

Finally!

Gentlemen, Find an Outlet: A Fully Charged Electric-Car Primer

The first lightning-powered ride arrived 175 years ago, but only now does it make sense to go electric. To get you plugged-in, we tested what's here, scoped out what's on the horizon, and answered that all-important question: Can batteries burn rubber?

By Josh Dean

Illustrations by James Kirkland

M

Mercedes
SLS AMG
E-CELL

If you have two years to wait and six figures to spend, your first electric car will come with wings.



Recently two famous men made pronouncements that signaled—after more than a century of false starts and alleged conspiracies—that the electric-car era

had begun. One was our president, who announced during his State of the Union address that the United States would have a million electric vehicles on the road by 2015. The other was Vince Vaughn, whose character in the trailer for *The Dilemma* declared that “electric cars are gay.” Gay-rights groups and

environmentalists were pissed, but electric vehicles (henceforth, EVs) were finally part of the cultural discourse—and actually rolling off the lots.

Today, Chevrolet and Nissan are the only major

automakers with EVs in dealerships, but we should see more than thirty models by 2015, with most big carmakers getting in the game. Charging stations are popping up across the country, and at least 15,000 should be installed by 2013—from gas stations to Cracker Barrel and Best Buy.

Few people are more thrilled with this paradigm shift than Chris Paine, director of the 2006 documentary *Who Killed the Electric Car?* “A lot had to happen when we switched from horse to car, too,” Paine reminds us. He’s right, of course:

We had to pave roads, pump gas, and invent tiny vanilla-scented pine trees. “I think we’re at the beginning of that change right now,” Paine says. “Actually, I don’t think it. I know it.” His next film will be released this spring. The title? *Revenge of the Electric Car*.



EARLY ADOPTERS, THESE ARE YOUR OPTIONS

The Luxurious (and You'll Pay for It) Hybrid

FISKER KARMA

SOLAR-POWERED CLIMATE CONTROLS!



• Henrik Fisker took a risk on EV power before it was cool or governmentally subsidized. The man who designed classic gas-guzzlers like the Aston Martin DB9 unveiled his concept in 2008. Three years later, his production car is ready, and just as eye-catching. The Karma lives up to its regal heritage, and for the sky-high sticker price, you get 403 horsepower, a top speed of 125 mph, and more torque than the \$1 million Bugatti Veyron. Like the Chevy Volt, the Karma isn't a pure EV; a four-cylinder gas engine fires up to charge the car after fifty miles of pure battery power. And when speeds get extra-legal, the engine helps to drive the wheels.

PRICE: \$88,400 with tax credits
RANGE: Up to 50 miles on electric alone; 250 combined gas/electric



The Crunchiest, Correct-est Electric

NISSAN LEAF

• Because an electric engine offers 100 percent of its torque up front, the Leaf is quicker than it has any business being. It's the only widely available pure EV right now—a fact that Nissan won't let you forget. The car runs on electric power and electric power only, which means you could end up waiting for a tow truck to drag you to an outlet. The Leaf is compatible with "quick-charge" (or DC) stations, which

fill batteries to 80 percent in half an hour, but don't count on them yet; as of this writing there are exactly two DC charge stations in America. And while the Leaf doesn't have the Volt's good looks, the Prius taught us that purposeful dorkiness is more than acceptable in the green-car category.

PRICE: \$25,280 with tax credits
RANGE: 62 to 130 miles, depending on conditions



→ Charging technology is standardized, so you can pull up to any outlet or charging station in America in any car and just plug in. You can use a standard 110-volt wall outlet, but plan on fifteen hours before your Volt is ready to roll. For a charge up to four times faster, try a 240-volt—just unplug your washer-dryer. DC charge stations will get you moving even faster; unfortunately, they're scarce.

Because electricity rates fluctuate wildly, it's hard to put a firm cost on filling up. The Electric Drive Transportation Association estimates that forty miles a day will cost \$1 to \$1.50 at the current rates. If you're burning gas, the average American day on the road will cost you around \$6.

The Great Compromise

CHEVY VOLT



• There's a gas tank in America's first mass-produced electric car; it powers a small combustion engine that kicks in to create energy after the battery is depleted.

PRICE: \$33,500 with tax credits
RANGE: 25 to 50 miles on electric power; 375 miles combined gas/electric

The engine was GM's solution for "range anxiety"—industry jargon for that "Oh, my God, we'll never make it home from Whole Foods" feeling. But while it lacks the Leaf's pure-EV street cred, the Volt is a genuinely fantastic car—solid, quiet, plenty powerful, with the kinds of bells and

whistles you'd expect for the price. Behind the car's smooth operating system is software containing roughly 10 million lines of code—2 million more than the Boeing 787 Dreamliner, which flies. The interior has a space-shuttle-cockpit feel, which reminds you that this is the future.

+/- Who Kept Killing (and Killing) the Electric Car?

The (frequently sabotaged, endlessly delayed, wildly erratic) history of EVs

1830s

Scottish inventor Robert Anderson designs a "horseless" carriage, powered by nonrechargeable batteries. Carriage drivers stick to horses.

1893

William Morrison of Des Moines debuts America's first (successful) electric automobile. A four-horsepower motor and rechargeable 786-pound battery propel it to speeds of...14 mph.

1897

Pope Manufacturing of Hartford releases first mass-produced electric cars. Tragically, they're not called Popemobiles.

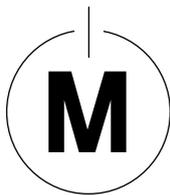
1899

Sacre bleu! Over in France, Camille Jenatton builds an electric racing car that becomes the first vehicle to reach 100 kmph.

1908

Henry Ford unveils the gas-powered Model T. While he figured out the mass-production thing, his wife drove Thomas Edison's **Detroit Electric**, which could last eighty miles without a charge.





Special Section

← 3 of 3

Electric Cars

COMING SOON: TWO WAYS TO BURN MONEY, WITHOUT BURNING GAS



If James Bond Went Electric

MERCEDES SLS AMG E-CELL

For its latest EV, Mercedes went straight to the top of its fleet and put its best team on the job—the wrench jiggers at AMG, the company's in-house performance-engineering arm. This electric version of the gorgeous throwback SLS gullwing will have a zero-to-sixty time that, at four seconds, is nearly equal to its fuel-devouring sibling. Each wheel is powered by a motor that spins to 1,200 rpm; combined, they'll churn out 526 horsepower and 649 lb-ft of torque. It's no surprise to see one of the world's top luxury brands launching its battery-powered technology in an



A "Tron" That Doesn't Suck

AUDI E-TRON

iconic sports car. The torquey, lightning-quick response of an electric engine was born for the fast lane, and the sleek exterior means you'll get the valet's undivided attention. Just tell him to watch his head on the gullwing doors.

EXPECTED: 2013

Audi unveiled two different electric concepts, both labeled e-tron, in successive years. It turns out that the plan is for a suite of EVs that carry the name the way the company's diesel-powered models are designated TDI. The first e-tron concept showed up in 2009 with projected stats

that stack up nicely against the Audi TT. The 2010 e-tron concept is basically an electric R8 with an estimated zero-to-sixty-two time of 5.9 seconds and a top speed capped at 124 mph. A full charge should get you 155 miles—a respectable escape.

EXPECTED: 2012

Can My Leaf Survive a Road Trip?



As any EV evangelist will tell you, 70 percent of Americans drive less than forty miles a day, and 90 percent drive less than a hundred. Most of us could drive a Leaf and never have to charge up on the road, or own a Volt and never burn an ounce of gas. But this is America, and impulsively chewing up endless reams of highway is our national pastime. So how do these EVs fare?

Let's say you're surfing Santa Monica when you hear that better waves are breaking in Carmel. The Leaf will get you up to Santa Barbara (eighty-five miles), where the city operates a charging station, but you'll have to stop again at the station in San Luis Obispo. And the final 132-mile stretch is just outside the Leaf's 130-mile maximum range. The Volt will get you to Oxnard on batteries alone and then burn gas all the way up to Carmel.

Until charging stations achieve the ubiquity of gas stations in America, you can plan your route using Clean Car Maps (cleancarmaps.com). Pretty soon you'll find stations using smartphone apps, just like everything else in your life.



Until some wizardly engineer quadruples the life of a lithium-ion battery, the EV's Achilles' heel will be the bulky and expensive battery pack. That's why, at least for now, two wheels are better than four. Bikes weigh less than cars, instantaneous torque equals hair-raising performance, and the electric motor simplifies things by eliminating the clutch. The Mission R, left, can hit 160 mph in one gear. And Best Buy will stock the \$10,000 Brammo Empulse, because EVs—powered by batteries and lacking gears and grease and pistons—are more like appliances than motor vehicles.

1920s THROUGH 1960s

Crickets. The Electric-Vehicle Ice Age. Thanks, Henry!



1974

Sebring-Vanguard's CitiCar makes its debut. One year later, they're the sixth-largest automaker in the U.S. By 1978, they're out of business.



1990

General Motors introduces an electric concept car that will become the famous EV1. By 1999 the car is "killed."

2001

Toyota ships its Prius hybrid to the States. Gore/Lieberman bumper stickers not included.

2006

Sony Pictures releases *Who Killed the Electric Car?* Answer: GM.

2010

Obama takes the Chevy Volt out for a spin and makes it almost forty feet before Secret Service stops him. The president drives off in his Cadillac.

