

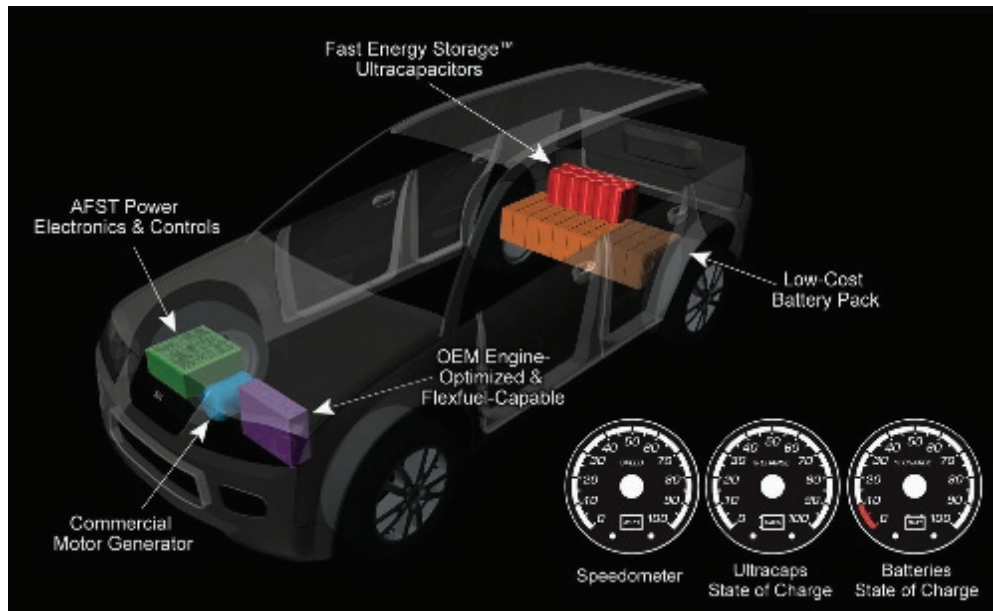


Energy, the Environment and the Bottom Line

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Company With Hybrid Battery Solution to Seek Billions From Energy Department

By MATTHEW L. WALD



AFS Trinity, a company in Bellevue, Wash., thinks it has licked the battery-life problem for hybrid cars, with its extra large capacitors. (Image: AFS Trinity)

The stumbling block for the plug-in hybrid, a vehicle designed to travel its first 40 miles or so every day on battery power, and the rest on gasoline, is the battery — particularly its durability.

For a long life, batteries typically need to be charged and discharged slowly, but electric cars make high demands on the battery — and not only when accelerating from a stop. They also use “regenerative braking,” where the drive motor is reversed, turning momentum back into current when the driver wants to slow down.

So in both acceleration and deceleration, the current flow can be so large it causes internal heating in the battery, shortening its life.

[AFS Trinity Power](#), a small company in Bellevue, Wash., says it has the problem licked. In January, the company rolled out a small S.U.V. that uses lithium-ion batteries nursed along by common electrical storage devices called capacitors.

Capacitors take a trickle of energy and store it up so it can be released in great bursts. They can also take a huge slug of energy quickly, and then deliver it slowly. This is at the heart of AFS Trinity’s innovation.

Electrically speaking, the capacitors, which look like an 18-pack of shrink-wrapped Red Bull cans, sit between the batteries and the wheels, so the flow into or out of the batteries is always fairly gentle, even if the car is making jackrabbit starts or panic stops.

Together, they store very little energy — less than one kilowatt-hour, a tiny fraction of what the lithium-ion batteries do — but they can charge and discharge almost instantly, almost forever, without damaging themselves, said Edward W. Furia, chief executive of AFS Trinity.

His company calls its capacitors, which are larger than most in use, “ultra capacitors.” The combined system in the company’s prototype “has been going and going and going,” Mr. Furia said.

AFS Trinity announced on Monday that it had put the electric system through a ten-month test in which it was charged from a wall socket and then discharged in a pattern typical of a 40-mile drive, including accelerations and regenerative braking.

The testing, carried out by an independent lab, [Mobile Power Solutions](#), of Beaverton, Ore., found that the buffered batteries lasted through 3,800 cycles, which would be more than 12 years for a car charged six times a week.

Unbuffered, the batteries lasted only 500 cycles — equivalent to less than two years.

Of course, most cars do not go 40 miles on most days, so gasoline use would often be zero. And while there is no accepted methodology yet for figuring the gas mileage of a plug-in hybrid, it could conceivably save many drivers several gallons of gas each week.

For its part, GM has been aiming for a plug-in hybrid sedan — the Volt — but has not yet settled on a battery, and durability has been one of the biggest issues. Given its current financial woes, a product that requires replacement under warranty in a few short years is hardly what that company needs now.

On Tuesday, the AFS Trinity said it plans to announce that it is applying for a \$2.5 billion loan from the Energy Department, under the \$25 billion loan program created as part of last year’s energy bill.

Common belief has been that the money would go entirely to the Big 3 automakers, but AFS Trinity, and a partner, [Ricardo](#), a British auto design company, believe they could take a factory that has been shut down — or will be soon — and convert it to build S.U.V.s with their electric system.

The company is showing off its “Extreme Hybrid” prototypes this week at the Los Angeles Auto Show.