



The image shows an electrolyser with hydrogen feed lines to the storage units. / Source: Swen Gottschall - Zukunft Gas

Smart valves for the hydrogen boom

The future belongs to green hydrogen – according to a study by Deloitte, it will dominate the supply mix and reach an 85 percent market share of over 500 million tons by 2050. At the same time, there is a need to invest \$9.4 trillion into the hydrogen supply chain by 2050 – so suppliers of components for the H₂ value chain can look forward to large-scale orders. For example, there's a need for an immeasurable number of valves to set up the supply – with numerous valves needing to be of the “smart” kind. In view of the fact that digitalisation is quite far advanced in a lot of cases, this is a task the industry should be able to solve.

The hydrogen market plays a central role in achieving climate neutrality by 2050. Therefore, around \$375 billion per year will be invested in this sector by 2050, as predicted by the “Green hydrogen: Energising the path to net zero. Deloitte’s 2023 global green hydrogen outlook” study of the Deloitte Center for Sustainable Progress. By 2050, industry will account for 42 percent of the total demand for green hydrogen, while transport will account for 36 percent. “In total, by 2050, up to 85 gigatonnes of CO₂ can be saved cumulatively by green hydrogen.” Tempting prospects.



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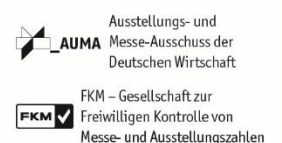
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According to the Deloitte study, by 2050, four regions will account for a total of 46 percent of global hydrogen production and 90 percent of trade: North Africa (44 million tonnes) and Australia (16 million tonnes), as well as North America (24 million tonnes) and the Middle East (13 million tonnes). “The most important importing centres will then be Europe, Japan, Korea and India, which account for more than 80 percent of world trade.”

A demand for valves to be used in new projects

The increasing demand for hydrogen is already reflected in the demand for valves. Hartmann Valves is supplying around 1,400 ball valves for pressure levels PN 16, PN 100 and PN 250 to the GET H2 Nukleus project in Gronau-Epe, Germany. Various nominal sizes of these ball valves (DN 25 to DN 300) are used, having been specially designed to meet the requirements of hydrogen storage.



With its material suitability test, Hartmann Valves makes it possible to check existing valves for hydrogen applications. / Source: Hartmann Valves



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The GET H2 Nucleus project sees one of the first publicly accessible hydrogen infrastructures in Germany being built from Lingen to Gelsenkirchen. To implement the project, an existing cavern of the RWE Gas Storage West GmbH filled with brine is to be converted for the storage of hydrogen. Also, additional systems are to be built at the existing compression and extraction station, and the cavern is to be connected for storage operations.

New H2 projects are springing up all over the place: For instance, "Hyperlink", a 660-kilometre-long H2 pipeline owned by the Gasunie network operator. Together with other projects, Hyperlink forms the European Hydrogen Backbone. It consists of five sub-projects. The first part of the Hyperlink network will be completed in 2026. By 2030, industrial customers and clusters are to be connected. "It will be possible to import or 'land' hydrogen; hydrogen storage will become part of the infrastructure; and there will be cross-border connections with the neighbouring countries of the Netherlands to the west and Denmark to the north," Gasunie explains. Both existing gas networks and newly built infrastructures are used in this – one supplier of valves and measuring instruments is the RMA Group.



Higher efficiency at higher pressures

From Herose's point of view, it is important to develop new valve series especially suitable for the very low temperature of liquid hydrogen (-255 °C) and the high pressure of compressed hydrogen (up to 1,000 bar). Herose safety valves prevent damage to people and equipment in case something unexpected happens and the pressure in a tank or pipeline becomes too high. In this case, the valve safely discharges the hydrogen into a vent system. These valves are used in high-pressure hydrogen systems, but also in liquid hydrogen systems that normally operate at moderate pressure.

Müller co-ax also supplies valves for the production, transport and distribution of hydrogen along the entire value chain. The industry is now in transition: "To establish existing solutions in the hydrogen industry, they need to

become more efficient,” the company explains. At the same time, in the case of hydrogen, higher pressure often means higher efficiency, since more hydrogen can be transported this way. The KX1000 valve from müller co-ax for instance is designed for pressures of up to 1000 bar and simultaneously has a high flow rate, too. “This can significantly shorten the refuelling process compared to conventional valves,” the company explains.

New valve types for new applications

Goetze KG Armaturen also focuses on the hydrogen market. As a manufacturer of safety valves, pressure reducers and overflow valves, the company uses valves in almost all areas of the hydrogen value chain – from formation via electrolysis and storage at high pressures or liquefaction at cryogenic temperatures right up to the point of use for users. “We regulate pressure before electrolysis occurs, protecting the feedwater pump circuit and ultimately the tanks for storing hydrogen against unacceptable overpressure.”

Goetze relies on stainless steels with a higher nickel content in particular, for example to prevent cold cracking. “When it comes to seals, compliance with certain standards is important to us,” the company emphasises. Seals must therefore be specially tested.



WUN H2 GmbH currently operates the largest green hydrogen production plant in Bavaria. / Source: Swen Gottschall/Zukunft Gas



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New applications require different operating conditions and sometimes new valve types. In the future, larger valves will be needed to cope with larger flows, according to Herose. The company has also developed valve modules where a combination of valves and piping provides various functions, and vacuum-insulated valves to be used directly on liquid hydrogen tanks and trailers.

New challenges and enticing prospects

In the future, the green hydrogen economy will develop in a more decentralised manner than the large-scale hydrogen production of today. In addition, the hydrogen system must react much more flexibly to volatile renewable energy production: "This challenge can only be met in a cost-effective way via the maximum implementation of digital and intelligent systems," the German Hydrogen Association (Deutscher Wasserstoff-Verband) explains. In addition to digitalisation, artificial intelligence will therefore also be "indispensable for ramping up and establishing a green hydrogen market economy". The valve industry is equipped for this too.

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With hydrogen, cold cracking may occur. In order to avoid this, the appropriate material is to be used in valve design. / Source: Zukunft Gas

The hydrogen boom will undoubtedly lead to a further increase in demand for valves, "as soon as the electrolyser industry manages to put the first plants of significant size into operation," the Waldemar Pruss Armaturenfabrik

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describes. "It won't be long before it is possible to handle large volume flows" – a challenge the valve industry will accept gladly and successfully.

Explore trends and highlights from the valve sector at VALVE WORLD EXPO from 1st to 3rd December 2026 in Düsseldorf. Find the latest industry news and product information on the www.valveworldexpo.de Internet portal.

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