

## **Electric vehicles gradually spark Valley interest. Will powering up be a problem?**

By Tim Sheehan

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There are fewer than 5,000 automobiles in Fresno, Kings, Madera and Tulare counties that are powered primarily by electricity – either battery-electric or plug-in hybrid vehicles that get their charge from a cord and an outlet rather than a hose and a gas pump.

And despite what auto dealers say is growing popularity among customers, such electric vehicles account for less than half of one percent of all cars and trucks on the road in the Valley. If demand continues to grow, however, researchers say their numbers could put increasing strain on a limited infrastructure of public charging stations at which drivers can power up their batteries – and potentially have consequences for the state's power grid.

“California's public charging stations are primarily located around major traffic corridors or highways, or where there is a high PEV (plug-in electric vehicle) density,” Lawrence Berkeley National Laboratory scientists Anand Gopal and Julia Szinai wrote in an analysis released Thursday. “However, public charging station construction has not kept pace with the existing and expected magnitude of PEV deployment across the state. This shortage of charging stations threatens to become a critical bottleneck to mass adoption of PEVs....”

California has almost 30.6 million registered cars and trucks; of that, about 342,000 are battery-electric or plug-in hybrid vehicles, according to Jan. 1 registration figures from the Department of Motor Vehicles. But aside from owners who may have charging systems installed at their homes, there are fewer than 4,500 public charging stations across the state with about 16,000 charging outlets. That's not going to be enough, Gopal and Szinai wrote in the report produced for Next 10, a nonpartisan policy organization.

Earlier this year, Gov. Jerry Brown set an ambitious goal for California to have 5 million zero-emission vehicles – such as electric-powered vehicles – on the state's roads by 2030. The researchers cited a California Energy Commission estimate that “by 2025 the state will need 99,000 to 133,000 public/workplace chargers and 9,000 to 25,000 fast chargers to support the number of expected PEVs on the road.”

The modest numbers of electric vehicles in the four-county Valley region likely means it could be a while before the charging infrastructure here is stretched thin. The U.S. Department of Energy's Alternative Fuels Data Center reports there are 73 public charging locations, offering 179 plug outlets in the Valley. So far, that seems to be sufficient for the 4,973 electric cars and SUVs registered in the Valley, along with those passing through the region on Highway 99, Interstate 5 and other state highways.

Brett Hedrick, owner/general manager of Hedrick Chevrolet in Clovis, said his dealership is seeing greater interest among customers in plug-in cars, whether purely electric or plug-in hybrids that have a gasoline engine as a backup.

“It's one of those things that's becoming popular, especially as the range gets better,” Hedrick said. Chevrolet's Bolt, a plug-in, battery-only car with a range of about 230 miles, and the Volt, which has gasoline power as a backup to extend its 50-mile electric range, “are both selling pretty well for us.”

“What happened with the Volt is that it came into the market (in 2011) and people were unsure about it,” Hedrick said of “range anxiety,” or customer fears of being stranded if their car battery ran out of juice. Because hybrids have both electric and gas, “you never get stuck anywhere.”

With battery-only cars, “you have to plan your trip, because you can only go so far. Those are the kinds of things that people had to get used to,” Hedrick added. “As people became more sure, more people sought to try that kind of (electric vehicle) life.”

Hedrick predicted that as more public chargers are installed in the region, even more Valley drivers will convert to electric vehicles. “The church next door is putting in chargers and those will be available to the public,” he said.

In a telephone interview, Gopal explained it this way: “People are affected both psychologically and in real terms by the lack of charging infrastructure. We live in a world of gas stations which we take entirely for

granted. When we buy a car, we don't even think about where we're going to fill up; we know it's just going to be there.

"The public is not quite at that stage yet for electric vehicles yet," Gopal added. "We want to remove that barrier as quickly as possible" by providing a ready abundance of public charging stations.

Last year, the San Joaquin Valley Air Pollution Control District joined up with the Fresno County Rural Transit Agency to establish a network of free-to-use public charging stations in rural cities across Fresno County to increase their availability. That means that every incorporated city in the county now has at least one place to charge an electric car.

Not coincidentally, the numbers of electric vehicles in California are concentrated primarily in areas of the state where there are more charging stations. Hedrick said that makes sense because those areas are densely populated.

"It's a little bit different here in the Valley. We are more used to having our big vehicles, our big pickups here," Hedrick said, noting the heavy use of pickups by farmers and other agriculture-related businesses. "Nothing will spur it more than a gas price hike where it starts making sense" to make the conversion to electric.

Some makes of hybrid SUVs are on the market, and "all the manufacturers are looking at the improving battery technology," Hedrick added. "If it can be put into a pickup, I'm sure they've got that on the drawing board."

The costs of electricity, gasoline, diesel and other fuels – and the vehicles themselves – are all part of the equation when it comes to people deciding what kind of vehicle to buy.

The Alternative Fuels Data Center reports that if electricity costs 11 cents per kilowatt hour (kWh) and the vehicle consumes 34 kWh to travel 100 miles, the cost per mile is about 4 cents. At that cost for electricity, an all-electric vehicle with a range of 70 miles will cost about \$2.64 to fully recharge. "This is about the same as operating an average central air conditioner for about 6 hours," the federal center estimated.

Electric rates for most PG&E residential customers in the Valley, however, are higher – about 28 cents per kWh. At that rate, a full charge on a vehicle with a 70-mile range costs about \$6.72, or just under 10 cents per mile. In the meantime, the current average price for regular unleaded gasoline in Fresno is about \$3.60 per gallon. Just how that stacks up to an electric vehicle will depend on the energy efficiency of your vehicle, but if you get 30 miles per gallon, that works out to a fuel cost of 12 cents per mile.

Both the state and federal governments, as well as utilities and local air pollution agencies, offer incentives – tax credits or rebates – for customers who buy plug-in hybrid or other zero-emission vehicles, according to the federal Department of Energy. Those serve to reduce the effective cost to get into an electric car in the first place – and are another key, said Hedrick, to nudge buyers to plug-in vehicles.

Next 10 founder and businessman F. Noel Perry, who drives a Chevy Bolt, said Brown's 5-million-PEV goal is realistic. "The decrease in the price of batteries is going to be a big piece of being able to hit that, as well as the charging infrastructure," he said. "Those are the key characteristics of being able to achieve that goal.

Gopal agreed, adding that the California Energy Commission has predicted that there would be 3.9 million PEVs on the road by 2030 – even under business-as-usual conditions without additional encouragements or incentives.

If Californians make the switch to electric vehicles in the numbers expected by the state, what will that mean for electricity supplies?

Gopal said it shouldn't be a concern. "On the overall power grid system, 5 million is not going to be a problem whatsoever," he told The Bee.

It's when people charge their cars at home in the evening after a day of commuting that concerns policy analysts. "If people drive home and immediately plug in, that coincides with sunset," Gopal said. "As California is increasing the amount of solar power on the grid, that's increasing the load at the same time

that solar resources are falling in the evening. It's a problem for the ramping rate of demand on utilities while renewable generation is falling down."

If anything, it will be neighborhood distribution systems – power lines and transformers – that utilities will need to manage. "Those lines are the ones that are going to have a higher draw," Gopal said. If one family on a block buys an electric car, he said, human nature is other neighbors tend to follow suit. "The utilities need to have a plan to ensure there's enough capacity on those lines."