

# Charging stations for electric vehicles boost spending at nearby businesses, study finds

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Charging stations for electric vehicles are essential for cleaning up the transportation sector. A new study by MIT researchers suggests they're good for business, too.

The study found that, in California, opening a charging station boosted annual spending at each nearby business by an average of about \$1,500 in 2019 and about \$400 between January 2021 and June 2023. The

spending bump amounts to thousands of extra dollars annually for nearby businesses, with the increase particularly pronounced for businesses in underresourced areas.

The study's authors hope the research paints a more holistic picture of the benefits of EV charging stations, beyond environmental factors.

"These increases are equal to a significant chunk of the cost of installing an EV charger, and I hope this study sheds light on these [economic benefits](#)," says lead author Yunhan Zheng MCP '21, SM '21, Ph.D. '24, a postdoc at the Singapore-MIT Alliance for Research and Technology (SMART). "The findings could also diversify the income stream for charger providers and site hosts, and lead to more informed business models for EV charging stations."

Zheng's co-authors on the paper, which was [published](#) today in *Nature Communications*, are David Keith, a senior lecturer at the MIT Sloan School of Management; Jinhua Zhao, an MIT professor of cities and transportation; and alumni Shenhao Wang MCP '17, SM '17, Ph.D. '20 and Mi Diao MCP '06, Ph.D. '10.

## Understanding the EV effect

Increasing the number of electric vehicle charging stations is seen as a key prerequisite for the transition to a cleaner, electrified transportation sector. As such, the 2021 U.S. Infrastructure Investment and Jobs Act committed \$7.5 billion to build a national network of public electric vehicle chargers across the U.S.

But a large amount of private investment will also be needed to make charging stations ubiquitous.

"The U.S. is investing a lot in EV chargers and really encouraging EV

adoption, but many EV charging providers can't make enough money at this stage, and getting to profitability is a major challenge," Zheng says.

EV advocates have long argued that the presence of charging stations brings economic benefits to surrounding communities, but Zheng says previous studies on their impact relied on surveys or were small-scale. Her team of collaborators wanted to make advocates' claims more empirical.

For their study, the researchers collected data from over 4,000 charging stations in California and 140,000 businesses, relying on anonymized credit and debit card transactions to measure changes in consumer spending. The researchers used data from 2019 through June of 2023, skipping the year 2020 to minimize the impact of the pandemic.

To judge whether charging stations caused customer spending increases, the researchers compared data from businesses within 500 meters of new charging stations before and after their installation. They also analyzed transactions from similar businesses in the same time frame that weren't near charging stations.



Locations of EVCS in California and locations of treated and control points of interest (POIs) in Downtown San Francisco and Downtown Los Angeles. Credit: *Nature Communications* (2024). DOI: 10.1038/s41467-024-51554-9

## Supercharging nearby businesses

The researchers found that installing a charging station boosted annual spending at nearby establishments by an average of 1.4 percent in 2019 and 0.8 percent from January 2021 to June 2023.

While that might sound like a small amount per business, it amounts to thousands of dollars in overall [consumer spending](#) increases. Specifically, those percentages translate to almost \$23,000 in cumulative spending increases in 2019 and about \$3,400 per year from 2021 through June 2023.

Zheng says the decline in spending increases over the two time periods might be due to a saturation of EV chargers, leading to lower utilization, as well as an overall decrease in spending per business after the COVID-19 pandemic and a reduced number of businesses served by each EV charging station in the second period. Despite this decline, the annual impact of a charging station on all its surrounding businesses would still cover approximately 11.2 percent of the average infrastructure and installation cost of a standard charging station.

Through both time frames, the spending increases were highest for businesses within about a football field's distance from the new stations. They were also significant for businesses in disadvantaged and low-income areas, as designated by California and the Justice40 Initiative.

"The positive impacts of EV charging stations on businesses are not constrained solely to some high-income neighborhoods," Wang says. "It highlights the importance for policymakers to develop EV charging stations in marginalized areas, because they not only foster a cleaner environment, but also serve as a catalyst for enhancing economic vitality."

Zheng believes the findings hold a lesson for [charging station](#) developers seeking to improve the profitability of their projects.

"The joint gas station and convenience store [business](#) model could also be adopted to EV charging stations," Zheng says. "Traditionally, many gas stations are affiliated with retail store chains, which enables owners to both sell fuel and attract customers to diversify their revenue stream. EV charging providers could consider a similar approach to internalize the positive impact of EV charging stations."

Zheng also says the findings could support the creation of new funding models for charging stations, such as multiple businesses sharing the



costs of construction so they can all benefit from the added spending.

Those changes could accelerate the creation of charging networks, but Zheng cautions that further research is needed to understand how much the study's findings can be extrapolated to other areas. She encourages other researchers to study the economic effects of charging stations and hopes future research includes states beyond California and even other countries.

"A huge number of studies have focused on retail sales effects from traditional transportation infrastructure, such as rail and subway stations, bus stops, and street configurations," Zhao says. "This research provides evidence for an important, emerging piece of transportation infrastructure and shows a consistently positive effect on local businesses, paving the way for future research in this area."

**More information:** Yunhan Zheng et al, Effects of electric vehicle charging stations on the economic vitality of local businesses, *Nature Communications* (2024). [DOI: 10.1038/s41467-024-51554-9](https://doi.org/10.1038/s41467-024-51554-9)

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