

# FUEL OF THE FUTURE: HYDROGEN GAS

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"I believe that water will one day be employed as fuel, that hydrogen and oxygen which constitute it, used singly or together, will furnish an inexhaustible source of heat and light, of an intensity of which coal is not capable."

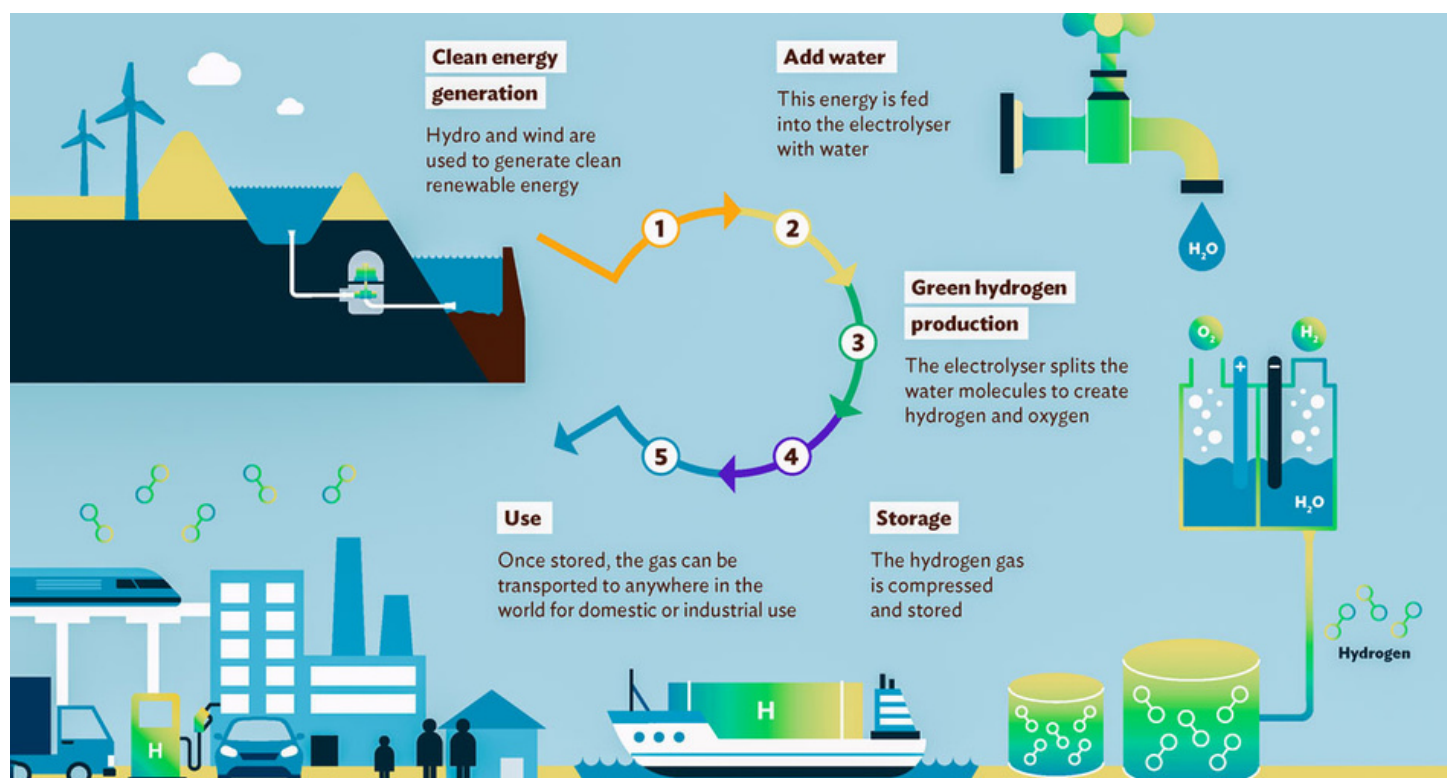
- Jules Verne

Hydrogen is a zero carbon-based fuel. When burnt with oxygen it produces just water as the end product, hence, it is considered to be a clean fuel. Presently, many commercial fuel cell vehicles and passenger cars utilize hydrogen in place of conventional fossil fuels.

It is popular rocket fuel, providing an impressive amount of impulse intensity. It's very light in weight and burns with incredible vigor. Hydrogen seems like the ideal fuel not only for the present but also for the future. It can aid us in tackling environmental issues. Air pollution due to vehicles as well as some industries can be reduced considerably as well as some industries. Hydrogen is very eco-friendly and is found in abundance on the earth. Hydrogen is a renewable source of energy.



Source: Google, Just love chemistry



Source: Google, Solarthermalworld.org



A few challenges, however themselves when it comes to making hydrogen the "go-to" fuel. The extraction of hydrogen is still dependent upon fossil fuels. Green hydrogen is obtained by a process called "electrolysis". The majority of hydrogen production is met by processes that involve the utilization of fossil fuels such as methane gas reforming. The process is also decently expensive which makes hydrogen a pretty luxurious fuel. The transportation and storage are costly as due to the low density of hydrogen it has to be stored under high pressure to maintain its efficiency. Hydrogen is highly volatile and flammable and odorless which makes it hard to detect a leak.

Despite all this, it's safe to say that with better strategies and technological advancements we'll be in a place to regard hydrogen as conventional fuel.

**FUEL CELLS ARE A CLEAN WAY TO PRODUCE POWER.**

Fuel cells are similar to batteries in that they produce electricity without combustion or emissions. Unlike batteries, fuel cells do not run down or need to recharge—as long as there's a constant source of fuel and oxygen. Compared to conventional gasoline vehicles, fuel cell vehicles can even reduce carbon dioxide by up to half if the hydrogen is produced by natural gas and by 90%, if the hydrogen is produced by renewable energy, such as wind and solar. There are also no pollutants emitted from the tailpipe—just water!

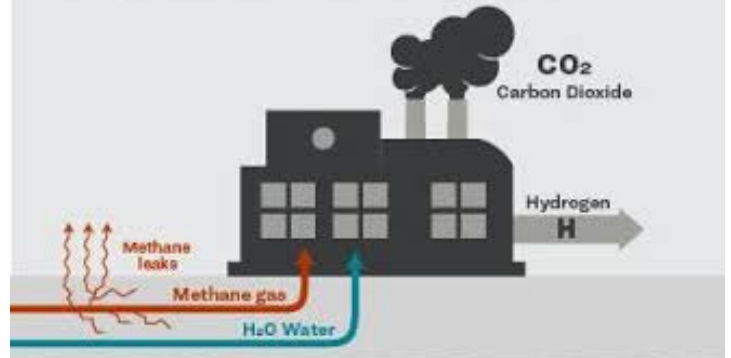


Source: Forbes

# Three ways to make hydrogen

## Gray hydrogen plant

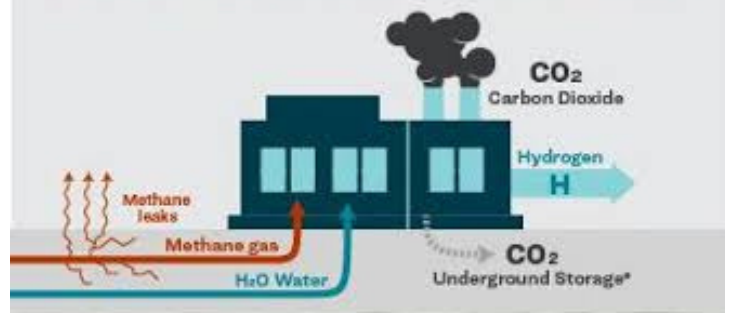
Steam methane reforming process uses methane gas and creates a reaction that results in hydrogen and carbon dioxide, which is released into the atmosphere.



## Blue hydrogen plant

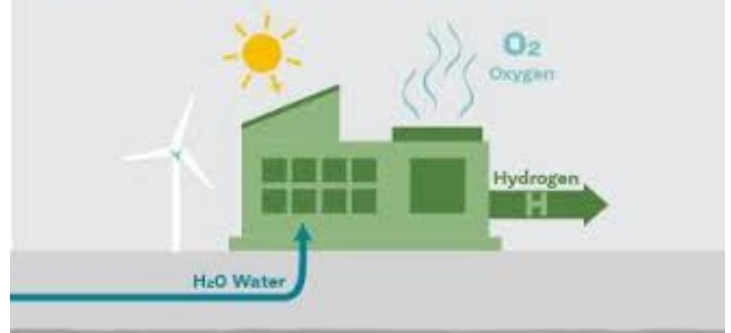
Steam methane reforming process uses methane gas and creates a reaction that results in hydrogen and carbon dioxide. Some of the carbon is captured and stored, while some is released into the atmosphere.

\*Underground storage of carbon poses additional environmental issues



## Green hydrogen plant

Process uses electrolysis to separate the hydrogen from oxygen in water and is powered with some form of renewable energy. No fossil fuels are used.



Source: Sierra Club