# Shifting Gears

## Running on E: The Chevy Volt Hits the Road

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What was left of Hurricane Lee was rapidly losing steam.

The rainfall had eased from a blinding deluge dropping two inches per hour, to a gentle, late summer rain. And the long distance haulers were taking advantage of the relative lull to make up for lost time by racing their big rigs up the New England interstate.

The speedometer approached 70 as I eased from the long entrance lane onto the right lane of US I-84 near the New York-Connecticut border – an unremarkable speed in normal circumstances, but close to excessive on this rain-slicked roadway. My visibility was suddenly poor: the rain was no match for the windshield wipers on the electric Chevy Volt, but the water pouring from the huge tires of the 18-wheeler in the middle lane next to me created the highway equivalent of a surfer going through a fast-curling Pacific wave off the Hawaiian coast.

Suddenly, I realized the wave was closing and the wheels of the big rig were getting closer. The truck was moving into my land and, with the Chevy lost in the water wall thrown up from the tires, the driver couldn't see me.  There was no shoulder, and the shortest route to

safety lay straight ahead. So I floored the accelerator.

There was no satisfying, accompanying engine rumble since the Volt's 111 kilowatt, electric engine runs silent. But it does deliver 273 pound-feet of torque directly to the axels, and there was a satisfying feel of gravity pushing me deeper into the leather seats as the volt shot forward. In seconds, the speedometer hit 95 and the traction control fought to keep the car running straight on the soaked roadway as the car just cleared the rumbling truck's front bumper.

It took less than a minute for the latest innovation from General Motors to show that it could compete with front running family sedans in terms of performance and handling. And in developing the Chevrolet Volt, GM has staked out a unique technological course in a newly evolving field of hybrid electric transportation. Whether the Volt and its successors will catch on with the car buying public, however, is still an open question?

The Volt is the third and, perhaps, the most versatile of the mass produced electric vehicles aimed at the general public, charting a different course than the Nissan Leaf and the Toyota Prius Hybrid Plug-in Electric (http://bit.ly/jj7NoZ ).

Toyota was the first off the electric block but is entering the market tentatively. The company is circulating 160 of the Plug-in Hybrids around the country at this time, gathering user feedback in anticipation of a formal launch next year. The initial Prius was revolutionary in that Toyota envisioned and developed a car which could fully operate on two different power plants. The new plug-in goes a step further, allowing you to drive with three power systems.

The hybrid power systems are standard. What is different is that the new battery pack powers the electric motor for about a half hour, or 13 miles, at speeds up to 60 miles per hour. After that, the charge is depleted and the car reverts to the standard hybrid combination with the interplay between the gas engine and electric motor. The electric motor can drive the car unaided at speeds up to about 25 miles per hour. After that, the Prius either uses both the gasoline engine and the motor or, at high speeds, just the gasoline engine. The difference the additional of the plug-in component makes in terms of gas mileage is incremental: the 13 miles running solely on electric power just extends the miles per gallon average of the car.

Nissan, on the other hand, completely bit the electric bullet with its Leaf. It has only an electric motor. The drawback, however, is that the car can get only about 75 miles before it needs a new charge – which can take eight hours. That makes it a perfect car for getting around in small towns or daily commutes within traffic-snarled metropolises like New York. But it is fairly useless for vacation trips and could be problematic in sprawling cities like Los Angeles. Nissan is banking on the Leaf being the preferred car of the future, when the electric charging infrastructure is as ubiquitous around the nation as the gas pump. But selling that notion now is a challenge.

With the Chevrolet Volt, GM is hedging its bets with what amounts to a reverse hybrid. With this sedan, only the electric motor can power the car, and a full charge – which takes 10 hours on a normal 110-volt outlet – will provide the equivalent of just 31 gas-free miles. The mileage is not absolute because sitting in New York City traffic, for example, can eat up with charge without the car physically going very far.

But after the charge is used up the small, 1.4-liter gasoline engine kicks in. It will not drive the Volt, but it serves as a generator to keep the battery charged to power the electric motor. That combination – an electric motor with a gasoline battery charger – gives the Volt its driving range of about 330 miles between visits to a traditional gas station. It is also what gives the Volt an EPA estimated mileage of 37 MPG on the highway, and a whopping 93 MPG in city driving.

The interplay between the gas engine and the battery required some tradeoffs. It provides enough juice to keep the car going, but not enough to fully charge the battery while the car is being driven and bypass the need for the 10-hour battery charge.

Pam Fletcher, the chief engineer of the Volt, said “there is always some minimum buffer in the battery to drive the car. The Volt’s engine uses about 65 percent of the battery’s capacity, and the internal combustion engine charges enough to maintain that minimum state of power. It does not power it back up to full.

“Our philosophy was if you want to go from the minimum state of the battery up to a full charge, you have to get that energy off the grid, where it is less expensive and more efficient to generate. And it is likely that the electricity you get from the grid will be generated in an environment with more easily treated emissions than those from a bigger internal combustion engine.”

Getting power off the grid is not free. Charging the Volt nightly can boost the electric bill of a three-bedroom home as much as 50%, according to some industry estimates. In high utility rate areas like New Jersey and New York, that means the savings you get by having less frequent trips to the gas station is nearly offset by the monthly electric bill.

The Volt does have some of the battery-charging features of the standard hybrid, such as regenerative braking, which converts the heat in the brake shoes to electricity. But it would take a bigger engine and batteries with greater storage capacity to have the4 Volt fully charged while on the go –and that would drive up its already hefty price of nearly $45,000.

Aside from the power plant technology the Volt is, above all, a family car, and it will be on the road competing with mid-sized sedans such as the Nissan Altima, Honda Civic and Toyota Corolla – which all have much lower sticker prices, and higher gasoline bills. In that regard, what has GM done?

Outside, the Volt is as sleek as its name implies. Its wide front and split grill could be viewed as aggressive were it not for the curved headlights which turn the metal grimace into more of a smile. The long, sloping hatch back ends in a raised spoiler instead of fading into the bumper, which gives the Volt more the appearance of a sporty, four-door coupe.

Inside, the Volt is a spacious sedan with the trimmings you would expect in a car with this price tag, and a few designs that may take some adjustment. The leather seats are wide, comfortable, and can be heated, which is particularly useful.

The dials on the dashboard are novel. There is a blue column showing the amount of electricity in the battery, which runs down as the battery is used up. And there is a green floating ball resembling a suspended Earth which monitors the Volt’s power flow. The center console is a white plastic with raised letters for Climate, Radio, and other controls, all activated by lightly touching them. Women who got into the Volt uniformly disparaged it as

the controls of a blender. 

But it is efficient. The rear backup camera is crystal clear. The navigation system is easy to use with a seven-inch LCD screen and, for communication, there is either the Bluetooth linking your cell phone to the car's audio system, or GM's satellite-based OnStar system. Live help at OnStar can provide turn-by-turn directions if you prefer that to the lady robot in the navigation system.

For entertainment, the Volt offers everything. There is a CD player, AM/FM and XM satellite radio, and connections for the iPod, MP3 player, or USB port. In addition, there is a 30 gigabyte hard drive to download a few thousand of your favorite songs and create your own travelling juke box.

For a hatchback, the Volt is surprisingly spacious. It is about the length of a Honda Civic, but has more interior leg room, so a pair of six-footers can actually ride in comfort in the rear seats. 

The Volt is a smart entry into the plug-in world, since an infrastructure for all around use does not yet exist for fully electric cars. Whether it catches on, or becomes a transitional vehicle as the electric infrastructure matures will be determined by events unfolding over the decade.

The Volt is a stylish, versatile, comfortable, sporty sedan which is dependable in a variety of road conditions. It will give the other electric road runners – and quite a few gas guzzlers – a quiet run for the money.

**2011 Chevrolet Volt**

**MSRP:** **$44,680**

**EPA Mileage:** **93 MPG City** **37 MPG Highway**

**Top Speed:** **100 MPH**

**Performance / Safety:**

111 Kilowatt electric motor and 1.4-liter gasoline engine delivering 84 horsepower and 273 pound-feet of torque; 5-speed automatic transmission; front wheel drive; independent MacPherson strut front suspension; torsion beam rear suspension; lithium-ion battery; antilock and 4-wheel disc brakes; stability and traction control; 17-inch forged painted aluminum wheels; rear vision camera; dual stage, frontal, knee and side-impact airbags.

**Interior / Comfort:**

AM/FM/XM satellite radio; Bluetooth and OnStar communications; Bose audio system with 6 speakers; CD player; 30 GB hard drive; USB port; iPod and MP3 connection; navigation system with 7-inch LCD screen; tilt and telescoping, leather wrapped steering wheel with

fingertip audio and cruise controls.