

## ON THE WAY

The Chevrolet Volt isn't the only new hybrid or electric vehicle on the horizon. Here's a sampling:

- The Nissan Leaf all-electric will roll out in selected markets before the end of the year. The base price is \$32,780, or \$25,280 after incentives.
- The Hyundai Sonata Hybrid is the first hybrid from a Korean manufacturer. It arrives later in the 2011 model year, averaging an expected 38 mpg.
- Also coming soon are hybrid versions of the Lincoln MKZ, Volkswagen Touareg and a small Lexus called the CT200h.



San Jose Mercury News

**The all-electric Leaf. Nissan says it will produce up to 150,000 cars at its Smyrna, Tenn., plant.**

- BMW already has introduced two ActiveHybrid models — the X6, starting at about \$88,000, and a 7-Series, starting at over \$100,000.
- Kia will likely sell a hybrid Oprima, which would use the Sonata's platform.
- The Smart ForTwo will be sold as an all-electric, likely by 2012.
- The Mitsubishi i-MiEV electric, already sold in Japan, may arrive in the U.S. as early as late 2011.
- Both Mini and the Fiat 500 will offer electric versions of their small cars by 2012, as should the Ford Focus.
- Volkswagen has an electric Golf in Europe, but it appears to be at least two years away from sales in the U.S.
- Coda, a start-up company, says it will have cars to sell in 2011. They are electric versions of the Chinese Hafei Sabo sedan.

— Orlando Sentinel



**GM rolled out this sleek, slightly futuristic Volt concept, left, in 2007. By the time the car was ready for production as a 2011 model, above, it looked more like a normal Chevy sedan.**

New York Times

## Q&A

# Hybrid or electric? Does it matter?

By Norman Meyersohn  
New York Times

Last week, General Motors began its press introduction for the 2011 Chevrolet Volt, which is scheduled to be in dealerships next month. Predictably, reports on the much-anticipated car — along with a bit of uproar about its operational details — began to ricochet around the Internet. Amid praise for the Volt's innovations and barbs at its \$41,000 price tag, writers and readers expressed confusion over just what the car is or isn't.

GM engineered the car to drive up to 50 miles purely on electricity from a large lithium-ion battery, producing no tailpipe pollutants. Yet unlike other electrics, the Volt concept car had a small gasoline engine that would start when the battery ran down, powering an onboard generator to produce the electricity needed to keep the car moving. Though the show car's styling was toned down for production, the drive system remains largely true to the original idea. Nearly four years later, that powertrain still defies a simple label. On

short commutes, the Volt burns no gas. On a full battery charge and a full tank of gas, the car can travel up to 350 miles, GM says, so it can be a family's primary car.

**Q: Is it an electric car or a hybrid?**

**A:** GM has consistently called the Volt an electric car — “purely electrically driven” was the wording in materials distributed to the press — basing its terminology on the fact that there is electricity driving the front wheels whenever the car is moving. The company insists it is not a hybrid.

But doesn't the gas engine under the hood make the Volt a hybrid by the industry's definitions? That may seem a reasonable conclusion, but GM argues that the engine's main job is to turn a generator. And because the Volt will not drive without electricity to its motor, GM

says, it should be considered an electric car. Certainly the Volt takes a different approach to automotive drive systems, perhaps best described as a new variation of the layout known as a series hybrid. Similar to the operation of diesel-electric locomotives, the series hybrid's combustion engine is used solely to produce electricity for an electric drive motor.

**So what's all the fuss?**

In contrast to what GM had said, the introduction made it clear that under certain conditions (highway speed with the battery depleted) the 4-cylinder gas engine does provide some assistance to the drive wheels. Hybrid systems in which a gas engine works in tandem with electric drive in this way — the Toyota Prius, for example — are known as parallel hybrids.

GM says it concealed the Volt's operational details for competitive reasons. Also, until this week GM was adamant that the gas-driven generator could never charge the battery, only maintain its charge as the car was driven. The company now says that the generator can send some power to the battery to replenish what it calls a buffer. When bloggers noted the discrepancies, charges of deception flew, even from publications that found the car to be smartly conceived.

**Why design the Volt this way?**

The engineers set out to build a car that would offer the benefits of an EV — zero emissions and cheap “refueling” at home among them — for the local driving and short trips that most

people do every day. To achieve maximum efficiency, the basic layout of an electric car was chosen as the starting point. But in a concession to practicality — to eliminate owner concerns about being stranded with a depleted battery — GM added the onboard generating system as a way to extend the car's range. This compromise added cost, weight and complexity, but was thought to make it more appealing.

**How much does it cost?**

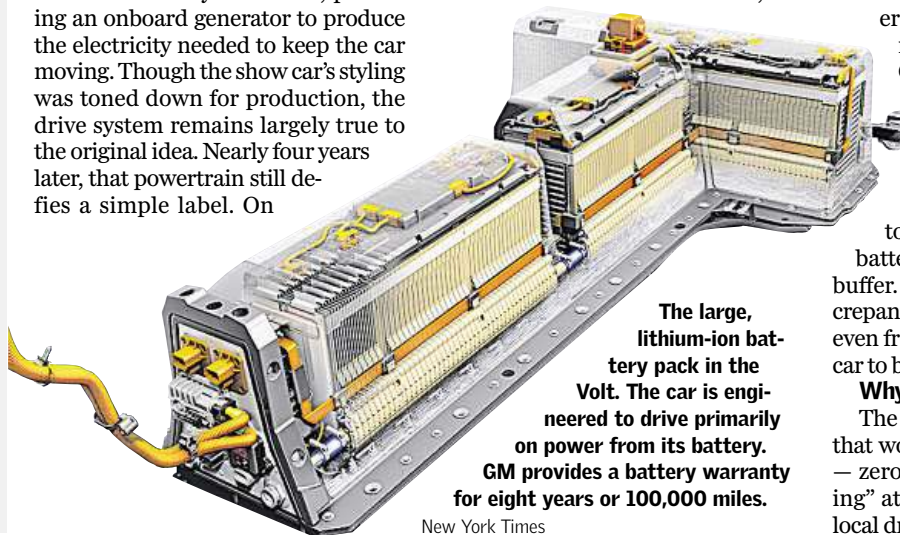
The price starts at \$41,000, including shipping and a charging cord for 120-volt hookups. The Volt is eligible for a \$7,500 federal tax credit and some state incentives. Chevrolet is offering a lease at \$350 for 36 months with \$2,500 due at signing. A 240-volt charger, which will replenish the battery in about four hours (it takes 10 hours using 120-volt household current) costs \$490. GM estimates an installation cost of \$1,475 for this unit.

**Why is the Volt's price so high?**

The car has many specialized components, and at first it will be made in relatively low volume — some 10,000 cars for North America through the end of 2011, a GM sales executive said last week. Another factor is the 16 kilowatt-hour lithium-ion battery pack, a complex assembly with a temperature control system. The battery may account for as much as \$10,000 of the car's total cost.

**What car is the Volt related to?**

The Volt shares its basic structure with the Chevrolet Cruze, a new compact sedan. Because the T-shaped battery is under the floor between the seats, there is room for only four.



**The large, lithium-ion battery pack in the Volt. The car is engineered to drive primarily on power from its battery. GM provides a battery warranty for eight years or 100,000 miles.**

New York Times