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## Patten's new plug-in hybrid electric vehicle (PHEV) to run on wind energy

Last year **Dr. John Patten**, the manufacturing engineering department chair, secured funding from a Community Energy Project Grant (CEPG) from the State of Michigan Energy Office and from WMU to retrofit his Toyota Prius with a \$10,000 battery system that transforms the hybrid-electric vehicle into a plug-in hybrid electric vehicle (PHEV). The vehicle now runs up to 40 miles on a battery before it moves into its hybrid mode.



**Dr. John Patten** plugs in to the electric grid at the CEAS campus to recharge the battery that was added to his Prius. The plug-in unit meter enables him to record volts, amps, watts, kilowatt hours and time. A full charge takes about 3 hrs.

Patten took the five-year-old Prius to Minneapolis – the nearest place where the work was available – for the installation of 200 pounds of lithium ion batteries, a controller, a charger, a regulator, a plug-in, and the interface that makes it a plug in. “It’s pretty cool,” he said. “I can go up to 40 miles on the battery before the hybrid kicks in.”

The new PHEV serves two major purposes. First it’s a demonstration vehicle. “I want people to know that this can be done,” he said.

Second, Patten is monitoring the car’s performance, use of gas and electricity, effects of temperature on the battery, and costs.

In addition, Patten wants to power the new battery with the electricity produced by a wind turbine located on the WMU Parkview campus



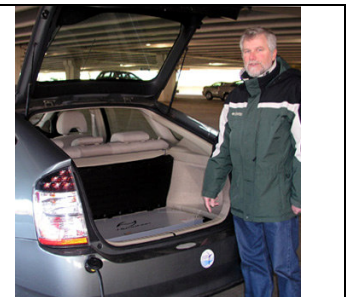
Patten’s new PHEV is easily recognizable by its special license plate.

along US 131 near the College of Engineering and Applied Sciences sign. He funded the turbine’s installation in 2007 with overhead and residual funds from his other research grants. Now he wants to incorporate it into the PHEV equation.

“The big picture of the research is determining whether the wind turbine produces enough electricity to charge the vehicle on average,” he said. “The preliminary data shows that it will. The research will show if that’s valid.”

Patten wants a completely green transportation system. “When the car runs in electric mode, there are no tailpipe emissions,” he said. “But when the car is plugged into a windmill, there will also be no power plant emissions.”

Patten shows the new battery, located in an unused storage compartment.



The present set up at the CEAS requires Patten to keep manual records about miles driven, kilowatt hours used, and time required. A new Web-based meter is presently being installed to automate the collection process. “We’ll put that information into a database and spreadsheet and use that for the analysis,” he said. “The results will be posted on the Web page.”

The CEPG grant lasts one year. Follow the research at [http://www.wmich.edu/mfe/energy/research\\_and\\_labs.php#phev](http://www.wmich.edu/mfe/energy/research_and_labs.php#phev)

Send your thoughts or suggestions for future topics to the editor at [jerrie.fiala@wmich.edu](mailto:jerrie.fiala@wmich.edu) Thank you.