ELECTRIC VEHICLES

## A Nationwide Study of the ELECTRIC VEHICLE SHOPPING EXPERIENCE



## ACKNOWLEDGMENTS

The first Rev Up report was written by Sierra Club's Mary Lunetta and Gina Coplon-Newfield in 2016 to examine car dealership sales of electric vehicles in states that had Zero Emission Vehicle (ZEV) standards. In 2019, we built off of Mary and Gina's original work to examine how EVs were being sold nationwide. The 2019 report was a tremendous success because of contributions from Hieu Le, Andrew Linhardt, Steph Larsen, Bhavi Moolya, Grace McRae, Julia Clemons, Larisa Mănescu, Gina Coplon-Newfield, Jim Bradbury, Alejandra Núñez, Orly Strobel, Hillary Davis, and Rosie Walter from Sierra Club; Eric Cahill from Plug In America; Adam Winer, Alfred Artis, and Shannon-Baker Branstetter from Consumer Reports; and Josh Goldman from Climate Nexus.

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During this project, our team faced many challenges with recruiting survey participants and data collection; however, with the amazing contributions from the team we were able to navigate supply chain issues and readjust our strategies to create a report that provides policymakers, advocates, and the auto industry with insights as to how we can improve electric vehicle adoption in the United States.


## TABLE OF CONTENTS

Acknowledgments ..... 02
Key Findings ..... 04
Introduction ..... 05
Availability and Inventory ..... 06
Regional Variations ..... 07
Zero-Emission Vehicle Program ..... 08
Automaker Variations. ..... 09
How California Compares ..... 11
Direct Sales ..... 12
Increasing EV Production ..... 13
Recommendations ..... 14
Methodology ..... 15

$66 \%$ of car dealerships nationwide did not have a single EV available for sale, while $34 \%$ of dealers did have an EV available for sale.

## Supply chain, inventory issues, and automaker

 allocation of EVs to dealerships created EV availability barriers. Of the $66 \%$ of car dealerships that did not have an EV for sale, $44 \%$ reported they would offer an EV for sale if they could get one.Some car dealerships refuse or are still not ready to sell EVs to consumers. Of the $66 \%$ of car dealerships that did not have an EV for sale, $45 \%$ of those dealers reported they would not offer an EV for sale regardless of automaker allocation and supply chain constraints.

## Only $27 \%$ of dealers in hte western resion

 had an EV available for sale - lower than all other regions. However, the Western region sold far more EVs than the rest of the country and accounted for $45 \%$ of the nation's EV sales in 2022, indicating that the low availability is a result of high sales turnover and high consumer demand.
## Mercedes-Benz (owned by Daimler AG)

 had the best EV availability among car brands: ${ }^{1} 90 \%$ of the Mercedes-Benz dealerships surveyed had an EV available for sale.Toyota and Honda had the worstev availability. Only $11 \%$ of Honda dealers and $15 \%$ of Toyota dealers had an EV available for sale.

The transportation sector is the largest source of greenhouse gas (GHG) emissions in the country. Passenger cars make up 15 percent of GHG emissions in the US and 57 percent of GHG emissions for the transportation sector. Vehicle pollution is not only harmful to our climate, but it disproportionately impacts low-income communities and communities of color who face greater exposure and higher rates of lung and heart disease when compared with their white or wealthier counterparts. Children, elderly populations, women, and those suffering from chronic illnesses face even higher risks.

Electric vehicles (EVs) are becoming more mainstream and technology has advanced significantly over the years. EVs produce significantly lower lifetime emissions than conventional gasoline-powered cars, even when accounting for mining for critical minerals, EV manufacturing, and the electricity for charging.

In his Executive Order on Strengthening American Leadership in Clean Cars and Trucks, President Biden committed to make 50 percent of new car and light truck sales be zero emission by 2030. Automakers are investing billions in manufacturing and selling EVs. And states, regulators, and the federal government are creating policies to rapidly accelerate this transition. In 2021, Congress passed the historic Infrastructure and Investment Jobs Act, which allocated $\$ 7.5$ billion in capital investments to create a national electric charging corridor and to build charging stations in underserved communities. In 2022, Congress passed the Inflation Reduction Act, which provides over \$370 billion in clean energy investments, including tax rebates for the purchase of new and used clean vehicles. In August 2022, California adopted the Advanced Clean

Cars (ACC) II standard, which requires manufacturers to have all new car sales in the state be 100 percent electric by 2035. Vermont, Washington, Oregon, New York, and Massachusetts immediately adopted the ACC II standard in 2022 and several other states started the rulemaking process in 2023.

The nation is moving forward with EVs, which provide consumers with massive air quality, cost-saving, and performance benefits compared with gasoline cars. According to a 2022 survey, interest in EVs is high across racial and ethnic groups. ${ }^{2}$ This report examines the availability of EV s being sold at car dealerships and the barriers to consumers who are in the market for an EV. The stark \#1 finding is that two-thirds of dealers don't even have one EV for sale. While some dealerships are still reluctant to fully embrace EVs, many dealers are expressing a newfound eagerness to sell EVs. However, it is the responsibility of manufacturers to deliver more EVs to all dealers. The ultimate conclusion is that automakers must invest more in EV production to match consumer demand that is at a record high.


## AVAILABILITY \& INVENTORY

If we are to achieve widespread EV adoption, dealerships need to offer EVs for sale and automakers need to produce more EVs and distribute them to their network of dealers. While supply chain issues from the COVID-19 pandemic resulted in EV production shortages and delays, automakers have not been prepared to scale up EV supply to meet consumer demand for years.

We surveyed dealers to see if they had any EVs available for sale. If they didn't, we asked if they would offer EVs if it weren't for supply chain and inventory issues.

- Nationwide, 66 percent of auto dealerships had no EVs for sale on their lots, while 34 percent of dealerships did offer an EV for sale.
- Of the 66 percent of dealerships that did not have an EV for sale on their lots, 44 percent reported they would offer an EV for sale if they could get one, while 45 percent reported they would not offer an EV for sale regardless of automaker allocation and supply chain constraints.

The reasons for EV availability varied. Here are several testimonials we heard from dealership surveys:
"We're getting more EVs in 2023. We have had them in the past but none this year. It's difficult to get any in stock."

NISSAN OF NEW ORLEANS IN LOUISIANA
"The sales person was knowledgeable about Audi's EVlineup and explained the benefits of EVs compared to Tesla, the market leader. Never tried to sell me an internal combustion vehicle, which was nice."

AUDI OF FAIRFIELD IN CONNECTICUT
"We haven't gotten into EVs just yet, we're not really moving towards that yet but we're starting to talk about selling it."

J AND R CAR AND TRUCK CENTER IN KANSAS
"We have big plans to sell EVs, but we just can't get any."

MIDWAY CHEVROLET BUICK CADILLAC DEALER IN MARYLAND
"We need to install chargers first before the automaker can send us EVs to sell."

TYRRELL-DOYLE CHEVROLET COMPANY IN WYOMING
"I was able to test drive the EVbecause they were sufficiently charged. I bought a new Chevy Bolt EV."

COURTESY CHEVROLET IN ARIZONA
"Dealer was happy to help me order an EV, but had no EVin stock that I could look at or test drive."

OURISMAN FORD IN VIRGINIA
"Dealer regretted that new EVs were only available by order, with delivery several months out."

ROSEDALE CHEVROLET IN MINNESOTA
"They didn't have an EV available to test drive. Volvo charges them during the weekend and they told us to come back during the week. Badpractice."

ALLSTAR VOLVO IN LOUISIANA
"You have to buy them sight unseen as the dealership has no inventory on hand. I was interested in the bZ4X and none were available or expected to be available for the foreseeable future."

BILL KIDD'S TOYOTA IN MARYLAND
"The dealership has sold over 1,700 Leafs over the past 10 years. Right now they cannot get more than one at a time and it is sold immediately."

CAMPBELL NISSAN IN WASHINGTON

The experiences of our volunteers differed depending on their location. Dealerships in some regions had more EVs available for sale than in others.

For the purposes of this report, we compared results from six different regions: the Northeast (11 states plus DC), the Southeast (12 states), the West (11 states), the Southwest (four states), and the Midwest (12 states). We supplemented our findings with EV sales and market share data for 2022 from Atlas Public Policy.

## EV Availability by Region

## Midwest Dealers

EVs NOT available for sale EV's available for sale

## Northeast Dealers

EVs NOT available for sale EV's available for sale

## Southeast Dealers

EVs NOT available for sale
EV's available for sale

## Southwest Dealers

EVs NOT available for sale EV's available for sale

## West Dealers

EVs NOT available for sale EV's available for sale


## Midwest

- Thirty percent of dealers had an available EV for sale while 70 percent did not.
- Of the 70 percent of dealers that did not have an available EV for sale, 40 percent would offer an EV for sale if they could, while 50 percent would not.
- The Midwest had a total of 101,631 EVs sold in 2022, representing 11 percent of EV sales nationwide.


## Northeast

- Thirty-two percent of dealers had an available EV for sale while 68 percent did not.
- Of the 68 percent of dealers that did not have an available EV for sale, 46 percent would offer an EV for sale if they could, while 40 percent would not.
- The Northeast had a total of 172,969 EVs sold in 2022 , representing 18 percent of EV sales nationwide.


## Southeast

- Forty-one percent of dealers had an available EV for sale while 59 percent did not.
- Of the 59 percent of dealers that did not have an available EV for sale, 41 percent would offer an EV for sale if they could, while 45 percent would not.
- The Southeast had a total of 158,777 sold in 2022, representing 17 percent of EV sales nationwide.


## Southwest

- Thirty-eight percent of dealers had an available EV for sale while 62 percent did not.
- Of the 62 percent of dealers that did not have an available EV for sale, 49 percent would offer an EV for sale if they could, while 41 percent would not.
- The Southwest had a total of 91,941 EVs sold in 2022, representing 10 percent of EV sales nationwide.

West

- Twenty-seven percent of dealers had an available EV for sale while 73 percent did not.
- Of the 73 percent of dealers that did not have an available EV for sale, 49 percent would offer an EV for sale if they could, while 46 percent would not.
- The West had a total of 423,993 EVs sold in 2022, representing 45 percent of EV sales nationwide.

Overall, we found that dealerships in the Southeast region had a higher percentage of dealers with an available EV for sale. However, the West region sells many more EVs and makes up a larger share of the EV market.

## ZERO-EMISSION VEHICLE PROGRAM

California's Zero-Emission Vehicle (ZEV) program encourages automakers to sell an increasing share of electric vehicles in the state. California first developed this program in the early 1990 s to address poor air quality, using its long-standing authority to adopt more stringent emissions standards for new motor vehicles under the Clean Air Act, subject to a waiver from the EPA.

The Clean Air Act also authorizes other states to adopt California's more protective standards. As of the date of this publication, 15 states have adopted California's ZEV Standards. These states are Colorado, Connecticut, Maine, Maryland, Massachusetts, Minnesota, Nevada, New Jersey, New Mexico, New York, Oregon, Rhode Island, Vermont, Virginia, and Washington.

The ZEV program is considered one of the nation's most forward-looking climate policies and is a driving force behind an expanding EV market. In August of 2022, California updated its ZEV program, known as the Advanced Clean Cars II program, which begins in 2026 and would require EV sales to reach 100 percent by 2035. States such as Massachusetts, New York, Oregon, Washington, and Vermont have already adopted ACC II, with more states to follow.

In analyzing EV availability at dealerships in ZEV states compared with non-ZEV states, we found no significant difference. However, there were differences among dealers that did not have EVs available for sale between ZEV and non-ZEV states, with more dealers in ZEV states indicating they would sell EVs if it weren't for inventory or supply chain issues.

- Thirty-five percent of dealerships in ZEV states had an available EV for sale, while 65 percent did not.
- Of the 65 percent of dealers that did not have an available EV for sale, 52 percent would offer an EV for sale if they could, while 41 percent would not.
- In 2022, the 16 ZEV states sold 580,487 EVs, representing 61 percent of $E V$ sales nationwide.
- Thirty-three percent of dealerships in non-ZEV states offered an EV for sale, while 67 percent did not.
- Of the 67 percent of dealers that did not have an available EV for sale, 41 percent would offer an EV for sale if they could, while 47 percent would not.
- In 2022, the 35 non-ZEV states sold 368,824 EVs, representing 39 percent of EV sales nationwide.

Overall, although EV availability between ZEV and non-ZEV states was similar, we found that ZEV states (31 percent of states) accounted for a disproportionate amount - 61 percent - of the nation's total EV sales. This suggests that the ZEV policy is working as intended and is driving higher EV uptake in states that have adopted the ZEV policy.


## AUTOMAKER VARIATIONS

Our staff and volunteers contacted dealerships representing 18 different automaker ownership groups:

- Aston Martin
- BMW Group (BMW, Mini)
- Daimler AG (Mercedes-Benz)
- Ferrari
- Ford Motor Company (Ford, Lincoln)
- General Motors (Buick, Cadillac, Chevrolet, GMC, Pontiac)
- Harley-Davidson
- Honda Motor Company (Acura, Honda)
- Hyundai Motor Group (Hyundai, Kia)
- Mazda Motor Corporation
- McLaren
- Renault-Nissan-Mitsubishi Alliance (Infiniti, Mitsubishi, Nissan)
- Stellantis (Alfa Romeo, Chrysler, Dodge, Fiat, Jeep, Maserati, Ram)
- Subaru Corporation
- Tata Motors (Jaguar, Land Rover)
- Toyota Motor Corporation (Lexus, Scion, Toyota)
- Volkswagen Group (Audi, Bentley, Bugatti, Lamborghini, Porsche, Volkswagen)
- Zhejiang Geely Holding Group (Volvo)

In addition, some dealerships surveyed offered brands produced by multiple ownership groups, and some were independent.

We ranked the automakers (those where we surveyed at least 10 dealerships) by those with the most dealerships with EVs available for sale, and included EV sales numbers for 2022. The results emphasize the need for automakers known for producing affordable vehicles, like Toyota and Honda, to offer EV models.

EV Availability by Automaker Group


EV Sales by Automaker Group, 2022



## HOW CALIFORNIA COMPARES

California is the fifth-largest economy in the world. With a population of more than 39 million people, it is the US state that sells the most cars. ${ }^{3}$ California has made significant investments to accelerate EV adoption. From robust EV purchasing and charging incentives to strong vehicle standards, it is no surprise that California is the state with the highest EV sales and market share, and accounted for one-third of the nation's total EV sales in 2022.

## California

- We found that only 19 percent of dealerships surveyed in California had an available EV for sale, while 81 percent did not.
- Of the 81 percent of dealerships that did not have an available EV for sale, 47 percent indicated they would if it weren't for inventory or supply chain issues, while 50 percent indicated they wouldn't sell EVs regardless.
- In 2022, California sold 317,595 EVs, representing 20 percent of total car sales within the state and 33 percent of all EV sales nationwide.
- Although California's EV availability was low according to our dealership surveys, based on its high EV market share and sales, we assume that inventory turnover rate is higher in California - meaning once an EV is made available for sale by a dealership in California, that EV is sold quickly.


## The Rest of the Country

- Outside of California, in the 49 other states and the District of Columbia, we found that 35 percent of dealerships surveyed had an available EV for sale, while 65 percent did not.
- Of the 65 percent of dealerships that did not have an available EV for sale, 44 percent would sell an EV if it weren't for inventory or supply chain issues, while 45 percent indicated they wouldn't sell EVs regardless.
- In 2022, these 49 other states and DC sold a total of 631,716 EVs, representing 66 percent of the nation's total EV sales.
- Although the rest of the country had a higher proportion of dealers with an EV available for sale based on our surveys, California's sales numbers indicate that the rest of the country does not sell EVs as quickly or as frequently as California.

For almost all products in America, consumers have the choice of buying directly from a manufacturer or buying from a retailer that sells other companies' products. For car purchasing, many states place restrictions prohibiting automakers from selling cars directly to consumers, meaning consumers can only buy these cars at dealerships rather than directly from the manufacturer.

EV manufacturers such as Tesla, Lucid Motors, and Rivian face barriers to entry in the market due to these restrictive laws in certain states that bar them from selling directly to consumers. These EV companies only make and sell EVs and their business models do not involve independent car dealerships, but rather storefronts that are owned directly by the respective companies.

Over the years, many states have recognized the anticompetitive nature of not allowing companies to sell directly to their customers and have passed laws to change this. Twenty-three states allow manufacturers to sell directly to consumers in their states, this law is often referred to as "Direct Sales." ${ }^{4}$

## Direct Sales States

- Thirty-four percent of dealers surveyed in direct sales states offered an EV for sale, while 66 percent did not.
- Of the 66 percent of dealers that did not offer an EV for sale, 48 percent indicated they would offer an EV for sale
if it weren't for inventory or supply chain issues, while 44 percent indicated they wouldn't sell EVs regardless.
- Direct sales states sold 615,724 EVs in 2022, representing 65 percent of all EVs sold nationwide.


## Non-Direct Sales States

- Thirty-three percent of dealers surveyed in direct sales states offered an EV for sale, while 67 percent did not.
- Of the 67 percent of dealers that did not offer an EV for sale, 41 percent indicated they would offer an EV for sale if it weren't for inventory or supply chain issues, while 46 percent indicated they wouldn't sell EVs regardless.
- Non-direct sales states sold 333,587 EVs in 2022, representing 35 percent of all EVs sold nationwide.

While there was not a difference in EV availability between direct sales states and non-direct sales states, direct sales laws are having a large impact on volume and sales. Direct sales accounts for only 23 states, but sold 65 percent of the nation's EVs, while non-direct sales accounts for 28 states (including DC), but only sold 35 percent of the nation's EVs.


Since our 2019 Rev Up report was published, the auto industry has committed half a trillion dollars of investments in scaling EV production. President Biden has signed two historic pieces of legislation, the Inflation Reduction Act and the Infrastructure and Investment Jobs Act, which invest billions in EV charging infrastructure and help make EVs more accessible. California adopted the Advanced Clean Cars II program, which ensures all new car sales in the state to be zero emission by 2035.

These historic investments and policies will continue to reshape the EV market for years to come; based on our survey findings EV availability remains scarce and production volume is currently not meeting consumer demand. Despite at least 1.9 million reservations or preorders ${ }^{5}$ for recently released EVs, there were only around 949,000 EVs sold in the US in 2022. ${ }^{6}$ The failure to offer EVs creates barriers to EV access for consumers and limits our nation's progress in reducing pollution, improving public health, and saving people money.

It's clear from our findings that automakers must manufacture higher volumes of EVs. A common theme from the 34 percent of dealers that did have an available EV for sale is that they sell their EVs quickly and oftentimes there are long waitlists to purchase one. We also heard that of the 66 percent of dealers that did not have an available EV for sale, 44 percent would offer an EV for sale right now if automakers delivered them.

Automakers should invest even more in their EV business lines, since consumer demand is at record highs, including across racial and ethnic groups, ${ }^{7}$ and dealers want to sell EVs. Automakers can scale EV production by focusing on building a robust, resilient, and domestic supply chain. This could involve diversifying their supplier base, so that they
are not reliant on a single supplier for critical components, and establishing contingency plans in case of disruptions. Additionally, developing strong partnerships with suppliers and other stakeholders in the supply chain can also be important for scaling EV production. There is a massive opportunity right now for automakers to clean up their supply chains as they transition to electric vehicles. The Lead the Charge campaign ${ }^{8}$ shows how automakers can and must radically transform their supply chains to be equitable, sustainable, and 100 percent fossil free.

We recommend dealerships become EV certified to best deliver the needs of EV consumers. For example, Ford dealerships that invest in EV charging, staff training, and nohaggle sales programs will be allocated more EVs. ${ }^{9}$ Plug In America also offers sales courses for specialized training. ${ }^{10}$ Dealers should consider partnering with local charging companies or utilities to offer charging infrastructure for EVs at their dealership. This could help to attract potential customers who are interested in EVs but may be concerned about the availability of charging options. Finally, dealerships could consider purchasing used EVs from other sources, such as private owners or rental car companies who are looking to sell their vehicles.

## Automakers should:

- Manufacture more EVs for sale across a wider range of states and regions, and increase inventory of EV models with varying battery range and performance.
- Support the adoption of the Advanced Clean Cars II Rule.
- Provide better incentives to dealerships for selling EVs, including free or affordable certification for dealerships to sell EVs.
- Create a more robust, resilient, and domestic supply chain.
- Improve manufacturing processes to scale EV production.
- Increase marketing and advertising for EVs.


## Auto dealers should:

- Partner with utilities to install charging infrastructure onsite to ensure vehicles are charged and available to test drive.
- Provide regular training to salespeople on EV charging technology, consumer incentives (state and federal rebates, tax credits), and effective sales strategies.
- Connect with local EV groups to participate in test ride events.


## State regulators and policymakers should:

- Adopt the Advanced Clean Cars II regulation.
- Maintain or increase existing rebate and incentive programs for the purchase of new and used EVs, and provide additional incentives for low-income and disadvantaged communities.
- Create EV consumer-rebate programs in states that do not have them-ideally to be administered at the point-of-sale.
- Provide grants and incentives for businesses, municipalities, and government agencies to invest in EV fleets and EV charging infrastructure
- Establish consumer EV education programs.
- Require utilities to install charging infrastructure, including at workplaces, at apartment complexes, and in low- and moderate-income neighborhoods.
- Display EVs prominently.


The dealership survey was conducted from June through November 2022.

## Sample Size:

We compiled a list of all car dealerships from Auto Buy Sell Dealers. Our nationwide sample size was determined by a formula where sample size $=[(Z-S c o r e) \wedge 2 * S t a n d a r d$ Deviation * (1-Standard Deviation)] / (Margin of Error)^2

The margin of error used was 3.5 percent, so our sample size needed to be 784 dealerships. Sample sizes for each state were proportional to the total number of registered dealers in each state.

We used a random number generator to select the car dealerships in each state that would be surveyed. We collected 801 dealership responses all together.

## Survey Process:

Sierra Club staff and volunteers called the selected dealerships and asked about EV availability, and translated the responses into Yes/No answers to these two questions:

1. Does the dealership have any EVs for sale?
2. If not, would the dealership offer EVs if not for inventory issues?

For 11 percent of the dealerships that answered no to the first question, we were unable to ascertain an answer to the second.

In addition, some volunteers visited dealerships in person to survey EV availability.

The surveys did not differentiate between plug-in hybrid electric vehicles and battery electric vehicles. Dealerships were categorized by brands and automaker group companies based on the dealership name. We estimate that 66 percent of car dealerships nationwide did not have EVs available for sale, and are 95 percent confident that the true proportion lies between 63 percent and 70 percent.

## ENDNOTES

1 Out of the 15 group companies where at least 10 dealerships were surveyed.
2 Survey Says: Considerable Interest in Electric Vehicles Across Racial and Ethnic Demographics, Consumer Reports, Union of Concerned Scientists, EVNoire, Green Latinos. September 2022. https://www.greenlatinos.org/_files/ugd/a42c65_5fff34fba11748138063dbf9d8d80363.pdf

3 Total car sales by state in 2022 calculated from EV sales and market share data published by Atlas Public Policy: https://www.atlasevhub.com.
4 This does not count states that only allow direct sales for Tesla.
5 Everything to Know About EV Reservations \& Pre-orders. https://www.recurrentauto.com/research/ev-reservations-pre-orders.
6 EV sales data from Atlas Public Policy.
7 Survey Says: Considerable Interest in Electric Vehicles Across Racial and Ethnic Demographics, Consumer Reports, Union of Concerned Scientists, EVNoire, Green Latinos. September 2022. https://www.greenlatinos.org/. files/ugd/a42c65 5fff34fba11748138063dbf9d8d80363.pdf
https://leadthecharge.org/solutions/
9 Ford CEO says $65 \%$ of U.S. dealers agree to sell EVs under company's investment programs.
https://www.cnbc.com/2022/12/05/ford-ceo-says-most-us-dealers-agree-to-sell-evs.html
10 PlugStar Electric Vehicle Dealer Training. https://pluginamerica.org/about-us/evtraining/\#dealers

