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Pros and Cons of Hybrid Vehicles

Any vehicle that combines two or more sources of power that can, directly or indirectly, provide propulsion power is a hybrid. A mo-ped (motorized pedal bike) for example, is a type of hybrid because it combines the power of a gasoline engine with the pedal power of its rider. Locomotives we see pulling trains are diesel-electric hybrids. Some cities 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).

The hybrid car is a cross between a gasoline-powered car and an electric car. The two power sources found in a hybrid car can be coupled in different ways. One is it has a fuel tank, which supplies gasoline to the engine. But it also has batteries that supply 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.

A hybrid vehicle contains a gasoline engine, much like the one you will find on most vehicles. However, the engine on a hybrid is smaller and uses advanced technologies to reduce emissions and increase efficiency.

A hybrid vehicle contains a fuel tank to store the gas for the engine. Gas 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 4 litres (7 lbs) of gas.

A hybrid vehicle contains a very sophisticated electric motor. Advanced electronics allow it to act as a motor as well as a generator. It can draw energy from the batteries to accelerate the car and as a generator; it can slow the car down and return energy to recharge the batteries.

A hybrid vehicle contains batteries. These are the energy storage devices for the electric motor.

It contains a transmission performing the same basic function as the transmission on a conventional vehicle. Some hybrids use constant variable automatic transmissions (CVT), which are radically different.

One may ask why anyone would build such a complicated machine. The reason is to reduce tailpipe emissions and to improve mileage. An electric car produces almost no pollution, but it can only go 80 to 160 km between charges. And the problem has been that it is very slow and inconvenient to recharge. So the hybrid is a compromise. It attempts to significantly increase the fuel economy and reduce the emissions of a gas-powered vehicle while overcoming the shortcomings of an electric car.

While the concept of the hybrid vehicle sound like it's the answer to increased fuel economy there are some drawbacks.

- The vehicles are generally smaller, so there is much less interior space.
- They are more streamlined and lighter using composite materials like carbon fiber or lightweight metals like aluminum and magnesium, which are more costly.

- They may not handle well on slippery surfaces such as ice and snow and are more susceptible to wind turbulence.
- They are generally slower accelerating on the highway where more power is required, especially on a very long grade.
- Maintenance costs will be higher. Some of the engines have multiple water pumps in the cooling system as the engine must be kept up to operating temperature at all times. The engine will shut off to conserve fuel at certain times when idling, but then when more power is required it must instantly come back to full load.
- At this time we do not know how long the battery life expectancy will be. They are guaranteed for 10 years or 150,000 km. To replace a battery, on a Ford Escape Hybrid for example, the cost ranges from $8,000 to $10,000.
- The battery also takes away valuable trunk space so you lose storage capacity.

Reading a recent survey of hybrid owners, the most frequent complaint was that while fuel economy was much better than a strictly gas powered vehicle; they were not achieving the advertised results. Economy gains are greater in city driving than on the highway so they are more suited as an urban vehicle.
With time these vehicles will improve and their costs will decline making them a more practical vehicle.

There are a few hybrid vehicles now available in North America, the Honda Civic and Insight, the Toyota Prius, Toyota Highlander; General Motors has a version of the Silverado pickup.

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