About hydrogen

WHAT IS HYDROGEN?

Hydrogen is the simplest and most abundant element in the universe. Hydrogen is a colourless, odourless and non-toxic gas.

WHY HYDROGEN?

Hydrogen can be used much like natural gas to heat homes, power vehicles and produce electricity, but importantly when burned, it produces only water vapour and energy as heat, with no carbon emissions.

HAS HYDROGEN BEEN USED BEFORE IN SOUTH AUSTRALIA?

Hydrogen is used around the world today, including industry in South Australia – for example when making steel.

From 1861 until 1969, South Australians relied upon Towns Gas to meet gas demand. Towns Gas was gas manufactured from coal and consisted of 50-60% hydrogen. Some places such as Hong Kong and Singapore still rely on Towns Gas.

South Australia switched from Towns Gas upon the discovery of natural gas, because natural gas was considered more economically viable. Today we know that blended renewable gas is the first step on our journey to lowering carbon emissions and that the cost of producing hydrogen is decreasing.

HOW IS HYDROGEN MADE?

Hydrogen is naturally occurring but is usually found attached to other elements – for example with oxygen as water (H_2O) or with carbon as natural gas (CH_4). Therefore, if we want to use hydrogen, we must separate it from these other elements.

There are a number of ways to produce hydrogen. The most common are to use electricity to split water into hydrogen and oxygen using electricity – a process known as electrolysis, or through a reaction using fossil fuels (natural gas or coal).

At the Tonsley Innovation District, we will establish Hydrogen Park South Australia, a facility that will make hydrogen gas using an electrolyser and renewable electricity.

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Australian Gas Networks

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Blended 5% renewable gas in Mitchell Park

For more information

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WHAT EQUIPMENT IS REQUIRED TO MAKE HYDROGEN?

Our facility at the Tonsley Innovation District will use a 1.25 megawatt Siemens PEM (proton exchange membrane) electrolyser. This equipment will use electricity to split water (H_2O) into hydrogen and oxygen. Siemens has installed a number of these units across the world. The units are very efficient, producing high purity hydrogen and are low maintenance. At Hydrogen Park South Australia we will use renewable electricity, meaning the hydrogen we produce is carbon free.

HOW WILL THE HYDROGEN BE USED AT HYDROGEN PARK SOUTH AUSTRALIA?

We will produce a maximum of 20kg of hydrogen gas per hour and on average we expect to produce around 40-60kg per day. This hydrogen will be blended with natural gas and supplied to customers using the existing gas network. We will also have the capacity to store approximately 40kg on site.

HOW WILL WATER BE USED TO PRODUCE HYDROGEN?

A key input for hydrogen production from electrolysis is water. We will connect to the SA Water network to source water for our facility. Water is simply delivered to the site as you would have it delivered to your house.

The water volumes consumed to produce hydrogen are very low: 300 litres per hour, or the equivalent of a 30-minute shower using a low flow shower head. The electrolysis process separates the atoms of hydrogen and oxygen with the hydrogen reformed back into water vapour when it is burned, releasing energy as heat.

HOW ELSE CAN WE USE HYDROGEN?

Hydrogen can be used like natural gas in homes and businesses to heat water, heat space and to cook, in industry such as fertilizer production, to generate electricity and even to fuel vehicles.

Our facility at the Tonsley Innovation District will blend renewable hydrogen with natural gas to supply to local homes and businesses. We are also looking to supply hydrogen to industry and to the transport sector via tube trailers (long storage tubes on the back of semi-trailers, a common mode of transport for the industry).

In doing this, we are helping our economy transition to a cleaner future. Renewable hydrogen has other benefits because there is growing demand for renewable hydrogen overseas, leading to new industries and jobs. This is the first step on our journey which will see hydrogen used throughout South Australia and Australia more generally.