

The Story on Hybrids

-- President Bush signed legislation to ratify the Federal Trade Commission's authority to set up a national do-not-call list that could lead to fines for telemarketers. --

BACKGROUND:

Have you pulled your car up to the gas pump lately and been shocked by the high price of gasoline? As the pump clicked past \$20 or \$30, maybe you thought about trading in that SUV for something that gets better mileage. Or maybe you are worried that your car is contributing to the greenhouse effect. Or maybe you just want to have the coolest car on the block.

Currently, several car companies have the technology that might answer all of these needs.

It's the **hybrid car**, and manufacturers are selling their versions in the United States. You're probably aware of hybrid cars because they've been in the news a lot. In

fact, most automobile manufacturers have announced plans to manufacture their own versions.



How does a hybrid car work? What goes on under the hood to give you 20 or 30 more miles per gallon than the standard automobile? And does it pollute less just because it gets better gas mileage? Any vehicle is a hybrid when it combines two or more sources of power. In fact, many people have probably owned a hybrid vehicle at some point. For example, a **mo-ped** (a motorized pedal bike) is a type of hybrid because it combines the power of a gasoline engine with the pedal power of its rider.

Hybrid vehicles are all around us. Most of the locomotives we see pulling trains are **diesel-electric hybrids**. Cities like Seattle have diesel-electric **buses** -- these can draw electric power

from overhead wires or run on diesel when they are away from the wires. Giant **mining trucks** are often diesel-electric hybrids. **Submarines** are also hybrid vehicles -- some are **nuclear-electric** and some are **diesel-electric**. Any vehicle that combines two or more sources of power that can directly or indirectly provide propulsion power is a hybrid.

The **gasoline-electric hybrid car** is just that -- a cross between a gasoline-powered car and an electric car. A gas-powered car has a fuel tank, which supplies gasoline to the engine. The engine then turns a transmission, which turns the wheels. An electric car has a set of batteries that provides electricity to an electric motor. The motor turns a transmission, and the transmission turns the wheels.

You can combine the two power sources found in a hybrid car in different ways. One way, known as a **parallel hybrid**, has a fuel tank, which supplies gasoline to the engine. But it also has a set of batteries that supplies power to an electric motor. Both the engine and the electric motor can turn the transmission at the same time, and the transmission then turns the wheels. In a typical parallel hybrid the fuel tank and gas engine connect to the transmission. The batteries and electric motor also connect to the transmission independently. As a result, in a parallel hybrid, both the electric motor and the gas engine can provide propulsion power.

By contrast, in a **series hybrid** the gasoline engine turns a generator, and the generator can either charge the batteries or power an electric motor that drives the transmission. Thus, the gasoline engine never directly powers the vehicle.

Hybrid cars contain the following parts:

- **Gasoline engine** - The hybrid car has a gasoline engine much like the one you will find on most cars. However, the engine on a hybrid is smaller

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and uses advanced technologies to reduce emissions and increase efficiency.

- **Fuel tank** - The fuel tank in a hybrid is the energy storage device for the gasoline engine. Gasoline has a much higher energy density than batteries do. For example, it takes about 1,000 pounds of batteries to store as much energy as 1 gallon (7 pounds) of gasoline.

- **Electric motor** - The motor on a hybrid car is very sophisticated. Advanced electronics allow it to act as a motor as well as a generator. For example, when it needs to, it can draw energy from the batteries to accelerate the car. But acting as a generator, it can slow the car down and return energy to the batteries.

- **Generator** - The generator is similar to an electric motor, but it acts only to produce electrical power. It is used mostly on series hybrids.

- **Batteries** - The batteries in a hybrid car are the energy storage device for the electric motor. Unlike the gasoline in the fuel tank, which can only power the gasoline engine, the electric motor on a hybrid car can put energy into the batteries as well as draw energy from them.

- **Transmission** - The transmission on a hybrid car performs the same basic function as the transmission on a conventional car. Some hybrids, like the Honda Insight, have conventional transmissions. Others, like the Toyota Prius, have radically different ones.

You might wonder why anyone would build such a complicated machine when most people are perfectly happy with their gasoline-powered cars. The reason is twofold: to **reduce tailpipe emissions** and to **improve mileage**. These goals are actually tightly interwoven.

California emissions standards dictate how much of each type of pollution a car is allowed to emit in California. The amount is usually specified in grams per mile (g/mi). For example, the low

emissions vehicle (**LEV**) standard allows 3.4 g/mi of carbon monoxide.

The key thing here is that the amount of pollution allowed does not depend on the mileage your car gets. But a car that burns twice as much gas to go a mile will generate approximately twice as much pollution. That pollution will have to be removed by the emissions control equipment on the car. So decreasing the fuel consumption of the car is one of the surest ways to decrease emissions.

Carbon dioxide (CO₂) is another type of pollution a car produces. The U.S. government does not regulate it, but scientists suspect that it contributes to **global warming**. Since it is not regulated, a car has no devices for removing CO₂ from the exhaust, so a car that burns twice as much gas adds twice as much CO₂ to the atmosphere.

Automakers in the U.S. have another strong incentive to improve mileage. They are required by law to meet **Corporate Average Fuel Economy** (CAFE) standards. The current standards require that the average mileage of all the new cars sold by an automaker should be 27.5 mpg (8.55 liters per 100 km). This means that if an automaker sells one hybrid car that gets 60 mpg (3.92 liters per 100 km), it can then sell four big, expensive luxury cars that only get 20 mpg (11.76 liters per 100 km)!

STORY:

(Reuters) - Toyota Motor Corp showed off the production site of its gasoline-electric hybrid cars to journalists for the first time on Thursday with a powerful message: they don't have to be expensive to make.

Not long ago, many leading auto makers, including the world's biggest, General Motors Corp, questioned the benefit of developing hybrid cars, arguing they are merely an interim solution before zero-emission fuel-cell vehicles take over.

They accused -- possibly accurately -- Toyota and Honda Motor Co, the only other mass-

producer of gas-electric hybrid cars, of selling them at a loss given the labor-intensive assembly required.

There may have been some truth to that argument before, but no longer, says Toyota, which launched its second-generation Prius hybrid sedan in Japan last month. That's a big and necessary step for Japan's top auto maker as it aims to offer the hybrid option on most of its models in the not-too-distant future. Toyota is hoping to sell 300,000 of the fuel-efficient vehicles a year starting mid-decade.

Hybrids use electric motors and battery packs to improve fuel efficiency, adding power during acceleration and reclaiming energy when braking and coasting. Toyota says the Prius gets 35.5 km per liter of gasoline, which is over 80 miles per gallon.

Visual comparisons with the production method for the previous Prius, launched in late 1997, are difficult since journalists were never allowed to visit the assembly site. But the numbers speak for themselves: the Prius's current assembly line rolls out around one car every minute, versus one every eight to 10 minutes has improved by at least 15 percent for the current model, a factory official said.

The auto maker is aiming to sell 76,000 units of the new Prius a year globally, with 36,000 of that in Japan -- actual sales of the previous Prius was 28,000 units last year. But the sales target is already looking extremely conservative. Toyota said on Thursday that orders in Japan reached 17,500 units in the first month. In the United States, where it goes on sale this month, orders topped 10,000 as of September 24. Reflecting their popularity, every other car on the five-model assembly line at the plant is a Prius.

In contrast, rival Honda says low volumes are forcing it to practically hand-build its Insight hybrid model, much like the NSX and S-2000 sports cars. Japan's second-largest auto maker

admits that after four years of selling hybrids, it barely makes any profit on them.

Nevertheless, Toyota's feat in mass-producing its hybrid car should be an encouraging sign for other rivals as they follow Japan's top two auto makers into the market. Among them, GM and Ford Motor Co are planning to introduce their first hybrid vehicles later this year. But with Ford admitting to doing so at a loss initially, it could be a while before they can emulate Toyota's success.

SIGNIFICANCE:

The real plug for hybrids could come next year, when Lexus and Ford offer hybrid technology to soup up their SUVs. Toyota's Lexus 330 hybrid sport-ute, which goes on sale next summer, will mate a V-6 engine with an electric motor to get the horsepower of a brawny V-8 engine at 30 to 35 mpg. Lexus will charge as much as \$5,000 more for the hybrid RX 330, but the SUV will outrun the regular V-6-powered RX 330. Toyota also plans to sell hybrid versions of its Highlander SUV and Sienna minivan in a few years. Ford will enter the fray with a gasoline-electric version of the Escape SUV. Says Ford Chairman and CEO William C. Ford Jr.: "We're not asking the customer to give up passenger space, luggage space, or acceleration."

Sounds great. Now if only the hybrids can actually make money. The original models, launched by Toyota and Honda Motor Co. three years ago, lost as much as \$8,000 a car. And the first-generation Prius, about the size and price of a Toyota Corolla, cost \$6,000 more than that compact. The new Prius is the same size and price as a midsize Camry. The Prius is not profitable yet, but Toyota predicts that if sales continue at the current pace, the hybrid will cover its development costs and move into the black in a few years. In the race to dominate the hybrid market, there's no denying that Toyota is in front.

By David Welch, with Kathleen Kerwin

SPORTS:

USA 0 : 3 GERMANY

Germany shocked the hosts and holders USA 0-3 in Sunday's first semi-final from Portland, Oregon. In what many were calling the match of the finals, a Kerstin Garefrekes goal on the quarter-hour mark was

doubled by Maren Meinert and then tripled by Birgit Prinz deep into injury time to send the Americans on their tearful way.

With the Americans attacking constantly but lacking the final touch, Germany did all they needed to in a solid, giant-killing performance. Avenging their quarter-final loss to the U.S. four years earlier, keeper Silke Rottenberg's heroics went a long way to seeing the Germans into their second-ever Women's World Cup final.

The match began with both sides battling physically in the middle of the pitch. All of the early pressure was coming Germany's way. Then, shocked by the early goal, the Americans came out of their tentative shell and surged into attack. Cindy Parlow, Wambach and Mia Hamm began to look tremendously impressive, but for all of their possession and attack, they rarely forced Rottenberg into a save.

In a frenzied final ten minutes of attack, the USA simply could not find a way past the sturdy German defense, and in injury time the

Europeans even added a couple more.

The United States women's national team are the standard bearers of women's football.

Experienced, skilled, organized and full of personality, the Americans were one of the unquestioned favorites and biggest attractions in their quest for their 3rd World Cup Trophy.



THIS WEEK IN HISTORY:

September 6, 1989**Bette Davis Dies**

Movie star Bette Davis dies of cancer on this day in 1989. During a career that spanned more than three decades, Davis appeared in some 80 films. Born Ruth Elizabeth Davis in Massachusetts, Davis decided in high school to become an actress. She enrolled in a theater school in New York and was chosen to work with the Provincetown Players theater group. Making the jump from working actress to star proved difficult for Davis, though--for more than a decade, she played mediocre roles on Broadway and in the movies. She was turned down by at least one drama school, fired by director George Cukor after her first stock-theater performance, and rejected by Goldwyn studios after her first screen test.

Universal finally signed Davis in 1930, but she played unremarkable roles until the mid 1930s. Even her first Oscar, the Best Actress award for *Dangerous* (1935), failed to win her starring roles. When she rebelled against Warner Bros. she was suspended, so she set off for England to make movies. Warner Bros. won a court battle that prevented Davis from working for anyone else, however, and Davis lost a widely publicized suit to terminate her contract. Despite losing the court battle, Davis did begin to command more respect from the company. In 1938, she won another Oscar for her role as a hot-tempered Southern belle in *Jezebel*.

She starred in a series of acclaimed films that won her Best Actress nominations for five consecutive years, including *Dark Victory* (1939), *The Letter* (1940), *The Little Foxes* (1941), and *Now, Voyager* (1942). In 1950, she won the New York Film Critics Best Actress Award for her performance in *All About Eve*. Her career tapered off in the late 1950s but revived in 1962 with a leading role in *Whatever Happened to Baby Jane?*

www.thehistorychannel.com

ENTERTAINMENT:**Siegfried & Roy Show
Canceled Indefinitely**

(AP) LAS VEGAS - Fans and employees of the Siegfried & Roy show held a candlelight vigil as famed performer Roy Horn remained in critical condition after being mauled by a tiger, and the show has been canceled indefinitely, officials said.



About 200 people stood outside the hospital at University Medical Center Sunday night, where Horn, 59, is being treated. He suffered a severe wound to his neck when the 7-year-old male tiger named

Montecore attacked Friday night in front of hundreds of people. Officials said Sunday he had improved and could move his hands and feet.

MGM Mirage officials said the show was "closed indefinitely." They added that even if Horn recovers, it's unclear whether he would ever be able to perform again in the rigorous show. With the show's future uncertain, about 267 employees are out of a job. Show employees were wondering if the company would pay out the rest of their contracts. MGM Mirage officials have promised to help employees land new jobs.

Without the show, the fate of the tigers is also unknown. Montecore continues to be quarantined at the hotel, officials said.

Horn had never been injured during a show before, "not a scratch, not by an animal," said Bernie Yuman, the pair's longtime manager, who added none of the 63 exotic cats "have ever shown aggression on stage."

Horn, along with longtime partner Siegfried Fischbacher, have been a staple on the Las Vegas Strip for years, performing their magic show to sold-out crowds at The Mirage since

1990. The illusionists, who put on one of the most well-known and expensive Las Vegas shows with their signature white tigers and lions, signed a lifetime contract with the resort in 2001. The German-born pair perform six shows a week, 44 weeks per year and have been onstage in Las Vegas for more than 35 years. They have done about 5,700 shows since coming The Mirage in 1990.

<http://www.siegfriedandroy.com>

PROMOTION:

The mention of Siegfried and Roy conjures magic, mystery and illusion. In a world-famous spectacle filled with tens of millions of dollars in sets, costumes and eye-popping illusions, it's the animals that steal the show.

Siegfried and Roy have performed for three decades in Las Vegas, delighting audiences from all over the world. They were selected as "Magicians of the Century" in 2000 and anyone seeing the show can easily understand why. From disappearing white tigers to death-defying illusions, this team of incredible talent produces a show with a seamless compilation of Pink Floyd, Houdini, Rousseau, Wagner, Barnum, Fantasia, Peter Pan and Midsummer Night's Dream, all tied together in magic. There is no other show like it!

From the very minute you enter the theater you are being entertained. The beginning bubble illusions keeps you guessing what's really going on. This spectacular production keeps your eyes glued to the performers constantly, from them riding atop an elephant to Roy suddenly appearing among the audience when you thought he was on stage right before your eyes!

And the best part of Siegfried and Roy is that they give back, especially through their conservation and reproductive efforts to save the world's most beautiful creatures, the white tigers and white lions. Now, that's real magic!

FEATURE:

Civil War:**Part IV**

The Civil War, like all wars, called for great sums of money to pay troops and supply them with equipment. At the outset of the war the Confederacy depended on loans, but this source of finance soon disappeared as Southerners began to be affected financially by the cost of the war and unable to buy bonds. The South never really tried heavy taxation because the government had no means to collect taxes and people in the South were reluctant and often unable to pay them. Instead it relied on paper money, freely printed. Backed only by the possibility of Southern victory, the money dropped in value as the war went on and as its outcome became more uncertain. The Confederacy suffered greatly from severe inflation and debt throughout the war. The Confederate rate of inflation was about 9000 percent. In contrast, the North's rate of inflation was only about 80 percent. As the value of money declined, prices rose accordingly.

The Union financed its armies by loans and taxes to a much greater degree than the Confederacy, even resorting to an income tax. The people of the North were more prosperous than those of the South. A national banking system was established by Congress to stimulate sales of U.S. bonds. Northerners had savings with which they could buy the bonds and had earnings from which taxes could be taken. The North also resorted to printing large amounts of paper money, called greenbacks, which were not backed by gold in the U.S. Treasury. As in the South, though to a much lesser degree, the paper money dropped in value in relation to gold, and prices rose. However, the North and South continued to fight as if their treasuries were full.

CIVIL WAR, 1861 Both sides prepared for what would become a much longer war than either at first imagined. Hundreds of thousands of

volunteers poured into the armies, and the respective economies tried to adjust to meet the demands of supplying huge military forces. On the battlefield, the Confederates won victories in Virginia at the First Battle of Bull Run in mid-July, and in Missouri at Wilson's Creek in August. Despite these setbacks, the Union army and navy took steps to begin operations along the upper Mississippi River and along the southern Atlantic coast. The goal was to implement Winfield Scott's Anaconda Plan to seize control of the Mississippi River and institute a naval blockade of the Confederacy. Away from the military sphere, the Trent Affair presented the Lincoln administration with a major diplomatic crisis that threatened to involve Britain in the American war.

FIRST BATTLE OF BULL RUN On July 16, 1861, a Union army, led by General Irvin McDowell, began to move toward Confederate troops under General Beauregard that were grouped about Manassas Junction, 40 km (25 mi) southwest of Washington, D.C. The two armies did not meet until July 21. The battle, known as First Bull Run or First Manassas, started well for the North. However, with the arrival of Confederate reinforcements and the heroic stand of General Thomas J. Jackson, who earned the nickname "Stonewall," the battle ended in an overwhelming victory for the South.

The defeat shocked the North. The people suddenly realized that the war could be a grim struggle that might last for years. Governors offered more troops and hurried forward regiments with full ranks. The Union War Department pushed the organization of long-term volunteers. General George B. McClellan was ordered to Washington from western Virginia, where he had made a name for himself in a series of small battles. McClellan took charge of the troops in and around the capital, enforcing discipline and instituting intensive training. By the end of October he had a well-equipped, well-trained army that was known as the Army of the Potomac. In November he replaced the aged general Winfield Scott as general-in-chief. [Stay Tuned...](#)

Quote of the Week:

Institution is the lengthened shadow of one man.
-Ralph Waldo Emerson

Fact of the Week:

There really is an insect called the love bug. It spends 56 hours – more than ½ its life - mating.

Word of the Week:

hominy (hom'i*ni), n. Corn hulled and coarsely ground, prepared for food by being boiled in water.

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And
Have a Great Week!

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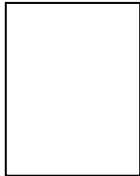
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