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# Charging Ahead on an Electric Highway

By BRADLEY BERMAN



**NEW ORDER** Charging the Tesla's battery at the Harris Ranch Supercharger station near Coalinga, Calif., took less time than a leisurely lunch stop.

Los Angeles

LAST Monday I drove the Model S, a full-size sedan recently introduced by Tesla, the California [electric-car](#) start-up, from Lake Tahoe to Los Angeles. I covered 531 miles and the drive took 11.5 hours, during which the car consumed zero gasoline and produced no tailpipe emissions.

My route, the first a Model S owner might take using Tesla Motors' network of so-called Superchargers, previewed a significant advance in the practicality of battery-electric cars. Tesla's string of strategically placed high-speed chargers made possible something that has not been available to American E.V. drivers: the ability to make a long-distance drive in a single day.

The Supercharger, Tesla's name for a proposed nationwide network of electric-car filling stations, outlines the most tangible blueprint so far of petroleum-free driving in the United States. "The one big holdout with most E.V.'s today is that you can't take a road trip," said J B Straubel, Tesla's chief technical officer. "What happens if I want to go across the country? I can't tell you how many times we get that question."

Tesla's answer is to install powerful charging stations — pumping electricity at 90 kilowatts, adding about 250 miles of range in an hour — at key locations between major cities. There's plenty of range for intracity travel. The goal of the charging network is to enable intercity journeys, eventually on a nationwide basis.

Before the end of October, the company plans to open its first charging locations to customers who have bought the Model S. Owners with the 85-kilowatt-hour battery, which comes equipped to use the Supercharger system (the fast-charge capability is optional on the 60 kilowatt-hour model) will receive free electric fuel for life at the stations.

Mr. Straubel said he saw the high-speed chargers as "the final piece of the whole technology suite" enabling Tesla to "take on an enormous part of the market we couldn't reach before."

My journey began at 6:55 a.m. at Kings Beach, Calif., elevation 6,000 feet, on Lake Tahoe's north shore. The 85-kilowatt-hour battery pack, which has an E.P.A.-rated range of 265 miles, was only three-quarters full when I left, but the Model S had no trouble with the 100 miles, much of it downhill, to the first charger in Folsom, Calif. When I arrived, the battery pack still held 40 percent of its capacity.

At 9:25 a.m. in Folsom I pulled the Model S close to the pedestal that carries the charging cable, which is only four feet long to ensure that it never falls to the ground and gets run over. The Supercharger itself, about the size and shape of a small refrigerator, sits 30 feet away. Plugging in was as easy as charging at home and simpler than using a gas pump.

On the Model S, the fast charger connects to a port hidden behind a door in the driver-side taillight — the same one used for lower-power refueling at home.

Amenities near the Folsom charger, as with other Tesla network locations, were not an obvious match for the automaker's upscale demographic. Tesla identified places close to chain restaurants, restrooms, Wi-Fi and motels.

Twenty-two minutes after plugging in, the charger had restored 100 miles of range in the Model S. It took another 20 minutes to add the next 50 miles because the rate of charging tapers down as the battery fills. Think of it as electrons having more difficulty squeezing into an increasingly crowded space. The smart strategy for fastest charging is to arrive at a destination with a nearly empty battery.

Another five minutes of charging brought the estimated range to 254 miles, enough to make it to the next stop, Coalinga. Tesla engineers advised holding

my speed to 70 miles per hour just to make sure. No restrictions were placed on air-conditioner use, though.

The Supercharger is clever in its construction. It starts with the same 10-kilowatt charger that is onboard every Model S. To build the Supercharger, the company strings together 12 of the same units, which were designed from the beginning as building blocks.

“It’s good modular engineering,” Mr. Straubel said. “We configured all the circuitry, the power and the communications so we can just stack them up.”

Each Supercharger can serve two cars, and most locations will have three units. With solar panels planned for many locations, operating costs are expected to remain low, perhaps explaining the free recharges.

My lunch stop at Harris Ranch, a hacienda-like restaurant, added 153 miles of range before my burger even arrived. So I cleared the charging spot for another Model S, a Tesla company vehicle that had joined the trip, and returned to lunch. With way more energy than I would need to reach the next station 115 miles away, I made up time by flying along with Interstate 5’s speedy traffic.

At 4:30 p.m., at the Lebec station — the first Tesla station to incorporate solar panels — I was content to add 117 miles of range in 25 minutes.

The final run to Tesla’s Southern California design center in Hawthorne was uneventful. I arrived at 6:30 p.m., almost 12 hours after leaving Tahoe. The Supercharger concept worked.

Driving a gas-powered car averaging 60 miles per hour, stopping one hour for lunch and twice for 15-minute rest stops, would have cut my travel time by one

hour. In my electric test car, if I had eaten my lunch on the go, the duration would have been much the same.

The transition from a day on the Interstates to an evening in Los Angeles, where a ceremony to introduce the Supercharger concept to a crowd of Tesla fans, was jarring.

After delivering a stilted, ad-libbed speech, Elon Musk, Tesla's chief executive, dropped the curtain from a glowing 40-foot object, apparently a charging location roadside sign, but unmistakably phallic in shape. I didn't see anything like it on my trip.

Let's hope that the cheap theatrics will fade, to be replaced by a more realistic image: thousands of E.V. owners on electric road trips, eating at highway fast-food restaurants and experiencing the open road like other Americans.