

PAS QUICKNOTES

Electric Vehicle Charging Stations

After years of false starts, the time of electric vehicles (EVs) has finally arrived. Advancements in battery storage and vehicle range, lower prices, and federal investments and incentives are helping to pave the way for the mainstreaming of EVs. The rapid deployment of EV charging infrastructure is essential to maintaining this momentum.

To help realize the wider benefits of EV adoption, especially the promised reductions in greenhouse gas emissions and other harmful forms of pollution associated with fossil fuels, it is essential for planners to understand the evolving state of EV charging stations and how to maximize their benefits at the local level.

BACKGROUND

While battery-powered cars are nearly as old as cars themselves, widespread adoption of EVs has been elusive. EVs depend on the availability of widespread charging infrastructure, just like gas-powered vehicles depend on the availability of gas stations. But without a critical mass of EVs already on the road, there is little incentive to build charging stations. "Range anxiety," a driver's concern that their EV may run out of power, has long been a limiting factor in wider-scale EV adoption. A few notable shifts, however, may be spelling an end to this dynamic.

Though the cost of an EV is still high compared to traditional cars, falling prices combined with federal and state incentives have helped to grow market share considerably. The [National Electric Vehicle Infrastructure \(NEVI\) Formula Program](#), established under President Biden's Infrastructure Investment and Jobs Act, has [committed \\$5 billion](#) for states to build out charging infrastructure along the interstate highway system and in disadvantaged communities. These developments, coupled with significant technological advancements in battery storage and charging speed as well as multibillion-dollar carmaker commitments and investments in EVs, all point to a future in which charging stations are ubiquitous across the country. Planners can play a role in helping to grow this network in ways that benefit their communities.

CHARGING STATION TYPES

[EV charging infrastructure](#) comes in three types: Level One, Level Two, and Level Three. Level One charging, by far the most common type, requires nothing more than standard 120-volt power. This enables EVs to be charged at home, though the process is slow; it can take more than 24 hours to fully charge a depleted battery. However, topping up the battery overnight is more than enough for the roughly 39-mile-per-day average driven by most Americans.

Limited electrical upgrades at home allow for Level Two charging, which uses 240-volt power. Its specialized equipment adds to overall cost but can cut charging time by 50 percent or more, improving convenience. This is the most common charging station encountered in parking garages, parking lots, workplaces, and other [public locations](#). Both Level One and Level Two charging can be built or retrofitted into existing public or private space, which makes them well suited for incidental charging while parked at a store or restaurant, at work, or while sleeping at home.

Level Three charging can fill an empty battery in about 30 minutes. It is far more expensive to install and operate than Levels One and Two and is more likely to be built as dedicated infrastructure, similar to a traditional gas station.

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EV charging station on a college campus in San Luis Obispo, California. Credit: Swalls/iStock/Gettyimages.com.



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Creating Great Communities for All

Planners should consider how to best implement these charging stations in the local built environment. What are the zoning or siting implications for at-home or public charging infrastructure? How might the longer time to charge an EV lead to potential issues of site access for publicly accessible charging stations? Given the growth in EVs, there may soon be far more demand for charging stations in convenient places. How can planners balance this increasing demand fairly and equitably with the needs of others?

DISTRIBUTION AND EQUITY

Ensuring the equitable distribution of charging stations while mitigating any potential issues of siting and design are two of the most critical challenges as EVs hit the mainstream. Currently, adoption rates for EVs and the availability of Level Two or Three charging stations are [far lower in rural areas than in urban and suburban locations](#), and the distribution and accessibility of charging stations are important considerations. People who don't live in single-family homes or lack a driveway or garage likely won't have the opportunity to charge at home and may have to rely on public or workplace charging stations, which tend to be located in or near affluent and primarily white neighborhoods. This dynamic can lead to "[charging deserts](#)," particularly in Black and Latino communities. For residents of these areas, this will add additional barriers to EV adoption as well as increasingly disproportionate exposure to air pollution from gasoline-powered vehicles.

With significant federal funding recently dedicated to expanding charging station infrastructure in both rural and urban areas, planners should play a major role at the local level in working to ensure charging stations are equitably distributed and accessible to all.

TECHNOLOGICAL CHANGE AND DISRUPTION

As an emerging market, the technology of EVs and charging stations is changing rapidly. Given the significant technological advancements happening in battery storage, charging speeds, and vehicle range, there is potential for on-the-ground investments in charging infrastructure to become quickly outdated. The increasingly strident role played by a few large players in the EV field, particularly Tesla, may also lead to significant local challenges. Gas stations tend to be independently franchised and serve all kinds of gasoline-powered vehicles. Tesla charging stations, by contrast, are exclusive to owners of Tesla vehicles (unless other users purchase an adapter). Such proprietary charging technology, while initially helping to grow the industry as a whole, has led to questions regarding the role of the private sector in the public realm. Given the growth potential for EVs, there are also major implications for the future of gas stations in communities across the United States. What might happen to these sites, and the people who work there, is an open question.

Planners should stay engaged in the mainstreaming of EVs generally, and the development of charging stations specifically. Planners are particularly well positioned to observe trends related to charging station deployment and EV adoption at the local level, particularly as new technology comes on the market, which can inform the development of local plans and codes.

CONCLUSION

While the deployment of charging infrastructure will have its challenges, the benefits of widespread EV adoption to climate and environmental outcomes are clear. Planners should work to ensure that charging stations are deployed fairly and equitably across communities now and into the future.

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FURTHER READING

Published by the American Planning Association

APA Learn. 2021. "[Come Down to Electric Avenue](#)."

Vock, Daniel. 2021. "[Electric Vehicles Are on the Rise. Is Your Community Ready?](#)" *Planning*, July 1.

Other Resources

California Governor's Office of Business and Economic Development. 2019. [Electric Vehicle Charging Station Permitting Guidebook](#). July.

New Jersey Dept of Environment Protection. 2022. [Charge Up Your Town: Best Management Practices to Ensure Your Town is EV Ready](#). February.

New York State Energy Research and Development Authority. 2022. [Charge NY: Charge Electric Best Practice Guides and Cases](#).

U.S. Department of Transportation. 2022. [National Electric Vehicle Infrastructure Formula Program—Minimum Standards for EV Charging Station Projects](#) (23 CFR Part 680).