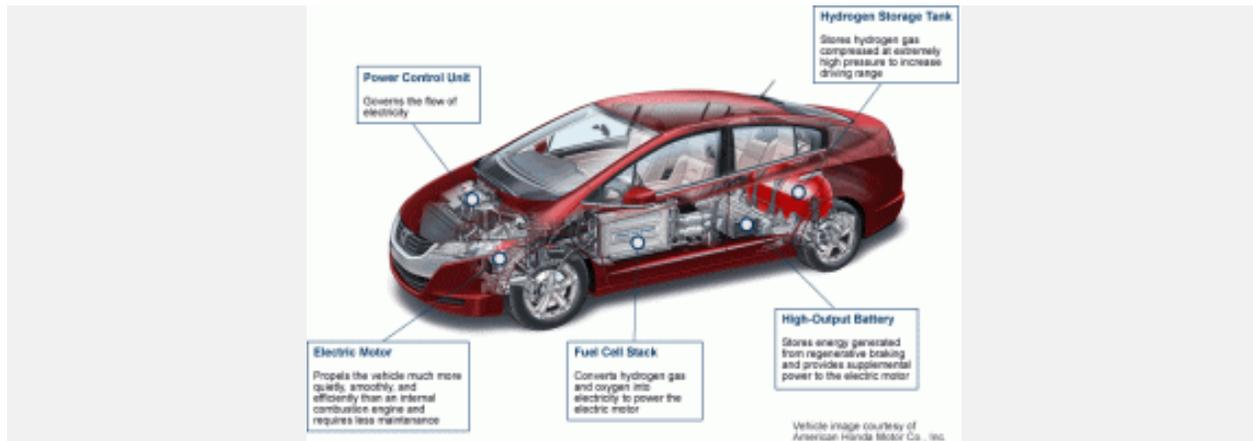


Fuel Cell Vehicles or Battery Electric Vehicles



. Fuel cell automobile

Let's look at the pros and cons of fuel cell vehicles. There is a lot to be said for this type of car which has zero emissions except for water vapor. The energy source is pure, compressed hydrogen stored in relatively small tanks in the back of the car. The hydrogen combines with oxygen (from the air) to form water, at the same time releasing the energy that propels the automobile. The reaction takes place in a large stack of electrolytic membranes at moderate temperatures with the use of platinum or other noble metal catalyst.

The hydrogen tanks and the fuel cell take up less space and weigh less than lithium-based batteries. Also, the so-called useful specific energy produced in fuel cells per unit of weight is far greater than for batteries. A hydrogen vehicle can have a range of about 300 to 350 miles between refueling.

So, this is a pretty radical departure from gasoline or other hydrocarbon-derived fuel or from battery electric vehicles. From an environmental standpoint, the zero emission feature is of particular note. Of course, both battery- and fuel cell-driven cars need external electricity to charge the battery or, respectively, to make the hydrogen and if this electricity is produced from coal or natural gas, the carbon dioxide emitted by the power plant is, of course, a Greenhouse gas. Therefore, neither method of powering the car is environmentally benign.

The big disadvantage for hydrogen is the need for a hydrogen infrastructure for refueling, specifically by exchanging an empty tank for a full tank. This will take a long time in coming, though, as for natural gas-based vehicles, this would be a considerably smaller problem for trucks, buses and delivery vehicles, where entire fleets are involved, allowing owners to



Mercedes Fuel Cell Bus

provide hydrogen refueling stations. The refueling issue for passenger cars is therefore the “killer”. It is easier to plug a battery-driven vehicle into your home or external outlet to recharge the battery, though recharging takes several hours. If this is done during off-peak hours when electricity is usually much cheaper, the cost per mile for battery-driven vehicles is quite acceptable. The cost per mile for vehicle-oriented compressed hydrogen available in dedicated filling stations is difficult to estimate, but is likely to be higher than the cost of power for cars using rechargerable batteries.

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