A CLOSER LOOK: EPRI RESEARCH IN ACTION

TACKLING THE BARRIERS TO WIDE-SCALE EV ADOPTION

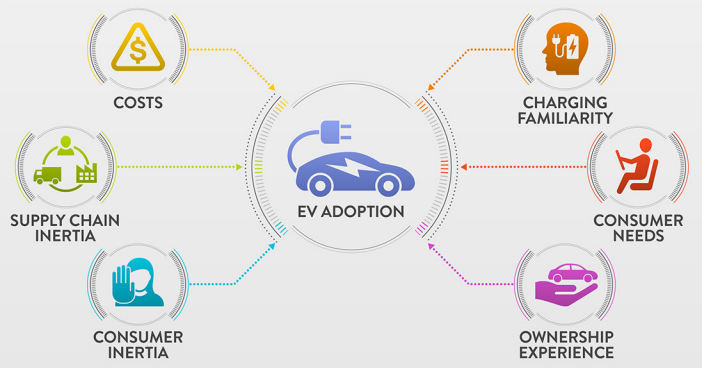
There's no shortage of forecasts about the growth of the global and national electric vehicle (EV) markets. For example, the research firm Wood Mackenzie projects EVs will make up nearly 40 percent of worldwide vehicle sales by 2040. Bloomberg forecasts that the acceleration of EV sales in the U.S. could happen even faster, with EVs accounting for one-fourth of all new car sales by 2025.

It can be tempting to believe that the economic, performance and environmental benefits of electric vehicles (EVs) are enough to ensure their wide-scale adoption. Indeed, American drivers frustrated with high and volatile gas prices could reasonably be expected to pursue EVs with an approximate fueling cost of $1 per gallon. A quieter ride, lower maintenance costs and the potential to use an EV to keep the lights on during a power outage also seem like powerful reasons for drivers to make the switch to electric cars and trucks.

Many drivers already are switching to electric to avoid high gas prices and to enjoy lower maintenance expenses and a quieter ride. In fact, close to 200,000 battery-powered EVs were sold in the second quarter of 2022, a record number and an increase of over 66 percent from the previous year. Plenty of other projections expect EVs to make up a growing share of vehicle sales, and most auto executives are convinced that over half of new cars sold by 2030 will be electric.

MASS EV ADOPTION IS NOT INEVITABLE

While there is clearly ample reason for optimism that the myriad economic, policy, performance and environmental drivers will result in significant consumer adoption of EVs, significant barriers still remain. According to one analysis, sales of EVs will account for about 30 percent of new car sales in 2030. This is well below the federal government's target that EVs represent 50 percent of new vehicle sales by 2030. Achieving that goal that is an instrumental part of the Biden administration's target to reduce greenhouse gas emissions 50 percent by the same year.



EPRI recently initiated a project to better understand the systemic challenges preventing an even larger percentage of consumers purchasing EVs – barriers that limit the ability to achieve important societal goals. As part of its analysis, EPRI determined that EVs are still in a relatively early stage on the product adoption curve. In

other words, it's primarily buyers willing to take a "risk" who seek out EVs. These buyers are known as innovators and early adopters.

MOVING FROM INNOVATORS AND EARLY ADOPTERS TO THE MAINSTREAM

Enticing drivers who are more skeptical about EVs to consider them the next time they purchase a vehicle requires understanding and addressing the most common and meaningful consumer barriers. EPRI reviewed existing research and interviewed subject matter experts in both the power and automotive industry to identify six categories of consumer barriers. These categories are meant to highlight the root causes of consumer hesitance to consider and purchase an EV, rather than broad adoption hurdles, like vehicle cost, driving range and variety.

The six adoption barrier categories are:

- ***Charging Familiarity.*** Drivers who lack confidence that charging an EV will be easy and readily available wherever they travel are unlikely to purchase an electric car or truck. Today, 78 percent of Americans believe that finding a charging station is difficult. In addition, home based charging may not be viable for drivers who live in apartments, condos or other housing situations where it's difficult to charge at home. There appears to be an opportunity to educate potential EV drivers about charging availability at home and on the road as well as charging times and equipment and infrastructure requirements.
- ***Consumer Needs.*** Drivers want specific features, capabilities and aesthetics in the vehicles they buy. Today, though, many consumers express frustration both that the EVs with the features they seek are not available and that the process of purchasing an EV is overly complicated.
- ***Ownership Experience.*** Owning an EV introduces a host of new experiences and decisions that are novel to new EV owners. From developing a practical understanding of how much range an EV actually has (and whether it's different from what is advertised) to where to find public charging to maintenance and repair needs, EV ownership involves a level of change that can potentially deter purchases. Given that many EV purchasers will own their vehicle for several years, these owners' perceived experience during this long period of time must be positive to increase EV adoption.
- ***Consumer Inertia.*** Some customers have a tendency to buy or continue buying a familiar product, even when superior options exist. Most people are slow to change. That is especially true when the change involves swapping out the vehicle they use to drive to work or school. Overcoming this inertia and resistance to change will require deeper understanding of vehicle buying behaviors.
- ***Supply Chain Inertia.*** It is a major undertaking to retool, reinvest and refocus the multi-trillion dollar vehicle supply chain. To produce enough EVs to meet demand, manufacturers will have to reinvent much of their supply chain and production process.
- ***Costs.*** The first wave of EV buyers tended to be wealthier and less concerned with the higher upfront cost of electric cars and trucks. But costs are a high priority for most vehicle buyers. While studies have demonstrated that the average total cost of owning an EV is lower than a gasoline-powered vehicle, the fact that EVs still have a higher upfront cost deters some drivers from considering them.

FUTURE RESEARCH

The aim of EPRI's research into EV adoption challenges is to provide actionable information that informs the utility industry and stakeholders of priorities and opportunities to expand the appeal of EVs to a broader audience and realize the many societal benefits of electric transportation. As part of that effort, EPRI will release six white papers, with each focused on one of the barrier categories. The papers will outline the causes of each of the barrier categories and identify future research priorities to tackle them in collaboration with industry partners.

ADDITIONAL EPRI RESOURCES

Electric Transportation Overview: State of the Market, Lessons Learned, and a Look Ahead, January 2020 (3002017822)

Identifying Likely Electric Vehicle Adopters, December 2019 (3002017550)

The Impact of Incentives on Electric Vehicle Adoption: National Average Results, December 2019, (3002017549)

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