

TECHNOLOGY

**Plug-in hybrids could be unifying factor between electric utilities and carmakers**

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[Electric Utility Week](#)

The two heaviest emitters of greenhouse gases could be about to seal a marriage of convenience, if President-elect Barack Obama's campaign promises to vigorously promote plug-in hybrid electric vehicles become reality.

The industry coupling would be cemented by the environmental benefits conveyed by plug-in hybrids, which have both electric motors and gasoline engines and can travel 100 miles on a single gallon of gasoline. Greenhouse gas emissions from cars would decrease — Congress is expected to mandate it soon — while electric utility sales would be boosted. Plug-ins could be recharged at home during off-peak hours, using standard electrical outlets. Environmentalists hope that off-peak charging will make better use of renewables.

To get things rolling, Obama, according to his web site in mid-November, has vowed to put one million plug-in hybrid electric vehicles on the road by 2015, convert the White House fleet to plug-ins within his first year in office, ensure that by 2012 half of all new federal cars are electric vehicles and provide a \$7,000 tax credit to consumers who buy electric vehicles.

Obama also has called for spending \$150 billion over the next decade on the commercialization of plug-ins and the development of renewables, clean coal plants, a smart-grid and utility infrastructure.

Despite the federal push, adoption rates of plug-ins are expected to be gradual, especially if fuel prices continue to decrease and the billions of dollars automakers would need to retool are unavailable. Because of that, it would not be necessary, power industry sources predict, to build more power plants for many years. Environmentalists are hopeful additional demand could even be met with more use of renewables, such as wind, an intermittent source of power.

"By 2030, even with a 50% adoption rate, we would be able to charge those vehicles without much generation addition," said Bill Johnson, chairman, president and CEO of Progress Energy and the head of the Edison Electric Institute's CEO task force on electric transportation.

"We don't expect a lot of pure plug-ins in the next five years," Johnson said. But looking ahead, "Obama wants a million ... I personally would like to see between five and 10 million by 2020."

With the possibility of a federal bailout of the auto industry, Johnson said he would support tying any financial assistance to an insistence that some of the money be used for electric vehicle retooling and technology. But, he added, auto companies "are having a hard time

making payroll. It would be hard to envision spending several billion" to further develop electric vehicles. Still, he "wouldn't be surprised at all if assistance came with some requirements that they move faster in the electric vehicle direction."

Federal climate legislation also should be a big boost. "By the end of this Congress I would expect some kind of overarching plan to reduce greenhouse gases that would include some kind of provisions for electric transportation," said Johnson. "When we have a federal plan for CO2 reduction that will mandate plans in the transportation sector, I expect to see significant movement" in adoption rates.

Plug-ins at your dealership soon

Plug-ins are expected to be on the market in 2010 and 2011. (The 106 plug-ins currently in the US have been individually modified.)

Major car manufacturers such as GM, Ford and Toyota expect to roll out versions within the next two years, with the Chevy Volt expected in 2010. China's BYD unveiled a plug-in at the North American International Automobile Show earlier this year and reportedly expects to begin selling a second smaller plug-in in Europe in the next year or two, after unveiling a prototype in Geneva.

Late next year, Toyota will begin to roll out plug-in hybrids with lithium batteries. They will not be sold in dealerships, a Toyota spokesman said. Instead, Toyota will lease them to fleet operators in Japan, Europe and North America because the company wants to observe the performance of the first-generation lithium battery before going into high-volume sales.

Electric transportation is catching the imagination of the public, at least, and has gained the attention of several US regions. In mid-November, San Francisco Bay Area cities promised to become the electric car capital of the US. Mayors of San Francisco, San Jose, Oakland and other cities in the region said they would offer incentives and standardize whatever infrastructure is needed, such as charging stations for hybrids not able to be charged at home.

Nissan-Renault also has announced plans to start selling a competitively priced electric car in Oregon in 2010 and bring the vehicle to mass market in 2012.

Some electric utilities, according to Johnson, also are considering switching at least part of their fleets over to electric vehicles to help jump-start development. The idea is being discussed among automakers and EEI members.

Given the uncertainty of adoption rates, it is unclear what the effect will be on petroleum consumption. Still, a 2007 study by Pacific Northwest National Laboratory, a Department of Energy research arm, estimated savings from plug-ins for light-duty passenger vehicles (auto and truck) of 1.4 million barrels of oil per day, or 11%. That savings is based on an estimated 51 million, or 15%, plug-in autos and trucks on the road in 2035. In 2095, that estimate jumps to 44% of 538 million autos and trucks, with an annual gasoline savings of 5.5 million barrels per day.

At the same time, the laboratory estimates an annual net carbon dioxide reduction of 169 metric tons, or 9%, in 2035, and a 27% reduction in 2095.

## Utilities starting trials

Although plug-ins are not likely to go "from 0 to 60, to use a driving analogy," as Jim Owen, a spokesman for EEI, put it, some utilities are looking ahead to what the impact on the grid eventually may be.

"The utilities that are starting to explore and plan for [plug-ins] now are the wise ones," said John Clark, of corporate development at Seattle-based GridPoint, a clean tech company with one focus on the smart grid. "It does seem to be that there is a huge pent-up demand for moving to electric transportation," but he does not see anyone in the utility sector hitting "some big red alarm button" in anticipation of a mass movement to it.

Plug-ins, "properly managed," could also become a source of load, Clark said. For instance, if hundreds of thousands of vehicles recharged at night during offpeak, they would be able to resupply the grid during daytime peaks, if there were an emergency.

Duke Energy and Progress Energy recently announced a plug-in pilot. Partnering with Advanced Energy, a Raleigh, North Carolina, non-profit company, the companies have begun a trial to help determine usage patterns, infrastructure needs and the impact on the grid.

In all, 12 converted Toyota Priuses will be used. Advanced Energy will operate one and Progress Energy six, deploying four in North Carolina and two in Florida. Duke will operate four in North Carolina. The University of Florida's Program for Resource Efficient Communities will participate with one vehicle.

"This is the nation's first PHEV trial to involve multiple utilities," said Ewan Pritchard, Advanced Energy's hybrid program manager, in a statement.

Each of the Priuses will be equipped with a device from **V2Green**, now a part of GridPoint, to establish two-way communication with the grid that would make the vehicles grid-aware. **V2Green** server software will be used to manage the flow of electricity to the cars, which will "successfully meet the needs of both drivers and the grid," Advanced Energy said.

When renewable energy such as wind and solar are available, charging behavior can be altered to maximize use of the cleaner energy, the company said.

Because both Duke and Progress are involved, the trial will explore the billing and operational requirements that it takes to support plug-ins that are driven between adjoining utility service areas. For instance, according to Advanced Energy, many plug-in owners will charge their vehicles at home in one service area, commute to work and connect to the grid in a different service area.

The pilot is one of several conducted by US utilities and is seen as a beginning. "These are solutions that take a while to put in place, so now is the time," Clark said.