Tesla, other electric vehicles poised to enter the mainstream

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After decades of sputtering starts and stalled hopes, the electric vehicle is poised to enter the mainstream.

Tesla Roadsters, Nissan Leafs and Chevy Volts are already on the market, and every major automaker has at least one electric model in the pipeline, giving consumers an array of choices in the coming years. The new wave of EVs just beginning to hit American highways is not the first - they were popular a century ago until cheaper, gasoline-powered cars gained dominance after World War I. But experts say the stars now appear to be aligned for an alternative to the internal combustion engine.

"This time it feels real," said Roland Hwang, director of the Natural Resources Defense Council's transportation programs. "Automakers are serious. There's oil price shocks. The long-term trends are very positive. There will be potholes in the road as this rolls out, but there aren't any showstoppers."

Advocates argue that EVs are not simply another type of car but a game-changer for the country. They say that widespread adoption of electric vehicles will help cut the greenhouse gas emissions that contribute to global warming and enhance national security by reducing the country's dependence on foreign oil.

The transition to EVs won't happen overnight, however. Current models have a limited range and are more expensive than most comparable gas-powered cars, making them unappealing to many drivers. But EV prices

are expected to decline as high-volume production pushes manufacturing costs down. And Silicon Valley startups are racing to improve battery technology, which should allow the cars to go farther between charges. When that happens, manufacturers and enthusiasts hope electric cars will become a viable option for millions of Americans.

OVERCOMING CHALLENGES

Tech-savvy early adopters such as Felix Kramer and Rochelle Lefkowitz, of Redwood City, Calif., are already sold. The couple outfitted their Toyota Prius, which operates on electricity as well as gas, with a larger battery pack in 2006. In December, they bought one of the nation's first Chevy Volts, which runs on electricity for about 40 miles before its gas engine kicks in. In January, they added an all-electric Nissan Leaf to their household fleet - making them the only family in the nation known to own three plug-in vehicles.

"I drove the Volt to get a haircut the other day, and people on the road were waving at me and giving me the thumbs-up," said Lefkowitz, who has grown used to strangers stopping her to talk about cars.

For EVs to enter the mainstream, the auto industry has to reach beyond enthusiasts like Kramer and Lefkowitz and appeal to a mass audience. The potential market is huge: Last year, Americans bought 11.6 million new cars and light trucks, and some analysts project sales of 16.3 million in 2015. If EVs can capture even a modest slice of that market, experts say, they could reduce America's dependence on foreign oil.

Sales of EVs are expected to be modest for the next few years because of their limited range, relatively high cost and a shortage of charging stations. There are currently about 120 public electric vehicle chargers in the San Francisco Bay Area, with more than 2,000 more planned in the next five years under a state program.

But despite such challenges, many in the industry point to encouraging signs.

'DEMAND IS OUT THERE'

When General Motors first launched the Volt, plans called for 10,000 to be built by the end of 2011 and 45,000 by the end of 2012. But GM is accelerating production, in part because some companies are turning to the vehicles to power their corporate fleets. General Electric has already ordered 12,000 Volts.

"It appears we've underestimated," said Tony Posawatz, the GM executive in charge of the Volt, adding that GM plans to make at least 15,000 Volts this year. "It's still early in the launch, but we're getting more and more feedback that the demand is out there. It's very much like using a smartphone - once people have the experience of driving electrically, they don't want to go back."

The Obama administration wants to see 1 million EVs on the road by 2015 and has proposed replacing the existing $7,500 tax credit with a $7,500 rebate at the time of sale to spur demand. Some analysts worry that goal will be hard to reach, even with robust government incentives. Mike Omotoso of JD Power and Associates thinks no more than 700,000 to 750,000 plug-in and pure EVs could be on American roads by 2015.

"The cost of the vehicles is too high, and gasoline-engine powered cars are getting more fuel-efficient all the time," he said. "Almost all new compact cars are getting 40 miles per gallon on the highway now, so why pay twice the money for an electric car that only has a 100-mile range?"

But rising oil prices could change that calculation.

"In early 2008, when gas went above $4 a gallon, all hell broke loose," said Alan Baum, a Michigan-based auto industry analyst. "Larger cars went out of fashion, and people started buying smaller cars and hybrids. If the price of gas goes up and stays up, that will increase consumer interest in EVs, plug-ins and hybrids."

EDUCATING CONSUMERS

Still, the EV industry faces significant obstacles, not the least of which are the current limits of battery technology. The most expensive part of an electric car is its lithium-ion battery - both because of the cells themselves and the sophisticated control systems needed to regulate temperatures around them.

"Batteries are heavy and bulky, and right now to extend range you just add more batteries," said Sunil M. Chhaya, an electric drive expert at EPRI, the Electric Power Research Institute, in Palo Alto. "They take up a lot of space inside the car, and everyone wants to reduce the size."

Doing that will require improvements in "energy density," which refers to the acceleration and range the batteries can provide. Toward that end, the Obama administration has given $2.4 billion in federal stimulus dollars to 48 advanced battery and electric-drive projects. Battery startups such as Envia Systems in Hayward and Amprius in Mountain View are attracting venture capital, and companies such as Coulomb Technologies of Campbell, which makes networked charging stations, are growing rapidly.

Another hurdle for electric cars is lack of public awareness. Many Americans still know very little about them, or have concerns about cost, range, safety and charging requirements.

In a recent survey of 1,716 American drivers conducted by IBM, about

40 percent said they had heard only "a little bit" about electric cars. One in five said they would be likely or very likely to consider an EV for their next auto purchase. But half of all respondents said they would not be willing to pay more for an electric car than a gas-powered one, and nearly a third said they would not be willing to invest in a home charging station.

"We saw a big education gap," said Kal Gyimesi, head of automotive research for IBM. "The more knowledge people had about EVs, the more viable an option it became. The EV industry has to continue to educate consumers about why this is a viable product."

And at the moment, there's one other obstacle: you can't just go to a dealership and buy an electric car straight off the showroom floor. In most cases, consumers must order the car months in advance of delivery.

CALIFORNIA TO DRIVE SALES

The first big push for electric vehicles came more than a century ago. In the 1890s, electric taxis were common on the streets of New York City. When President William McKinley was shot in 1901, he was driven to the hospital in Buffalo, N.Y., in an electric ambulance. Henry Ford purchased an electric vehicle for his wife, Clara, and also worked with Thomas Edison on an electric vehicle model. Sales of plug-in vehicles peaked in 1912, when 6,000 were sold.

In the late 1990s, GM briefly produced the EV1, but consumers could not buy the car outright - they had to lease it. GM canceled the EV1 in 2003, inspiring the 2006 documentary film "Who Killed the Electric Car?" (Filmmaker Chris Paine's sequel, called "Revenge of the Electric Car," is having its world premiere in New York on April 22 - Earth Day.)

In addition to the Roadster, Leaf and Volt, a wave of EVs is expected to launch in California later this year, including the Coda Sedan, Ford Focus Electric and Mitsubishi "i." Tesla's Model S - one version promises a range of 300 miles - and Honda's Fit EV are scheduled to hit the market in 2012. Audi, Daimler and Volkswagen are also developing electric vehicles - there's even buzz about a possible all-electric Volkswagen bus.

Pacific Gas & Electric has analyzed hybrid vehicle registration data and says the Bay Area will be "ground zero" for EVs, particularly in the Peninsula, East Bay and Marin County. It expects anywhere from 219,000 to 845,000 electric vehicles to be on the roads within its vast Northern California territory by 2020.

Kramer and Lefkowitz, with their three plug-in cars, are among those leading the charge. Kramer is the founder of CalCars, a small nonprofit organization that promotes plug-in hybrid electric vehicles (PHEVs) as the key to reducing America's dependence on foreign oil.

"We have to stop using fossil fuels as quickly as possible," Kramer said. "If more people understood the urgency - both of saving the planet and in terms of energy security - we could get there even faster."