

Charging up the auto industry

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This year's iconic North American International Auto Show featured a wave of new hybrid and electric cars that suggest the vehicles have truly come into their own. But what's the future for the technology needed to power these cars? In particular, can the industry really expect in the coming years an electric car battery that is not only economical, but delivers the performance needed to make these cars a common site on the streets?

According to Scott Fletcher, Senior Editor at Popular Science, the dynamics for innovation are falling into place. "A few years ago there were essentially no electric cars on the road in the United States," said Fletcher, who is also the author of "Bottled Lightning: Superbatteries, [Electric Cars](#), and the New Lithium Economy." "Now there are several thousand that people actually own, which is completely different than in the 1990s when people were leasing EV1s. Think about it: GM leased 800 EV1s over the course of three years. Last year alone, GM sold nearly 8,000 Volts."

Better [battery technology](#) for powering these vehicles also looks promising. "There is much good work going on," according to Jeff Sakamoto, Assistant Professor in Michigan State University's Department of Chemical Engineering and [Materials Science](#). "Some of it is focused on exploring new battery configurations and chemistries. One, referred to as a 'solid state' battery, uses a solid ceramic [electrolyte](#) that can replace current, flammable liquid electrolytes. Other potentially interesting though challenging areas include research on lithium-air batteries. Researchers are also exploring how different [electrode](#)

[materials](#), particularly silicon, might be used to improve [battery performance](#)."

Another innovative direction is redox flow batteries. "Basically, these batteries pump an [electrolyte solution](#) or powder in and out of the battery," said Clare Grey, Professor in the University of Cambridge's Department of Chemistry. "Most batteries today are closed, sealed systems, so you're limited to the electrons you have in a contained space. Flow batteries get rid of that limitation...And more electrons out means cars with longer ranges."

In 2011, Grey received The Royal Society's Kavli Medal and Lecture for work that included groundbreaking in situ studies on batteries and fuel cells. Grey recently noted that not only the technology is promising; incentives are changing in countries like the United Kingdom so the industry itself is invested in the success of these cars. "[In Europe,] emissions are regulated across each manufacturer's fleet of vehicles. So as a result, BMW and Mercedes... are really pushing their electric and hybrid vehicle programs to reduce their fleets' overall emissions. ...And the good thing is, people are buying these cars. At the high-end of the market, it seems, people don't mind paying a bit extra for electric or hybrid vehicles. In the most optimistic scenario that demand will eventually trickle down into the lower-end markets as well."

More information: For the complete discussion between Fletcher, Grey and Sakamoto by The Kavli Foundation, visit: [www.kavlifoundation.org/scienc ... arging-auto-industry](http://www.kavlifoundation.org/scienc...arging-auto-industry)

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