



## ***HYDROGEN IS HERE TO STAY***

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**Ex Solutions for Hydrogen (H<sub>2</sub>) Atmospheres**

# HYDROGEN -

## BRINGING EFFICIENT ENERGY TO THE WORLD

### HYDROGEN BASICS:

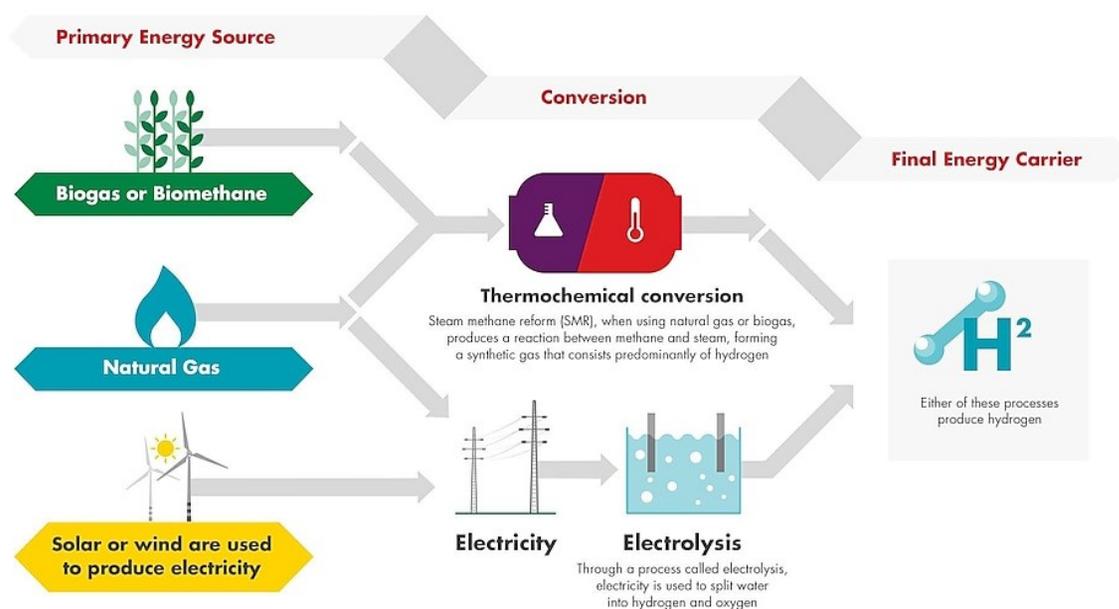
Hydrogen is a clean alternative to methane, also known as natural gas. It's the most abundant chemical element, estimated to contribute 75% of the mass of the universe.

Hydrogen can be produced from a variety of resources, such as natural gas, nuclear power, biogas and renewable power like solar and wind.

### WHY IS HYDROGEN DIFFERENT?

Hydrogen from renewables can be produced through various pathways, with the most established being the use of renewable electricity to split water into hydrogen and oxygen in an electrolyser.

At present, 95% of worldwide hydrogen production comes from fossil fuels, however this is set to change with the increasing demand and lower cost of renewable electricity.



# HYDROGEN -

## CURRENT EXAMPLES IN OUR WORLD

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### WHAT IS HYDROGEN USED FOR?

Hydrogen is already widely used in our world to provide a clean source of energy for:

- Chemical and food processing
- Rocket fuel
- Electricity production through fuel cells
- Vehicle fuelling



### WHAT IS THE FUTURE OF HYDROGEN?

Hydrogen will play a critical role supporting global economies to achieve net zero emissions by 2050 and limit global temperatures rises to 1.5C.

It estimated that Green Hydrogen could supply up to 25% of the world's **energy** needs by 2050 and become a US\$10 trillion addressable market by 2050.

Future uses:

- Steel and fertilizer production
- Large and small scale power generation
- long distance shipping
- Remote power applications

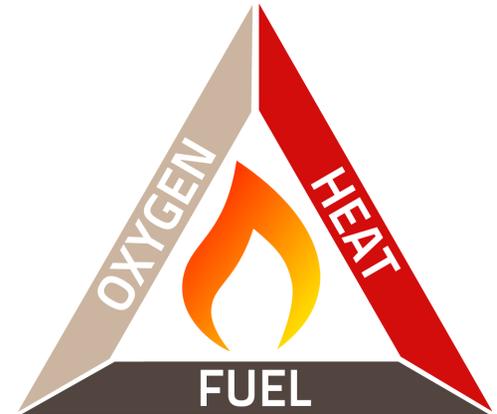
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## WORKING SAFELY IN H2 ATMOSPHERES

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### IMMEDIATE DANGERS

The largest concern when working with or around Hydrogen is its flammability. Hydrogen possesses the NFPA 704's highest rating of 4 on the flammability scale because it is flammable when mixed even in small amounts with ordinary air.



### REDUCING DANGER & RISK

Industry experience demonstrates that explosions can cause loss of life and serious injuries as well as significant damage.

Preventing releases of dangerous substances, which can create explosive atmospheres, and preventing sources of ignition are two widely used ways of reducing the risk. Using the correct equipment can help greatly in this.

Therefore, equipment intended for use in explosive atmospheres must comply with international safety directives such as ATEX, IECEx, EAC and NEC 500,



# HYDROGEN -

## JCE GROUP APPLICATIONS IN H2 ENVIRONMENTS

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### HYDROGEN APPLICATIONS:

- Designing, manufacturing and testing PLC based control systems for the production and storing of hydrogen for use in both hazardous and safe area.
- ATEX and IECEx certified control equipment for use in hazardous areas (Zone 1 & 2), supplied and manufactured in the UK.
- Hybrid systems incorporating fuel cell technology, solar and wind for producing clean energy to off-grid locations or unmanned platforms.
- Monitoring systems (CCTV and security) with networking capabilities.
- Fuel cell systems for use in remote locations.



### FUEL CELL APPLICATIONS:

JCE can offer a set of solution based upon fuel cells supplied with different fuels:

- Hydrogen: can be used in Gas form delivered using gas cylinders, this allows the storage of large amounts of energy in a small space.
- Methanol: This can be used as an energy source in liquid form, where pressurised cylinders are not possible to be used
- Ammonia: this is another form of producing hydrogen, separating ammonia (liquid) to produce Hydrogen

With these solutions we can offer a wide range of fuel cells, ranging from 100W to 10kW or more.

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## JCE GROUP APPLICATIONS IN H2 ENVIRONMENTS

The use of fuel cells and hydrogen production has a number of hazards and risk associated with it. JCE have extensive experience in complying with associated directives such as ATEX Equipment Directive, Low Voltage Directive, Machinery Directive, Pressure Equipment Directive, Electromagnetic Compatibility Directive and the Gas Appliance Directive.

Hydrogen has the highest flammability range and lowest required ignition energy of any fuel.



Groups of gas our equipment is certified to:

Sub-Group	Typical gas/vapour
IIA	Propane
IIB	Methane
IIB+H2	Hydrogen
IIC	Acetylene



To explore our wide range of H2 certified electrical control systems, panels and components please visit our website or contact us via the below information:

<https://www.jcegroup.com/products>

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