

# The California City Embracing the Future of EVs

By Taylor Kim, AIA, LEED AP

**H**OME TO ELECTRIC VEHICLE (EV) PIONEER TESLA, it is no surprise that the city of Palo Alto, Calif., leads the nation in electric vehicle sales at nearly 30 percent of new cars sold. As the city has embraced this technology and its role as an EV ambassador, it has enacted some of the most robust EV parking requirements in the country.

In 2014, Palo Alto established itself as a pioneer of EV legislation when it passed a first-of-its-kind law that required new homes, apartments, office buildings, and hotels to be wired for EV charging. To encourage adoption, the city offered a variety of incentives such as free EV charging; a \$30,000 rebate to offices and residential complexes that install chargers; and a streamlined permit process for residential EV parking. The city's current goal is to have 6,000 residential EVs by 2020 and 19,000 by 2030. This proactive legislation has proven remarkably successful; Palo Alto's EV charging spaces are currently at around 40 percent occupancy.

## The Cost

Providing this much EV infrastructure comes at a high cost. According to the U.S. Department of Energy, a single level 2 charging station—Palo Alto's standard—can cost up to \$65,000 with an additional \$12,700 for installation. EV charging points also lead to an increase in electricity demand; Palo Alto projects a 6 to 7 percent increase when EVs dominate the automobile market. However, when this infrastructure is included during initial construction versus a future retrofit, much of the cost can be mitigated.

Armed with this knowledge, when Palo Alto needed more public parking to support a new public safety building planned for downtown, the city saw an opportunity to invest in the electrical future they wished to achieve. When the new California Avenue parking structure opens in 2020, 25 percent of the 630 parking spaces will be wired for EV charging, with 5 percent, or 32 spaces, accessible on its first day of

operation. The remaining 125 spaces will have wiring in place so that charging stations can be installed in the future.

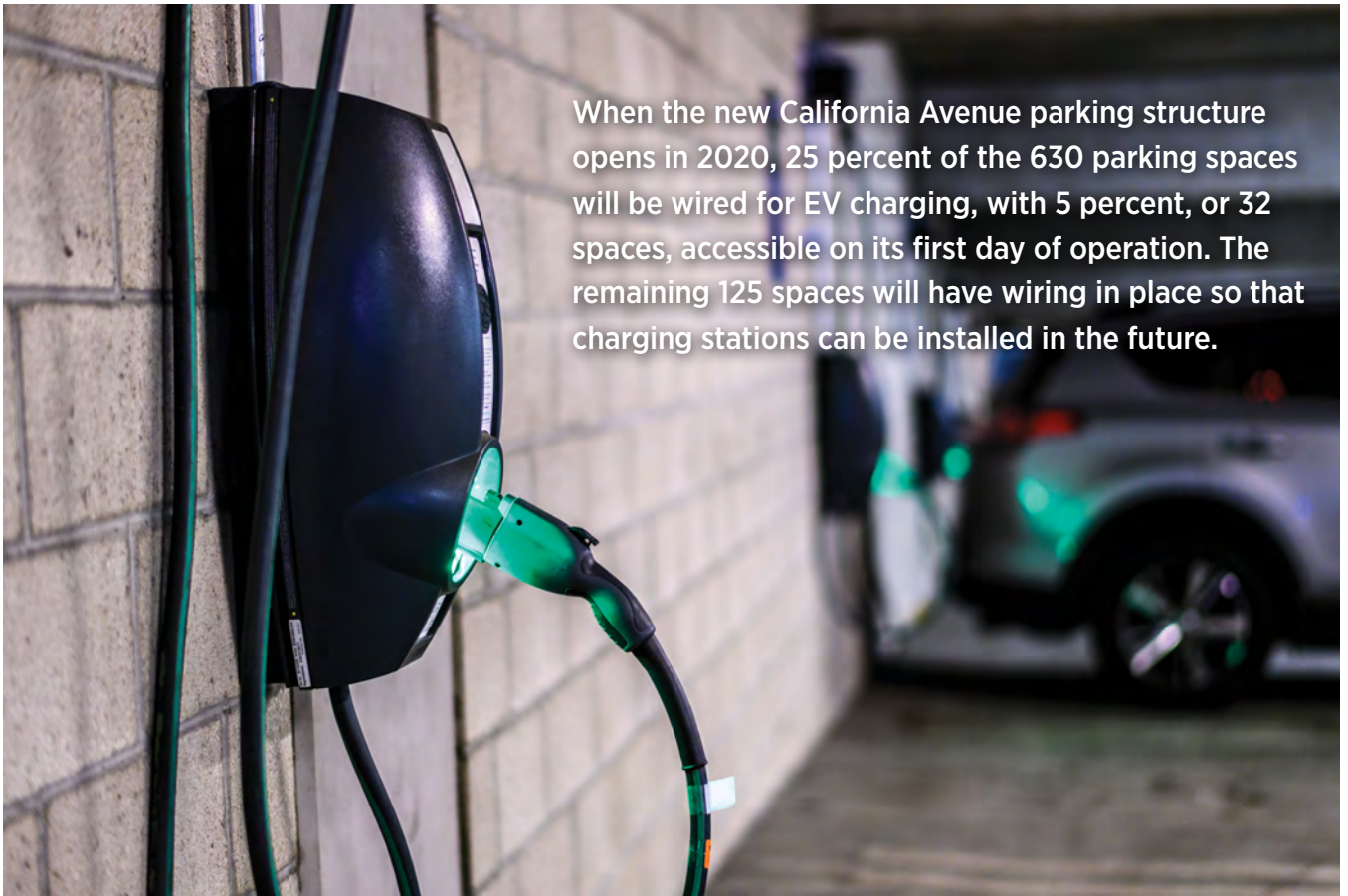
## Challenges

Such ambitious EV requirements pose unique design challenges to accommodate the increase in both electrical capacity and load. The transformer at the California Avenue Garage had to be upsized to be able to accommodate chargers for 125 future EV spaces. To lessen the overall power demand, 95 percent of the EV spaces in the facility will use power-sharing dual chargers. When two cars are plugged into a dual charger, each will receive 50 percent power, which will decrease the electrical requirements by almost half of that used by single chargers.

Providing sufficient EV accessibility requires careful consideration as well. The Americans with Disabilities Act (ADA) does not provide a national standard when it comes to EV, but the state of California has stringent requirements when it comes to EV accessibility. For the California Avenue Garage, this means the number of required EV accessible charging spaces is calculated based on the facility's total number of charging stations rather than the total number of accessible spaces, increasing the number of accessible spaces required. Providing the additional spaces and clearances to accommodate this can in turn affect the overall stall count and efficiency.

## Looking Ahead

As demand for EV charging continues to increase, efficient utilization of charging infrastructure will become



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more and more important. Cars that monopolize spaces long after they are done charging mean less charging for others who need it. For example, when someone parks in an EV charging space on an office campus, that person isn't likely to move his or her car when it is finished charging so someone else can use the space. That means a single space may only charge one car throughout the workday. To address this, some Palo Alto office campuses, such as Facebook, use EV valets who unplug a car once it is fully charged and move the cable to the next car.

Such adaptations are critical to the development of EV infrastructure and important to bear in mind when considering the projected future of EVs in the United States. While EV sales currently make up only 2 percent of the national market share, by 2025 that number is expected to increase to 7 percent, with around 1.1 million EVs sold. Other automakers are also hopping on the EV bandwagon. According to Bloomberg, the number of EV models on the market is predicted to double by 2022. Palo Alto's accomplishments and dedication to promoting EVs and providing EV infrastructure can help us better understand how to prepare for an electrified future. ◆



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