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From the Los Angeles Times

## Toyota, UC to test plug-in hybrid cars

Researchers at UC Irvine and UC Berkeley will try out a version of the popular Prius equipped with the new technology.

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Toyota Motor Corp., the leading seller of gasoline-electric hybrid vehicles in the U.S., is moving closer to bringing a plug-in version of its popular Prius to market.

The automaker said Wednesday that it was teaming up with two California universities to test so-called plug-in versions of the Prius, cars that would be capable of traveling farther and faster than current models on electricity alone.

Toyota also said it had won permission from the Japanese government to begin road-testing plug-in hybrids in its home country.

Researchers at UC Irvine and UC Berkeley will receive plug-in prototypes as part of a nearly \$3-million project aimed at studying the effects of plug-in technology on air quality and electricity demand in California.

California's Air Resources Board is also participating, Toyota said. The agency forced automakers to sell battery-electric cars in the state in the late 1990s and now requires big automakers to sell hybrids and is pushing the companies to reduce carbon emissions from vehicles.

The moves are the latest by a major automaker to amp up the possibility — if not yet the reality — of plug-in hybrids. Ford Motor Co. announced a partnership this month with Southern California Edison Co. to test plug-in versions of its Escape hybrid sport utility vehicle.

At the time, Ford Chief Executive Alan Mulally said it could be five to 10 years before the company had plug-ins in its showrooms. Toyota executives have been similarly cautious.

"Although there is much work to be done with plug-ins, we see this pilot program as a significant step in the advancement of the technology," said Dave Illingworth, senior vice president of Torrance-based Toyota Motor Sales USA Inc.

Toyota's decision to move forward with plug-in research brings a true heavyweight into the game.

Including vehicles sold under its Lexus luxury nameplate, Toyota accounts for about 80% of hybrid sales in the United States. During the first half of this year, the company's hybrid sales — led by the Prius sedan — jumped almost 70% from the same period a year earlier. Hybrids account for about 2% of U.S. new-vehicle sales.

Since introducing the Prius, Toyota has sold more than 1 million hybrids worldwide.

Conventional hybrids are powered by a gasoline engine and an electric motor and can run for limited periods solely on electric power. The battery pack is kept charged by electricity produced by the gas engine and by the vehicle's regenerative braking system.

A plug-in hybrid, by contrast, has a more powerful battery pack capable of powering the vehicle for short distances at higher speeds on electricity alone. Once the battery is depleted, the hybrid powertrain takes over.

The batteries can be recharged using a standard home electrical outlet. Priuses modified to run as plug-ins have achieved more than 100 miles per gallon. A conventional Prius is rated at 46 mpg in combined city-highway driving, according to the latest government estimates.

In addition to extending the vehicle's range, Toyota said, a plug-in system would achieve "a major reduction" in tailpipe emissions.

Cost has been an issue with the development of plug-ins. Some experts estimate that plug-in technology could add \$10,000 to a vehicle's sticker price.

Batteries have also been an issue. Toyota said that it planned to use "oversize" nickel-metal-hydrate batteries in its plug-in prototypes but that it was working on a more powerful and compact battery system for use in an actual mass-market vehicle.

Automakers have focused on lithium-ion batteries as a likely power source for plug-ins, but some have said considerable work needs to be done to perfect the technology for use in cars.

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