



Prize Winner

Science Writing Year 5-6

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GREEN HYDROGEN

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What is Green Hydrogen?

Green hydrogen is a type of sustainable energy. It is referred to as “green” as it is produced using natural, renewable energy sources like wind or solar power. This powers the electrolysis of water, which is a process that splits hydrogen from oxygen in water, using an electrical current.

When pure hydrogen is used as a fuel source, it only releases water into the atmosphere, instead of carbon dioxide, like fossil fuels do. Hydrogen can be produced in many different ways, but some of these processes emit large amounts of carbon dioxide depending on the fuel used to create it. Grey hydrogen is made with natural gas and the production process, called Steam Methane Reforming, can emit up to 12 kilograms of carbon dioxide per kilogram of hydrogen produced. Grey hydrogen is currently the most commonly used type of hydrogen. Blue hydrogen reduces these emissions of carbon dioxide to 3 to 5 kilograms by adding carbon capture and storage to the process. Green hydrogen further reduces emissions to less than one kilogram of carbon dioxide per kilogram of hydrogen, meaning it is better for the world.

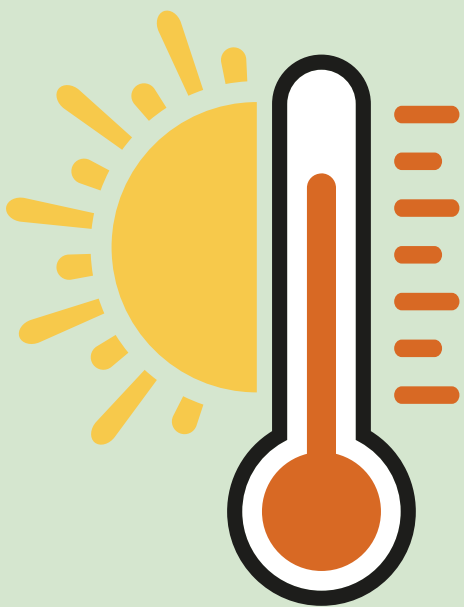


What are the Advantages?

Green hydrogen has many advantages, the main one being that it reduces the amount of carbon dioxide released into the atmosphere. It is also sustainable, and it is a clean, green energy source. When hydrogen is turned into energy, it binds with oxygen from the air, to create electricity inside a fuel cell. This results in the release of steam or water, instead of carbon dioxide. Green hydrogen can achieve the reduction of carbon dioxide emissions and will help battle climate change and global warming. It is also storable, and can be compressed into tanks for a very long time. It can also be transported more easily than lithium batteries, as it is a light element.

What are the Disadvantages?

The use of green hydrogen comes with its disadvantages as well. The energy required to produce green hydrogen is expensive, and due to the large amounts of energy needed, it leads to a high cost of production. This is the reason why green hydrogen currently only makes up a small proportion of the overall hydrogen. Hydrogen is also extremely unstable, and therefore needs to be handled and stored with extreme care. This is to prevent dangerous explosions and potential leakages.



How will it affect our future?

An increase in the use of green hydrogen will have positive effects on our future as it will help lower the amount of greenhouse gases released into the atmosphere. With this reduction in harmful emissions, climate change will hopefully slow down and global warming can be minimised. Climate change refers to the long term shifts of weather. Long ago, climate change happened due to natural causes, such as large volcanic eruptions or changes in the sun's activity. Lately, since about the 1800s, the cause of climate change has been a result of human activity, in particular, from burning fossil fuels creating greenhouse gases that make global warming a bigger problem. Global temperatures have already risen by 1.1°C since preindustrial times and the use of green hydrogen could potentially minimise further temperature increases. Climate change is a huge problem that can affect our health, safety, and many other things that can alter our daily lives. Climate change is a bigger threat to people who live on small islands, for the rising sea level has the potential to displace them from their homes. Some entire communities have had to relocate due to the sea level rising too high for it to be safe to live there. In the future, it is very possible that it will happen to a number of other communities. Green hydrogen has a potential to slow down climate change by a significant amount.

What can Green Hydrogen be used for?

There are many industries that make use of green hydrogen. Some of these include:

- Transportation

Cars are being produced using hydrogen as a fuel source to generate electricity to power the engine. There is also the potential that hydrogen will be used to fuel mining vehicles, trains, aircrafts, buses, trucks and ships.

- Chemical industry

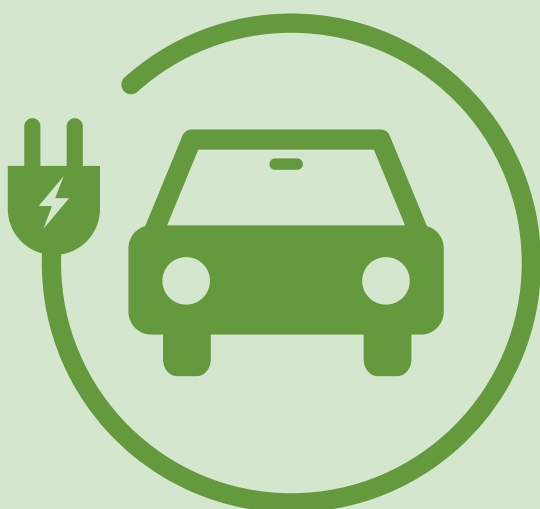
Hydrogen is currently being used to manufacture ammonia and fertilisers, as well as petroleum products.

- Steel Industry

The steel industry contributes greatly to greenhouse gases and pollution. The use of hydrogen as an alternative fuel source would improve the sustainability of the production.

- Domestic household use

There is potential for green hydrogen to be used in houses to replace traditional fossil fuels. However, there is a lot of work and research to be done to make the domestic use of hydrogen safe and affordable.



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