

Electrifying the Vehicle Market

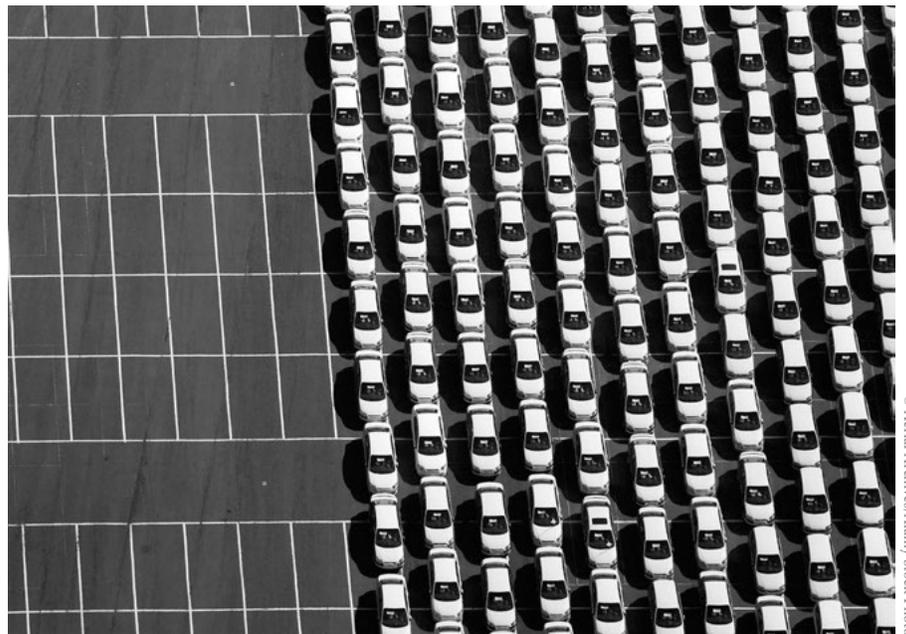
Evaluating Automaker Leaders and Laggards

HIGHLIGHTS

The auto industry is changing, with electric cars providing a new and better alternative to conventional gasoline and diesel vehicles. However, some automakers lag in bringing electric vehicles to market, especially outside of California, which has policies that require automakers sell EVs there. BMW, GM, Nissan, and Tesla are doing better at making electric options available. Toyota, Hyundai/Kia, Fiat Chrysler and Honda are lagging behind in their efforts to build and sell EVs. Car buyers cannot buy cars that are not available, and the lack of availability of EVs in many markets will slow the transition from petroleum to electricity.

The mass-market introduction of electric-drive vehicles represents an extraordinary change for the automotive industry, offering a viable alternative to the internal combustion engine for the first time since the early 20th century. Global sales of electric vehicles (EVs) have topped a million in just the five years since they became available on the market.* US sales over the same period are on track to hit a total of a half million by the end of 2016. Buyers are compelled by EVs' lower fuel costs and better driving experience, as well as the convenience of avoiding gas stations and the environmental benefits of driving on electricity.

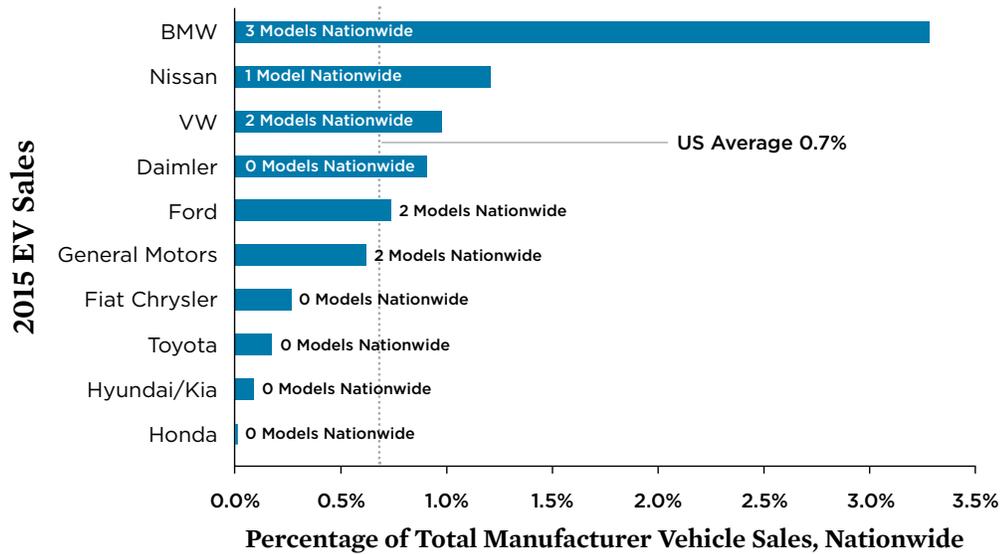
In the race to bring electric vehicles to market in the United States, some automakers are leaders but others are laggards, and efforts vary widely. That is the conclusion of this detailed analysis by the Union of Concerned Scientists (UCS) of automakers' efforts to bring EVs to market and make them available to consumers. This UCS analysis covers the number of vehicles sold in the United States, the number of models available, and the percentage of EVs sold compared with total vehicle sales for each company. It also looks at variations in the availability of EVs by manufacturer and location.



US consumer interest in EVs is increasing, but when it comes to making EVs available for sale nationwide, some automakers are leaders, and some are laggards..

* Unless otherwise noted, the term "electric vehicle" refers here only to plug-in electric vehicles and excludes fuel-cell electric vehicles.

FIGURE ES-1. Automakers That Make EVs Available Nationwide Have Higher Sales

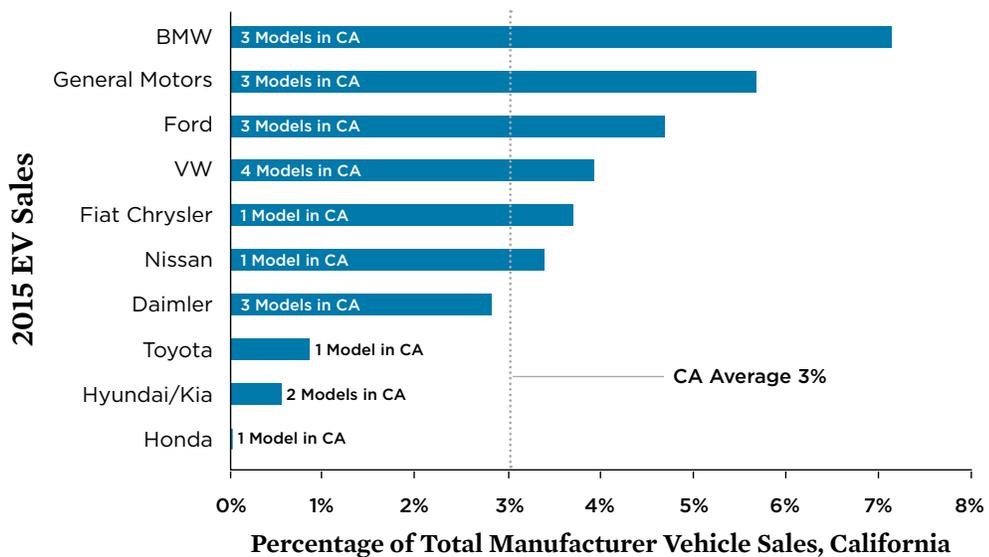


Automakers that offered more EV models and made them available across the United States sold a higher percentage of such vehicles. BMW was the clear leader among major manufacturers, while Fiat Chrysler, Toyota, Hyundai/Kia, and Honda were far behind in both EV sales and model availability.

Note: Available Nationally = Registrations in 40+ states

SOURCES: INSIDEEVS.COM, WARDAUTO.

FIGURE ES-2. BMW and General Motors Lead in California with More Than 5% of New Car Sales EVs



BMW and General Motors led in California, with EVs representing more than 5 percent of all of their sales. Honda and Toyota sold few EVs in California because they stopped selling plug-in vehicles during 2015.

SOURCES: IHS AUTOMOTIVE, CALIFORNIA NEW CAR DEALERS ASSOCIATION'S CALIFORNIA AUTO OUTLOOK.

Market Leaders and Laggards

Market leaders have developed multiple EV models and made them available to buyers in many states. Market laggards have been slower to shift to EVs, either by making them available in only a handful of states or by not designing or selling any EVs (see Figures ES-1 and ES-2).

THE LEADERS

- **BMW** has made a major commitment to electrification, and its EV sales reflect that. BMW leads all major automakers in EVs sales as a proportion of total sales: more than 3 percent across the United States and topping 7 percent in California.
- **General Motors**, with the Chevrolet Volt, and **Nissan**, with the LEAF, were early leaders in developing and selling EVs. The Volt is the top-selling plug-in hybrid EV, and the LEAF is the top-selling battery EV since 2010.
- **Tesla** is a leader among automakers, producing only EVs. It was the top-selling EV carmaker in 2015 and its upcoming Model 3 has attracted unprecedented interest.

THE LAGGARDS

- **Honda** currently offers no plug-in electric vehicles in the United States. Even when the company did sell EVs here, its efforts lagged behind those of other automakers. Honda's total EV sales in the United States since 2011 are lower than General Motors' EV sales in a single month (April 2016).
- While **Toyota** is a leader in hybrid-vehicle technology, it lags in deploying plug-in electric vehicles. Toyota had success in selling the Prius Plug-in, but the company removed the model from the market and currently has no plug-in EV for sale in this country.
- **Fiat Chrysler** sells its only EV, the Fiat 500e, successfully in California and Oregon. However, the company does not offer any electric option in the rest of the country.
- **Hyundai/Kia** has not made its two plug-in EVs, the Kia Soul and Hyundai Sonata plug-in hybrid, widely available and its EV sales are significantly lower than those of most other major automakers.

Strong Consumer Interest in EVs

In a 2016 survey of drivers in California and the Northeast, conducted by UCS and Consumers Union, drivers expressed a



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EVs offer car buyers lower costs to fuel and operate, a better driving experience due to quiet operation and quick acceleration, and the convenience of recharging at home. However, drivers can't choose EVs if automakers don't offer them for sale.

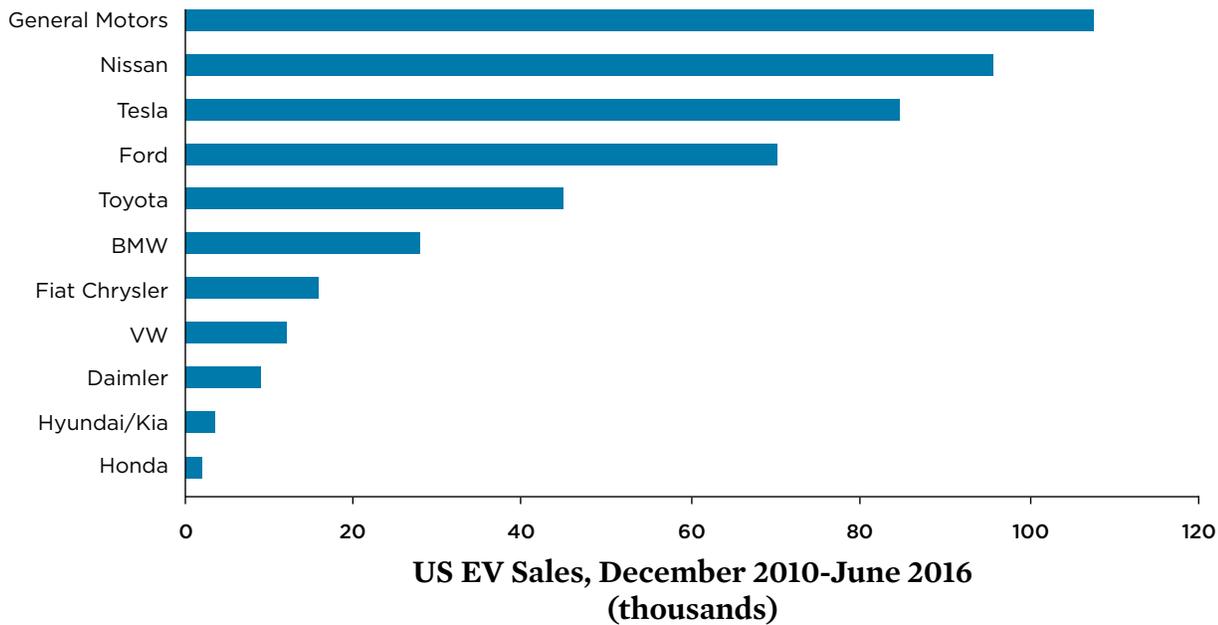
strong interest in EVs. Most drivers would consider an EV for their next car. The survey also found that over 40 percent of households could potentially use an EV based on access to parking, access to a plug, and usage requirements (UCS 2016). The unprecedented interest in Tesla's upcoming Model 3 further demonstrates strong consumer interest in EVs, with over 350,000 reservation deposits (Fehrenbacher 2016).

Limited EV Choices Outside California

While interest in EVs is strong across regions, their availability is not. Our analysis finds that California consumers have considerably more opportunity to buy electric cars than do consumers in the rest of the United States. This is in terms of both the number of vehicles available and the choice of models (see Figures ES-3, p. 4 and ES-4, p. 5).

Some EVs are available in only a handful of states, or they are available in such small numbers as to be effectively unavailable.

FIGURE ES-4. Total EV Sales in the United States



General Motors and Nissan lead in sales of EVs due their early entry into the EV market. Honda has sold the fewest EVs out of all major automakers.

SOURCE: INSIDEEVS.COM.

All electric vehicle models on the market in the United States are available in California, where consumers could choose among 22 models of EVs in 2015. In contrast, some EVs are available in only a handful of states, or they are available in such small numbers as to be effectively unavailable. Automakers collectively made more than 12 models available in only five states besides California, where the greater model availability is due in large part to the state's Zero Emission Vehicle policy.

California also has a much greater rate of electric vehicle sales. For example, one in 14 BMWs sold in the state in 2015 was an EV, and BMW offers California car buyers four EV models.

Consumer interest in EVs is growing, but they need more EV options in local car showrooms, especially outside California.

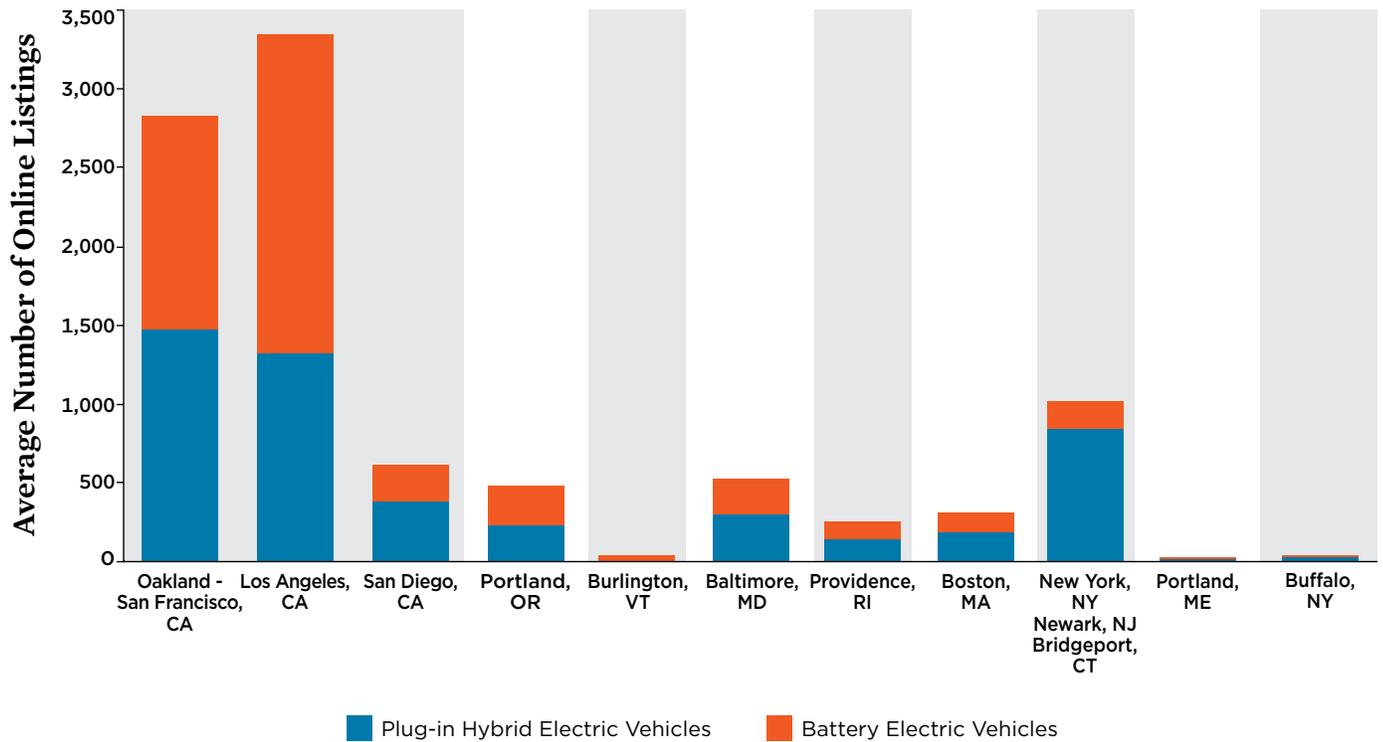
EVs Often Hard to Find at Dealerships

While many factors influence EV sales, new-car buyers cannot choose vehicles that are not available for purchase. An examination of new EVs listed for sale shows that consumers, especially outside California, would have a far harder time locating an EV than they would when seeking a similar gasoline model.

To collect data on the availability of EVs and comparable gasoline-powered vehicles, a popular automotive website was searched for vehicles listed for sale at dealerships. The search found far fewer new EVs on dealers' lots in cities outside California. For example, dealers near Los Angeles offered an average of over 3,000 EVs during the first half of 2016, but those in the New York City area offered about 1,000 (see Figure ES-5, p. 6). Even fewer vehicles were found for sale in other cities, with an average of just over 300 listings for Boston-area dealers. This trend is seen even when adjusting for the total number of vehicles in use in each metropolitan area. For example, Boston had just 10 percent of the EVs listings of Oakland when adjusting for relative car ownership.

Because of the lack of EVs at dealerships in many areas, sales data are a poor indicator of the extent of consumer

FIGURE ES-5. The Availability of EVs in Selected Metropolitan Areas, January-June 2016



City	Unique EV Listings per 1 Million Vehicles	EV Availability (Relative to Oakland - San Francisco)	Average EVs Listed for Sale	Proportion of Dealers offering an EV*
Oakland - San Francisco, CA	1,718	100%	2,822	93%
Los Angeles, CA	783	46%	3,323	97%
San Diego, CA	567	33%	614	89%
Portland, OR	558	32%	490	85%
Burlington, VT	551	32%	47	44%
Baltimore, MD	507	30%	524	66%
Providence, RI	417	24%	259	61%
Boston, MA	179	10%	317	61%
New York, NY - Newark, NJ - Bridgeport, CT**	137	8%	1,022	66%
Portland, ME	132	8%	28	53%
Buffalo, NY	81	5%	38	39%

Significantly fewer EVs are available outside California, both in terms of the absolute number of vehicles and their relative availability.

* Excluding Honda and Toyota, which do not currently offer a plug-in EV.

** Because the search radii for these cities overlap, the analysis combined EV and availability metrics.

interest in electric vehicles. EV sales will be smaller if an automaker does not build or offer an EV model for sale or a consumer cannot find one on a dealer lot easily. While leading automakers make their EVs relatively widely available, all automakers could improve the availability of EVs and the number of models available at dealerships.

Conclusions

This assessment of automaker efforts to bring EVs to market provides a snapshot of current and past sales and availability data, looking at a relatively new and dynamic part of the auto industry. In summary:

- Progress has been uneven, with some automakers clearly ahead in offering multiple EV models and making the vehicles available to more consumers across the country, while others offer few if any models with only limited availability.

- In California, which has the highest EV sales of any state, significantly more plug-in EV models are available compared with the rest of the United States.
- While leading automakers make their EVs relatively widely available, all automakers could improve the availability of EVs and the number of models available at dealerships, especially outside of California.

All automakers could improve the availability of EVs and the number of models available at dealerships.



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California's Zero Emission Vehicle requirement has spurred many automakers to focus their EV efforts there, neglecting prospective EV buyers in the rest of the United States.

Through tax credits, rebates, infrastructure support, and other incentives, federal and state governments are taking important steps to accelerate the adoption of electric vehicles. Consumer interest in EVs is growing as well, as shown by the nearly 500,000 EVs sold in the United States to date and the strong interest in cars like the newly announced Tesla Model 3. However, consumers need more EV options in local car showrooms, especially outside California. Policies like California's Zero Emission Vehicle program are critical for ensuring that automakers do their part to help the country transition to electric vehicles and other cleaner vehicles.

Looking forward, many automakers have announced or stated plans to expand their offerings of EV models, expand

their efforts to new regions, and invest more in R&D, driven by competition and underpinned by regulatory measures like the Zero Emission Vehicle program. Some companies, including Honda, Toyota, and Hyundai, have placed greater emphasis on fuel-cell vehicles, a complementary electric-drive technology that could fit the needs of many consumers, yet automakers have been slow to bring these vehicles to market. If automakers deliver on their commitments, electrification of passenger vehicles could rapidly reshape the automotive industry, bringing a change that is needed to reduce carbon emissions and avoid the worst effects of climate change. Automakers who do not invest in EVs may miss out on a potential market that will be vital to the future of the auto industry.



FIND THE FULL REPORT ONLINE: www.ucsusa.org/EVavailability

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