

Frequently Asked Questions

FOUR TRUTHS ABOUT HYDROGEN

Fuel cell vehicles will be cost competitive with other options. According to an MIT study, once in mass production, an FCV with 350-mile range will cost \$3,600 more than a conventional car. A PHEV-30 will cost \$4,300 more and a BEV-200 will cost \$10,000 more.

Hydrogen is a clean, efficient fuel. FCVs using hydrogen made from natural gas are more energy efficient and cleaner than gasoline in a conventional vehicle, and on par with BEVs using electricity made from natural gas.

We can build the infrastructure in a smart and cost-effective manner. The National Research Council reports that \$8 billion over 16 years can build stations to supply fuel for 1.8 million FCVs through 2020 and 10 million through 2025. (The existing global gasoline infrastructure costs \$160 billion annually.)

Compressed hydrogen provides the range people want. In real-world driving, several FCVs have a range of 300-500 miles on a tank. Filling the tank takes just minutes.

INTRODUCTION

To reach California's goals for cleaner air and reduced greenhouse gases we need full-function cars, pickups, vans and SUVs that people want to drive and transit buses they want to ride. These vehicles must be comparable or better than the vehicles we are driving today, and be better for the environment.

We believe hydrogen-powered fuel cell vehicles are the best option for fulfilling this promise.

QUICK ANSWER

It's the only way to reach our future goals.

LONG ANSWER

California has a goal of reducing greenhouse gas emissions to 80 percent below 1990 levels by 2050. Vehicles account for almost 40% of GHG emissions. To reach the goal, we have to reduce the number of miles we drive and the GHGs created when producing and using fuel in our vehicles. Electric-drive vehicles, fuel cell and plug-in battery, significantly lower GHG emissions from transportation.



#11

QUESTION:
Why make the
investment now?

QUICK ANSWER

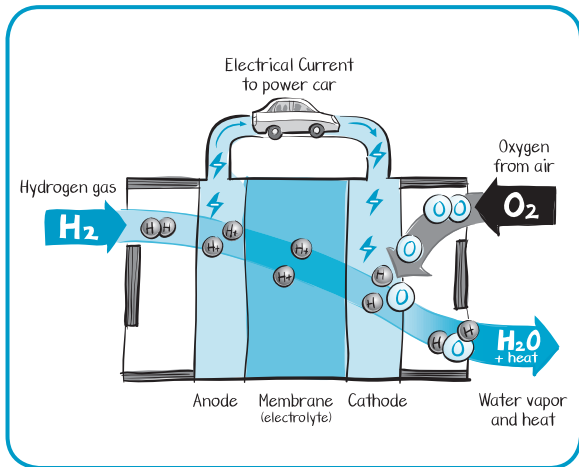
A battery stores energy and a fuel cell creates electricity from energy stored in a fuel tank.

LONG ANSWER

A fuel cell has an anode, a cathode and a membrane coated with a catalyst.

The membrane is the electrolyte. The reactants

(hydrogen and oxygen) are stored externally. Hydrogen enters the anode side of the fuel cell and oxygen enters from the cathode side.



#1

QUESTION:

How is a fuel cell different than a battery?



QUICK ANSWER

CaFCP works together to promote the commercialization of fuel cell vehicles.

LONG ANSWER

CaFCP members collaborate on the issues that move the vehicles to market. For example, California was the first state to designate hydrogen as a transportation fuel. With that designation came a need to immediately

#10

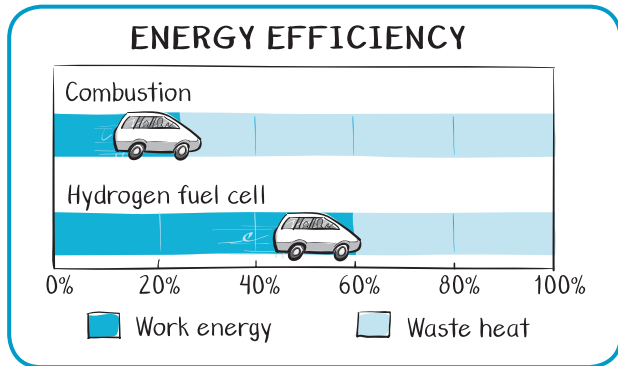
QUESTION:
What does CaFCP do?

QUICK ANSWER

Fuel cell vehicles are 2-3 times more efficient than conventional combustion engine vehicles.

LONG ANSWER

As energy transfers from one system to another, some energy becomes “work” and some becomes “waste.” In a vehicle, work energy provides power and waste energy becomes heat. Efficiency is a measure of the amount of work energy from the fuel. A fuel cell is about 60% efficient. In a vehicle, the fuel cell powers an electric motor, which is also very efficient in converting the energy from the fuel cell into work.



#2

QUESTION:
How efficient is a
fuel cell?

QUICK ANSWER

Be vocal about your support for fuel cell vehicles and hydrogen fuel.



LONG ANSWER

Although it will be several years until fuel cell vehicles are available for sale in California, and perhaps longer in other parts of the country, we have to start now. Being vocal in your support keeps attention on addressing these issues now.

#9

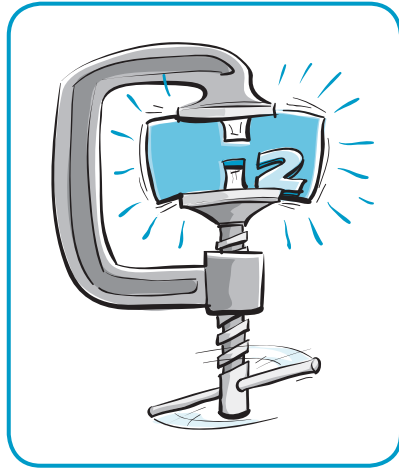
QUESTION:
What can I do to move
this along?

QUICK ANSWER

Fuel cell vehicles use gaseous hydrogen.

LONG ANSWER

Fuel cell vehicles carry their hydrogen in a gaseous state. At normal temperatures, hydrogen is a gas. A kilogram of gaseous hydrogen fills more space than a kilogram of liquid hydrogen.



One way to extend the range of a vehicle is to increase the amount of fuel it holds. So why don't FCVs use liquid hydrogen? To be a liquid, hydrogen must be stored at -423°F (-253°C). If the hydrogen warms up even a little, it begins to evaporate. The tanks to hold

#3

QUESTION:
Is the H_2 a liquid or gas?

QUICK ANSWER

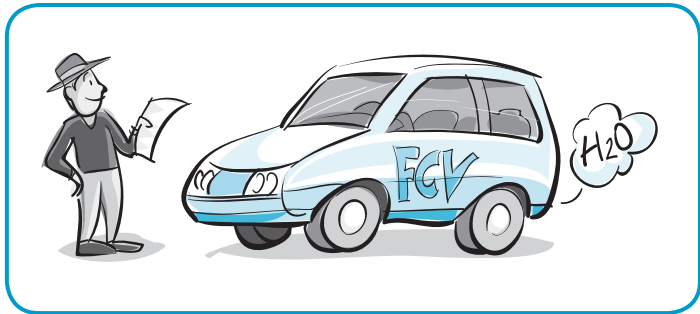
Look for them around 2015.

LONG ANSWER

Fuel cell vehicles are not for sale, although each of the automakers

has FCVs on the road. For the most part, drivers for the available vehicles have already been identified.

Several automakers have stated plans to put FCVs in early market areas in about 2015. The early market vehicles will be available in Santa Monica, Irvine, Torrance, Newport Beach, the San Francisco Bay Area and the Sacramento area.

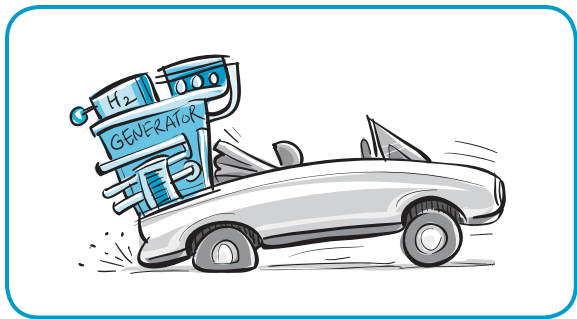


#8

QUESTION:
How can I get one?

QUICK ANSWER

It's possible, but not practical.



and cost to the vehicle. It's easier and more cost effective to produce the fuel at a central location.

LONG ANSWER

Early in CaFCP's history, some automakers looked at reforming gasoline or methanol into hydrogen onboard the vehicles. Both processes worked, but added weight, complexity

#4

QUESTION:

Why not make the H_2 onboard the vehicle?

#7

QUESTION:
How does a fuel cell
vehicle perform?

QUICK ANSWER

Great!

LONG ANSWER

In most respects, a fuel cell vehicle drives like a conventional vehicle. It has power and performance—great pick-up and easily cruises at freeway speeds. Inside the vehicle, it has all the space and comfort you'd expect. The dashboard gauges are different, displaying percentage of fuel remaining, kilowatts instead of RPM, and power management.

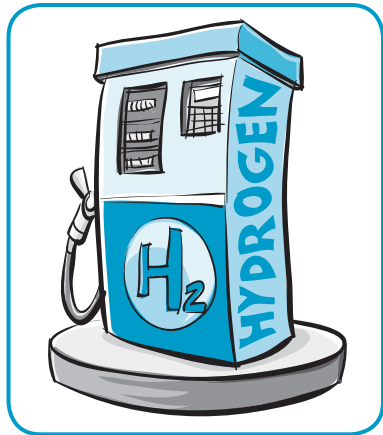


QUICK ANSWER

Hydrogen stations look similar to gasoline stations.

LONG ANSWER

Like at a gasoline station, an FCV pulls up to a hydrogen dispenser that sits on an island. The dispenser nozzle looks similar to a nozzle on a natural gas or propane dispenser. The nozzle locks on to a valve on the vehicle. When the seal is tight, fuel flows into the tank. The process sounds similar to filling helium balloon.



#5

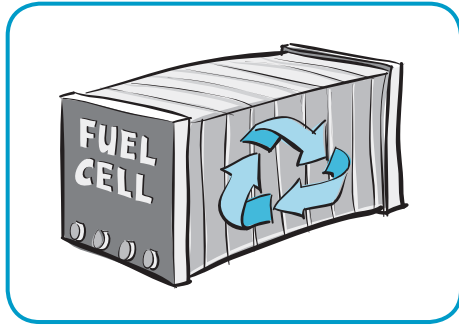
QUESTION:
What do hydrogen
stations look like?

QUICK ANSWER

They won't wear out during the life of the vehicle.

LONG ANSWER

The fuel cells are being designed to last the lifetime of the vehicle, about 150,000-200,000 miles. As with vehicles and drivers today, some people will get more than 200,000 miles and some will get less. The automakers assume that, like today, when the vehicle reaches 150,000 miles most people will trade in their fuel cell vehicle for a newer model. It may be that some people choose to replace the fuel cell, just as some people choose to replace the engine in a conventional car.



#6

QUESTION:

What happens when the fuel cell wears out?