Global electric vehicle charging infrastructure market monitor (2024)

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This market monitor evaluates the global development of electric vehicle (EV)[1] charging infrastructure as of 2024, with a special emphasis on China, Europe,[2] and the United States—the top three EV markets globally. Definitions of key terms along with details about the data sources for this analysis are provided in the appendix.

Our analysis focuses on public charging infrastructure—that is, wired stationary chargers that are accessible to the general public. Excluded from this analysis due to lack of data are private chargers, which are chargers only accessible to one or a few specific vehicle owners, such as home chargers in houses and apartments, workplace chargers, and depot chargers for commercial vehicle fleets. Alternative methods and devices used to recharge EVs, including wireless charging, battery swapping, and overhead catenary charging facilities, are also outside the scope of this brief.

Factors influencing charging demand—such as EV stock and housing-type distribution (e.g., single-family homes vs. apartments)—vary significantly between regions. Consequently, this brief should not be interpreted as an assessment of which market is "better" or of whether a market's charging network adequately meets local demand, but rather as an overview of developments in key public charging infrastructure markets.

NUMBER OF PUBLIC CHARGERS

The number of public chargers continues to grow globally, with China leading both in scale and growth rate. Global public charger stock increased from 2.3 million in 2022

1 In this paper, the term "electric vehicles" refer to battery electric vehicles (BEVs) and plug-in hybrid electric vehicles (PHEVs). This includes cars, vans, buses, and trucks but does not include two-wheelers, three-wheelers, or low-speed vehicles.

2 Europe refers to the 27 Member States of the European Union, the countries of the European Free Trade Association (Iceland, Liechtenstein, Norway, and Switzerland), and the United Kingdom.

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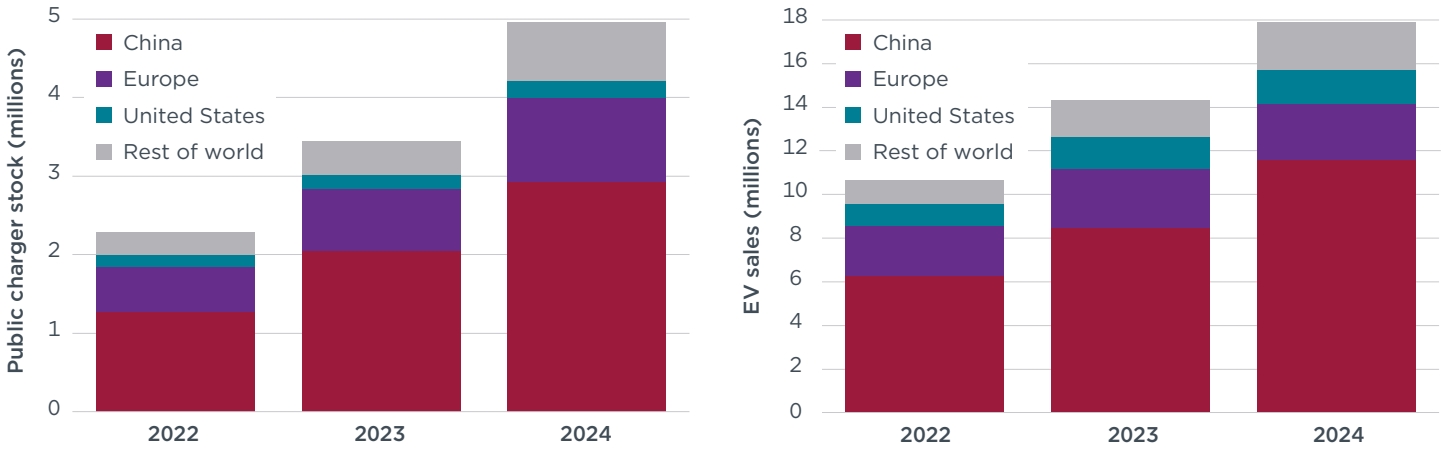
to almost 5 million in 2024 (Figure 1, left panel), with a compound annual growth rate (CAGR) of 47%. The number of public chargers in China more than doubled, increasing from 1.27 million in 2022 to 2.93 million in 2024. During the same 2-year period, public charger stock in Europe grew from 580,000 to 1.06 million, while in the United States it rose from 150,000 to 220,000. As of 2024, China accounted for 59% of the global stock of public chargers, Europe 21%, and the United States 4.4%. From 2022 to 2024, the CAGR of public charger stock was 52% in China, 35% in Europe, and 21% in the United States.

As of 2024, China accounted for 65% of global EV sales, Europe 14%, and the United States 9% (Figure 1, right panel). From 2022 to 2024, the CAGR of EV sales was 36% in China, 5% in Europe, and 27% in the United States. This suggests a parallel growth trend between public charging infrastructure and EV sales across the three leading markets. For China and Europe, the number of public chargers increased at a much higher rate than EV sales, while the United States showed a comparable growth rate between these two metrics.

Figure 1
Global public charger stock (left) and EV sales (right), 2022–2024



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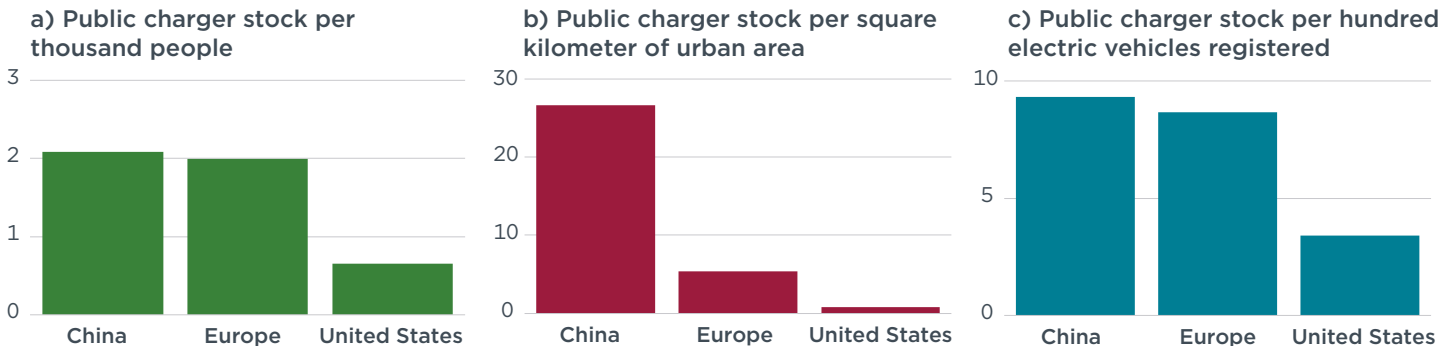
In addition to public charger stock, we also evaluated public charger density in China, Europe, and the United States in 2024. We used three metrics to measure public charger density: population, geographic size, and EV stock (Figure 2). Regardless of the metric used, China had the highest public charger density. In terms of population, China had 2.1 public chargers per 1,000 people, similar to Europe (2.0), and far ahead of the United States (0.7). By geographic size, China recorded 27 public chargers per square kilometer of urban area, nearly 5 times higher than Europe (5.3) and over 30 times higher than the United States (0.8). And in terms of EV stock, China had 9.3 public chargers per 100 registered EVs, compared with 8.7 in Europe and 3.4 in the United States.

Figure 2

Public charger stock in China, Europe, and the United States in 2024 (a) per 1,000 people, (b) per square kilometer of urban area, and (c) per 100 registered EVs



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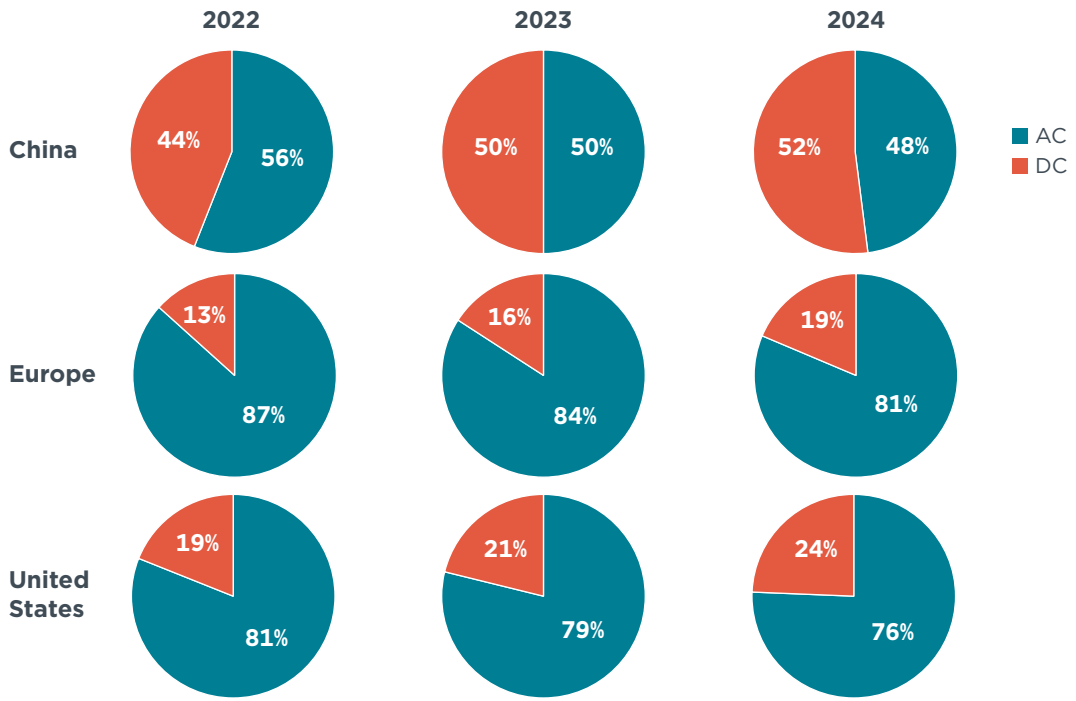
Public chargers are categorized as either alternating current (AC) chargers or direct current (DC) chargers; DC chargers usually have a larger power output (i.e., greater maximum power that can be delivered to an EV) and thus can charge a vehicle faster than AC chargers. Figure 3 compares the split between public AC and DC chargers in China, Europe, and the United States from 2022 to 2024. As shown, the share of DC chargers has increased in all three markets. In China, the DC share rose from 44% in 2022 to 50% in 2023 and 52% in 2024, surpassing AC chargers to become the dominant charger type. Although Europe and the United States remained AC-dominant, both saw steady increases in the share of DC chargers. As of 2024, 19% of public chargers in Europe were DC chargers, up from 13% in 2022. In the United States, the share of DC chargers grew from 19% to 24% over the same period. The average share of DC chargers globally increased from 31% in 2022 to 39% in 2024.

Figure 3

Share of public AC and DC chargers in China, Europe, and the United States, 2022–2024



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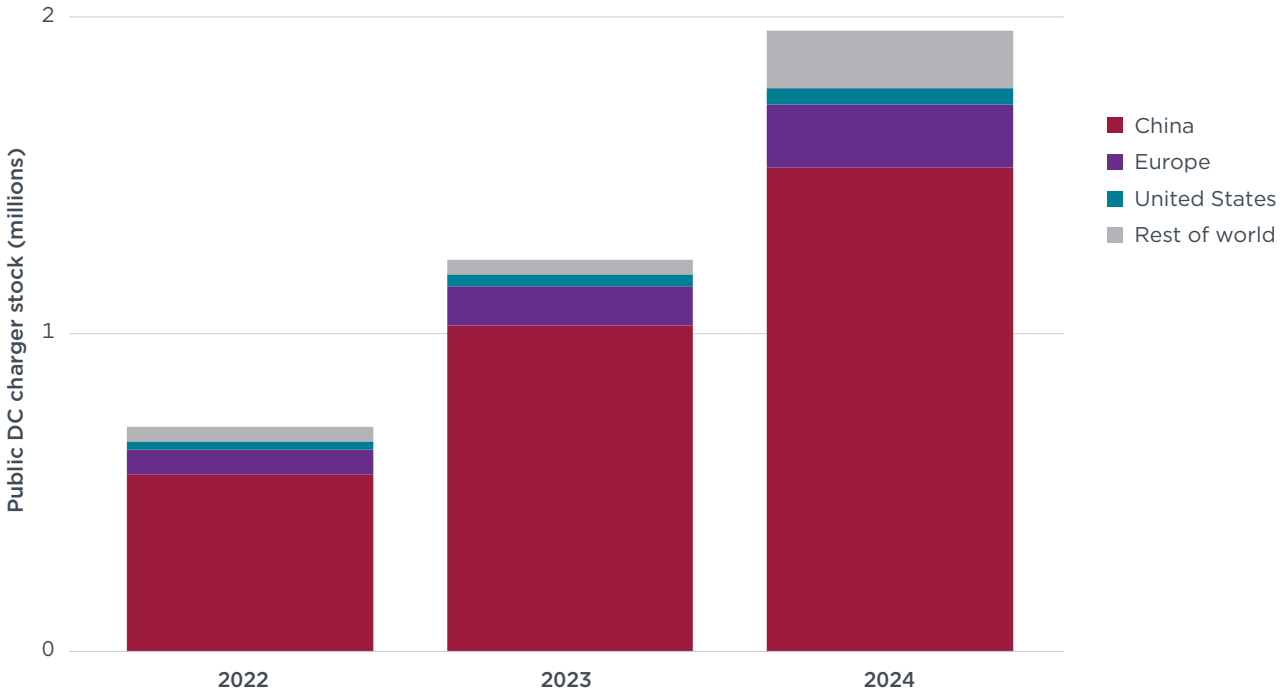
As shown in Figure 4, the global public DC charger stock increased considerably from 708,000 in 2022 to almost 2 million in 2024, with a CAGR of 66%. China's public DC charger stock in particular saw substantial growth, rising from 560,000 in 2022 to 1.53 million in 2024, a CAGR of 65%. In Europe, the number of public DC chargers increased from 77,000 in 2022 to 198,000 in 2024 (a CAGR of 60%), while the United States saw a rise from 28,000 to 53,000 over the same period (a CAGR of 38%). These markets represented 78% (China), 10% (Europe), and 2.7% (the United States) of the total global stock of public DC chargers.

Figure 4
Public DC charger stock globally, 2022–2024



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Figures 5–7 display the geographic distribution of public charger stock and public DC charger stock by province in China, by country in Europe, and by state in the United States. In all three markets, there was a clear concentration: in China, 70% of public charger stock was in the top 10 provinces; in Europe, 87% was in the top 10 countries; and in the United States, 57% was in the top 10 states.[3] Likewise, 69% of the DC charger stock was in the top 10 provinces in China, 80% was in top 10 countries in Europe, and 60% was in the top 10 U.S. states. These patterns resemble the concentration of EV sales in these three leading markets.[4]

At 622,000 public chargers, Guangdong had the largest public charger stock out of all of China's provinces, accounting for 21% of China's total stock. This was followed by Zhejiang, Jiangsu, Shanghai, and Shandong provinces. Guangdong also led the country in public DC charger deployment: As of 2024, Guangdong had deployed 259,000

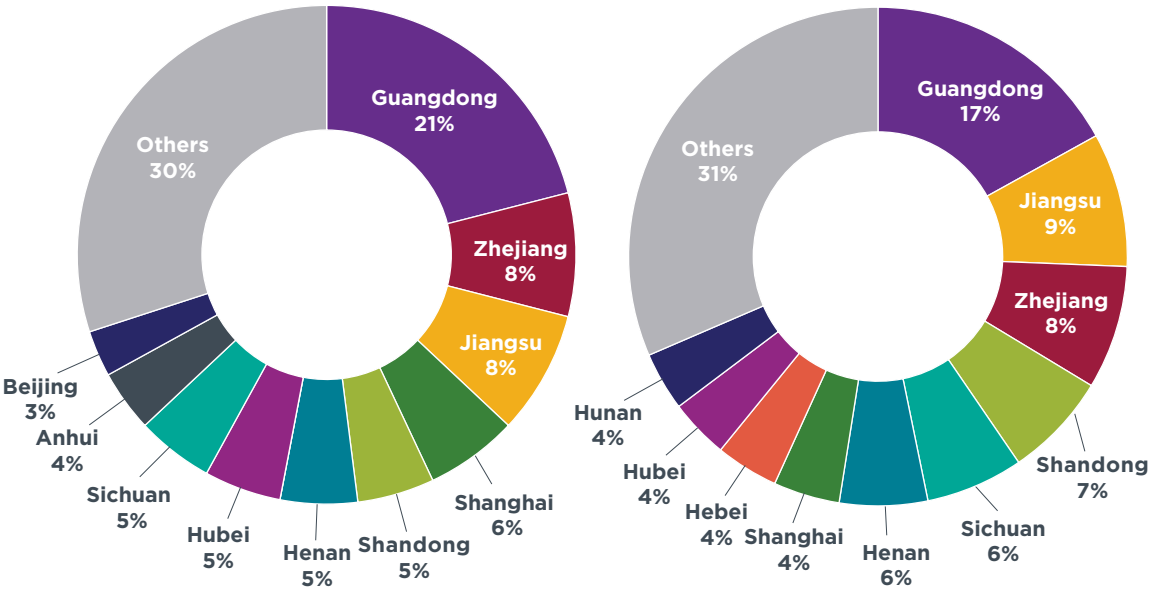
3 In this report, "top 10" refers to the cities, provinces, states, countries, or charge point operators with the highest total stock of public chargers.

4 Yidan Chu et al., *Leading New Energy Vehicle Cities in China: The 2022 Market* (International Council on Clean Transportation, 2024), https://theicct.org/publication/ev-china-city-markets-2022-update-mar24/; Michelle Monteforte et al., *European Market Monitor: Cars and Vans 2024* (International Council on Clean Transportation, 2025), https://theicct.org/publication/european-market-monitor-cars-vans-2024-feb25/; Aaron Isenstadt and Peter Slowik, *U.S. Passenger Electric Vehicle Sales and Model Availability Through 2024* (International Council on Clean Transportation, 2025), https://theicct.org/publication/us-passenger-ev-sales-and-model-availability-through-2024-apr25/.

public DC chargers, constituting 17% of the national total. Sichuan and Shandong ranked higher in public DC charger stock than they did in overall public charger stock; in these provinces, DC chargers made up 72% of public charger stock—significantly higher than the national average of 52% and well above the shares observed in other leading provinces.

Figure 5

Share of public chargers (left) and public DC chargers (right) by province in China, 2024



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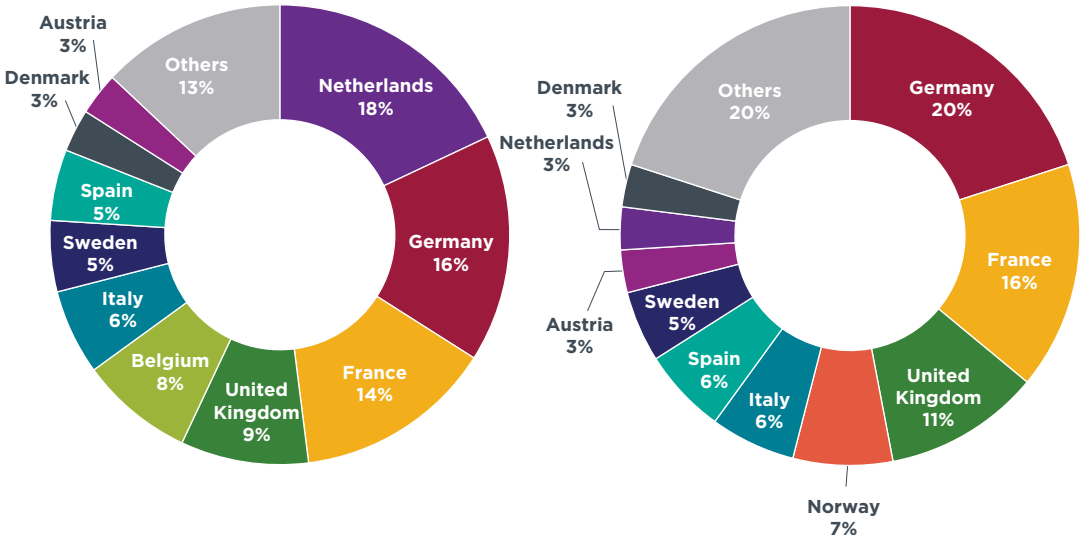
In Europe, the Netherlands had the largest public charger stock, with 188,000 public chargers as of 2024, 18% of the region's total. This was followed by Germany, France, the United Kingdom, and Belgium. When only considering DC charger stock, Germany was the top-ranking country in Europe, with 39,000 public DC chargers in 2024, 20% of Europe's total. In terms of the DC share of total public charger stock, Norway stood out with a 40% share, relative to a regional average of 19%. By contrast, the shares of DC chargers were substantially lower in Belgium (6%) and the Netherlands (3%). Overall, Norway ranked higher in DC charger stock than it did in total public charger stock, while the Netherlands and Belgium ranked higher in public charger stock than they did in DC charger stock.

Figure 6

Share of public chargers (left) and public DC chargers (right) by country in Europe, 2024



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In the United States, California had the largest public charger stock in 2024—49,000 public chargers, accounting for 25% of total U.S. stock—followed by New York, Florida, Texas, and Massachusetts. California also led in DC charger deployment, with 13,000 DC chargers as of 2024, 26% of the national total. New York and Massachusetts ranked lower in DC charger stock than in overall public charger stock; in these states, DC chargers accounted for only 13% of total public charger stock—significantly below the national average of 24%.

Figure 7

Share of public chargers (left) and public DC chargers (right) by state in the United States, 2024

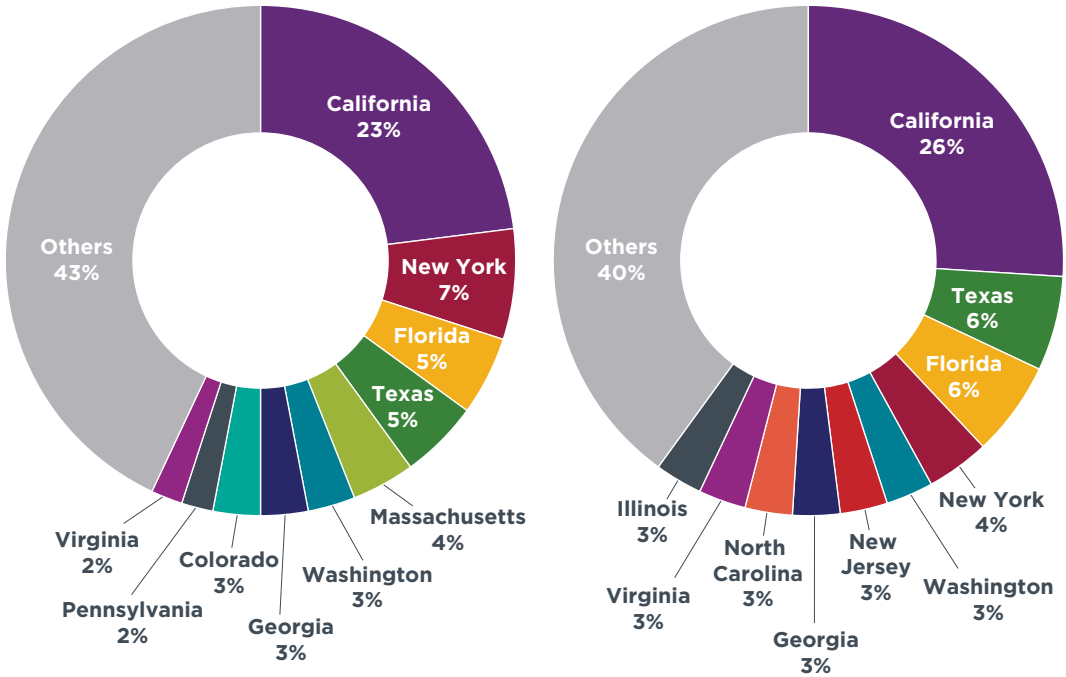

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Figure 8 compares public charger stock in the top 10 cities in China, Europe, and the United States as of 2024, along with the relative shares of AC and DC chargers in each city. To allow more consistent comparison with China—where the official definition of a city usually extends well beyond the urban core to cover surrounding districts and counties—we used comparable metrics for European and U.S. metropolitan areas.[5]

Overall, the public charger stock in top Chinese cities was an order of magnitude higher than that in European and U.S. cities. Shenzhen ranked first globally with 288,000 public chargers as of 2024, followed by Shanghai (173,000), Guangzhou (112,000), Wuhan (91,000), and Beijing (90,000). The global top 10 consists entirely of Chinese cities, and these cities collectively accounted for over one-fifth of global public charger stock. Amsterdam ranked first in Europe, with 39,000 public chargers, and two other Dutch cities—Rotterdam-The Hague and Utrecht—placed in Europe's top 5. In the United States, Los Angeles ranked first with 18,000 chargers, with three other cities in California—San Francisco, San Jose, and San Diego—in the U.S. top 10.

In general, the share of DC chargers in the top 10 Chinese cities was significantly higher than that of the top 10 cities in Europe and the United States. The share of DC chargers in the top 10 Chinese cities ranged from 15% (Shenzhen) to 80% (Foshan). In Europe, Amsterdam had the lowest percentage of DC chargers among the top 10 cities, at 3%, while Barcelona had the highest, at 15%. In the United States, DC shares in the top 10 cities ranged from 12% (Boston) to 22% (San Francisco).

5 Specifically, European metropolitan areas are delimited according to level 3 of the EU's Nomenclature of Territorial Units for Statistics (NUTS 3), while U.S. metropolitan areas are delimited according to the Core-Based Statistical Area (CBSA) classification.

Figure 8

Public charger stock (left) and technology mix (right) of the top 10 cities in China, Europe, and the United States, 2024

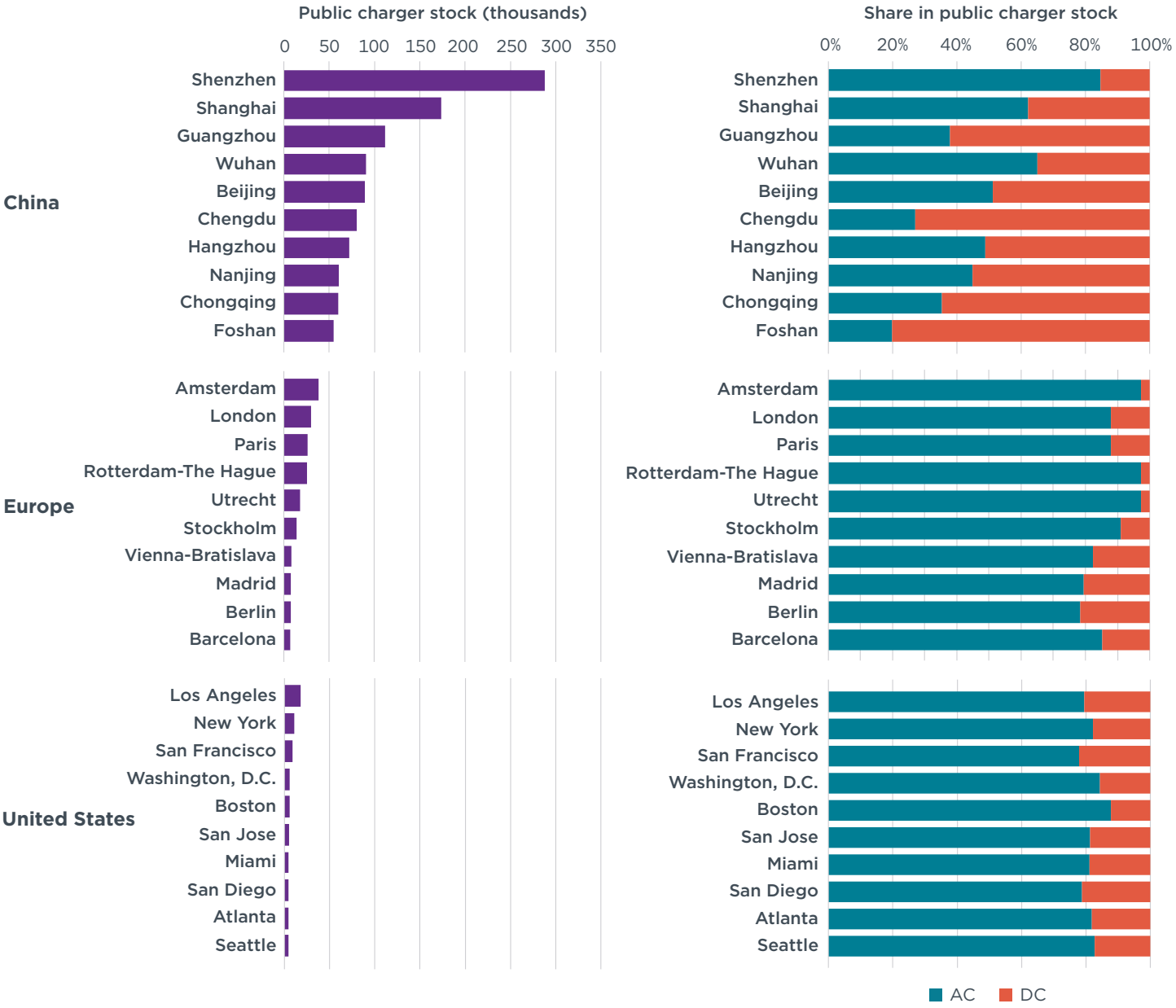

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Figure 9 illustrates the geographic distribution of public charger stock at the city level in China, Europe, and the United States in 2022 and 2024. All three leading markets exhibited uneven regional distribution of public chargers. In China, cities in the eastern and southern regions generally had more public chargers in place compared to those in northern and western China. Similarly, northern and western Europe saw higher concentrations of public charger stock than southern and eastern Europe, while in the United States the highest concentrations of public chargers were along the east and west coasts. A comparison of the maps in Figure 9 indicates that, in Chinese and European cities, the public charger stock overall saw significant growth and the regional distribution became noticeably more even between 2022 and 2024. While public charger stock also grew in U.S. cities, there was less discernible progress in addressing regional disparities, with many of the country's central states remaining sparsely covered.

Figure 9

City-level distribution of public charger stock in China, Europe, and the United States, 2022–2024

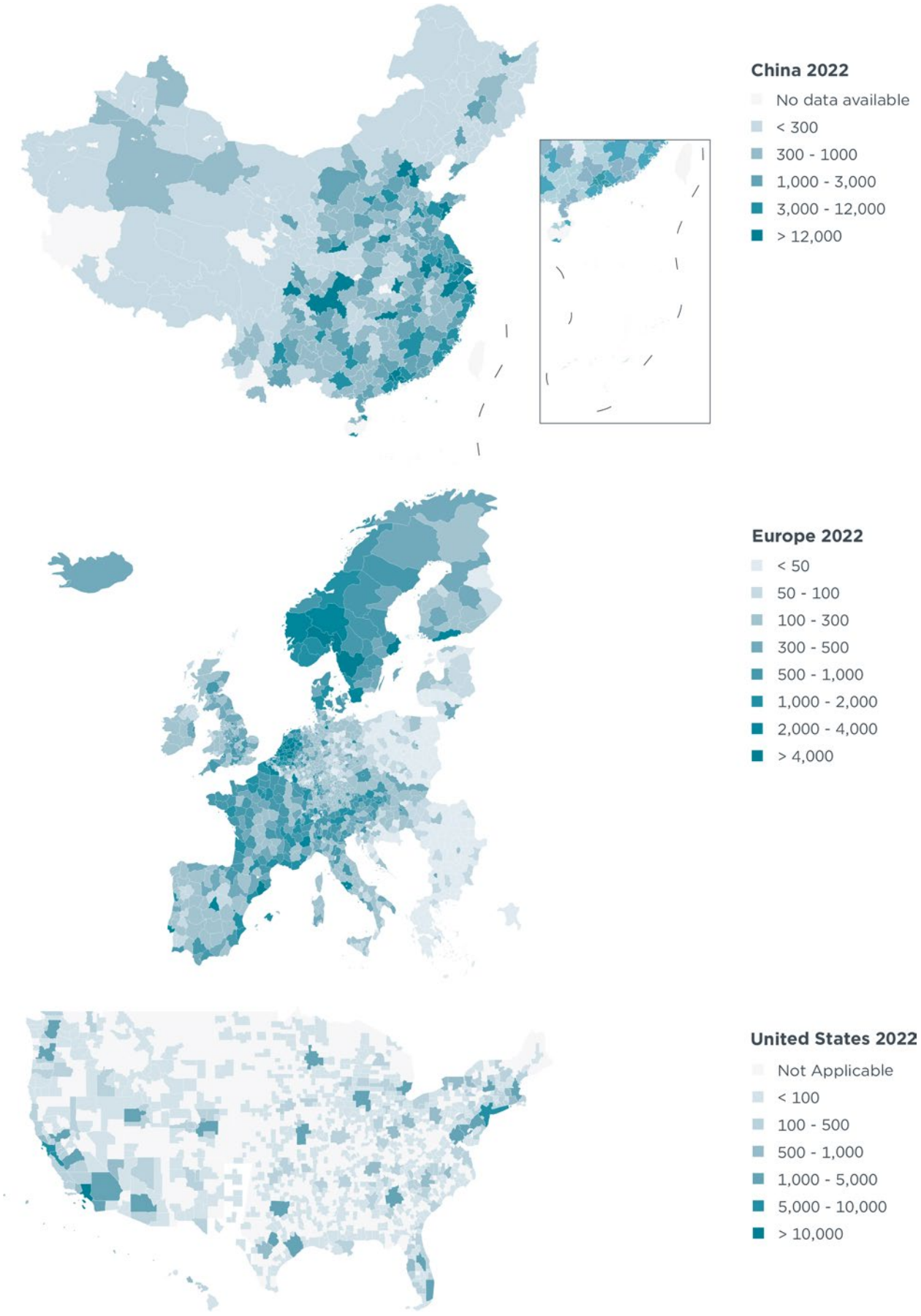
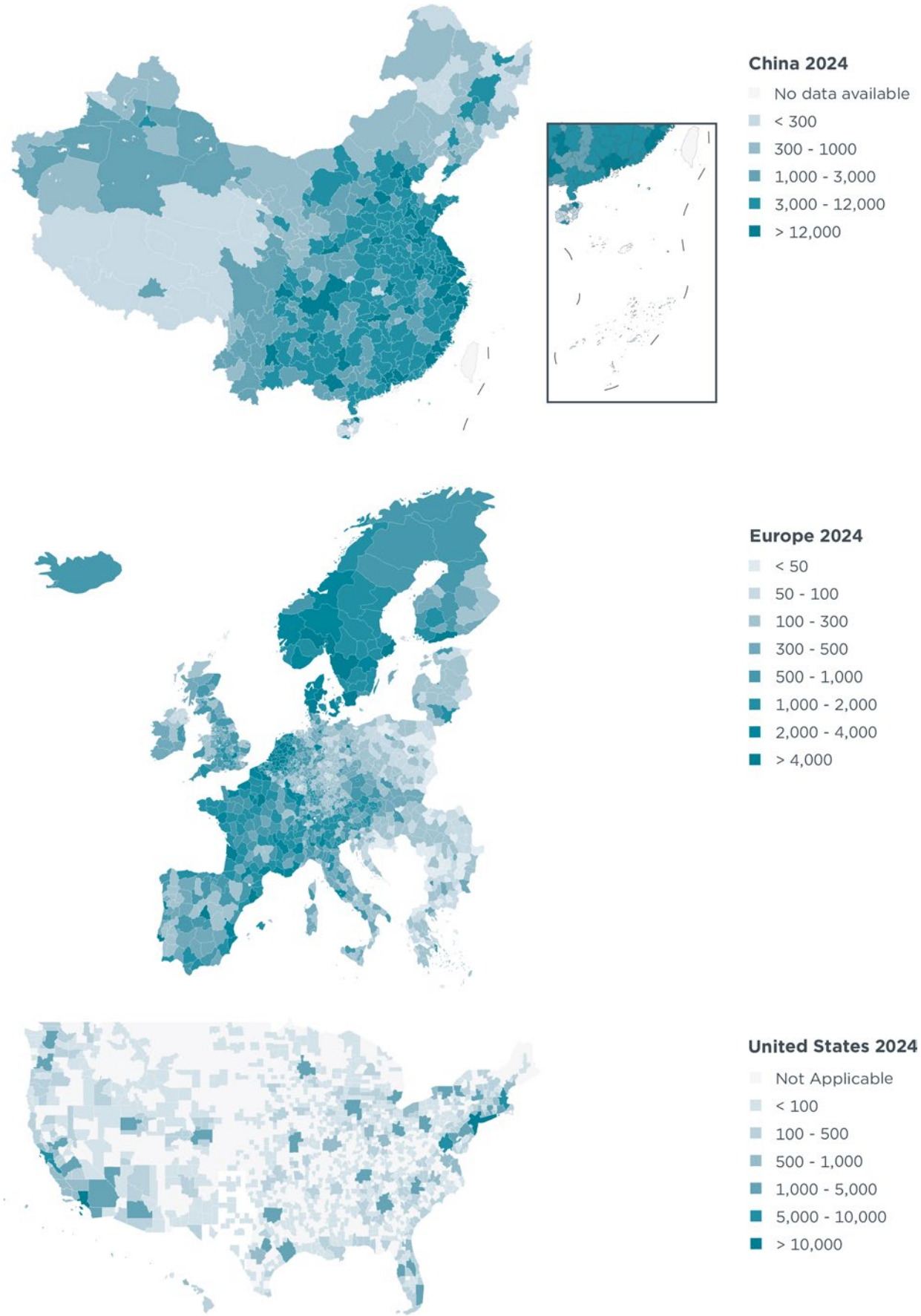


Figure 9

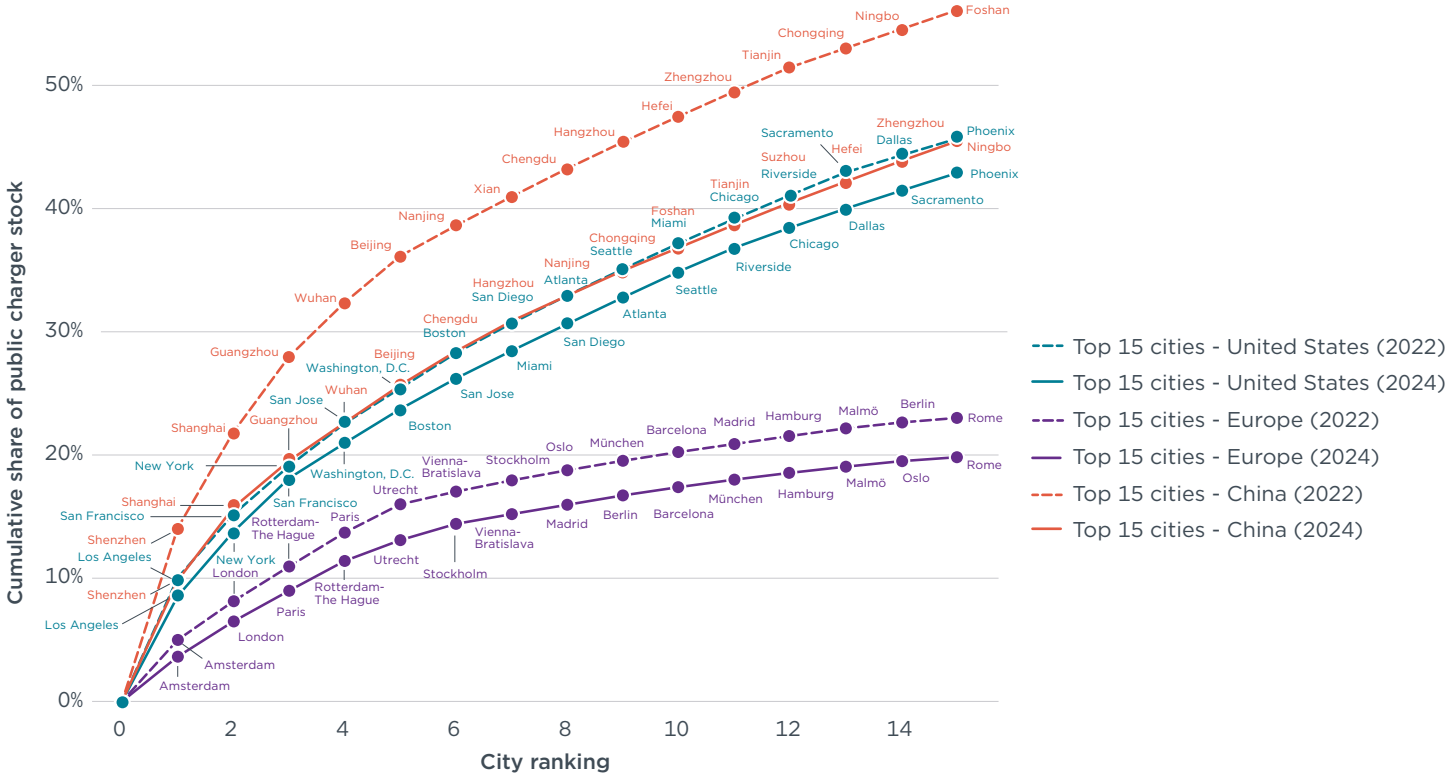
City-level distribution of public charger stock in China, Europe, and the United States, 2022–2024



Public chargers in all three leading markets remained heavily concentrated in a small number of more developed cities. Figure 10 shows the concentration of public chargers in the top 15 cities of each market by tracking the cumulative shares in each city in 2022 and 2024. Between 2022 and 2024, cumulative shares grew considerably more even, indicating a substantial decline in concentration, particularly in China. For example, in 2022, the top 15 Chinese cities accounted for 56% of the national public charger stock. By 2024, this share had fallen to 45%. As in Figure 9, this indicates a more geographically balanced distribution overall. Europe and the United States also saw modest shifts toward a more balanced distribution of public charger stock. Between 2022 and 2024, the share of public charger stock in the top 15 cities dropped from 23% to 20% in Europe and from 46% to 43% in the United States.

Figure 10

Cumulative share of public charger stock of the top 15 cities in China, Europe, and the United States, 2022–2024



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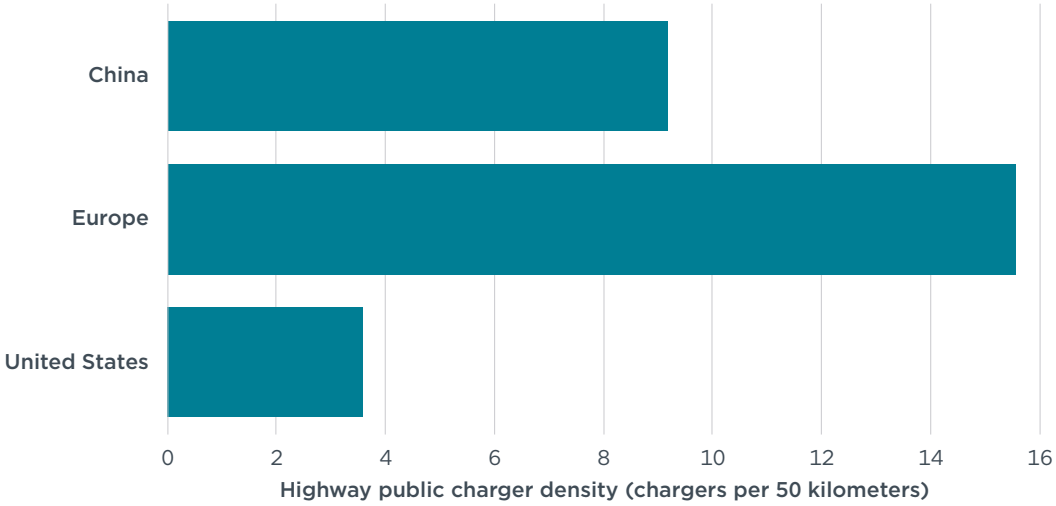
Another important measure of public charging infrastructure is public charger availability on highways. Figure 11 presents highway public charger density in China, Europe, and the United States. Public charger density was calculated by dividing the total number of public chargers along highways by the total length of highways. According to data from China's National Energy Administration and Ministry of Transport,[6] China had installed approximately 35,000 public chargers along the country's 190,000 kilometers of highways by the end of 2024, covering nearly 98% of highway service centers. This amounts to a highway public charger density of 9.2 public chargers per 50 kilometers. Europe led all three markets on this metric with an

6 National Energy Administration, *Transcript of the First-Quarter 2025 Press Conference of the National Energy Administration* (National Energy Administration, January 23, 2025), https://www.nea.gov.cn/20250123/544b9af2b6aa4590a60945e81e0d8ee1/c.html; Ministry of Transport of the People's Republic of China, 2024年交通运输行业发展统计公报 [2024 Transportation Industry Development Statistical Bulletin] (June 12, 2025), https://xxgk.mot.gov.cn/jigou/zhghs/202506/t20250610_4170228.html.

average of 15.5 chargers per 50 kilometers of highway.[7] By comparison, the United States had 3.6 chargers per 50 kilometers of highway.

Figure 11

Highway public charger density in China, Europe, and the United States, 2024



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NUMBER AND COVERAGE OF PUBLIC CHARGING POOLS

The number and coverage of public charging pools elucidate the real-world spatial accessibility of charging infrastructure. As shown in Figure 12, the number of public charging pools grew in all three leading markets over 2022–2024. Europe ranked first with around 313,000 public charging pools deployed as of 2024, followed by China (236,000) and the United States (59,000). When combined with the charger stock data in Figure 1, this amounts to a ratio of 12 chargers per pool in China, 3 in Europe, and 4 in the United States (Figure 13). Despite continued growth, public charger pools remained highly concentrated geographically in all three markets as of 2024. In Europe, 87% of public charging pools were located in the top 10 countries, led by the Netherlands (67,000), Germany (50,000), and France (35,000). In China, 66% of pools were concentrated in the top 10 provinces, with Guangdong (34,000), Jiangsu (26,000), and Zhejiang (19,500) topping the list. Similarly, in the United States, the top 10 states accounted for 64% of all public charging pools, led by California (13,400), New York (4,400), and Florida (3,900).

7 The highway length data for Europe and the United States come from the Trans-European Transport Network (TEN-T) and the U.S. National Highway System (NHS), respectively. For Europe, we included the TEN-T comprehensive network in our analysis. For the United States, we included roads classified as interstates by the NHS. The number of public chargers along highways in Europe and the United States was estimated by matching the longitude and latitude of public chargers with their highway networks using a 150-meter buffer, per the International Energy Agency, *Global EV Outlook 2025* (2025), https://www.iea.org/reports/global-ev-outlook-2025/.

Figure 12

Public charging pool stock in China, Europe, and the United States, 2022–2024

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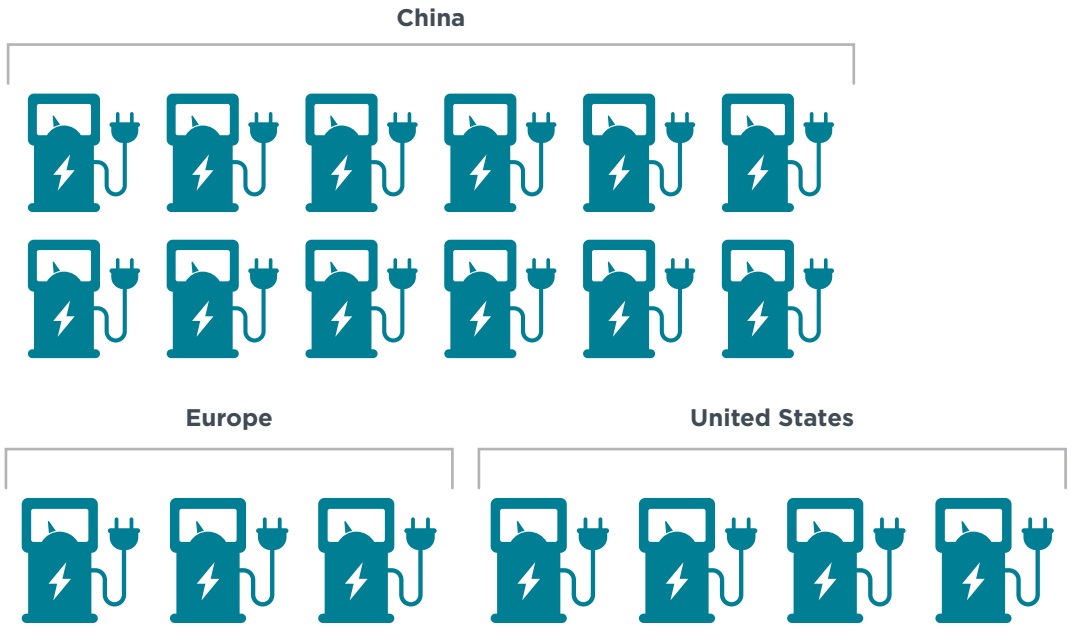
Figure 13

Average number of chargers per public charging pool in China, Europe, and the United States, 2024



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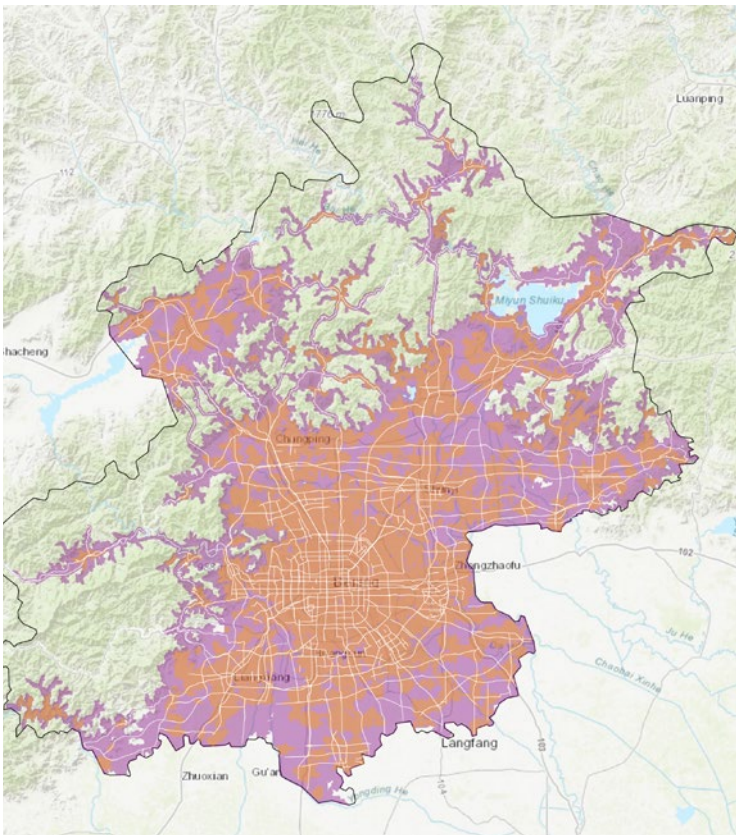
We also quantified the coverage of public charging pools—that is, how public charging pools are geographically distributed within a given area—by calculating the minimum drive time needed to reach a public charging pool. Proposed in a previous ICCT report, this metric provides a more accurate measure than simply calculating the straight-line distance to the nearest public charging pool.[8] Figure 14 shows the minimum driving time to reach public charging pools in three representative cities in the three leading markets—Beijing, Paris, and Los Angeles—as of 2024. Orange areas represent regions where EV drivers could find a public charging pool within 5 minutes, and purple areas indicate regions where public charging pools are accessible with a drive time between 5 and 20 minutes.

8 Hongyang Cui et al., *Charging up China's Transition to Electric Vehicles: A Dive into China's Public Charging Infrastructure Deployment and Comparison with Europe and the United States* (International Council on Clean Transportation, 2024), https://theicct.org/publication/charging-up-china-transition-to-ev-jan24/.

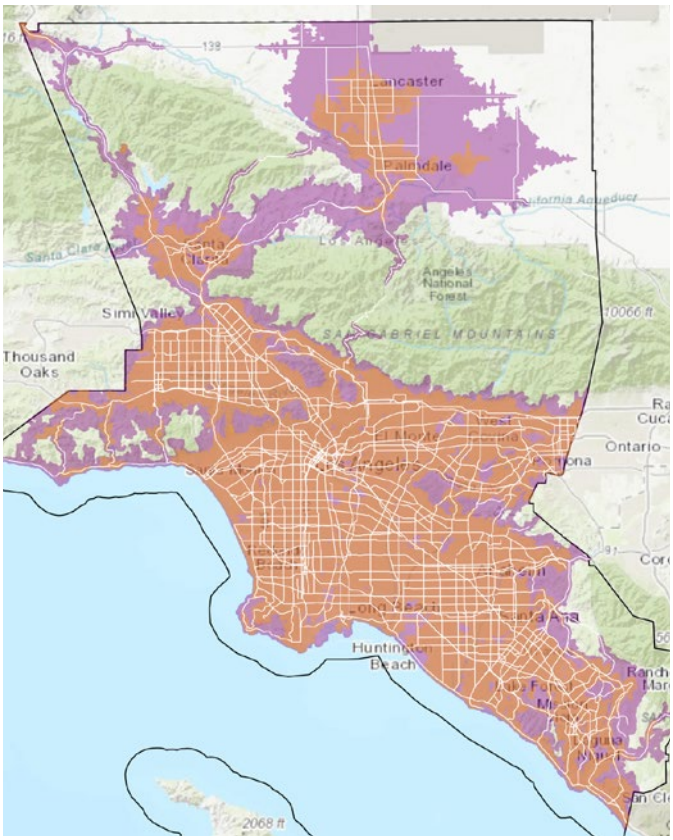
Figure 14

Minimum drive time needed to reach a public charging pool in Beijing, Paris, and Los Angeles, 2024

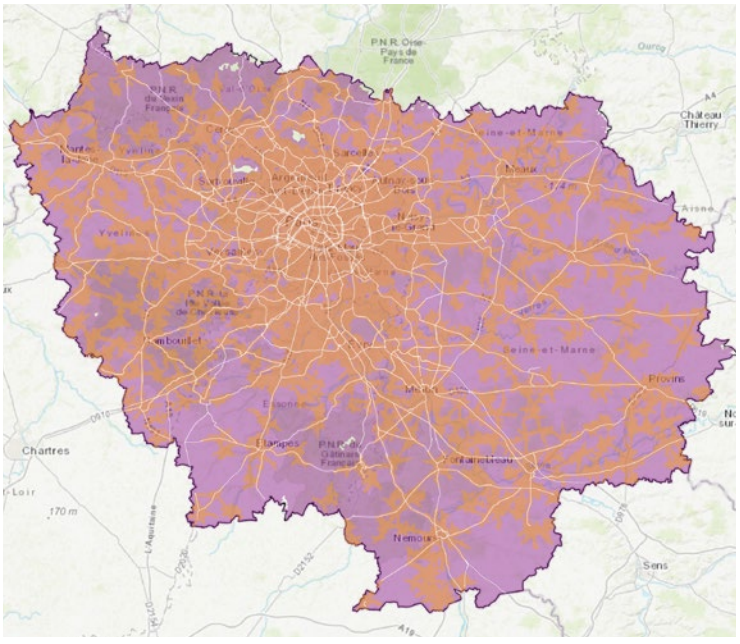
a) Beijing



c) Los Angeles



b) Paris



- Areas with a drive time of less than **5 minutes** to reach a public charging station
- Areas with a drive time of **5 to 20 minutes** to reach a public charging station

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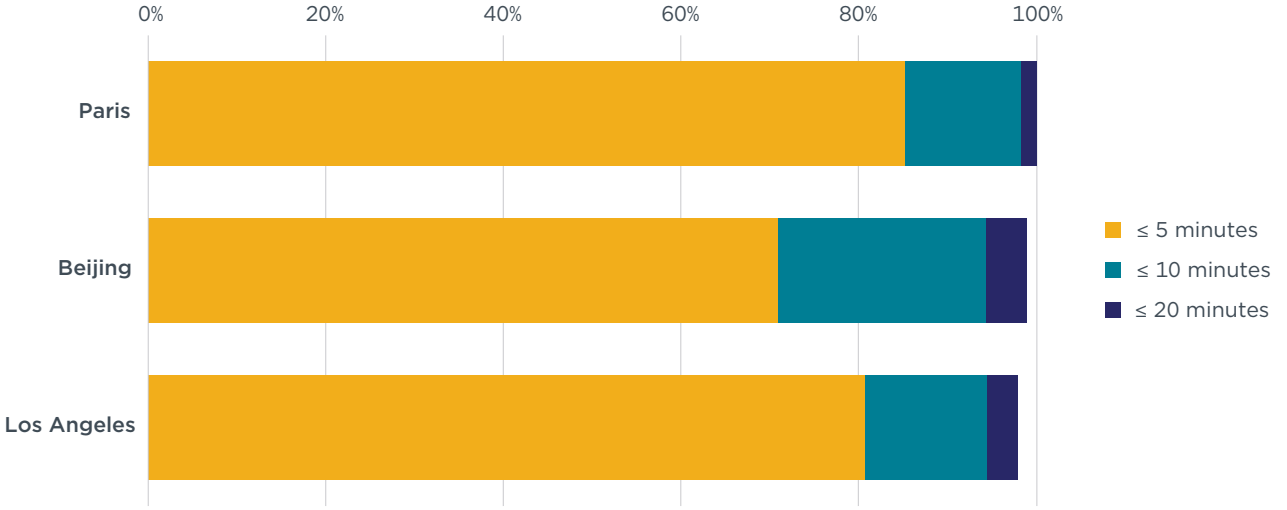
To assess real-world public charging pool availability in each of these three cities, we also calculated public charging pool coverage in built-up areas—that is, excluding areas that are not suitable for infrastructure layout, such as mountains, lakes, rivers, and wetlands. Calculating public charging pool coverage within built-up areas gives a

representative picture of the actual accessibility of charging infrastructure in locations where charging demand is most likely to arise, namely where most people live, work, and travel. To calculate this, we measured the percentage of built-up areas where EV drivers could find a public charging pool within 0–5 minutes, 5–10 minutes, and 10–20 minutes of driving time.

As shown in Figure 15, the three representative cities have widely distributed public charging networks in built-up areas. Paris stood out with 85% of built-up areas falling within a 5 minute drive of a public charging pool. Within 10 minutes, drivers could reach a public charging pool in 98% of Paris's built-up areas, and within 20 minutes, drivers could reach a public charging pool in nearly 100% of built-up areas. The public charging pool coverage was similar between Beijing and Los Angeles. In Beijing, public charging pools were reachable within a 5 minute drive in 70% of built-up areas, within a 10 minute drive in 94% of built-up areas, and within a 20 minute drive in 99% of built-up areas. In Los Angeles, public charging pools were reachable within 5 minutes in 81% of built-up areas, within 10 minutes in 94% of built-up areas, and within 20 minutes in 98% of built-up areas.

Figure 15
Coverage of built-up areas by drive time to nearest public charging pool, 2024



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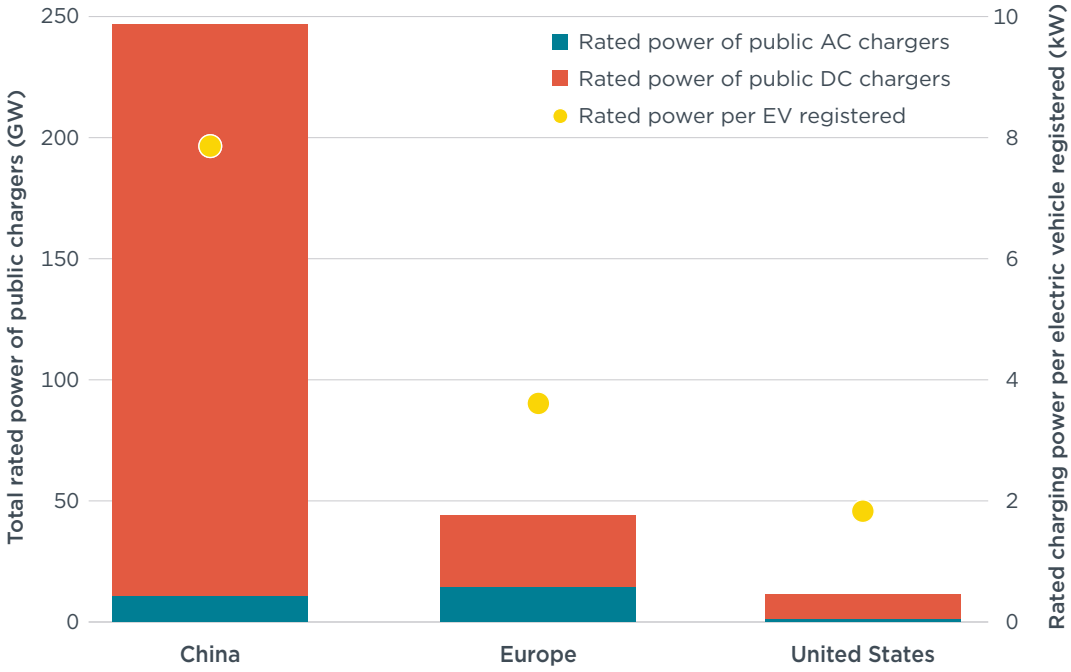
CAPACITY OF PUBLIC CHARGERS

The capacity of public chargers, measured in rated power, is another critical factor to consider when assessing public charging infrastructure networks.[9] This is because power output significantly impacts charging speed and, by extension, user convenience. As shown in Figure 16, by the end of 2024, the total rated power of China's public charging infrastructure network reached 247 GW, which was almost 6 times higher than that of Europe (44 GW) and 21 times that of the United States (12 GW). In all three markets, DC chargers were the dominant contributor to the capacity of public charging infrastructure networks. In China, DC chargers accounted for 96% of the total rated power of public chargers in 2024, compared with 67% in Europe and 89% in the United States. Public power installed per EV in China was 7.9 kW, while in Europe and the United States it was 3.6 kW and 1.8 kW, respectively.

9 The rated power of a charger refers to the maximum outpower that the equipment can continuously deliver under standard operating conditions. This is determined by the rated voltage and rated current. In general, a higher rated power indicates a faster charging speed.

Figure 16

Total rated power of public chargers by charger type in China, Europe, and the United States, 2024



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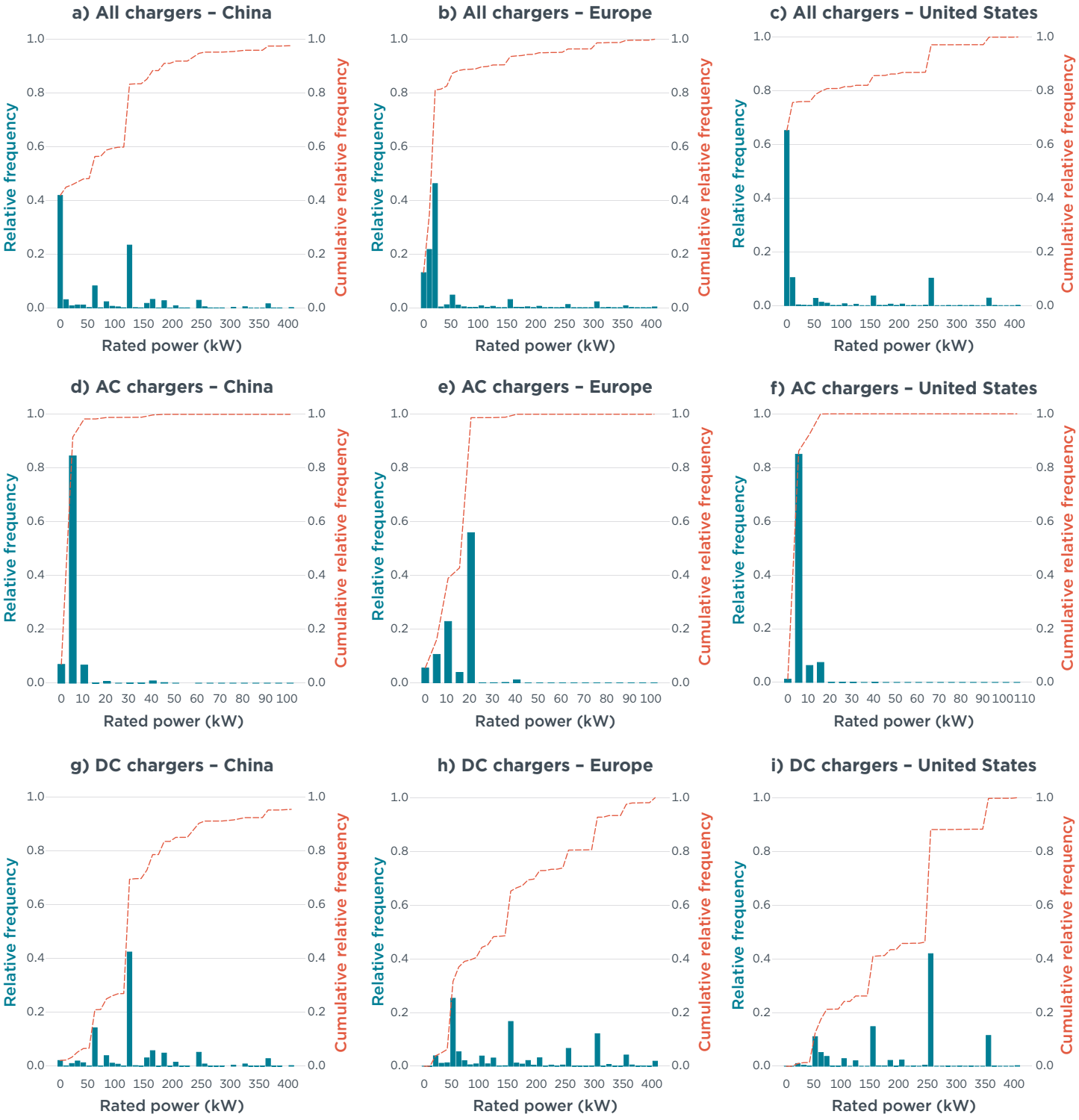
The rated power distribution of public chargers in China, Europe, and the United States varied considerably. As shown in Figure 17, China's public chargers were dominated by AC chargers with a rated power of 7 kW, which accounted for 40% of the country's public charger stock. This was followed by DC chargers with a rated power of 120 kW (22%) and 60kW (7%). Among China's public AC chargers, 84% were 7 kW and 7% were 3.5 kW; among its public DC chargers, 42% were 120 kW and 14% were 60 kW.

In Europe, AC chargers with a rated power of 22 kW were the most common charger type in 2024, accounting for 45% of total public charger stock, followed by AC chargers with a rated power of 11 kW (18%) and DC chargers with a rated power of 50 kW (5%). Among Europe's public AC chargers, 55% had a rated power of 22 kW and 22% had a rated power of 11 kW; of its public DC chargers, 24% were 50 kW, 17% were 150 kW, and 12% were 300 kW.

In the United States, the most prevalent public charger type in 2024 was the 6.5 kW AC charger, which represented 24% of total stock, followed by 7.2 kW AC chargers (17%) and 250 kW DC chargers (10%). Among public AC chargers, 6.5 kW and 7.2 kW chargers accounted for 31% and 23% of all chargers, respectively; among public DC chargers, 250 kW models were dominant at 42%, followed by 150 kW (15%) and 350 kW (11%).

Figure 17

Rated power distribution of public chargers in China, Europe, and the United States, 2024



Notes: For figures that include DC chargers (that is, Figures 17a, b, c, g, h and i), axis marks progress in 10 kW intervals; that is, 0 refers to 0–10, 50 refers to 50–60, and so on. For figures that only focus on AC chargers (Figures 17d, e, and f), the axis marks progress in 5 kW intervals, such that 0 refers to 0–5, 5 refers to 5–10, and so on.

OPERATORS OF PUBLIC CHARGERS

This section focuses on charging point operators (CPOs), entities responsible for managing and operating public chargers. Examples include State Grid in China, Ionity

in Europe, and Electrify America in the United States. Figure 18 compares the number of public charging CPOs operating public charging pools in China, Europe, and the United States. Compared with China and the United States, the public charging market in Europe was much more fragmented. As of 2024, Europe had a total of 2,994 public charging CPOs in operation—27 times more than the United States (110) and 53 times more than China (57). As shown in Figure 19, when looking at the subnational level—that is, CPOs in Chinese provinces, European countries, and U.S. states—the European market continued to show a higher degree of fragmentation. Germany had the most public charging CPOs in operation as of 2024, with 1,201, followed by France (242), the Netherlands (223), Belgium (152), and the United Kingdom (106). California and Guangdong—the U.S. state and Chinese province with the highest public charger stock—had only 56 and 43 CPOs in operation, respectively.

Figure 18

Number of public charging CPOs in China, Europe, and the United States, 2024

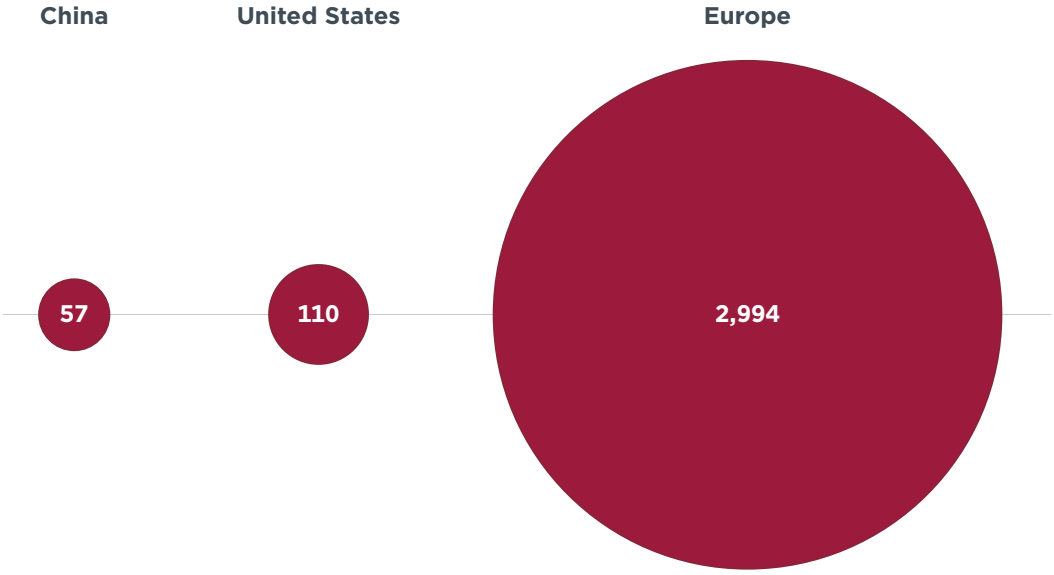


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Figure 19

Number of public charging CPOs in the top 5 subnational markets in China, Europe, and United States, 2024

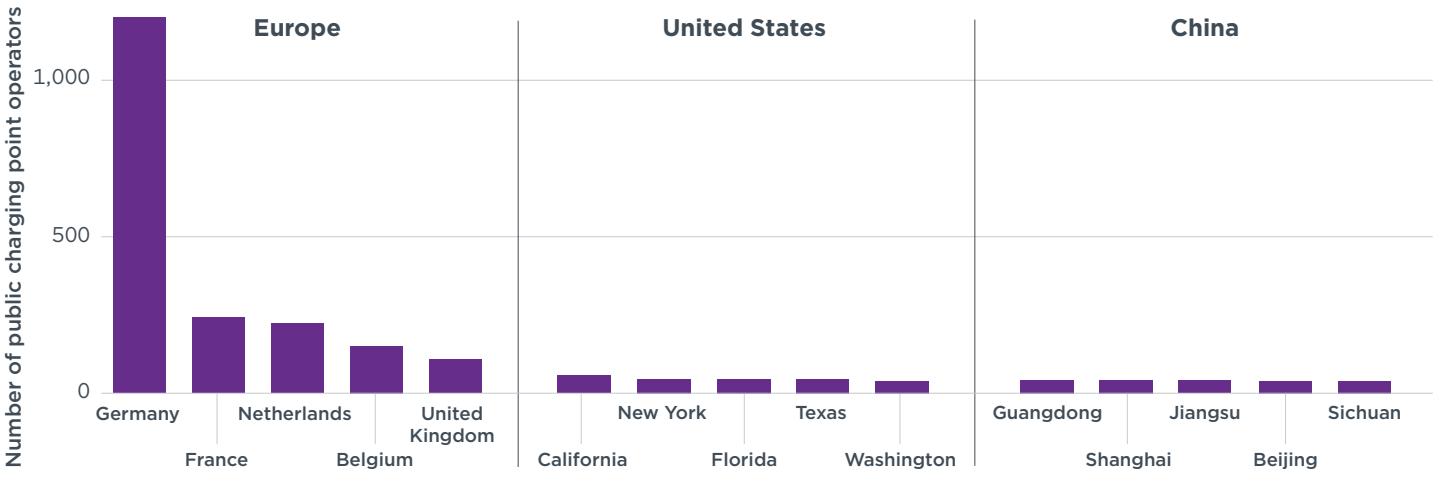

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Figure 20 compares the top 10 public charging CPOs in China, Europe, and the United States. We classify CPOs into six types: pure players, electric utilities, oil and gas companies, original equipment manufacturers (OEMs) and OEM partnerships, retail companies, and tech companies.[10] The relatively low market share of the top 10 CPOs in Europe (23%) corresponds to the fragmentation of its public charging market. By comparison, the CPO markets in China and the United States were more concentrated, with the top 10 CPOs representing 81% and 83% of public charger stock as of 2024, respectively.

The largest public charging CPO in the United States, ChargePoint, held a market share of 38%. This was considerably more than StarCharge, the largest CPO in China, at 16%, and Vattenfall InCharge in Europe, at 3.7%. As shown in Figure 20, in Europe, China, and the United States, market shares of the top 10 CPOs in the DC market were slightly higher than in the AC market.

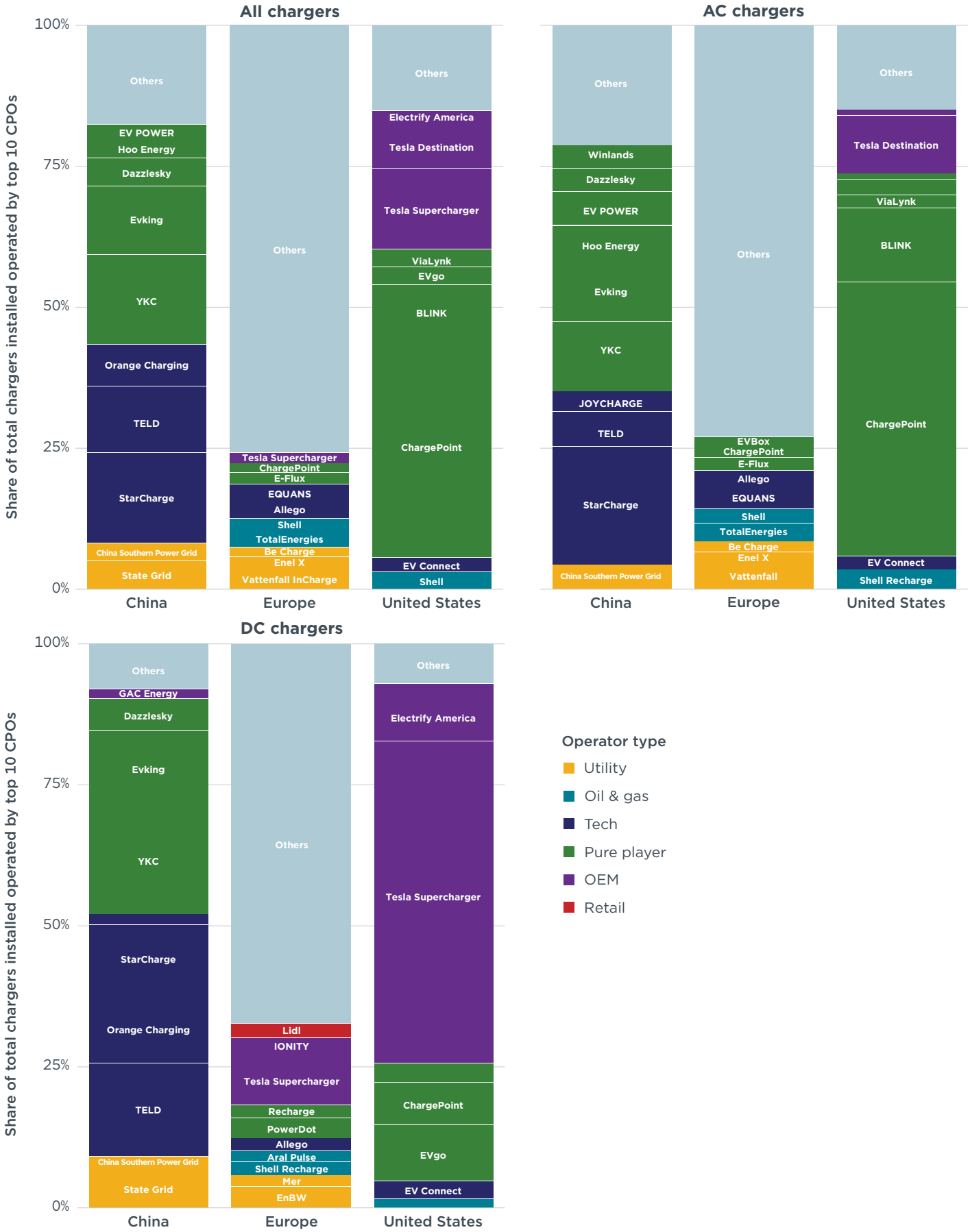
In China, pure players, tech companies, and electric utilities accounted for most of the public AC and DC charger markets. In the United States, pure players, led by ChargePoint, dominated the AC public charger market; meanwhile, OEMs led the DC market, with Tesla Supercharger, Tesla Destination, and Electrify America[11] collectively holding 67% of public DC charger stock. Europe, by contrast, had a much more diverse market. As of 2024, three of the top 10 CPOs in Europe were electric utilities, two were oil and gas companies, two were tech companies, two were pure players, and one was an OEM. Notably, one German retailer also broke into the top 10 in Europe's public DC charging market in 2024.

10 Sonsoles Díaz et al., *Toward Healthy Competition in the European Public Charging Market: Stakeholder Dynamics and Pricing Trends* (International Council on Clean Transportation, 2025), https://theicct.org/publication/toward-healthy-competition-eu-public-charging-market-feb25/.

11 Electrify America, LLC is a subsidiary of Volkswagen Group of America.

Figure 20

Market share and type of top 10 public charging CPOs in China, Europe, and the United States, 2024



CONCLUSION

This brief assessed public charging infrastructure deployment globally as of 2024, highlighting the world's three largest EV markets: China, Europe, and the United States. The analysis did not consider private charging infrastructure, and thus should not be interpreted as an evaluation of how each market's EV charging network compares with its charging needs. For example, although the United States lags behind China and Europe in terms of public charger stock, our previous analysis indicated that charging infrastructure deployment in the United States is on track to support its growing EV sales.[12] Our analysis draws the following key conclusions:

Led by China, Europe, and the United States, the global public charging infrastructure network has grown rapidly. From 2022 to 2024, public charger stock increased globally from 2.3 million to nearly 5 million, a CAGR of 47%. As of 2024, the three leading markets—China, Europe, and the United States—accounted for 85% of global public charger stock. Over the same period, the global public DC charger stock increased from 708,000 in 2022 to almost 2 million in 2024, a CAGR of 66%. China, Europe, and the United States together held 91% of the global total of public DC charger stock. In China and Europe, the growth of public charger stock outpaced EV sales, while in the United States, performance in both metrics grew at a comparable rate.

DC chargers make up a growing share of global public chargers. Between 2022 and 2024, the stock of public DC chargers increased at a faster rate than that of public AC chargers. Consequently, the share of DC chargers in the global public charger stock increased from 31% in 2022 to 39% in 2024. This upward trend in the share of DC chargers was even more pronounced in the three leading markets. In China, the share of public DC chargers rose from 44% in 2022 to 52% in 2024, surpassing AC chargers for the first time as the dominant charger type. In Europe, 19% of public chargers were DC chargers in 2024, up from 13% in 2022. In the United States, the share of DC chargers grew from 19% to 24% over the same period.

China has established the world's largest public charging infrastructure network and has the world's largest EV fleet, but it lags Europe when it comes to highway charger density. As the world's largest EV market, China had deployed 2.93 million public chargers by the end of 2024, representing 59% of the global total. This was about 3 times the stock of Europe and 14 times that of the United States, which had much lower EV sales than China. The total rated power of China's public charging infrastructure network reached 247 GW as of 2024, almost 6 times that of Europe and 21 times that of the United States. Meanwhile, as of 2024, China's highway public charger density was 9.2 chargers per 50 kilometers, compared with an average of 15.5 chargers per 50 kilometers in Europe.

Public chargers in China, Europe, and the United States remained concentrated in subnational markets with high EV sales, but there were notable trends toward more even geographical distribution, particularly in China. Around 70% of China's public charger stock was in its top 10 provinces as of 2024. In Europe, 87% of public chargers were in the top 10 countries, while in the United States, 57% were in the top 10 states. The top 10 subnational markets represented 87% (Europe), 66% (China), and 64% (United States) of total public charging pools. This concentration of public charger stock mirrors the concentration of EV sales in these three markets. At the city level, the top 15 Chinese cities accounted for 45% of the national public charger stock in 2024, down from 56% in 2022, indicating a shift toward a more geographically balanced

12 Logan Pierce and Peter Slowik, *Assessment of U.S. Electric Vehicle Charging Needs and Announced Deployment through 2032* (International Council on Clean Transportation, 2024), https://theicct.org/publication/assessment-of-us-ev-charging-needs-and-announced-deployment-through-2032-mar24/.

distribution. Over the same period, the share of the top 15 cities dropped more modestly in Europe (from 23% to 20%) and the United States (from 46% to 43%).

The world's leading EV cities have established a high-coverage public charging network in built-up areas. Beijing, Paris, and Los Angeles, selected as representative examples of high-electrification cities in the three leading markets, had comprehensive public charging coverage. As of 2024, 85% of Paris's built-up areas fell within a 5 minute drive of a public charging pool, 98% were within a 10 minute drive, and almost 100% were within a 20 minute drive. In Beijing, 70% of built-up areas fell within a 5 minute drive of the nearest public charging pool, 94% within a 10 minute drive, and 99% within a 20 minute drive. In Los Angeles, the coverage rates for drive times of 0–5 minutes, 0–10 minutes, and 0–20 minutes were 81%, 94%, and 98%, respectively.

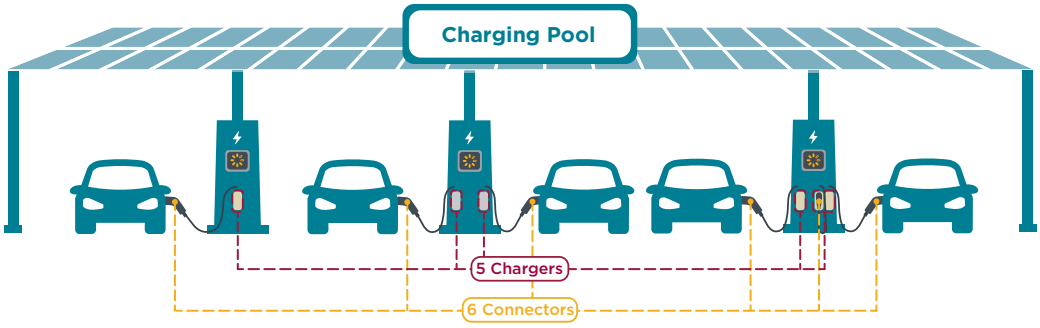
Europe had a more decentralized and diverse public charging market compared with China and the United States. As of 2024, Europe had a total of 2,994 public charging CPOs in operation, compared with 110 in the United States and 57 in China. At the subnational level, the European market also showed a higher degree of fragmentation. Europe's top 10 CPOs accounted for 24% of its public charger stock in 2024; comparatively, the top 10 CPOs in China and the United States represented 83% and 85% of total public charger stock, respectively. In addition, Europe's top 10 CPOs included a wide range of operator types, such as electric utilities, oil and gas companies, tech companies, pure players, OEMs, and retailers. None of these held more than 5% of the market. In comparison, in China, pure players, tech companies, and electric utilities were the main players in both the AC and DC public charging markets. In the United States, pure players led in the AC market while OEMs led in the DC market.

APPENDIX: DEFINITIONS AND DATA SOURCES

Definition of charger and charging pool: Chargers, also known as electric vehicle supply equipment, charging points, or charging ports, refer to devices through which electricity is transferred from the grid to the EV. As illustrated in Figure A1, a charger typically has one connector, while a charging pool consists of one or more chargers. In markets where multiple charging standards coexist, such as Europe and the United States, a charger may consist of multiple connectors that each comply with different charging standards. In such cases, when one connector is in use, no power will be allocated to the other connectors of the same charger. In China, where all chargers comply with one unified standard, one connector counts as one charger.

Figure A1

Concept chart of a charging pool with multiple chargers and connectors



Data sources: Charger deployment data in this paper were sourced from the China Automotive Technology and Research Center (CATARC)[13] for China, Eco-Movement[14] for Europe and the United States, and the International Energy Agency (IEA) for the rest of the world.[15]

13 "About Us," China Automotive Technology and Research Center Automotive Data Co., Ltd., accessed September 11, 2025, https://www.catarc-adc.com/gywm/.

14 "About Us," Eco-Movement, accessed September 11, 2025, https://www.eco-movement.com/about-us/.

15 International Energy Agency, *Global EV Outlook*.

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