Energy and Environmental™ Services

ASTRA

Hydrogen Energy FAQ's

FAQ'S

HOW OFTEN DO YOU NEED TO REPLACE THE FUEL CELLS IN HYDROGEN VEHICLES?

A fuel cell has a lifetime of approximately 10 years. Fuel cells can be used for the extent of their lifetime due to the fact that they are constantly being supplied with hydrogen (similar to constant supply of gas to a tank).

HOW DO HYDROGEN FUEL CELLS COMPARE TO BATTERIES USED IN ELECTRIC CARS?

Although batteries are more efficient using renewable energy for transportation ,this advantage disappears quickly because batteries in electric cars weigh more than the tank of hydrogen and the fuel cell combined for the same capacity of energy storage.

WHAT IS THE DIFFERENCE IN CHARGING TIMES?

Electric vehicles powered with batteries take several hours to charge. Fuel cell hydrogen electric vehicles charge in minutes. Not to mention, when an electric battery is low in charge it becomes less efficient. Fuel cells do not report to have this problem, which could prove crucial for certain applications that might require a great freedom of range for transport.

WHAT IS THE DIFFERENCE IN CHARGING STATIONS?

The charging stations for electric batteries are less expensive. However, while a charging station charges 1 vehicle over several hours, a hydrogen charging station can possibly charge more than 10 vehicles.

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HOW ENVIRONMENTALLY FRIENDLY IS THE PROCESS FROM WHICH YOU OBTAIN THE HYDROGEN?

We use electrolysis to produce hydrogen, which only requires water and electricity, this process is completely carbon free. This is a cleaner way to produce hydrogen. Additionally, our facilities are 100% solar powered, including the electricity necessary for generating the hydrogen for the bus.

To this day, the majority of the hydrogen used for transportation worldwide is generated from fossil fuels (natural gas, for example, steam reformed and heated to high temperatures which releases a large amount of CO2 into the atmosphere, and therefore is not carbon free).

HOW MUCH HYDROGEN CAN BE STORED IN YOUR PRIVATE VEHICLE?

An average vehicle can store up to 5 kilograms of hydrogen, which translates into a range of approximately 500. The hydrogen bus approximately stores 38 kg, and has an expected range between 266 km and 350 km.

WHY ARE HYDROGEN TECHNOLOGIES IMPORTANT FOR COSTA RICA?

Costa Rica has achieved approximately 90% of its electrical energy production from renewable sources. However, electrical energy only represents 30% of all of the energy consumed by the whole country. The rest of the energy consumption is fossil fuels, primarily used for cars and other forms of transportation. All of these fossil fuels are imported, none of it is produced in Costa Rica. Hydrogen produced by electrolysis requires only electricity and water. This means that it can be produced 100% in Costa Rica and it would allow Costa Rica to stop importing fossil fuels.

FAQ'S

HOW MUCH DOES IT COST TO FILL UP A TANK WITH HYDROGEN COMPARED TO GASOLINE?

That depends of the maturity of the industry. In California, for example, it cost $5 dollars per kilogram of Hydrogen (5 kg being a full tank). That means that you could fill up your tank for just $25. In less developed or supported regions hydrogen typically costs around $15 per kilogram.

HOW HARD IS IT TO "REFUEL" A VEHICLE THAT RUNS ON HYDROGEN?

The process of "refueling" a hydrogen powered vehicle is quite similar to refueling a vehicle that runs on gasoline. For heavy cargo vehicles , which must be running constantly, hydrogen is a better option. Unlike electric vehicles which take up to several hours to recharge, refueling your vehicle with hydrogen will take about 5-10 min.

HOW DO THESE HYDROGEN TECHNOLOGIES AFFECT THE CONSUMER AND THE TRANSPORTATION SECTOR?

Hydrogen vehicles are much more efficient than those that use internal combustion engines and they are carbon free. Despite having a similar energy storage capacity as fossil fuels, hydrogen technologies out perform by 1.6 times more. Consumers would actually benefit if the cost of a kilo of hydrogen was the same as a gallon of gas.

Both types of electric transportation are useful. Battery vehicles are appropriate when used on short trips and with more charge time (i.e., private vehicles that charge during the night) Hydrogen vehicles are more appropriate when the vehicle must be kept in operation continuously (for example, taxis, some buses,trains, trucks, airplanes, ships, forklifts, etc.)

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HOW EXPENSIVE IS IT TO BUILD THE INFRASTRUCTURE TO SUPPORT HYDROGEN VEHICLES?

The initial cost for infrastructure will be high during the first stages, but it is important to think about this as an investment in the future. Our transformative vision for this country, a long term vision, is one that should be implemented gradually but continually. Once the initial infrastructure is constructed, the costs of hydrogen will be competitive to those of gasoline.

ARE THERE PLANS TO USE THE WATER VAPOR THAT ESCAPES THROUGH THE EXHAUST OF A HYDROGEN VEHICLE?

The exhaust for a hydrogen vehicle is merely water vapor.
This is not only harmless to the environment but it is actually beneficial for it, because the water used to make the hydrogen then returns to the ecosystem. Some hydrogen vehicles have experimented with the collection of water vapor from the exhaust which when collected presents itself as liquid, drinking water, which could be recycled into a main water supply.

WHAT ARE OTHER WAYS WE CAN USE HYDROGEN?

Hydrogen is a versatile mechanism for energy storage. It can be used for transportation, primary and secondary energy systems, and industrial uses (i.e. semiconductors, glass production, agrochemicals, among others). In addition to hydrogen, electrolysis also produces high-purity oxygen with commercial value.