Data Story

Xiyu Zhang

In recent years, electric vehicle sales are continually breaking records. According to a recent International Energy Agency (IEA) report, one in every seven passenger cars bought globally in 2022 was an EV. Electric vehicles (EVs) are generally seen as vital to decarbonize road transport. However, despite the strong increase in the sales of electric vehicles, it is not enough to offset the emissions from conventional fleets, mainly from hot-selling sports utility vehicles (SUVs), according to a project of IEA. Time is limited, and the window for reaching the goal of net zero is closing quickly. It is urgent to accelerate the deployment of electric and zero-emission vehicles.

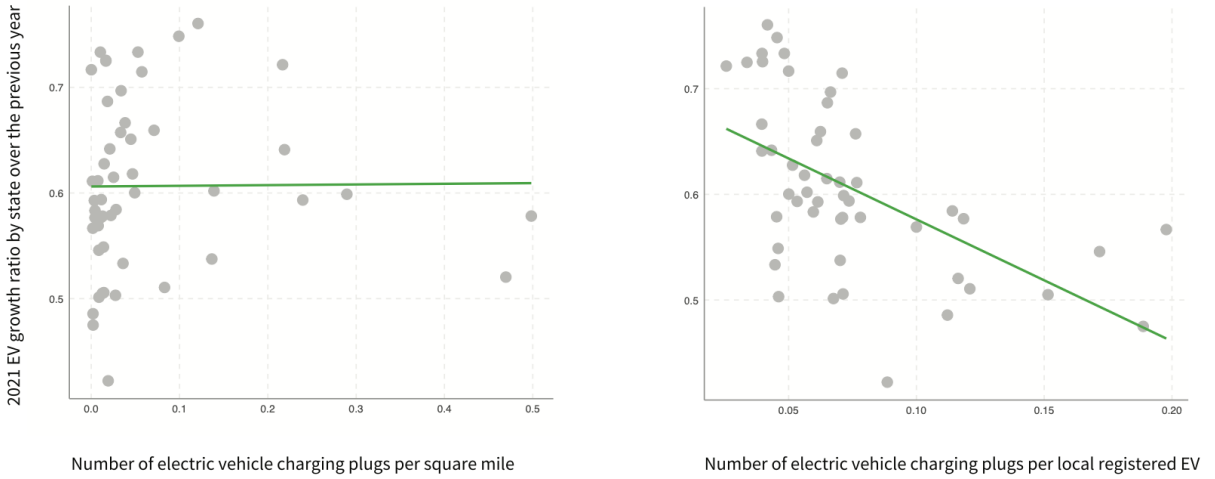
In the past decades, plenty of supportive investments and policies have been implied in key markets to stimulate the sale of EVs, and many of them were proven efficient. The United States market is no exception. Among the most noteworthy and most recent policies accelerating EVs in the US is the National Electric Vehicle Infrastructure (NEVI) Formula Program, authorized under the Bipartisan Infrastructure Law (BIL), aiming to build a nationwide network of 500,000 electric vehicle charging stations (EVCS) by 2030. It is widely believed that the more EV charging posts are built, the more people will be motivated to buy EVs. Many stories in the news media match this inherent impression. “More people want to buy an electric car, but they have concerns about power,” reported by WYPR News, John Lee, demonstrating the impediment for Maryland to move to all electric vehicle sales is people’s worries about being powerless. This state has an ambition that only electric vehicles will be sold in the state by 2035.

However, some most updated data of 2021 tell a different story.

We sought to examine the relationship between the growth of electric vehicles in each state in 2021 and the density of electric vehicle charging plugs in each state's charging facilities. The following figure shows two regressions based on two scatter plots. There are two widely used definitions of “density of electric vehicle charging plugs”, also called chargers, in relative literature. One calculates the number of EV charging plugs per unit area, and the other calculates the local average number of EV charging plugs per registered electric vehicle.

No significant positive correlation between EV growth and the density of electric vehicle charging plugs

Electric vehicle increase statistics, 2021

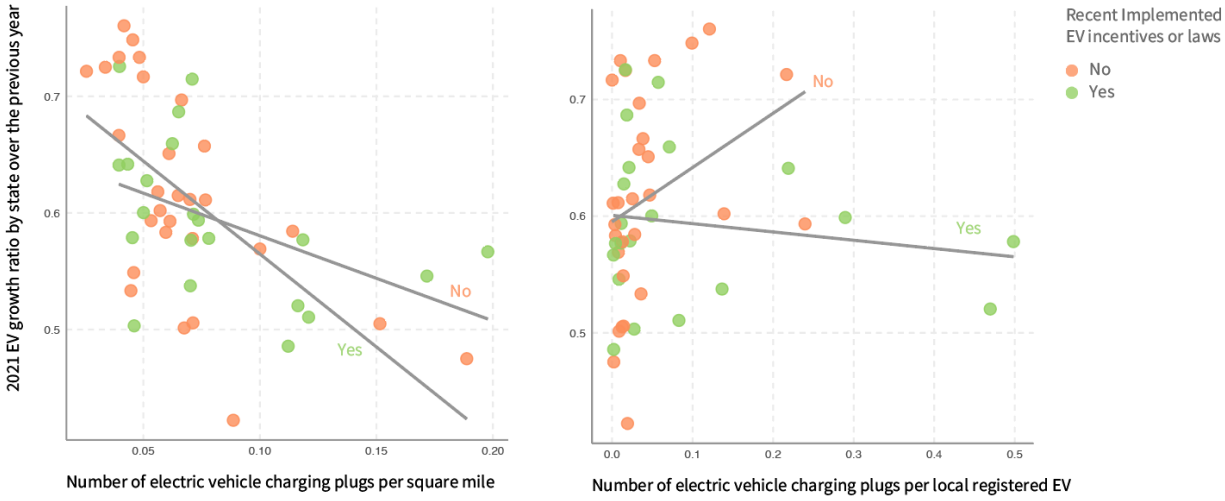


Source: Alternative Fuel Data Center: Alternative Fuel Stations, EV registration

In fact, numerous factors influence a resident's decision to choose an electric vehicle over a conventional one. Merely expanding the number of electric vehicle chargers available may not necessarily stimulate the sale of electric vehicles. The demographics of the local population, the travel characteristics of the local population, and policy scenarios are just as important as the ease of access to EV charging stations in determining EV sales.

Only in states that have not yet implemented pro-electric vehicle policies,
the increase in EV chargers is positively correlated with the growth in the number of EVs

Electric vehicle increase statistics, 2021



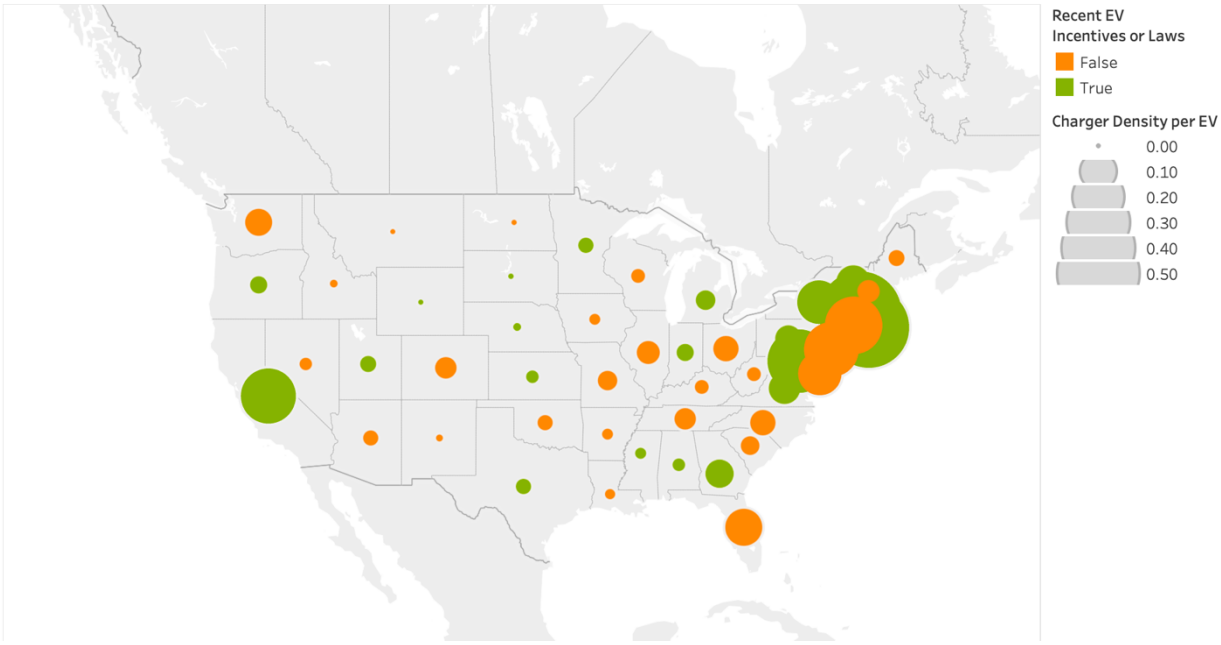
Source: Alternative Fuel Data Center: Alternative Fuel Stations, EV registration, Laws and Incentives

This visualization demonstrates that generally, states without recent policy encouragement benefit from constructing more EV chargers.

The reason behind the inadequate impact of expanding electric vehicle charging stations could be attributed to the fact that states that have already implemented EV incentives have more abundant EV charging posts. Consequently, there are already more charging plugs available for each electric vehicle, resulting in a lower possibility of residents experiencing power shortages. In such circumstances, the development of new EV charging facilities provides little motivation for residents to opt for electric vehicles.

In states with EV incentives, EV charging posts are more plentiful

Ratio of electric vehicle charging posts to electric vehicle ownership by state in the United States, 2021



Maryland is one of the states that has implemented an electric vehicle incentive. Whether building EV charging stations is the first thing to stimulate EV consumption in Maryland should be further tested, rather than taken for granted as correct knowledge.