

Sustainability

EVs: When electric dreams become reality

27 July 2023

Key takeaways

- Electric vehicle (EV) adoption can make an important contribution to reducing emissions. BofA Global Research projects a rapid rise in the market share of EVs, and predicts the number of new EV model launches over 2024-27 will exceed that of new internal combustion engine vehicles for the first time.
- Bank of America internal data shows the rise in EV penetration is broadening out from the West of the US, with the South and Midwest showing particularly stronger growth.
- However, challenges such as a lack of access to proper charging infrastructure for consumers across different regions could hinder a transition to a low-emissions economy.

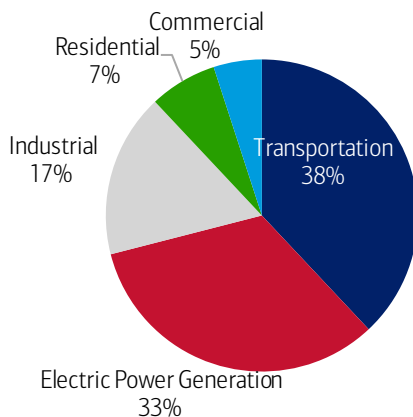
The EV transition plays a vital part in lowering overall emissions

Emissions from the transportation sector are the single largest source of carbon dioxide (CO₂) in the US (Exhibit 1). Therefore, in order for the country to reduce its overall CO₂ emissions and contribute to the global move towards more sustainable energy solutions, it is critical that this sector play a significant role.

Within transportation, the largest source of CO₂ comes from personal vehicles (Exhibit 2). Despite the improving efficiency of cars and trucks running on gasoline, electric vehicles (EVs) increasingly look to be part of a solution to accelerate further progress on lowering CO₂ emissions. EVs, when combined with investments in renewable power generation and distribution, have the potential to significantly decarbonize the energy content of transportation.

Exhibit 1: Shares of energy-related emissions by sector (2021, %)

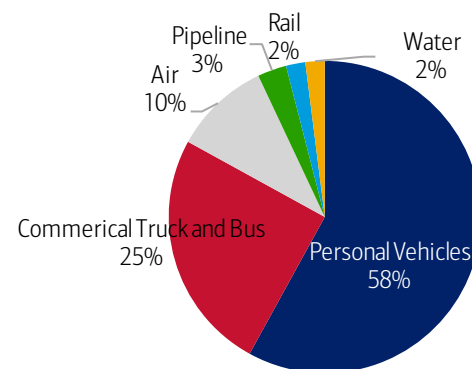
Transportation is the single biggest contributing sector to emissions



Source: Congressional Budget Office (CBO)

Exhibit 2: Shares of transportation-related carbon dioxide emissions by mode (2019, %)

Personal vehicles emit the greatest amount of CO₂ within transportation



Source: Congressional Budget Office (CBO)

IRA behind the wheel

The US Inflation Reduction Act (IRA) extended and enhanced the incentives for private and business users to shift towards EVs (Exhibit 3). At the same time, the IRA brings investment in public charging infrastructure to support the build-out of EV fleets.

Exhibit 3: Key EV/battery-related items in the IRA

The US government plans on spending more than US\$60bn in incentives to accelerate US manufacturing of EVs and EV batteries

Subsidy/Incentive	Amount	Details
EV tax credit	Up to \$7,500 per vehicle	Tax credit for purchasing EVs assembled in North America or leased EVs. For purchased EVs, EV battery components must be manufactured or assembled in North America (50% in 2023 → 100% in 2028).
Production tax credit	\$30bn	Tax credit for accelerating US manufacturing of clean energy, such as batteries and solar panels
Factory-building loan	\$20bn	Loans to build new clean vehicle manufacturing facilities
Investment tax credit	\$10bn	Tax credit to build clean technology factories, such as EVs and solar panels
Factory revamping grant	\$2bn	Grant to retool existing auto factories to make clean vehicles
Used EV tax credit	Up to \$4,000 per vehicle (30% of sale price)	Tax credit for purchasing used EVs. No restrictions on place of manufacture/assembly

Source: BofA Global Research

Consumer tax credits created by the IRA for new and used electric vehicles, tax credits for electric commercial vehicles, and individual and commercial charging infrastructure tax credits appear to already be having an impact on EV adoption. According to EY Americas¹, US consumer interest in electric vehicles is at an all-time high, with about half (48%) of US car buyers intending to purchase an EV in the next 24 months.

The interest can be attributed, at least in part, to the passage of the Bipartisan Infrastructure Act in 2021 and the subsequent implementation of the IRA (Exhibit 7). The clean vehicle tax credits from the IRA should help to improve the affordability of EVs, which BofA Global Research expects to drive greater demand in the short term and help in pushing penetration rates for EVs and other hybrid vehicles higher over the long term.

Specifically, BofA Global Research determined that the penetration rate, or total market share, of EVs is growing rapidly (Exhibit 4). Their “bottom-up” analysis (see Methodology for details) estimates that by 2025 the EV penetration rate in the US will be approximately 21%, which would be an almost 4x increase from 2022.

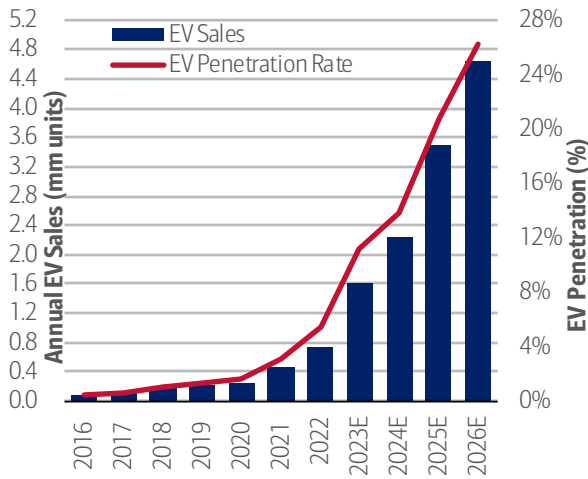
Expanding demand for EVs is also reflected in the number of new vehicle models coming to the market, with BofA Global Research estimating over 60 electric and/or hybrid vehicles in the alternative powertrain product pipeline (Exhibit 6). Furthermore, they state that the number of new electric vehicle launches over model years 2024-27 will exceed that of new internal combustion engine vehicles for the first time.

Fluctuating costs of energy and gasoline, as well as EV battery production, can still present some challenges for consumer adoption. However, BofA Global Research presents an alternative estimate for EV adoption under a more conservative modelling approach (see Methodology for details) which assumes that EV penetration ultimately depends on the cost to consumers. This scenario, which assumes the current regulatory scheme including IRA credits remains in place, equates to a 2025 EV adoption rate of around 15% (Exhibit 5), lower than their “bottom up” estimate, but still about 3x more than 2022 levels.

¹ EY research: Nearly half of US car buyers intend to purchase an EV | EY - US

Exhibit 4: Projected US EV volumes & EV penetration under Bottom-up analysis

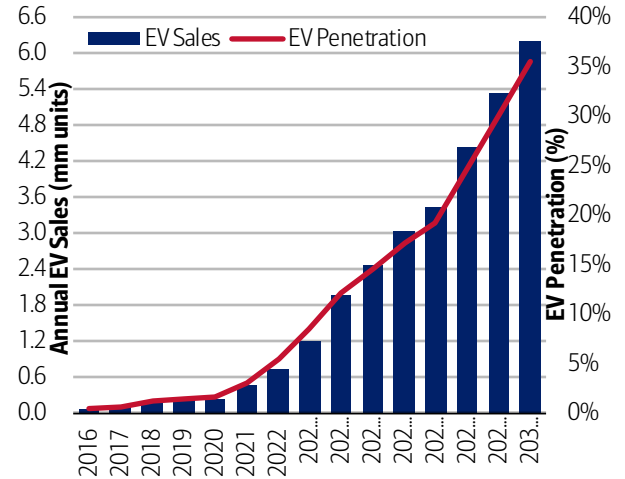
The BofA Global Research Bottom-up approach estimates that EV penetration will be ~21% in 2025



Source: BofA Global Research estimates

Exhibit 5: Projected US EV volumes & EV penetration under Top-down analysis

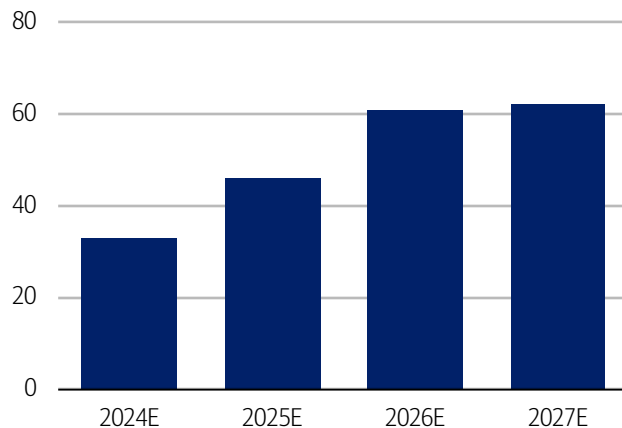
The BofA Global Research Top-down approach estimates that EV penetration will be ~15% in 2025



Source: BofA Global Research estimates

Exhibit 6: Projected alternative powertrain product pipeline count over MY2024-27

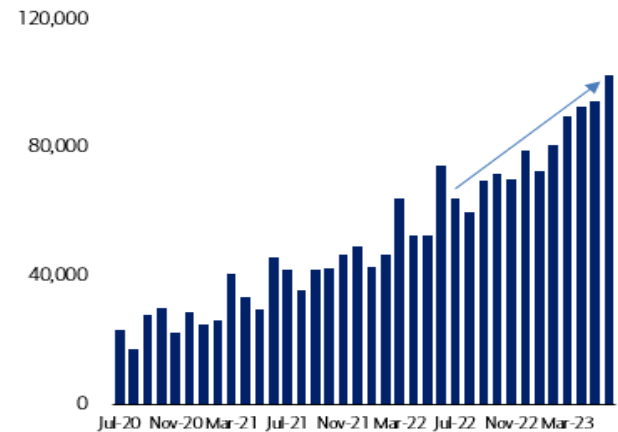
Over 60 electric and/or hybrid vehicles are estimated to be in the alternative powertrain product pipeline by 2027E



Source: BofA Global Research

Exhibit 7: New EV sales in the U.S. (absolute number)

EV sales grew by +70% since the passage of IRA



Source: Wards Intelligence

The South and Midwest showing signs of EV catch-up

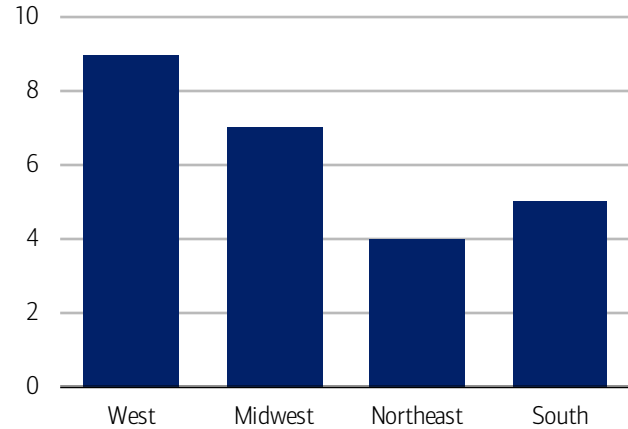
For some time the West region of the US, particularly California, led US EV adoption, with California maintaining the highest market share for EVs of any state in the US (US Department of Energy). But, more recently, since the second half of 2019, the South and Midwest have been exhibiting faster growth relative to the West.

Using Bank of America internal auto loan origination data, we can track the spread of EVs and hybrid electric vehicles across the nation. As of June 2023, consumers in the South and Midwest have been originating EV and plug-in hybrid electric vehicles (PHEV) at a faster pace than the West and the Northeast (Exhibit 9).

Interestingly, the US Department of Energy reports that the West easily outnumbers other regions when it comes to state-level incentives for clean transportation enacted since January 2020 (Exhibit 8). So, the increased adoption of EVs in the South and Midwest may reflect more federal IRA-related policies. At the same time, states such as California already have a more mature EV market and faster growth in other states may be a form of catch-up.

Exhibit 8: Number of clean transportation incentives enacted since January 2020 by Census region

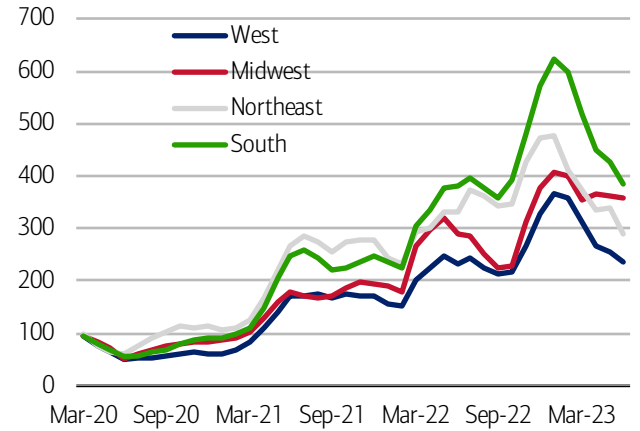
The West has the greatest number of state incentives enacted within the past few years



Source: US Department of Energy. Data as of June 27th, 2023.

Exhibit 9: Number of EV/PHEV auto loan originations by Census region (indexed, June-December 2019 = 100, 3-month moving average)

All regions have seen increasing adoption by consumers over the last few years



Source: Bank of America internal data as of June 2023

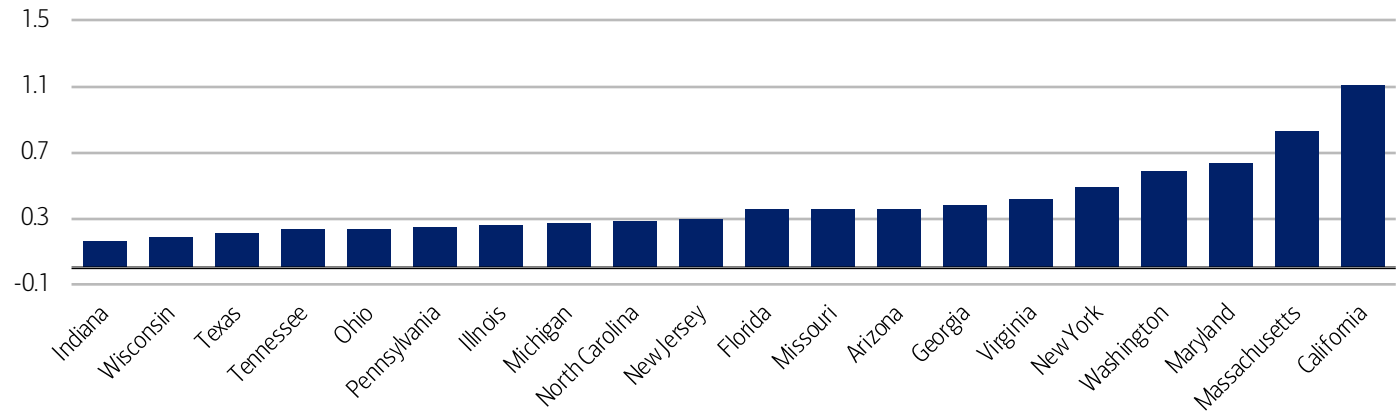
Regional infrastructure ranges

Will increased EV adoption in these regions continue at current pace? A crucial part of the story will be whether there is good charging infrastructure in place.

Exhibit 10 shows there is some way to go to ensure potential EV-adopters have access to charging stations. More mature markets such as California are well ahead of other states where we are currently seeing faster EV auto loan originations. Of course, the two go hand-in-hand to some extent, with the rising EV sales in the South and Midwest likely to incentivize EV charging providers to build out their networks.

Exhibit 10: EV charging stations per 1000 of the population for 20 largest US states (2022)

The charging infrastructure remains unevenly spread across the United States.



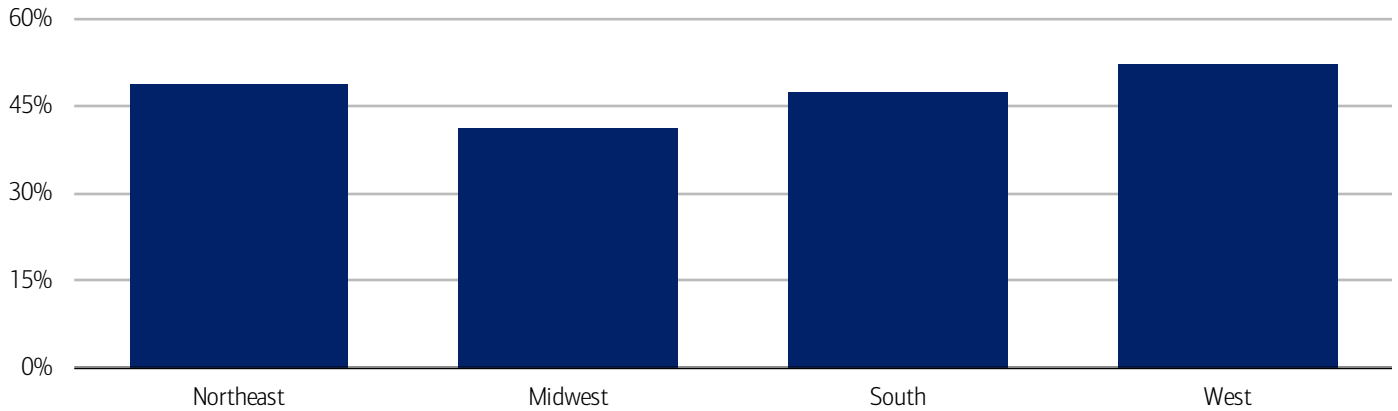
Source: US Department for Energy, US Census Bureau

What's more is there appears to be widespread appetite for access to home charging solutions. A Bank of America Electric Vehicle Consumer Market survey found that across all regions, nearly half of respondents indicated they would be interested in installing an electric vehicle charging station in their home if it was affordable (Exhibit 11).

The continued impact of the IRA and more accessible charging infrastructure allows for the road ahead to be more clearly leading to a sustainable future, in our view.

Exhibit 11: Assuming you could afford it, how interested would you be in installing an electric vehicle charging station to your home?

Interest in the South is comparable to that of the West



Source: Analytics, Modeling and Insights (AMI) Culture and Trends, "Electric Vehicle Consumer Market", August 2022

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.

Bank of America consumer EV/PHEV auto loan originations data reflects loans for private vehicle sales and covers originations at dealers, direct purchases and refinancings.

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 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' approach to forecasting EV volumes and penetration in the US market is 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.

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