

## Comparing Alternative Powertrains

Prius is about to get some high-profile competition. The upcoming Chevrolet Volt will have a huge marketing program behind it. Meanwhile, Nissan has already been airing attention-grabbing ads for its electric vehicle, the Leaf.

Consumer reaction to these early marketing efforts may fall into two categories. Some might think, "They're just like Prius, right?" Others will ask, "What the heck are they?" Either way, sales consultants should expect a lot of questions and be prepared to do a lot of educating.

This Hot Sheet will explain the competitors' powertrains, how they differ from that of Prius, and why Prius is still the best choice.

### The Players

#### ■ Toyota Prius

Prius is a parallel hybrid. It's a hybrid because it has both a gas engine and electric motors. It's a parallel hybrid because the gas and electric systems can power the car independently or together. A Power Split Device seamlessly and continuously blends the power outputs; it also acts as the car's transmission.

Electric power comes from a moderately sized battery pack. The batteries are recharged through regenerative braking and by using the output of the gas engine. The gas engine is "recharged" by filling up at a gas station.



#### ■ Nissan Leaf

Leaf is a purely electric car; there is no gas engine. Electric power comes from a large battery pack distributed around the chassis. The batteries are recharged by plugging into an electrical outlet for a trickle charge, or plugging into a special charging station for a faster charge. Leaf also uses regenerative braking.



#### ■ Chevrolet Volt

At first, Chevy said Volt was a series hybrid. Like Prius, Volt was a hybrid because it has both a gas engine and electric motors. It was a series hybrid because the gas engine did nothing but generate electricity for the batteries and the electric motors, and the motors then powered the wheels. In other words, there was no connection between the gas engine and the wheels.

Recently, however, things became more complicated. Chevy backtracked and admitted there are times when the gas engine directly powers the wheels, but it is vague on details about how often, under what circumstances and for how long. Many shoppers will find the company's caginess does not inspire confidence.

Volt's gas engine is used to make sure the batteries do not remain below 30% charge. However, the engine is not used to fully recharge the batteries. Only hooking up to an outboard electric charger can do that. Thus, once the batteries are down to 30% capacity, the gas engine has to run more-or-less continuously until the car is plugged in to recharge the batteries.



# Alternative Powertrains

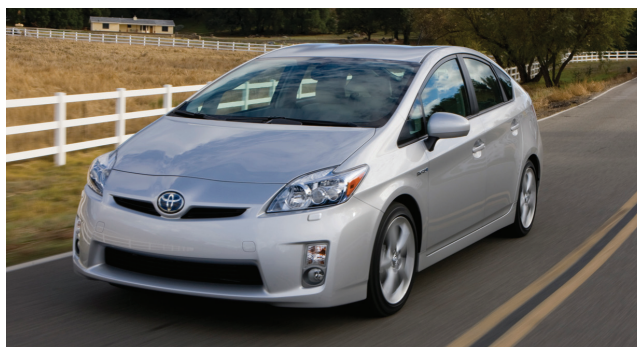
## Let the Games Begin

This table summarizes a few of the main differences among Prius, Leaf and Volt, focusing on their powertrains.

		Prius	Leaf	Volt
Range	Gas range limited only by gas station availability	✓	NA	✓
	Electric-only (approx.)	1.5 mi	73 mi	35 mi
Recharging	Gas: About five minutes at a gas pump	✓	NA	✓
	Electric: Household recharge time (max. hours) <sup>1</sup>	NA	20	10
	Risk of not having electric hookup when needed	NA	✓	✓
Space	Smaller batteries for more interior space	✓	NA	NA
	EPA "Midsize" rating	✓	NA	NA
	EPA "Compact" rating	NA	✓	✓
Durability	History of millions of sales	✓	NA	NA
Price	Starting price (approx.) <sup>2</sup>	\$23k	\$33k	\$41k

## The Winner

For most people most of the time, Prius is still the best bet. It has the most interior room, yet still has a 2010 EPA-estimated 50 mpg combined fuel-economy rating (actual mileage will vary). It drives like a regular car and doesn't require a special electrical supply to "recharge" quickly. And, Toyota's Hybrid Synergy Drive has been proven over years of service and more than 2.8 million sales worldwide. That's a combination of qualities the other cars can't match.



## For More Information

See eShowroom for these related documents:

- Hot Sheet, "Alternative Fuels Roundup," September 2010
- Edge, "Prius vs. Leaf" and "Prius vs. Volt," December 2010

<sup>1</sup> At 220V, Volt can recharge in four hours, Leaf in seven. Installing a 220V home charging station may be a significant extra cost and may be subject to utility company approval. <sup>2</sup> Starting price does not include tax incentives that may be available. MSRP includes delivery, processing and handling fee. Excludes taxes, license, title and available or regionally required equipment. Actual dealer price may vary.

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