

## Electric Vehicles

# EVs on the charge

07 November 2022

### Key takeaways

- Adoption of Electric Vehicles (EVs) could increase up to seven-fold by 2025, according to BofA Global Research analysis. EV costs – and how quickly they could come down via incentives and technological advances – are key to the trajectory, in their view.
- Greater adoption also requires widespread access to charging stations. In this report, we use a new source of Bank of America internal data on EV charging payments to investigate how EV charging demand is developing and which key demographics are driving it.
- The Bank of America EV charging payments data suggests EV customers use charging stations more when gas prices rise. But the high upfront cost of the vehicles still dictates who is plugging in – nearly half (42%) of active EV charging spend is from a higher-income (annual income >\$100K) cohort.
- State-level investment in charging infrastructure can also boost usage. California has the highest concentration of charging stations in the US, and over half (52%) of the Bank of America EV charging payments data originates there.

### Renew and recharge

Many government environmental policies and incentives are aimed at accelerating the decarbonization effort. The US [Inflation Reduction Act](#) is a prime example, with increased tax credits for new and used electric vehicles.

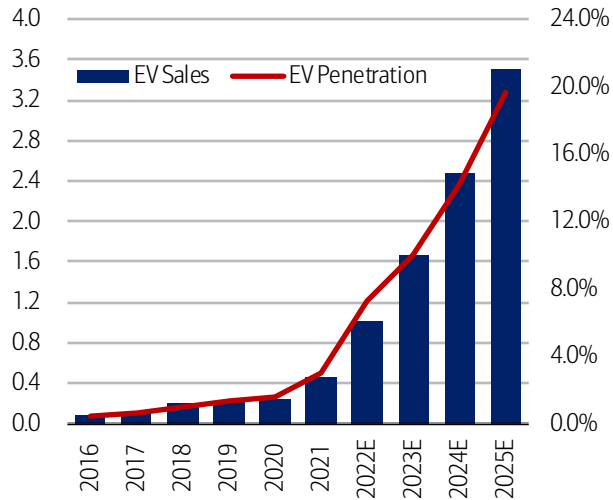
Government incentives sit alongside technological developments which, according to Bank of America (BofA) Global Research, mean the costs of several clean energy technologies have now come down to the point of being at, or close to, the most economical choice in many markets – particularly renewable energy and Electric Vehicles (EVs).

In turn, EV sales have been increasing. BofA Global Research determined that the penetration rate, or total market share, of EVs is growing rapidly (Exhibit 1). Their ‘bottom-up’ analysis (see Methodology for details) estimated that by 2025 the EV penetration rate will be approximately 20%, which would be nearly 7 times as much as year-end 2021.

BofA Global Research also presents two alternative estimates (a base case scenario and a bull case scenario) for EV adoption under a ‘top-down’ approach (see Methodology for details), which takes into consideration the fluctuating costs of energy and gasoline. Their base case scenario assumes the current regulatory scheme remains in place (\$7.5k/vehicle federal tax credit, 200k limit), and this equates to a 2025 EV adoption rate of around 10% (Exhibit 2). Their bull case scenario, on the other hand, assumes that federal tax incentives are upped to \$10k per vehicle on average and the limit is eliminated over the entirety of the estimated period (through 2030) – this could push the EV adoption rate to as high as around 25% in 2025 (Exhibit 3).

**Exhibit 1: Projected US EV volumes & EV penetration under BofA Global Research Bottom-up analysis**

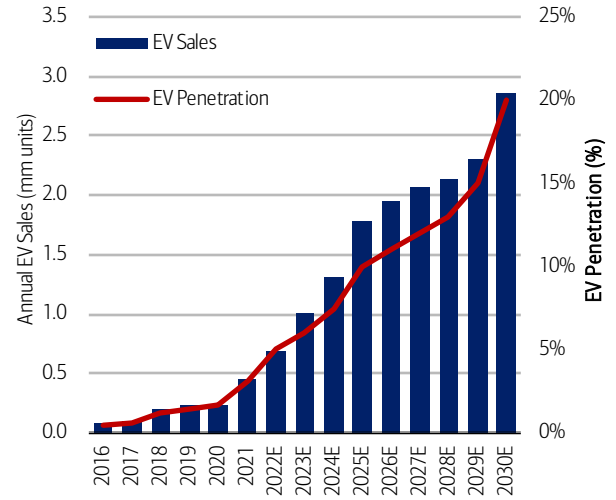
The BofA Global Research Bottom-up approach estimates that EV penetration will be ~20% in 2025



Source: BofA Global Research estimates

**Exhibit 2: Base Case EV penetration and volumes under BofA Global Research Top-down approach**

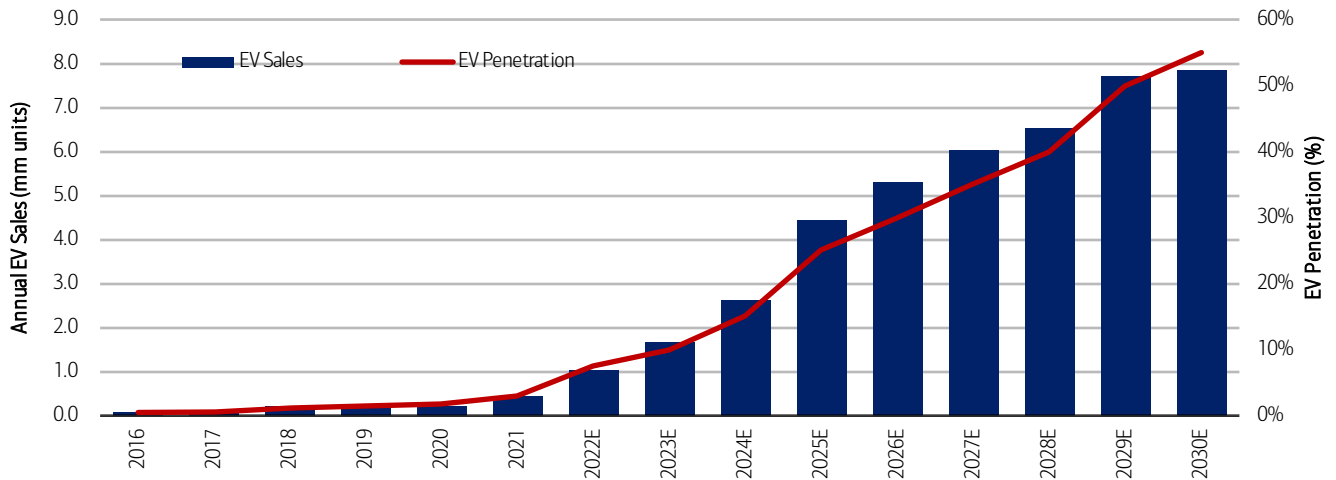
BofA Global Research Top-down 'base case' estimates 10% penetration in 2025



Source: BofA Global Research estimates

**Exhibit 3: Bull Case EV penetration and volumes under BofA Global Research Top-down approach**

BofA Global Research Top-down 'bull case' estimates 25% penetration in 2025



Source: BofA Global Research estimates

**Charging forward**

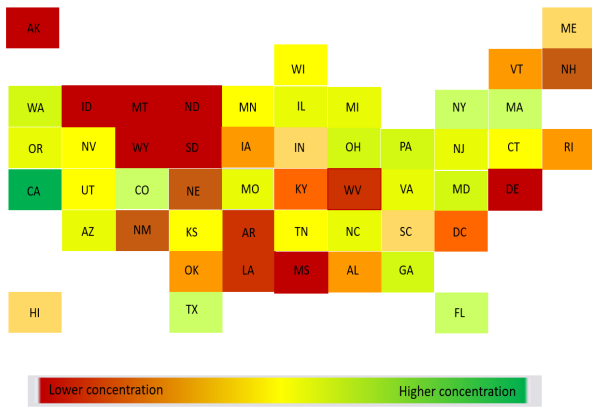
The federal government wants to ensure widespread access to charging stations for EV customers to support a transition. One policy in this area is the Alternative Fuel Corridors (AFC), a designated network along critical routes that attracts funding. Unsurprisingly, states with higher population counts currently have many more stations available for use (Exhibit 4).

There is some way to go before consumers feel confident about their access to reliable charging infrastructure. For example, nearly half (43%) of consumers in a recent 2022 CivicScience survey strongly disagreed with the statement that they were aware of charging stations near them, and 46% strongly disagreed that it was easy to find charging stations on-the-go (Exhibit 5).

Here, there is the danger of a 'chicken and egg' situation, with EV adoption being potentially held back by lack of access to charging infrastructure, while at the same time private sector incentives to invest in charging points are restrained unless there is an existing large EV user base.

**Exhibit 4: Heat map of US Electric Vehicle charging stations as of October 2022**

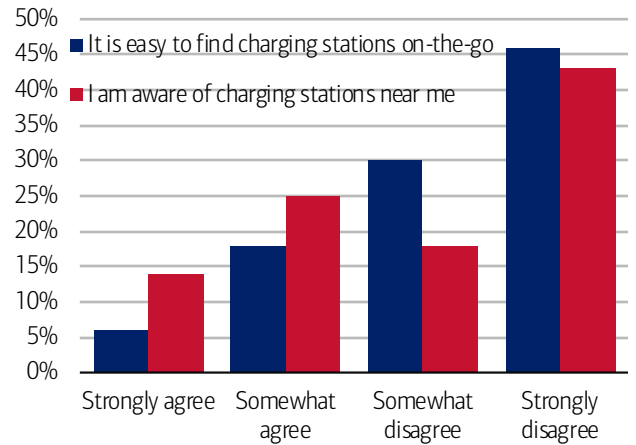
States with higher population counts currently have higher concentrations of charging stations available.



Source: Department of Energy

**Exhibit 5: Percentage of respondents who agreed or disagreed that charging stations were easy to find and were aware of them nearby**

According to the 2022 CivicScience survey, more US consumers strongly disagreed it was easy to find charging stations on-the-go and they were aware of charging stations near them



Source: CivicScience

**More pain at the pump, more use of the plug**

Payments data represents a potentially useful way to monitor how efforts to enhance and expand EV charging are developing. In this report, we use Bank of America internal payments data, covering ACH (automated clearing house), debit/credit cards and bill payments, to provide an initial snapshot of the charging landscape.

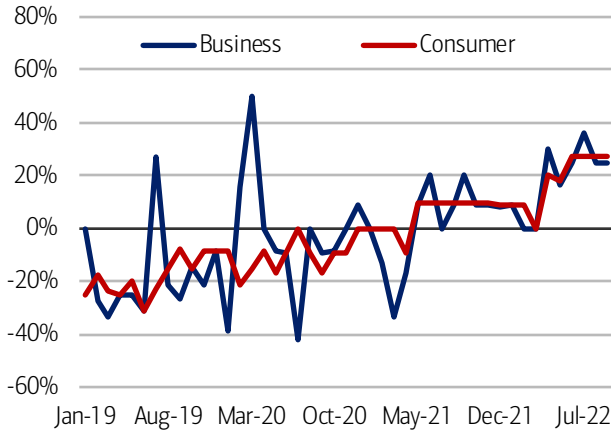
Exhibit 7 shows the year-on-year (YoY) growth in the number of customers making EV charging payments. The YoY growth has averaged over 50% since 2019. It is all the more notable considering that the pandemic lockdowns reduced the total miles driven throughout 2020- 2021.

Exhibit 7 also suggests that spike in oil prices encouraged people to make greater use of the charging network. This likely reflected both more intensive use of customers’ existing EVs and the rapid adoption of new EVs, with model launches in the space helping to support demand.

EV charging demand has both a business and a consumer component, with individual consumers representing the largest share overall. Exhibit 6 shows that the growth in the average EV charging transaction amount YoY% has been more volatile for businesses, particularly during the pandemic. For consumers there has been less volatility and increasing growth over 2021 and 2022. The transaction amount might also be influenced by lockdowns during the pandemic, with business demand particularly impacted by changing consumer behavior, as lockdowns shifted demand towards delivery and online business models.

**Exhibit 6: Average EV charging station transaction amount YoY% growth by customer breakdown through Sept 2022 (%)**

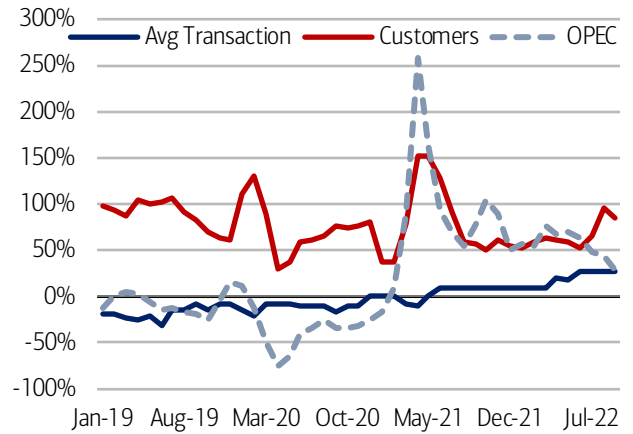
Though businesses have experienced more volatility, both cohorts that comprise the customer base trend on positive net growth



Source: Bank of America internal data

**Exhibit 7: YoY% change in average transaction, customer count and OPEC oil basket price reference basket price through Sept 2022 (%)**

The YoY% trend of customers making EV charging payments follows the YoY% change in the Organization of the Petroleum Exporting Countries (OPEC) oil price



Source: Bank of America internal data, Haver

Note: The OPEC Basket is a weighted average of oil prices collected from OPEC member countries, and it serves as a reference point for oil prices.

**Higher income = higher usage**

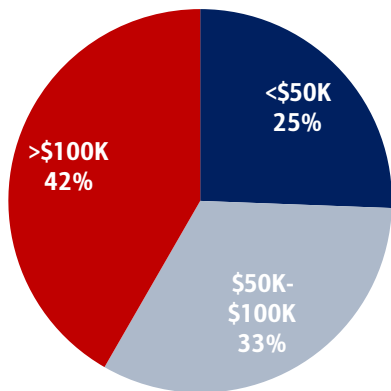
One potentially limiting factor in widespread adoption of EVs is the relatively high upfront vehicle costs, which may make them a less attractive proposition to those on lower incomes.

In the Bank of America internal data we find that higher-income transactions (annual income >\$100K) make up nearly half (42%) of the October month-end share of charging payments (Exhibit 8). But middle-income (annual income \$50K-\$100K) transactions make up another 33% of EV charging payments. So, while the data is somewhat skewed to the higher-income group, it appears that EV charging and potentially overall EV adoption is beginning to filter down the income distribution.

In regards to age, we find that older and younger millennials (see Methodology for details) together comprise over half of the EV charging payments transactions in our October month-end data (Exhibit 9). Older Millennials in particular account for approximately one-third of payments. These are outsized contributions relative to these groups' share of the total US population. Conversely, baby boomers are relatively underrepresented, as are Generation Z. For the latter group, this might reflect the relatively high cost of EVs relative to their average income.

**Exhibit 8: Income breakdown of transactions of EV charging payments data as of October 2022 (%)**

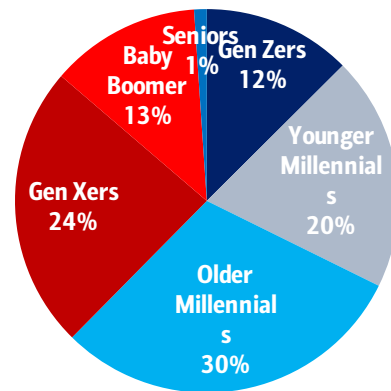
Higher-income spend (>\$100K) make up nearly half (42%) of the October month-end share of EV charging payments



Source: Bank of America internal data

**Exhibit 9: Age breakdown of transactions of EV charging payments data as of October 2022 (%)**

Older and younger millennials together comprise over half of the EV charging payments in our October month-end data



Source: Bank of America internal data

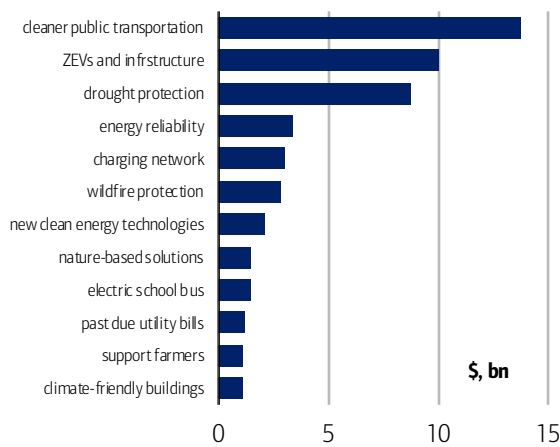
## California: it's electric!

California has the highest volume of charging stations in the US, as illustrated in Exhibit 4. Regulatory pressure has likely played an important role here: California has enacted legislation targeted to ensure it achieves a more stringent emissions reduction target of 55% by 2030. At the state level, the administration recently passed the \$54bn California Climate Commitment bill, which entails spending nearly \$25bn on cleaner public transportation, zero emissions vehicles (ZEV), and electric vehicle infrastructure (Exhibit 10).

In Bank of America payments data, over half (52%) of the share of total transactions of EV charging payments in October are from customers based in California (Exhibit 11). The other states with the largest share of EV charging payments amongst Bank of America customers - such as Florida, Texas, Washington and New York – are not those with particularly generous tax rebates to match. According to the data from the Department of Energy, Connecticut and Delaware lead with the highest tax rebates, while Maryland, California and Massachusetts follow closely behind. It may be that in some states, EV adoption and the associated charging roll-out develop a momentum of their own.

### Exhibit 10: Select California Climate Commitment spending initiatives (\$)

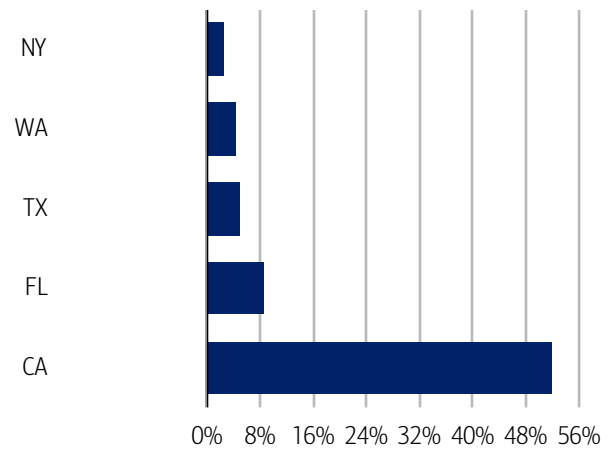
The \$54bn California Climate Commitment bill will spend nearly \$25bn on cleaner public transport, zero emissions vehicles, and EV infrastructure



Source: State of California, BofA Global Research

### Exhibit 11: Share of transactions of EV charging payments by state in October 2022 (%)

Over half (52%) of EV charging payments originate from customer accounts in California



Source: Bank of America internal data

Overall, there has been an increase in the growth of EV charging and associated electric vehicle adoption. We will keep monitoring our data and report on developments.

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## Methodology

Selected Bank of America transaction data is used to inform the macroeconomic views expressed in this report and should be considered in the context of other economic indicators and publicly available information. In certain instances, the data may provide directional and/or predictive value. The data used is not comprehensive; it is based on **aggregated and anonymized** selections of Bank of America data and may reflect a degree of selection bias and limitations on the data available.

Any payments data represents aggregated spend from US Retail, Preferred, Small Business and Wealth Management clients with a deposit account or credit card. Aggregated spend include total credit card, debit card, ACH, wires, bill pay, and business/peer-to-peer.

Generations, if discussed, are defined as follows:

- 1) Gen Z: born after 1996
- 2) Younger Millennials: born between 1989-1995
- 3) Older Millennials: born between 1978-1988
- 4) Gen Xers: born between 1965-1977
- 5) Baby Boomer: born between 1946-1964
- 6) Seniors: born before 1946

BofA Global Research's 'bottom-up' approach to forecasting EV volumes and EV penetration in the US market began with standalone EV model launches over model years 2023-2026 (calendar years 2022-2025). They determined each of the new models to be launched over their forecast period and also forecasted average annual volume for a model over its entire life to derive metrics such as replacement rate, average showroom age, etc.

BofA Global Research's 'top down' EV penetration forecasts (base case scenario versus bull case scenario) are based on a cost parity analysis between Internal Combustion Engine (ICE)/EV components/vehicles (for Original Equipment Manufacturers), and a price parity analysis between ICE/EV average transaction prices (for consumers) and cost parity analysis between ICE/EV total cost of ownership (for consumers).

Additional information about the methodology used to aggregate the data is available upon request.

# Disclosures

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