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Xcel Energy Announces Six-Month Test of V2G and Plug-In Hybrid Electric Vehicles

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Six plug-in hybrid electric vehicles (PHEVs) will be on the road by the end of 2007 as part of a demonstration test of vehicle-to-grid (V2G) technology by Xcel Energy. The project, which will convert six Ford Escape Hybrids to PHEVs equipped with V2G technology so each can charge and discharge power to and from the grid, is one of the nation's first real-world demonstrations of the V2G technology.

With operations in eight states, Xcel Energy will study how the vehicles perform in varied geographic regions and climates over a six-month period. Three company employees will serve as test drivers, using three of the PHEVs in typical home settings. The remaining three PHEVs will be used in the company's fleet.

With every US home connected to the electricity grid, vehicle-to-grid technology could be key to meeting our growing energy needs. This project will allow us to explore how PHEVs can become an integrated part of a 'smart house' and our vision of the smart grid energy system of the future—one that allows customers and utilities to work together to balance the power grid, lower greenhouse gas emissions and improve our nation's energy security.

—Michael Lamb, executive director of Xcel Energy Utility Innovations

Xcel Energy's demonstration will build on its previous PHEV impact study by examining how drivers—and their vehicles—will react and perform in real-world settings. The project will explore the potential benefits of widespread PHEV use including: reducing petroleum-related emissions and greenhouse gases, enhancing energy security by reducing dependence on foreign oil, improving the reliability and cost-effectiveness of the electricity grid, exploring ways to make PHEVs more accessible and lowering vehicle fuel costs.

The project is a joint collaboration between Xcel Energy; Hybrids Plus Inc. in Boulder, Colo.; V2Green Inc. in Seattle, Wash.; and the US Department of Energy's National Renewable Energy Laboratory in Golden, Colo.

[Hybrids Plus \(earlier post\)](#) will replace the cars' nickel-metal hydride batteries with a 12 kWh lithium-ion phosphate battery pack using 26650 cells from A123Systems for the base conversion to a plug-in hybrid.

To make the cars V2G capable, each will be equipped with a V2Green Connectivity Module that controls vehicle charging, collects data and communicates via a cellular modem ([earlier post](#)); and an Inverger (a 6-kilowatt inverter and charger in a single unit) from Hybrids Plus. V2Green will also supply server software enabling remote control of smart charging and V2G functions.

By outfitting the vehicles with these components, Xcel Energy can remotely control the battery cycles in each vehicle by requesting that each postpones charging or begins discharging energy back to the electricity grid.

Resources

- K. Parks, P. Denholm, and T. Markel "[Costs and Emissions Associated with Plug-In Hybrid Electric Vehicle Charging in the Xcel Energy Colorado Service Territory](#)" NREL/TP-640-41410 May 2007
- Hybrids Plus Escape PHEV [spec sheet](#)

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