and cannot be fully derived from this analysis alone, the findings suggest that affordability risks may become increasingly important as public charging dependency grows.

Clear pricing requirements, transparent tariff structures and interoperability standards can therefore help support both fair competition and consumer trust. This becomes particularly important in dense urban areas where many households depend primarily on public charging infrastructure rather than private home charging.

Overall, the findings suggest that future charging policy should balance three objectives simultaneously:

- accelerating large-scale infrastructure rollout;
- improving spatial and social accessibility;
- and increasing overall network efficiency and affordability.

The comparison between the four cities shows that these objectives are strongly interconnected and require coordinated long-term policy approaches rather than isolated infrastructure deployment measures.

Appendix

A. Modelling inputs and assumptions

The four cities differ strongly in urban density, parking structure, charging maturity and available datasets. Consistent city-level datasets are currently not available in a generic form across all four cities.

To create a comparable framework, a set of assumptions was therefore applied across all cities. These assumptions are not intended as exact predictions, but as realistic benchmark values based on EVConsult project experience, Dutch and European charging benchmarks, current charging utilisation patterns and expected market developments. The full list of assumptions is added to the appendix of this report.

Base inputs

EV adoption fleet

Only Greater London had official targets for both 2030 and 2035. The 2030 target for Paris was derived by scaling the national target to the city's EV adoption level. For Warsaw and Madrid, the 2030 targets were taken from the Clean Cities (E-)Mission: Zero study. The 2035 targets for Warsaw, Paris and Madrid were estimated by taking each city's current EV adoption and projecting forward along an IEA adoption S-curve. This resulted in the following adoption forecasts.

City	*2024 (official data)*	*2030 (forecast)*	*2035 (forecast)*
Greater London	6.0%	36.0%	59.0%
Madrid	1.8%	17.0%	43.9%
Paris	4.9%	25.1%	54.5%
Warsaw	1.1%	5.0%	24.9%

Table 15

The EV adoption rates for vans were estimated from IEA adoption data and assumed to be uniform across the four cities, since the decision to adopt an electric van is driven primarily by total cost of ownership rather than by local factors. For 2030 and 2035, the fleet adoption of electric vans was estimated to be 16% and 38%. For Warsaw this assumption may overestimate adoption, but it holds well for the other three cities.

Greater London

The used data for residents, registered cars and income level per household for Greater London is presented in the table below.

District	*Residents*	*Registered cars*	*Income level*
City of London	15,111	2,292	£ 129,429.00
Barking and Dagenham	232,747	65,774	£ 21,179.00
Barnet	405,050	139,148	£ 36,880.00
Bexley	256,434	104,078	£ 25,722.00
Brent	352,976	91,917	£ 29,569.00
Bromley	335,319	142,158	£ 34,399.00
Camden	216,943	39,155	£ 61,657.00
Croydon	409,342	135,967	£ 27,096.00
Ealing	385,985	115,548	£ 30,437.00
Enfield	327,434	116,560	£ 27,981.00
Greenwich	299,528	75,925	£ 28,453.00
Hackney	266,758	40,442	£ 34,013.00
Hammersmith and Fulham	188,687	45,905	£ 51,554.00
Haringey	263,850	60,889	£ 37,746.00
Harrow	270,724	96,269	£ 31,249.00
Havering	276,274	112,320	£ 27,088.00

Hillingdon	329,185	145,173	£ 25,649.00
Hounslow	299,424	94,973	£ 28,652.00
Islington	223,024	33,210	£ 41,955.00
Kensington and Chelsea	144,518	37,643	£ 110,651.00
Kingston upon Thames	172,692	63,210	£ 34,234.00
Lambeth	316,920	59,679	£ 35,607.00
Lewisham	301,255	73,501	£ 29,500.00
Merton	218,539	67,823	£ 37,416.00
Newham	374,523	68,555	£ 24,233.00
Redbridge	321,231	102,631	£ 27,443.00
Richmond upon Thames	196,678	74,428	£ 49,666.00
Southwark	314,786	54,782	£ 34,635.00
Sutton	214,525	84,094	£ 27,343.00
Tower Hamlets	331,886	46,020	£ 31,111.00
Waltham Forest	279,737	75,580	£ 28,104.00
Wandsworth	337,655	75,668	£ 47,804.00
*Westminster**	209,996	46,000	£ 76,381.00

Table 16

On Westminster: London Datastore gives 69,641 cars but this also includes lease cars on company HQ addresses which distorts the data. The used number is based on 115,000 households (Census 2021) x 40% (60% car free households according to Census 2021 TS045).

Warsaw

The used data for residents and registered cars for Warsaw is presented in the table below. No income level data is publicly accessible at the district level. Therefore, the relative income level per district was set on 1 for all districts.

District	*Residents*	*Registered cars*	*Income level*
*Śródmieście**	97,073	53,905	Unknown
*Mokotów**	225,149	133,548	Unknown
*Ochota**	79,115	44,685	Unknown
Wola	150,588	72,863	Unknown
Żoliborz	58,685	33,158	Unknown
Praga-Północ	59,263	42,878	Unknown
Praga-Południe	185,633	97,956	Unknown
Bemowo	129,146	77,578	Unknown
Białołęka	160,386	74,473	Unknown
Bielany	130,910	82,269	Unknown
Rembertów	24,888	18,523	Unknown
Targówek	122,758	69,902	Unknown
Ursus	70,248	33,537	Unknown
Ursynów	149,326	90,545	Unknown
Wawer	89,166	64,335	Unknown
Wilanów	52,855	23,641	Unknown
Włochy	50,554	43,892	Unknown
Wesoła	26,659	14,531	Unknown

Table 17

On Śródmieście, Mokotów and Ochota: The Panorama report (2024) gives 107,809, 267,096 and 74,475 cars registered but also includes company cars registered at company headquarters HQ addresses which distorts the results. The used numbers are based on an expert assumption that 50%, 50% and 40% of the Panorama data in these districts are company cars.

Paris

The used data for residents, registered cars and income level per person for Paris is presented in the table below.

District	*Residents*	*Registered cars*	*Income level*
1st Arrondissement	15,207	1,791	€ 40,504.29
2nd Arrondissement	19,979	2,352	€ 37,551.00
3rd Arrondissement	32,386	3,813	€ 38,499.41
4th Arrondissement	27,547	3,244	€ 37,088.33

5th Arrondissement	55,932	13,500	€ 40,772.80
6th Arrondissement	41,158	11,800	€ 47,877.50
7th Arrondissement	48,784	14,200	€ 54,889.62
8th Arrondissement	35,837	10,500	€ 53,083.57
9th Arrondissement	57,934	12,300	€ 42,536.92
10th Arrondissement	84,310	14,800	€ 31,632.78
11th Arrondissement	138,887	23,500	€ 32,620.00
12th Arrondissement	138,907	27,200	€ 33,281.18
13th Arrondissement	182,347	35,400	€ 27,174.12
14th Arrondissement	137,426	26,800	€ 32,932.14
15th Arrondissement	231,476	44,200	€ 37,053.14
16th Arrondissement	161,450	48,500	€ 49,390.86
17th Arrondissement	160,526	33,900	€ 41,684.06
18th Arrondissement	183,839	28,100	€ 27,668.90
19th Arrondissement	179,566	29,400	€ 23,712.50
20th Arrondissement	185,914	27,900	€ 24,477.50

Table 18

Madrid

The used data for residents, registered cars and income level per household for Madrid is presented in the table below.

District	*Residents*	*Registered cars*	*Income level*
Centro	146,349	32,500	€ 45,996.86
Arganzuela	158,760	48,000	€ 52,891.33
Retiro	120,447	44,500	€ 66,621.60
Salamanca	150,796	72,000	€ 72,545.14
Chamartín	149,654	81,000	€ 84,182.33
Tetuán	169,479	46,000	€ 45,331.00
Chamberí	143,807	41,000	€ 66,877.83
Fuencarral-El Pardo	257,495	112,000	€ 61,853.89
Moncloa-Aravaca	126,978	58,000	€ 70,870.00
Latina	254,161	78,000	€ 37,976.64
Carabanchel	280,685	89,000	€ 36,849.56
Usera	153,980	42,000	€ 34,424.86
Puente de Vallecas	260,178	84,000	€ 33,341.40
Moratalaz	96,075	34,000	€ 43,820.33
Ciudad Lineal	234,075	76,000	€ 48,819.11
Hortaleza	209,541	82,000	€ 68,136.33
Villaverde	173,183	45,000	€ 34,824.17
Villa de Vallecas	126,519	41,000	€ 39,909.50
Vicálvaro	95,233	31,000	€ 41,561.00
San Blas-Canillejas	169,990	68,000	€ 43,947.75
Barajas	50,539	22,000	€ 57,265.50

Table 19

Base scenario assumptions

The base scenario represents a business-as-usual scenario defined by current EV adoption trends and charging patterns, without any major behavioural or policy shifts.

General assumptions:

- Weight factor (EV adoption): **0.5**. The effect of the relative income index on the EV adoption is reduced by a weight factor to account for the fact that while income is an important factor in EV adoption, it is not the only one. To illustrate the effect of the weight factor, a district with a relative income of 1.5x the average only has a 1.25x higher EV adoption.
- Double use factor: **0.6**. This reflects the assumption that public charge points can serve multiple users over time, reducing the total number of required charge points.
- AC to DC (50–150 kW) equivalence ratio: **0.1667**. Assumption that one DC charger is operationally equivalent to approximately six AC chargers because of higher throughput.

Charging technology dominance assumptions:

- AC prevalence in 2030 and 2035: **80%**. Assumption that most charging demand in European cities will continue to be covered by AC charging infrastructure.

- DC prevalence in 2030 and 2035: **20%**. DC charging mainly supports fast charging demand, commercial users and users without long parking durations. However, the limited space in cities could also make DC more usable.

Charge points per EV assumptions:
- Resident EV ratio: **0.125 AC charge points per EV**. Based on research and benchmark studies suggesting a likely range between 0.125 and 0.20. The Dutch market currently operates closer to 0.20 because of its strong AC-oriented charging strategy.
- Commuter EV ratio: **0.075 AC charge points per EV**. Assumption that approximately 7.5 to 10% of commuter EVs dependent on public parking generate direct public charging demand. Charging demand at workplaces with private parking is expected to increase because of EPBD requirements within the EU.
- Visitor EV ratio: **0.04 AC charge points per EV**. Expert assumption that 4–7% of visitor EVs dependent on public parking require charging. Visitor charging demand is more likely to shift towards DC charging because of shorter parking durations. In dense inner-city areas, DC charging can partly replace AC charging because of limited public space.

District typology

Each district has been classified into a typology of six distinct categories based on their urban structure, traffic flows, composition of user groups and parking availability:

1. Historic Centre: the oldest, densest core of the city, with a tight historic street pattern, very little private parking, and intense competition for kerbside space among residents, commuters and visitors.
2. Classic inner district: Established, high-density residential and commercial neighbourhoods just outside the historic core, largely built before the car era and therefore heavily reliant on on-street parking and charging.
3. Mixed-use urban district: Diverse districts combining housing, retail, offices and amenities, where varied and overlapping daily activity drives strong and sustained demand for public charging.
4. Transit-hub: Districts organised around major stations, interchanges or airports, where charging demand is shaped by through-traffic, commuters and travellers rather than by the resident population.
5. Residential suburbia: Lower-density, predominantly residential outer districts where more dwellings have access to private garages or off-street parking, reducing dependence on public charging.
6. Industrial fringe: Peripheral districts dominated by industrial, logistics and commercial uses, with sparse residential population and charging demand tied mainly to fleet, freight and workplace activity.

Following the above classification, the ratio of user groups and the ratio of private vs. public parking space were estimated for each district.

Both the classification of the districts as well as the ratios of user groups and parking space were verified by experts with local knowledge and adjusted where deemed necessary. Nevertheless, the classification and estimation of ratios remain estimates and come with inherent uncertainty, yet they remain the only feasible approach in the absence of detailed district-level data.

Greater London

		User groups parking			*Private-public parking*	
District	Typology classification	Resident ratio	Commuter ratio	Visitor ratio	Private	Public
City of London	1. Historic centre	15%	35%	50%	10%	90%
Barking & Dagenham	5. Residential suburbia	75%	20%	5%	50%	50%

Barnet	5. Residential suburbia	80%	15%	5%	65%	35%
Bexley	5. Residential suburbia	90%	5%	5%	80%	20%
Brent	4. Transit-hub	65%	25%	10%	35%	65%
Bromley	5. Residential suburbia	85%	10%	5%	85%	15%
Camden	2. Classic inner district	50%	25%	25%	10%	90%
Croydon	4. Transit-hub	70%	20%	10%	45%	55%
Ealing	4. Transit-hub	65%	25%	10%	40%	60%
Enfield	5. Residential suburbia	85%	10%	5%	60%	40%
Greenwich	4. Transit-hub	65%	20%	15%	35%	65%
Hackney	3. Mixed-use urban district	60%	20%	20%	10%	90%
Hammersmith & Fulham	3. Mixed-use urban district	55%	25%	20%	15%	85%
Haringey	4. Transit-hub	70%	20%	10%	35%	65%
Harrow	5. Residential suburbia	85%	10%	5%	65%	35%
Havering	5. Residential suburbia	90%	5%	5%	85%	15%
Hillingdon	5. Residential suburbia	65%	25%	10%	60%	40%
Hounslow	4. Transit-hub	60%	30%	10%	40%	60%
Islington	2. Classic inner district	55%	25%	20%	8%	92%
Kensington & Chelsea	2. Classic inner district	60%	15%	25%	12%	88%
Kingston upon Thames	5. Residential suburbia	75%	10%	15%	70%	30%
Lambeth	3. Mixed-use urban district	55%	25%	20%	12%	88%
Lewisham	4. Transit-hub	70%	20%	10%	30%	70%
Merton	4. Transit-hub	70%	15%	15%	45%	55%
Newham	4. Transit-hub	65%	25%	10%	25%	75%
Redbridge	5. Residential suburbia	80%	15%	5%	65%	35%
Richmond upon Thames	5. Residential suburbia	75%	10%	15%	70%	30%
Southwark	3. Mixed-use urban district	55%	25%	20%	15%	85%
Sutton	5. Residential suburbia	85%	10%	5%	75%	25%
Tower Hamlets	3. Mixed-use urban district	55%	30%	15%	15%	85%
Waltham Forest	4. Transit-hub	75%	20%	5%	30%	70%
Wandsworth	3. Mixed-use urban district	65%	15%	20%	35%	65%
Westminster	1. Historic centre	25%	30%	45%	10%	90%

Table 20

Warsaw

			User groups parking		*Private-public parking*	
District	**Typology classification**	**Resident ratio**	**Commuter ratio**	**Visitor ratio**	**Private**	**Public**
Śródmieście	1. Historic centre	10%	40%	50%	15%	85%
Mokotów	3. Mixed-use urban district	55%	30%	15%	35%	65%
Ochota	2. Classic inner district	55%	30%	15%	20%	80%
Wola	3. Mixed-use urban district	45%	35%	20%	60%	40%
Żoliborz	2. Classic inner district	70%	20%	10%	30%	70%
Praga-Północ	4. Transit-hub	65%	15%	20%	15%	85%
Praga-Południe	3. Mixed-use urban district	70%	20%	10%	25%	75%
Bemowo	5. Residential suburbia	80%	15%	5%	40%	60%
Białołęka	5. Residential suburbia	90%	5%	5%	80%	20%
Bielany	5. Residential suburbia	75%	15%	10%	45%	55%
Rembertów	5. Residential suburbia	95%	2%	3%	90%	10%
Targówek	5. Residential suburbia	80%	15%	5%	45%	55%
Ursus	5. Residential suburbia	85%	10%	5%	70%	30%
Ursynów	4. Transit-hub	75%	20%	5%	40%	60%
Wawer	5. Residential suburbia	95%	2%	3%	95%	5%
Wilanów	3. Mixed-use urban district	85%	5%	10%	85%	15%
Włochy	3. Mixed-use urban district	50%	30%	20%	65%	35%
Wesoła	5. Residential suburbia	95%	2%	3%	95%	5%

Table 21

Paris

			User groups parking		*Private-public parking*	
Arrondissement	**Typology classification**	**Resident ratio**	**Commuter ratio**	**Visitor ratio**	**Private**	**Public**
1st Arrondissement	1. Historic centre	5%	35%	60%	8%	92%
2nd Arrondissement	1. Historic centre	10%	45%	45%	5%	95%
3rd Arrondissement	1. Historic centre	55%	15%	30%	5%	95%
4th Arrondissement	1. Historic centre	30%	15%	55%	8%	92%
5th Arrondissement	1. Historic centre	50%	20%	30%	12%	88%
6th Arrondissement	1. Historic centre	40%	20%	40%	15%	85%
7th Arrondissement	2. Classic inner district	35%	25%	40%	25%	75%
8th Arrondissement	3. Mixed-use urban district	15%	45%	40%	35%	65%

9th Arrondissement	3. Mixed-use urban district	20%	40%	40%	12%	88%
10th Arrondissement	3. Mixed-use urban district	65%	25%	10%	7%	93%
11th Arrondissement	3. Mixed-use urban district	80%	10%	10%	8%	92%
12th Arrondissement	4. Transit-hub	70%	20%	10%	25%	75%
13th Arrondissement	3. Mixed-use urban district	70%	20%	10%	30%	70%
14th Arrondissement	4. Transit-hub	65%	20%	15%	20%	80%
15th Arrondissement	2. Classic inner district	75%	15%	10%	35%	65%
16th Arrondissement	2. Classic inner district	80%	10%	10%	45%	55%
17th Arrondissement	3. Mixed-use urban district	65%	20%	15%	30%	70%
18th Arrondissement	3. Mixed-use urban district	75%	10%	15%	10%	90%
19th Arrondissement	3. Mixed-use urban district	85%	10%	5%	20%	80%
20th Arrondissement	3. Mixed-use urban district	85%	5%	10%	15%	85%

Table 22

Madrid

			User groups parking		***Private-public parking***	
District	**Typology classification**	**Resident ratio**	**Commuter ratio**	**Visitor ratio**	**Private**	**Public**
Centro	1. Historic centre	15%	25%	60%	8%	92%
Arganzuela	3. Mixed-use urban district	65%	20%	15%	35%	65%
Retiro	2. Classic inner district	50%	20%	30%	45%	55%
Salamanca	2. Classic inner district	35%	25%	40%	40%	60%
Chamartín	4. Transit-hub	45%	40%	15%	60%	40%
Tetuán	3. Mixed-use urban district	60%	30%	10%	25%	75%
Chamberí	2. Classic inner district	45%	30%	25%	35%	65%
Fuencarral-El Pardo	5. Residential suburbia	75%	20%	5%	85%	15%
Moncloa-Aravaca	4. Transit-hub	60%	25%	15%	70%	30%
Latina	3. Mixed-use urban district	80%	15%	5%	45%	55%
Carabanchel	3. Mixed-use urban district	80%	15%	5%	45%	55%
Usera	3. Mixed-use urban district	85%	10%	5%	20%	80%
Puente de Vallecas	6. Industrial fringe	85%	10%	5%	20%	80%
Moratalaz	5. Residential suburbia	85%	10%	5%	60%	40%
Ciudad Lineal	3. Mixed-use urban district	75%	15%	10%	35%	65%
Hortaleza	5. Residential suburbia	80%	15%	5%	85%	15%
Villaverde	5. Residential suburbia	85%	10%	5%	50%	50%
Villa de Vallecas	6. Industrial fringe	85%	10%	5%	40%	60%
Vicálvaro	5. Residential suburbia	85%	10%	5%	60%	40%
San Blas-Canillejas	5. Residential suburbia	80%	15%	5%	65%	35%
Barajas	6. Industrial fringe	80%	10%	10%	80%	20%

Table 23

High Efficiency scenario assumptions

The High Efficiency scenario assumes more efficient use of charging infrastructure and a gradual shift from residential public charging towards workplace and destination charging. The key assumptions are:

- Charging near home decreases to 85% of the base scenario. This reflects increased charging at workplaces and destination locations, driven by an increased equipment of workplaces, leisure and shopping sites with (semi-)public charge points.
- Shift from public to private charging at home: 5%. This represents a limited shift from public charging dependence towards privately accessible charging. The main drivers of this are expected to be the price gap in favour of charging at home and the incremental equipment and retrofitting of private parking spaces with charge points, supported by the right to plug as stipulated by the European Building Performance Directive (EPBD), and the new and renovated housing added to the existing building stock.
- AC prevalence decreases from 80% to 75% (while DC prevalence increases from 20% to 25%). This reflects a moderate shift towards higher-power charging infrastructure as already observed throughout many European countries, driven by increasing average charging speeds of vehicles, limited urban space and the commercially more viable financial nature of DC charging.

High Efficiency + Modal Shift scenario assumptions

The High Efficiency + Modal Shift scenario combines infrastructure efficiency improvements with broader urban mobility changes. The key assumption is:

Overall car ownership decreases to 90% of the base scenario. This reflects increased use of public transport, active mobility and shared mobility solutions driven by the implementation of ambitious but existing and tested urban mobility measures. Importantly, the scenario does not assume a reduction in EV adoption itself, but rather a reduction in total vehicle ownership. This leads to lower overall charging demand while maintaining high EV penetration within the remaining vehicle fleet.

Sensitivity analysis

A sensitivity analysis was carried out to test how robust the projected charge point numbers are to variation in the two assumptions that most strongly influence the results:

- **Charge points per EV ratio**: the model was re-run with all three charge point per EV ratios (resident, commuter and visitor) adjusted by −10% and +10%.
- **Double use factor**: the double use factor was adjusted by −20% and +20%. A wider band was applied here than for the charge point per EV ratio, because the degree of overlap in charge point use between user groups is harder to estimate and therefore carries greater uncertainty.

B. Results modelling exercise

The results of the modelling exercise for 2030 and 2035 are presented in the tables below per district. The installed base is derived from the stocktaking exercise and based on Eco-Movement data.

Greater London

The table below presents the number of charge points installed in 2026 and projected in 2030 and 2035 in the boroughs of London.

	Installed		*2030*		*2035*	
Borough	**AC**	**DC**	**AC**	**DC**	**AC**	**DC**
City of London	39	7	491	20	657	27
Barking & Dagenham	89	30	1,061	44	1,782	74
Barnet	652	122	1,900	79	3,175	132
Bexley	155	14	668	28	1,120	47
Brent	1,704	142	2,293	96	3,840	160
Bromley	24	12	787	33	1,316	55
Camden	665	49	2,124	89	3,535	147
Croydon	600	132	2,684	112	4,498	187
Ealing	1,130	124	2,692	112	4,508	188
Enfield	329	101	1,579	66	2,646	110
Greenwich	778	104	1,845	77	3,090	129
Hackney	400	28	1,502	63	2,512	105
Hammersmith & Fulham	2,913	64	2,056	86	3,426	143
Haringey	157	27	1,634	68	2,730	114
Harrow	250	24	1,193	50	1,997	83
Havering	113	60	551	23	924	38
Hillingdon	184	38	2,109	88	3,537	147
Hounslow	2,034	252	2,241	93	3,754	156
Islington	787	18	1,448	60	2,417	101
Kensington & Chelsea	780	39	2,682	112	4,023	168
Kingston upon Thames	354	72	720	30	1,204	50
Lambeth	2,343	145	2,304	96	3,852	160
Lewisham	345	106	1,909	80	3,197	133
Merton	338	24	1,517	63	2,536	106
Newham	310	33	1,830	76	3,069	128
Redbridge	508	76	1,237	52	2,073	86
Richmond upon Thames	108	-	1,016	42	1,693	71
Southwark	1,186	42	2,018	84	3,374	141
Sutton	92	39	706	29	1,183	49
Tower Hamlets	2,330	44	1,639	68	2,743	114
Waltham Forest	1,893	54	1,889	79	3,165	132
Wandsworth	2,986	92	2,305	96	3,844	160
Westminster	688	13	4,227	176	7,019	292

Table 24

Warsaw

The table below presents the number of charge points installed in 2026 and projected in 2030 and 2035 in the districts of Warsaw.

	Installed		*2030*		*2035*	
District	**AC**	**DC**	**AC**	**DC**	**AC**	**DC**
Śródmieście	75	12	1,391	58	6,056	252
Mokotów	64	28	715	30	3,115	130
Ochota	36	24	295	12	1,283	53
Wola	117	17	263	11	1,143	48
Żoliborz	3	6	173	7	754	31
Praga-Północ	25	11	275	11	1,196	50
Praga-Południe	18	33	548	23	2,386	99
Bemowo	10	22	332	14	1,444	60
Białołęka	30	44	101	4	441	18
Bielany	35	15	328	14	1,427	59
Rembertów	1	2	12	1	54	2
Targówek	29	20	274	11	1,192	50
Ursus	10	7	70	3	305	13
Ursynów	41	16	398	17	1,731	72
Wawer	21	20	22	1	94	4
Wilanów	11	14	24	1	106	4
Włochy	64	41	131	5	571	24
Wesoła	2	0	5	0	21	1

Table 25

Paris

The table below presents the number of charge points installed in 2026 and projected in 2030 and 2035 in the arrondissements of Paris.

	Installed		*2030*		*2035*	
Arrondissement	**AC**	**DC**	**AC**	**DC**	**AC**	**DC**
1st Arrondissement	318	4	393	16	859	36
2nd Arrondissement	262	14	282	12	616	26
3rd Arrondissement	82	-	117	5	257	11
4th Arrondissement	198	22	121	5	264	11
5th Arrondissement	272	24	414	17	905	38
6th Arrondissement	170	12	414	17	903	38
7th Arrondissement	746	34	509	21	1,112	46
8th Arrondissement	1,640	19	706	29	1,541	64
9th Arrondissement	413	14	747	31	1,632	68
10th Arrondissement	571	9	396	17	867	36
11th Arrondissement	252	12	578	24	1,262	53
12th Arrondissement	380	49	581	24	1,270	53
13th Arrondissement	373	34	649	27	1,420	59
14th Arrondissement	622	53	621	26	1,358	57
15th Arrondissement	635	30	835	35	1,823	76
16th Arrondissement	948	48	872	36	1,903	79
17th Arrondissement	1,658	16	768	32	1,677	70
18th Arrondissement	542	16	641	27	1,402	58
19th Arrondissement	384	25	546	23	1,194	50
20th Arrondissement	240	16	552	23	1,206	50

Table 26

Madrid

The table below presents the number of charge points installed in 2026 and projected in 2030 and 2035 in the districts of Madrid.

	Installed		*2030*		*2035*	
District	**AC**	**DC**	**AC**	**DC**	**AC**	**DC**
Centro	278	106	1,520	63	3,893	162
Arganzuela	108	28	677	28	1,734	72
Retiro	74	20	648	27	1,662	69
Salamanca	285	46	1,403	58	3,600	150
Chamartín	222	43	1,072	45	2,752	115
Tetuán	112	26	733	31	1,878	78
Chamberí	122	31	756	32	1,940	81
Fuencarral-El Pardo	223	44	377	16	967	40
Moncloa-Aravaca	180	23	453	19	1,162	48
Latina	49	23	756	32	1,936	81
Carabanchel	61	31	853	36	2,184	91
Usera	47	24	558	23	1,427	59
Puente de Vallecas	44	14	1,102	46	2,821	118
Moratalaz	6	17	248	10	635	26
Ciudad Lineal	122	17	982	41	2,516	105
Hortaleza	123	15	283	12	725	30
Villaverde	23	18	375	16	960	40
Villa de Vallecas	97	127	431	18	1,105	46
Vicálvaro	66	66	221	9	566	24
San Blas-Canillejas	267	26	445	19	1,139	47
Barajas	131	35	92	4	235	10

Table 27

C. Results High Efficiency and High Efficiency + Modal Shift scenarios

London

High Efficiency Greater London	***2030***		***2035***	
Borough	**AC demand**	**DC demand**	**AC demand**	**DC demand**
City of London	434	24	581	32
Barking & Dagenham	817	45	1,372	76
Barnet	1,424	79	2,380	132
Bexley	468	26	785	44
Brent	1,801	100	3,017	168
Bromley	527	29	882	49
Camden	1,709	95	2,843	158
Croydon	2,083	116	3,491	194
Ealing	2,108	117	3,530	196
Enfield	1,190	66	1,994	111
Greenwich	1,447	80	2,424	135
Hackney	1,195	66	2,000	111
Hammersmith & Fulham	1,643	91	2,738	152
Haringey	1,277	71	2,135	119
Harrow	891	49	1,491	83
Havering	368	20	617	34
Hillingdon	1,616	90	2,709	151
Hounslow	1,764	98	2,955	164
Islington	1,160	64	1,936	108
Kensington & Chelsea	2,130	118	3,195	177
Kingston upon Thames	533	30	892	50
Lambeth	1,843	102	3,082	171
Lewisham	1,497	83	2,507	139
Merton	1,176	65	1,965	109
Newham	1,445	80	2,424	135
Redbridge	927	52	1,554	86
Richmond upon Thames	752	42	1,254	70
Southwark	1,613	90	2,697	150
Sutton	511	28	856	48
Tower Hamlets	1,312	73	2,196	122
Waltham Forest	1,477	82	2,474	137
Wandsworth	1,805	100	3,010	167
Westminster	3,670	204	6,094	339

Table 28

High Efficiency + Modal Shift Greater London	***2030***		***2035***	
Borough	**AC demand**	**DC demand**	**AC demand**	**DC demand**
City of London	391	22	523	29
Barking & Dagenham	735	41	1,235	69
Barnet	1,282	71	2,142	119
Bexley	421	23	706	39
Brent	1,621	90	2,715	151
Bromley	475	26	794	44
Camden	1,538	85	2,559	142
Croydon	1,874	104	3,142	175
Ealing	1,897	105	3,177	176
Enfield	1,071	60	1,795	100
Greenwich	1,302	72	2,181	121
Hackney	1,076	60	1,800	100
Hammersmith & Fulham	1,479	82	2,464	137
Haringey	1,150	64	1,921	107
Harrow	802	45	1,342	75
Havering	331	18	555	31
Hillingdon	1,454	81	2,438	135
Hounslow	1,588	88	2,660	148
Islington	1,044	58	1,742	97
Kensington & Chelsea	1,917	107	2,875	160
Kingston upon Thames	480	27	803	45
Lambeth	1,659	92	2,774	154
Lewisham	1,347	75	2,256	125
Merton	1,058	59	1,769	98
Newham	1,301	72	2,182	121
Redbridge	835	46	1,399	78
Richmond upon Thames	677	38	1,129	63
Southwark	1,451	81	2,427	135
Sutton	460	26	770	43
Tower Hamlets	1,181	66	1,977	110
Waltham Forest	1,329	74	2,227	124
Wandsworth	1,625	90	2,709	151
Westminster	3,303	183	5,485	305

Table 29

Warsaw

High efficiency Warsaw	***2030***		***2035***	
District	**AC demand**	**DC demand**	**AC demand**	**DC demand**
Śródmieście	1,241	69	5,403	300
Mokotów	567	32	2,470	137
Ochota	235	13	1,025	57
Wola	205	11	894	50
Żoliborz	136	8	591	33
Praga-Północ	217	12	945	53
Praga-Południe	431	24	1,875	104
Bemowo	257	14	1,117	62
Białołęka	71	4	309	17
Bielany	253	14	1,102	61
Rembertów	7	0	32	2
Targówek	211	12	919	51
Ursus	52	3	224	12
Ursynów	309	17	1,345	75
Wawer	9	0	37	2
Wilanów	16	1	71	4
Włochy	101	6	439	24
Wesoła	2	0	8	0

Table 30

High Efficiency + Modal Shift Warsaw	***2030***		***2035***	
District	**AC demand**	**DC demand**	**AC demand**	**DC demand**
Śródmieście	1,117	62	4,862	270
Mokotów	511	28	2,223	124
Ochota	212	12	922	51
Wola	185	10	805	45
Żoliborz	122	7	532	30
Praga-Północ	195	11	851	47
Praga-Południe	388	22	1,688	94
Bemowo	231	13	1,005	56
Białołęka	64	4	278	15
Bielany	228	13	992	55
Rembertów	7	0	29	2
Targówek	190	11	827	46
Ursus	46	3	202	11
Ursynów	278	15	1,210	67
Wawer	8	0	34	2
Wilanów	15	1	64	4
Włochy	91	5	395	22
Wesoła	2	0	8	0

Table 31

Paris

High efficiency Paris	**2030**		**2035**	
Arrondissement	**AC demand**	**DC demand**	**AC demand**	**DC demand**
1st Arrondissement	355	20	775	43
2nd Arrondissement	253	14	552	31
3rd Arrondissement	94	5	205	11
4th Arrondissement	101	6	220	12
5th Arrondissement	332	18	726	40
6th Arrondissement	335	19	732	41
7th Arrondissement	415	23	905	50
8th Arrondissement	619	34	1,351	75
9th Arrondissement	655	36	1,432	80
10th Arrondissement	315	18	689	38
11th Arrondissement	453	25	990	55
12th Arrondissement	457	25	999	55
13th Arrondissement	509	28	1,113	62
14th Arrondissement	491	27	1,073	60
15th Arrondissement	649	36	1,419	79
16th Arrondissement	671	37	1,464	81
17th Arrondissement	604	34	1,319	73
18th Arrondissement	504	28	1,102	61
19th Arrondissement	425	24	930	52
20th Arrondissement	430	24	940	52

Table 32

High Efficiency + Modal Shift Paris	**2030**		**2035**	
Arrondissement	**AC demand**	**DC demand**	**AC demand**	**DC demand**
1st Arrondissement	319	18	697	39
2nd Arrondissement	227	13	497	28
3rd Arrondissement	84	5	184	10
4th Arrondissement	91	5	198	11
5th Arrondissement	299	17	654	36
6th Arrondissement	302	17	659	37
7th Arrondissement	373	21	815	45
8th Arrondissement	557	31	1,216	68
9th Arrondissement	590	33	1,288	72
10th Arrondissement	284	16	620	34
11th Arrondissement	408	23	891	49
12th Arrondissement	411	23	899	50
13th Arrondissement	458	25	1,002	56
14th Arrondissement	442	25	966	54
15th Arrondissement	585	32	1,277	71
16th Arrondissement	603	34	1,318	73
17th Arrondissement	543	30	1,187	66
18th Arrondissement	453	25	992	55
19th Arrondissement	383	21	837	47
20th Arrondissement	387	21	846	47

Table 33

Madrid

High efficiency Madrid	***2030***		***2035***	
District	**AC demand**	**DC demand**	**AC demand**	**DC demand**
Centro	1,343	75	3,439	191
Arganzuela	531	29	1,360	76
Retiro	511	28	1,310	73
Salamanca	1,133	63	2,906	161
Chamartín	840	47	2,157	120
Tetuán	582	32	1,492	83
Chamberí	606	34	1,554	86
Fuencarral-El Pardo	255	14	653	36
Moncloa-Aravaca	340	19	873	49
Latina	583	32	1,492	83
Carabanchel	657	37	1,683	93
Usera	434	24	1,111	62
Puente de Vallecas	859	48	2,198	122
Moratalaz	187	10	478	27
Ciudad Lineal	764	42	1,958	109
Hortaleza	190	11	487	27
Villaverde	286	16	733	41
Villa de Vallecas	332	18	851	47
Vicálvaro	167	9	427	24
San Blas-Canillejas	333	19	854	47
Barajas	65	4	166	9

Table 34

High Efficiency + Modal Shift Madrid	***2030***		***2035***	
District	**AC demand**	**DC demand**	**AC demand**	**DC demand**
Centro	1,208	67	3,095	172
Arganzuela	478	27	1,224	68
Retiro	460	26	1,179	66
Salamanca	1,020	57	2,616	145
Chamartín	756	42	1,941	108
Tetuán	524	29	1,342	75
Chamberí	545	30	1,398	78
Fuencarral-El Pardo	229	13	588	33
Moncloa-Aravaca	306	17	786	44
Latina	524	29	1,343	75
Carabanchel	592	33	1,515	84
Usera	391	22	1,000	56
Puente de Vallecas	773	43	1,978	110
Moratalaz	168	9	431	24
Ciudad Lineal	688	38	1,762	98
Hortaleza	171	10	439	24
Villaverde	258	14	660	37
Villa de Vallecas	299	17	766	43
Vicálvaro	150	8	384	21
San Blas-Canillejas	300	17	768	43
Barajas	58	3	149	8

Table 35