



The Perfect Fit

# Hydrogen Industry

Climate-neutral solutions for the future



# Hydrogen – energy source for the future

**The success of the energy transition calls for innovative solutions that in turn enable intelligent climate protection. Hydrogen plays a key role in the comprehensive and economical realisation of this. The enormous potential of this energy source is clearly evident. For this reason, the production, transportation, storage and utilisation of hydrogen are becoming increasingly significant.**

Today, hydrogen is generated, in the chemical sector and refining, through the addition of steam (steam reforming). This process is performed in numerous largescale plants.

As the element with the smallest atomic mass, hydrogen always occurs in a chemical compound. In nature it can be found in the form of water, acids or hydrocarbons, for example. Hydrogen needs to be removed from this compound before it can be used as an energy source. In future, a climate-friendly process is required that enables water to be electrolysed by electricity generated from renewable sources to break it down into its components of hydrogen ( $H_2$ ) and oxygen (O).

## Overview of different manufacturing processes

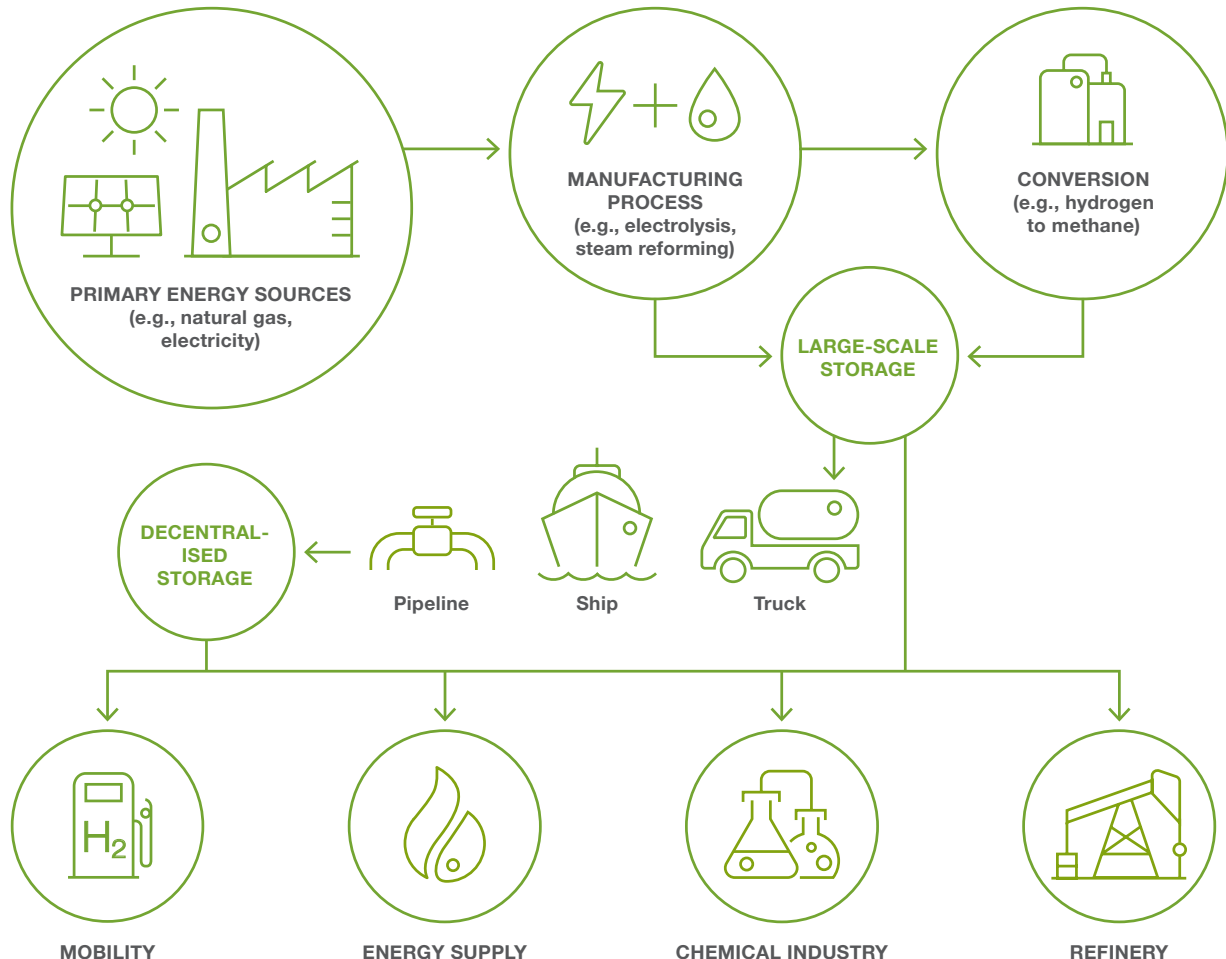
**Grey hydrogen:** Fossil fuels are used for this. Natural gas is split into hydrogen and carbon dioxide through thermal action. The  $CO_2$  released exacerbates the greenhouse effect.

**Blue hydrogen:** Produced in the same way as grey hydrogen. However, the  $CO_2$  is stored and not released into the atmosphere. The question of how the bound  $CO_2$  is stored has yet to be clarified.

**Turquoise hydrogen:** Generated via methane pyrolysis. This sees the methane in natural gas split into hydrogen and solid carbon, which can later be reused as granulate. This ensures that no  $CO_2$  enters the atmosphere.

**Violet / yellow hydrogen:** Electrolysis is used to split water into oxygen and hydrogen. The electricity required for this is sourced from either nuclear energy (violet) or an energy mix (yellow). This results in the creation of either radioactive waste or climate-harming  $CO_2$ .

**Green hydrogen:** This also sees hydrogen generated via electrolysis. The energy for hydrogen generation comes exclusively from renewable sources and is therefore the most environmentally friendly production process.



# Solutions for the hydrogen industry

**Hydrogen is considered as the energy source of the future. It ultimately enables energy-intensive industrial sectors to operate in a climate-friendly manner. To achieve this, a hydrogen core network measuring over 11,000 kilometres is to be established in Germany by 2032, linking the relevant hydrogen suppliers with all major consumers.**

This calls for competent partners who, in addition to an economical supply concept and smooth processes, offer accompanying services that leave no questions unanswered. Thanks to our many years of experience in the field of energy supply, we are able to provide you with exactly this service package.

The current trend leans towards expansion of the hydrogen industry. The following projects in which we are involved serve to illustrate this:

## **Hanekenfähr H<sub>2</sub> grid connection**

Feeding of hydrogen from the eponymous hydrogen park into the existing piping network

- L360NE line pipes
- Pipe bends and T-pieces from L360NE
- Partially featuring PE and GRP coating



## **Neckarenztalleitung (NET)**

Construction of a high-pressure natural gas pipeline (green gases and hydrogen) from Wiernsheim to Löchgau

- 508x12.5mm pipe bends, L360ME quality
- PUR coating

## **Trailblazer, Oberhausen**

Beginning in Oberhausen, the first electrolyser on a global scale is to supply key industries in the Rhine/Ruhr area with hydrogen from renewable energy sources

- Pipes, flanges and fittings ASME 304L/316L, WPB/WPL6
- Pipes DIN EN 10217-7, 1.4571, annealed
- Charpy impact test -20°C with carbon steel
- Size range 21,3 – 219,1mm

## **Good reasons for co-operation with rff**

Our extensive expertise in the handling of complex projects is based on a comprehensive range of services. This is key to ensuring the just-in-time calling of high-quality pipes and pipe fittings in consistent quality. This is ensured by a number of different aspects: the product range of the highest technical standard is available from the logistics centres in Stuhr/Bremen and Beucha/Leipzig within the shortest of times. The perfect interaction of all factors necessary for the smooth support of your projects means that you receive a complete package that offers supplementary added value.



# We are there where you need us.

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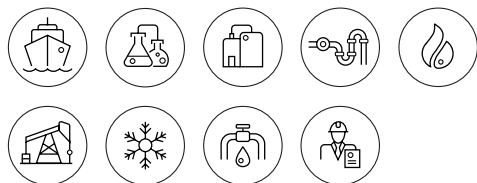
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