

About hydrogen

Hydrogen is the most abundant element in the universe, making up more than 90% of all matter, however it is rarely found in its elemental form and must be produced.

Hydrogen has multiple uses powering industry, homes, and vehicles but also serves as a feedstock in green fertilisers and aviation fuel.

Hydrogen can be used as a replacement fuel to displace natural gas in residential and industrial processes as well as a substitute to diesel and petrol in vehicles.



Different types of hydrogen production

Green hydrogen

is produced through the process of electrolysis – using electricity to split the hydrogen and oxygen; when renewable electricity is used there are no emissions from the production of hydrogen.

Grey hydrogen

relies on fossil fuels for production, and is made through Steam Methane Reforming (SMR) which creates significant carbon emissions.

Blue hydrogen

is made through SMR with the emitted CO₂ captured and then either stored or used, however Carbon Capture is only ~60% effective in practice.



Hydrogen is **safe**. It has been used for centuries and is a well understood element.



Green hydrogen is **sustainable** if it is produced with renewable electricity.



Hydrogen is **mobile**; it can be transported by road rail or ships.



Hydrogen is **storable**; it can be compressed and stored in large volumes like fossil fuels.

Why use hydrogen instead of just renewable energy?

The Project is seeking to use green energy generated by renewables to produce green hydrogen, primarily because it is so flexible and can be used as a solution to numerous energy-intensive components of the Brewery.

Green hydrogen production provides an exciting opportunity to secure a flexible net zero solution to our energy needs. There are zero greenhouse gas emissions associated with hydrogen generation if the energy required for this process originates entirely from renewable sources, such as solar or wind.

Hydrogen has numerous specific benefits: it can power a fleet of vehicles and provide the energy required for large scale industrial processes without the use of fossil fuels (and associated emissions), can be stored for use at any point, and can be easily transferred or exported using existing technology/infrastructure.

Whilst renewable electricity is sustainable and effective, there are limitations with factors like storage and the timing of power provision (e.g. solar power is limited to daylight hours and wind energy to windy periods). If this renewable energy is used to create hydrogen, which can then be stored and used as required for a whole range of uses, it allows for a more efficient and flexible operation across the numerous core elements of Magor Brewery can be achieved.



Vehicles that clean the air around them

When used to power fuel cell electric vehicles (FCEVs), as is being proposed for the Brewery's HGVs and forklift trucks, there are numerous benefits over traditional diesel-powered vehicles. Fuel Cell Electric Vehicles, in common with electric vehicles, are quiet, have no exhaust emissions (except water) and have much higher efficiencies. In addition, FCEVs actually take in air and filter out the particulates as part of the process, meaning that they clean the air as they drive along.