

Wednesday, June 10, 2009

GM Opens a Battery Research Lab for the Volt

The large facility is meant to reflect a change of direction for the bankrupt company.

By Kevin Bullis

This week, [GM \(http://www.gm.com/\)](http://www.gm.com/) officially opened a 3,000-square-meter battery lab at its technical center in Warren, MI. The lab is being used to test battery cells and packs for the forthcoming Volt plug-in hybrid vehicle, which [the company says \(http://www.technologyreview.com/blog/energy/23597/\)](http://www.technologyreview.com/blog/energy/23597/) it will continue to develop, in spite of its recent bankruptcy filing.

The new battery lab is part of [GM's strategy to develop its own battery packs \(http://beta.technologyreview.com/read_article.aspx?ch=specialsections&sc=batteries&id=21957\)](http://beta.technologyreview.com/read_article.aspx?ch=specialsections&sc=batteries&id=21957), just as it now develops its own gasoline engines. Indeed, the battery lab occupies space once devoted to internal combustion power-train development.

As GM's engineers develop a battery pack for the vehicle, one of the [key remaining questions \(http://www.technologyreview.com/energy/21387/\)](http://www.technologyreview.com/energy/21387/) is how durable the batteries will prove. The lab will allow the engineers to test the packs under extreme conditions to determine whether they will last for the life of the car.

Fritz Henderson, GM's new CEO, is using the Volt and the battery lab to highlight a new direction for the automaker. Henderson recently called the lab the "lifeblood of our future" and said that "the new GM intends to be a leader in these technologies" once it emerges from bankruptcy. The Volt, a vehicle that will operate on battery power alone for 40 miles, then use a gas- or ethanol-fueled generator to supply electricity to extend its driving range, is scheduled to go into production late next year.

As the company completes work on the battery for the first-generation Volt, it's also developing batteries for the second and third generation of the vehicle, which involves evaluating different battery materials and cells to find ones that store more energy, making it possible to use fewer of them.

The lab has two main sections: one for evaluating battery cells from various suppliers, and one for evaluating the performance of battery packs--cells packaged with electronics and systems for cooling and heating the cells to keep them at an optimal temperature range. The battery packs contain a type of lithium-ion cell that can be degraded by extreme temperatures.

Inside the lab, the packs are charged and discharged while being subjected to high and low temperatures as well as extremes of humidity. Engineers can also simulate different altitudes by placing the packs in barometric chambers. So the engineers can simulate conditions along a humid, hot coastline at sea level, or atop an arid and cold mountain. They can also mimic road conditions with a machine that shakes the battery packs. Elevated temperatures, which speed up the aging process of battery materials, are being used to confirm a ten-year lifetime for the batteries with about two years' worth of tests. In addition to being tested in the battery lab, the packs are being subjected to tests in actual vehicles both on the road and in a climate-controlled wind tunnel. So far, more than 100 battery packs have been built for testing.

Although GM plans to design and build its own battery packs, it will rely on other manufacturers to supply the cells that make up the packs. The lab will be used to conduct research in cooperation with these suppliers to improve cell designs. Some GM researchers are also developing new cell materials, says Ramona Ying, a GM battery researcher, although they ultimately need to work with suppliers to build the cells.

The lab is designed so that engineers around the world can collaborate remotely on battery development. Engineers can monitor and control testing equipment in the lab remotely: those at the lab can communicate with engineers at other GM battery labs in New York and Germany, as well as with researchers at the University of Michigan who are part of a new GM-sponsored battery engineering program there.

The Volt's battery and generator system are being designed to work with a variety of vehicles. GM has already announced a European variant of the Volt, as well as a Cadillac concept vehicle that would use similar technology. But GM executives this week declined to predict what proportion of future GM vehicles will use the technology. Batteries are expensive, and the Volt is predicted to cost more than \$40,000, which could limit its appeal. Denise Gray, GM's director of energy-storage systems, says that the main challenge for the second- and third-generation Volt battery packs, which are being developed at the new lab, is bringing down costs.

"New technology is expensive, so generation one is going to be an expensive battery pack," Gray says. "We have goals to get the price down quite a bit in order to make it a sustainable business in the future."

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Upcoming Events

[6th Annual MITX Technology Awards \(http://www.mitxawards.org/technology\)](http://www.mitxawards.org/technology)

Boston, MA

Tuesday, June 16, 2009

<http://www.mitxawards.org/technology> (<http://www.mitxawards.org/technology>)

[Nanotech Europe 2009 \(http://www.nanotech.net\)](http://www.nanotech.net)

Berlin, Germany

Monday, September 28, 2009 - Wednesday, September 30, 2009

<http://www.nanotech.net> (<http://www.nanotech.net>)

[2009 Medical Innovation Summit](http://www.ClevelandClinic.org/innovations/summit)

<http://www.ClevelandClinic.org/innovations/summit>

Cleveland, OH

Monday, October 05, 2009 - Wednesday, October 07, 2009

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