

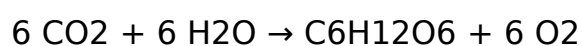
# Example of report on establishing the barriers to the use of hydrogen as fuel for...

[Environment](#)



Greenhouse gases are those gases that trap heat in the atmosphere. Several chemical compounds in the earth's atmosphere are greenhouse gases. They allow sunlight to pass through them into the surface of the earth. This light is reflected from the surface back towards the space in the form of infrared radiations or heat. The greenhouse gases absorb these radiations and trap the heat in the atmosphere. After some time, the amount of energy sent from the sun to the surface becomes equal to the energy radiated back into the atmosphere. This process leaves the temperature of the surface of the earth constant. There are several gases that possess the greenhouse properties. Most of them occur in nature such as carbon dioxide, water vapor, nitrous oxide and methane. Others result from human action such as the gases that are used for aerosols.

Carbon dioxide (CO<sub>2</sub>) is usually emitted into the atmosphere through the burning of fossil fuels, which include coal, oil and natural gas, solid waste, trees and wood products. Certain chemical reactions also lead to the emissions of this gas such as the reactions in the manufacture of cement. It forms the highest composition of the greenhouse gases with about 84% of the total greenhouse gas composition. It is eliminated from the atmosphere through the biological processes of photosynthesis in plants.



Carbon dioxide + Water + Light energy → Glucose + Oxygen

The other greenhouse gas is Methane (CH<sub>4</sub>), which constitutes 10% of the total composition of the greenhouse gases. It is emitted during the transport of natural gas, coal and oil. It is also emitted from livestock and other agricultural practices and organic waste decay. Nitrous gas (N<sub>2</sub>O), which

constitutes 4%, is also emitted during agricultural and industrial activities and in the combustion of fossil fuels. The least in the composition is fluorinated gases, which include perfluorocarbons, hydrochlorocarbons, and sulfur hexafluoride. They are synthetic and powerful, and are majorly emitted in the industrial production processes. Even though these gases are emitted in smaller quantities, they are highly potent greenhouse gases and are referred to as High Global Warming Potential gases (High GWP gases). Hydrogen gas has recently been used to propel cars and machines. It is considered as pollution free or a green byproduct due to the environment friendly emissions. The combustion of hydrogen produces water as the by-product. Water vapor is considered harmless to the environment (Tabak 2009).



Hydrogen gas + Oxygen gas → water

The above equation is possible with the aid of heat energy. There is another product of this reaction when it takes place in an open environment; however, this product - nitrogen gas - is emitted in very small quantities. Hydrogen appears first in the periodic table making it the lightest element on the surface. This implies that though it is abundant, it is not easy to harvest naturally since it is very high above all other gases in the atmosphere, therefore, it is produced in companies in order to supply the demanded quantities to the Hydrogen propelled vehicle users. Hydrogen gas is refined from natural gas, coal and oil. The most disadvantageous part of using hydrogen gas fuel is spillage. When this gas leaks into the atmosphere, there are possibilities of being abundant in the atmosphere. Too much hydrogen

gas in the atmosphere decreases the presence of the ozone layer. Studies have established that moving from the other forms of energy used in propelling cars to hydrogen would lead to 60 - 120 trillion grams of hydrogen yearly. As this gas mixes with atmospheric air, it produces additional water that makes the atmosphere damp. This effect on the atmosphere holds the same magnitude as the High Global Warming Potential gases.

There are several barriers to using these hydrogen-fueled gases. These limitations include the production of the gas, which emits large amounts of carbon dioxide gas. The other limitation is cost; powering the process of electrolysis in the production of hydrogen using wind, sunlight and water is very expensive. Additionally, the infrastructure for using this technology such as installing hydrogen fuel stations would take a lot of time and bears great environmental risks such as pollution from spillage. Production of mass hydrogen cars would also require the use of copper to manufacture the electric motors used by these cars. Copper is not available for the massive manufacture of these motors. These disadvantages far outweigh the advantages associated with the production of this technology.

## **Electric Vehicles (EV)**

There is no perfect technology. This is the reason behind the continued inventions. The electric vehicles powered by the use an electric motor, which are powered by rechargeable battery packs. They have advantages such as energy efficiency; they convert 59%-62% of energy from the grid to supply power to the wheels (Darrel and Anderson 2012). They are also environmental friendly; they produce no tailpipe pollutants. Although it is argued that the companies that produce these energies produce pollutants,

almost all other companies produce these gases, including the other forms of energy such as petrol, diesel and hydrogen. However, these vehicles do not pollute the environment in the manner that the former vehicles did with their waste products (U. S. department of energy, 2013). The other advantage related to the use of such vehicles is the reduction on energy dependence. Hydrogen is a secondary energy source while electric vehicles use electricity, which is a domestic energy source. The latest releases of this technology include Mitsubishi i-MiEV and Ford Focus electric cars.

Another possibly intervention to the problem of environment polluting energies is the use of solar powered cars. They also use solar powered batteries to provide power to the wheels. They do not have tailpipe pollution emissions as other vehicles (E. V World 2013).

## **Conclusion**

Hydrogen gas powered vehicles have several environmental advantages associated with reducing the pollution effects of cars on the environment. However, some setbacks mark the technology as destructive just as other forms of fuel such as petrol. These setbacks include emission of excess water to the environment through combustion in the vehicles and the reaction between hydrogen gases that has leaked into the environment with atmospheric air. This water dampens the atmosphere thereby reducing ozone. Though these cars provide a solution to problems such as global warming, the solution requires too much infrastructure to be installed in countries that would take decades, especially in developing countries. This solution seems ideal, but far from the world's reality. Recovery from this problem has been arrived at by the invention of solar powered vehicles and

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the electronic vehicles. These vehicles do not produce tailpipe pollutants to the environment and are generally environmental friendly.

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