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More Public Charging Infrastructure Alone Will Not Increase Electric Vehicle Sales

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Issue

Plug-in electric vehicles (PEVs), including battery electric vehicles and plug-in hybrid electric vehicles, are an important technology for decarbonizing transportation and reducing urban air pollution. A lack of public charging infrastructure is frequently cited as a primary barrier to continued, widespread PEV market growth. Public and private stakeholders are investing in public charging infrastructure, in part because they hope the presence of more infrastructure will encourage consumers to purchase PEVs. However, public charging infrastructure can only affect PEV sales if people—especially those who are not already PEV owners—see it, and by seeing it become more likely to consider purchasing a PEV.

Researchers at UC Davis examined this relationship. They used data from a survey administered in the first quarter of 2021 of approximately 3,000 California car-owning residents, as well as data on PEV registrations and public charger locations. They modeled the relationships between multiple variables (Figure 1).

Key Research Findings

There is no relationship between public charging location density and participants' reporting whether they see public charging, at least within the current range of charging location densities (Figure 1, paths 1 and 2). The number of public charging locations per capita in each participant's home ZIP code is not associated with either participants having seen PEV charging "in the parking lots and facilities [they] use" or whether they've considered a PEV for their household. However, participants living in regions with more PEV registrations per capita are more likely to report seeing charging stations (Figure 1, path 3). There is no relationship between PEV registrations per capita and PEV purchase consideration (Figure 1, path 4).

There is no relationship between whether study participants reported seeing public charging locations and whether they considered purchasing a PEV (Figure 1, path 5). Rather, participants' prior engagement with PEVs, such as information gathering or having conversations with PEV owners, is associated with their consideration of purchasing a PEV (Figure 1, path 6).

Interest in PEVs leads to seeing public charging locations, not the other way around (Figure 1, path 7). As prior awareness, knowledge, and assessment of PEVs do not depend on the density of charging stations near people's homes, the presence of charging infrastructure may not be creating interest in PEVs.

Though the relationship between charging infrastructure and PEV sales is modeled in a way that does not specify which one causes the other, PEV sales may be leading PEV infrastructure development (Figure 1, path 8). This is an inference consistent with the analysis but would need to be confirmed in a study considering changes in PEV infrastructure and sales over time rather than differences at one point in time.

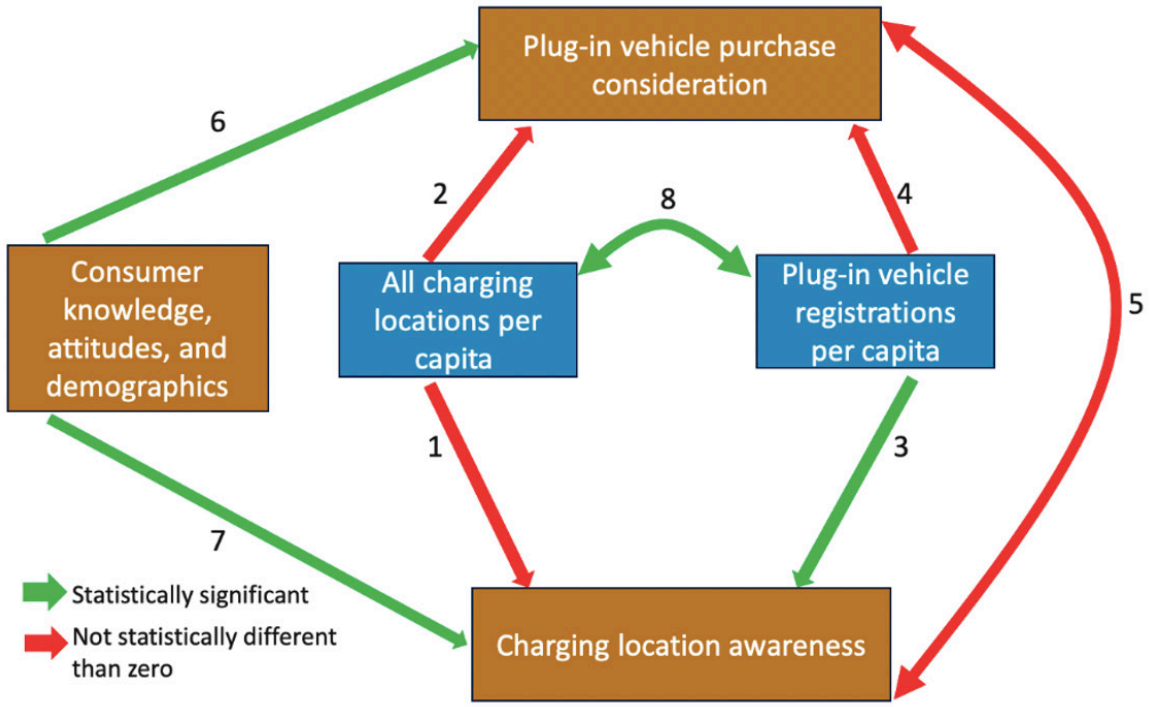

Figure 1. Model framework relating participants and whether they see PEV charging and have considered acquiring a battery electric vehicle to differences in the density of PEV sales and charging locations. Numbered paths refer to the order of presentation of results. Brown boxes refer to variables associated with participants. Blue boxes refer to exogenous variables.

Policy Implications

While more charging infrastructure is needed to support the transition to PEVs, this research indicates that the increasing presence of infrastructure, per se, does not translate to more people considering acquiring PEVs. Rather, increasing interest in PEVs is a prerequisite to more people seeing public charging. Further research should explore the effectiveness of broad engagement strategies, such as commercial and social marketing and social movements.

More Information

This policy brief is drawn from the report "Understanding the Impact of Charging Infrastructure on the Consideration to Purchase an Electric Vehicle in California," prepared by Kelly Hoogland, Kenneth S. Kurani, Scott Hardman, Debapriya Chakraborty, and Adam Davis of the University of California, Davis. The full report can be found here: https://www.ucits.org/research-project/2021-34/.

For more information about the findings presented in this brief, contact Kelly Hoogland at kmhoogland@ucdavis.edu or Ken Kurani at knkurani@ucdavis.edu.

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