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## **BEHIND THE WHEEL/General Motors EV1, Toyota RAV4-EV, Honda EV Plus; Charge! Doing an Electric Commute**

By **ANDREW POLLACK**

A TURTLE icon suddenly lit up on the dashboard of my Toyota RAV4 Electric Vehicle. The car's batteries were exhausted and I had entered "limp home mode," which would allow me to putter along at a reduced speed for a few miles to make it back to a charger.

But instead of slowing down, the car stalled completely on a dark street a mile from my home. Panicked, I jumped out, pushed the car to the side of the road and began scrounging for coins to call a tow truck.

But after turning the car off for a few minutes and then restarting it, the RAV4-EV moved again, though for only another block before it stalled again. It took about 15 minutes of starting and stopping, including a heart-pounding dash across busy Wilshire Boulevard, to make it back to my garage.

Running out of charge is the worst nightmare for the driver of an electric car. There are few places for recharging, and you cannot walk to a service station and buy a can of charge to get you moving again. In this case, however, as part of my effort to assess the everyday practicality of three electric vehicles, I had ignored low-battery warnings for 20 miles and deliberately run down the batteries to see what would happen.

Southern California is the nation's test-bed for electric vehicles. Spurred by a state rule that will require 10 percent of the vehicles sold in the state to be emission-free starting in 2003, manufacturers have introduced several electric models. And a network of public charging stations, which would be the gas stations of the electric age, is beginning to sprout.

I spent four weeks using electric vehicles for all of my driving, with a few exceptions for distances beyond the cars' range. In addition to the Toyota, I sampled the General Motors EV1 and the Honda EV Plus.

So far, few of these cars have been leased. (Manufacturers, worried about the batteries' longevity, are generally offering the cars for lease rather than purchase.) G.M., the first to market in December 1996, had leased just 430 through the end of June. Honda, which is making its EV available in New York this month, has leased 177 in Southern California since the car's debut in May 1997. Toyota, having decided that EV's are not suited for general consumers, is leasing the car only to fleets, but on a nationwide basis. Since November it has received orders for 382.

Besides a limited driving range that makes it difficult to visit distant suburbs, the cars are expensive. The electric RAV4, for instance, leases for \$457 or sells for \$42,000. It has a top speed of 78 miles an hour and can travel about 100 miles on a charge. The conventional, gasoline-powered RAV4, which sells for about \$25,000, can go more than four times that far on a tank of gasoline, and at much higher speeds.

G.M.'s car leases for \$399 a month for three years, a steep price for a two-seater that goes 70 to 90 miles -- at most -- on a charge. (The price includes free towing to a charger if the need arises.) The Honda EV Plus, a four-seat hatchback that looks like a small minivan, leases for \$455 a month.

On top of those prices, one needs to have a charger installed at home. The construction required for that costs

\$800 or more.

Despite these drawbacks, the electric cars were perfectly suitable for commuting and moving around town for appointments. And they offer some advantages. The ride is quiet, and there is something nice about not having to go to gas stations -- one can just plug in the car at home for recharging overnight. The power I used was scarcely noticeable on my monthly electricity bills. I normally spend \$10 to \$15 a week on gasoline.

Driving an electric car is similar to using a gasoline-powered car, but there are differences. Turning on the car requires flicking a switch rather than igniting a spark and turning over the engine.

While Honda and Toyota still require drivers to turn a key, this is largely a nod to tradition. G.M. has done away with keys altogether. You unlock the doors and start the car by punching a numeric code onto keypads. In all the cars, the dashboard lights up -- but, eerily, there is no sound or vibration, making it hard to believe the car is running.

Driving is quiet as well, although a high-frequency whine from the motor rises in pitch during acceleration and falls during deceleration. The EV1 is quick, but the Honda and Toyota are sluggish.

Although Southern California is the nation's capital of electric vehicles, most people still have never seen one. I had driven only half a block in the G.M. EV1 when the driver behind me pulled alongside at a red light and asked, "What kind of car is that?" For the whole month I found myself being stared at and questioned.

This is especially true for the EV1, which looks like a space-age sports car with an unusual, tapered rear end. (Like the Honda, the EV1 does not share its body with any other vehicle.) By the time I got the RAV4-EV, which looks virtually the same as the regular RAV4, I was pining for some anonymity. But my hopes faded when I saw that Toyota had prominently labeled the car as an electric vehicle with big letters across the sides.

The lack of familiarity resulted in more than stares. Valet parking attendants, ubiquitous in Los Angeles, generally did not know how to handle these cars. I usually gave a quick lecture and hoped the attendant would remember enough to retrieve the car later. At one restaurant, the attendant listened to my explanation, got in the Honda and turned the key. After a few minutes, he said, "I'm sorry, I can't get it started." The car was actually on, but he could not hear it. At a hotel, the attendant listened to my explanation, then left the car parked in front.

I had a sense that driving range would be a problem when I got into my fully charged EV1 for the first time and saw on the dashboard readout that I had 36 miles left. While G.M. advertises a range of 70 to 90 miles, the computer in the car estimates the actual range based on how the car had been driven recently. After driving 9 miles to work, the range gauge still said 36 miles, some small comfort. But even after a week of conservative driving, the most I could get the gauge to read on a full charge was 42 miles.

I was so scared about wasting electricity that I wouldn't turn on the radio or use the electric windows. The G.M. car, the first to market, uses lead-acid batteries, but will get more efficient nickel-metal-hydride batteries this year. The Honda EV Plus and Toyota RAV4-EV already use those batteries. The Honda can typically go 60 to 80 miles; the Toyota gave me 103 miles before I entered limp-home mode. Both are four-seaters with more cargo space than the EV1; I felt more at ease using the air-conditioner in them.

But if G.M.'s car lacks range, the company has done more than the others to allow for recharging away from home, even providing a portable charger than can be plugged into a household outlet. More important, it subsidized the construction of 165 charging sites around Southern California, at places like airports, hotels and shopping centers. For now, the electricity is free.

I pulled in for a fill-up at a Ralphs supermarket one evening. Sure enough, just in front of the store, right next to the blue-striped handicapped parking area, were two choice parking spots painted green and marked for

EV's only. To my surprise, both spots were full -- but not with EV's. After all, why waste a good spot? Parking without authorization in a handicapped spot brings a big fine, but not so for spaces reserved for EV's. The people using these spots were equally astonished to see a real electric car show up in need of a battery charge.

When I finally got to the charger, I inserted its paddle into a slot in the front of the car and was told by an electronic readout that my batteries were 66 percent full and would require one hour and 15 minutes to charge fully. So I wandered inside the store and bought ice cream, cookies and other things I didn't need. (Now I see why Ralphs installed the chargers.) But after I killed 25 minutes shopping, the charger said another hour would still be required. I gave up.

Each vehicle uses a different charging system, which impedes the development of public charging stations. (Imagine if different brands of cars needed different gas stations.) Indeed, there is a Betamax-versus-VHS battle between the inductive charging favored by G.M. and Nissan and the conductive charging favored by Honda and Ford. Toyota, which now uses a conductive system -- one different from Honda's -- plans to develop an inductive system with G.M.

I found all three systems easier to operate than a gasoline pump, although G.M.'s was most elegant. But it almost doesn't matter whether a standard is set: the stations will be of little use unless charging can be done nearly instantly. It now takes three hours or more to fully charge a depleted EV1, and six hours or more to fill up the Honda or Toyota.

After a month, I concluded that electric cars are fine, even fun, for those with a short commute, a predictable driving pattern, a willingness to be stared at -- and a gasoline powered car in reserve. Limp-home mode is a small comfort, but it's not enough to put one's insecurities completely to rest.

### Keeping Current: Electrics in New York

HERE are few charging stations. Cold winters shorten the range of some batteries. Aside from dedicated environmentalists, the public has been slow to embrace electric cars, given their comparatively high prices and short leashes. Yet a New York State law requires seven major auto makers to sell a total of 7,800 zero-emission cars in the current model year.

The law is being challenged in court, and hardly anyone expects auto companies to end up paying billions of dollars in penalties for failing to meet the mandate. Still, a number of companies are offering EV's in New York, partly to demonstrate how advanced -- and how limited -- their technology is, and partly to convince politicians that few New Yorkers are ready for EV's.

Here is a list of the electric vehicles that leading manufacturers currently offer, or soon will, in New York State:

**CHEVROLET S-10 ELECTRIC** -- Compact pickup; lead-acid batteries. Maximum range: 40 to 60 miles. Available from seven dealers in the state. Base price: \$34,289 including delivery; leases available.

**CHRYSLER EPIC VAN** -- Mini-van; nickel-metal-hydride batteries. Range: 80 to 90 miles. Available this fall to fleets only. (Available to consumers this winter.) Lease is \$450 a month for 36 months.

**FORD RANGER ELECTRIC** -- Compact pickup; lead-acid. Range: 50-60 miles. Available at eight dealers. Price: \$27,795 after \$5,000 incentive. Lease: \$637 a month for 36 months.

**HONDA EV PLUS** -- Subcompact hatchback; nickel-metal-hydride. Range: 70-80 miles. Available from Paragon House of Honda, Woodside, Queens. Lease: \$455 a month for 36 months, including insurance and

maintenance, with no down payment.

SOLECTRIA FORCE -- Subcompact sedan, lead-acid batteries (others available). Range: 40-50 miles. Available from Solectria, 33 Industrial Way, Wilmington, Mass. Price: \$33,995 plus delivery charges.

TOYOTA RAV4-EV -- Compact sport utility; nickel-metal-hydride. Range: About 100 miles. Fleet sales only, through Toyota Motor Sales USA. Lease: \$457 a month for 36 months.