

Mobile lab takes hybrid electric vehicle technology on the road

April 24 2012, By Jennifer Donovan



Michigan Tech's Hybrid Electric Vehicle Mobile Lab heads for Washington, DC.

Take some galvanized nails, vinegar, soda pop and copper wire, piece them together just right, and what do you get? A battery.

Visitors to Michigan Technological University's [hybrid electric](#) vehicles mobile lab—on display in Washington, DC, this week— will get to fabricate and test batteries made from common household items, ride a specially designed stationary bike that turns your legs into a hybrid electric engine, and literally see a car engine run. Its cylinders are made of transparent quartz, so you can see the pistons moving up and down and the flames produced by combustion.

The mobile lab also gives visitors a look at a power generation model for the future: the microgrid. The microgrid concept is an integral part of the future vision of smart-grids. The mobile lab itself is a microgrid, with its

own self contained electric power system.

The lab has a diesel generator to provide most electrical needs, but it also has solar panels, a small wind turbine and a battery storage system.

When the hybrid vehicles are plugged into the lab, it becomes a microcosm of the future electric grid. All the circuits have been instrumented, and a graphical user interface shows in real-time all the energy production and usage in the trailer.

As more consumers switch to plug-in hybrid vehicles, the increase in power load is going to have a huge impact on the electric grid, because the existing grid is very old and is not designed to handle the upsurge in demand. The microgrid concept will help since it involves more renewable and distributed power generation closer to the consumer. .

The eye-catching mobile lab—in Michigan Tech colors of black and gold—is the showpiece of the University’s pioneering hybrid electric vehicle engineering program. Funded by a \$3 million US Department of Energy grant and \$750,000 of in-kind contributions from automotive industry sponsor and partners, the mobile lab takes hybrid electric vehicle education—the cutting edge of automotive engineering—right to working and displaced engineers, company employees, students and communities.

The lab/classroom was designed and built at Michigan Tech, a public research university in Houghton, on the Upper Peninsula of Michigan. Housed in an expandable double-wide trailer, it is pulled by a class 8 diesel semi. The engine’s manufacturer, Detroit Diesel, provided the semi on a no-charge, 10-year consignment, and instrumentation systems were donated by National Instruments and Wineman Technologies.

The Department of Energy hopes the mobile lab will become a model for automotive engineering education.

The lab is on a road tour this week and next. On April 24, it will be parked in front of the Capitol building in Washington, DC. Invited by Michigan Senator Carl Levin, a group of government officials be treated to a demo and tour. A Michigan Tech contingent will be on hand, including Carl Anderson, associate dean of the College of Engineering; William Predebon, chair of the Department of Mechanical Engineering-Engineering Mechanics; Dan Fuhrmann, chair of the Department of Electrical and Computer Engineering; Gordon Parker, professor of mechanical engineering; Wayne Weaver, assistant professor of electrical and computer engineering; and Jeremy Worm, director of the mobile lab.

On Saturday and Sunday, April 28-29, the mobile lab will be at the 2nd USA Science & Engineering Festival in the Washington Convention Center. The festival is free and open to the public. Visitors will be welcome to tour the lab and try their hands (or in the case of the hybrid electric bike, their feet) at experiments that illustrate the principles of hybrid electric technology.

On Tuesday, May 1, the lab staff will conduct demos at TARDEC, the US Army's tank research center in Warren, Mich. On Wednesday, May 2, they will do demos for Chrysler Corporation engineers. Then, on Thursday, May 3, the lab will be on display at the High School Enterprise Showcase at the Renaissance Center in Detroit, sponsored by General Motors and Michigan Tech.

Provided by Michigan Technological University

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