


Blue Gold

China wants to be climate-neutral by 2060, while the USA, Canada, and the EU are aiming for it as early as 2050. Hydrogen plays an important role in this plan. For maximum sustainability, the flammable gas must be generated from renewable energies such as the sun, water, or wind. DEKRA also sees a lot of future potential in H₂.

Text Matthias Gaul

I believe that water will one day be employed as fuel, that hydrogen and oxygen which constitute it, used singly or together, will furnish an inexhaustible source of heat and light, of an intensity of which coal is not capable." Is this a present-day statement? Not at all. Rather, the words date back to 1875, when one of French author Jules Verne's main protagonists - more precisely, engineer Cyrus Smith - said them in the novel "The Mysterious Island". According to the imaginary scientist, water broken down into hydrogen and oxygen with the help of electricity would serve as fuel instead of coal in the distant future. A bold vision at the time.

Almost 150 years later, hydrogen is attracting increasing attention as an energy supplier, especially in light of climate change. Politicians, scientists, and industry around the world are pushing the technology more than ever and see great potential with regard to the energy and mobility system's necessary transformation.

"Hydrogen will only play a key role if it's 'green'"

Hildegard Bentele,
Member of the European Parliament (EPP)



For example, the European Commission's Hydrogen Strategy presented in July 2020 states that "between 2025 and 2030, hydrogen must become an integral part of our integrated energy system." It says that from 2030 onward, renewable hydrogen will be used on a large scale in all sectors in which it has been difficult to reduce CO₂ emissions so far.

Many hurdles on the way to a green hydrogen economy

"However, we still need to put in a lot of effort to achieve this ambitious goal," says Hildegard Bentele, who sits in the EU Parliament for the European People's Party (EPP) and works there in the

Kite gas/fuel ship for the production of green hydrogen on the open ocean

The Top 3 Largest Hydrogen Projects in the World

> Asian Renewable Energy Hub

Across an expanse of 6,500 square meters, 26 gigawatts (GW) of hydrogen will be generated with the help of wind turbines and photovoltaic systems in the East Pilbara region in northwestern Australia. However, the mega-project is currently on hold due to concerns raised by the Australian Department of the Environment. A final investment decision has been set for 2025.

> North₂

In the north of the Netherlands, Shell, Equinor, Gasunie, RWE, and the port of Groningen Seaports want to jointly build a system of offshore wind farms, electrolyzers, gas storage facilities, and pipelines. A capacity of 4 GW is planned by 2030, and more than 10 GW by 2040.

> AquaVentus

On Helgoland, a development association consisting of around 40 companies is planning a generation capacity of 10 GW for green hydrogen from offshore wind energy and its transport to the mainland by 2035.

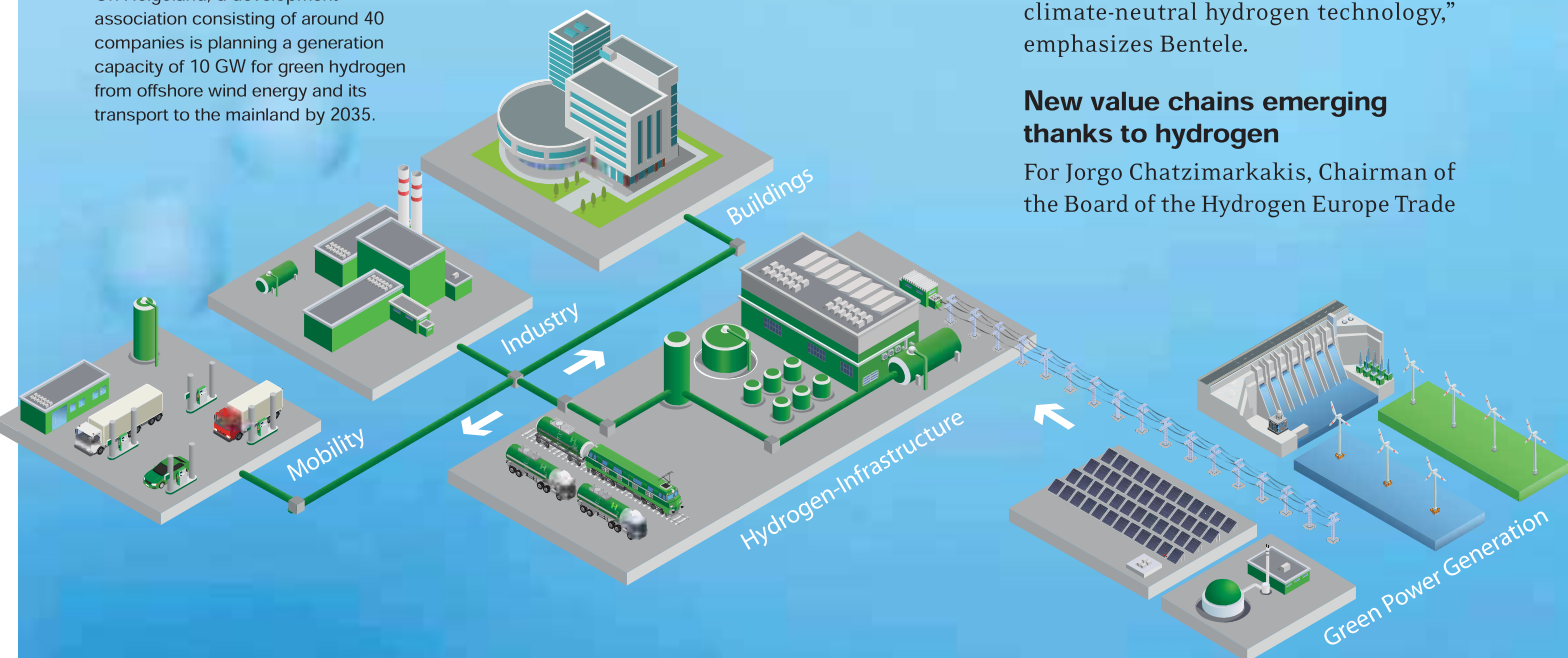
Development, Environment, and Industry Committees, among others. In light of the fact that up to 95 percent of hydrogen currently used in industry is still of fossil origin, research as well as investments in applications with hydrogen from renewable sources must be significantly expanded. “As far as the production of green hydrogen is concerned, the EU must strategically deepen partnerships in particular with countries where a lot of cheap renewable energy is produced, for example in Africa,” advises the MEP. Bentele is addressing an acute problem. After all, alternatives to fossil fuels are needed for the long-term success of the energy revolution and for climate protection. However, hydrogen will

only play a key role here if it’s “green”, i.e. if the electricity required for the electrolysis of water comes from renewable sources such as the sun, water, or wind, therefore making its production CO₂-neutral.

However, the politician also sees numerous other hurdles along the way. For example, the fastest possible certification of low-carbon hydrogen in order to further investments, the revision and adaptation of corresponding guidelines, as well as the stipulation of safety standards and recycling regulations. “I see diverse fields of activity for independent expert organizations such as DEKRA, particularly in the area of certifications as well as safety standards. With their know-how, they play an important role with regard to the future viability of climate-neutral hydrogen technology,” emphasizes Bentele.

New value chains emerging thanks to hydrogen

For Jorgo Chatzimarkakis, Chairman of the Board of the Hydrogen Europe Trade



How the Hydrogen Cycle Works

Green hydrogen is produced by electrolysis of water, using electricity exclusively from renewable sources. The gas can be stored in large-scale storage facilities and transported in pipelines and is then available for a wide range of applications – for example in transport, industry, and buildings.

"This is the beginning of a new era"

Jorgo Chatzimarkakis, Hydrogen Europe

Association, whose 300 or so members have included DEKRA since July 2021, norms and standards as globally applicable as possible are also a basic prerequisite for a successful transformation to the hydrogen economy. "This would be good for climate protection as well as the competitiveness of the players involved," affirms the German-Greek agricultural and political scientist. In his view, these players could include the Stuttgart-based start-up Oceanergy in the near future. Funded by the state government of Baden-Württemberg, among others, the company is developing the so-called Kite Propulsion System K1 as the heart of a high-altitude wind propulsion technology for innovative kite gas/fuel ships. With the help of generators and turbines, green hydrogen is produced and stored on the open sea and then delivered to port terminals.

Chatzimarkakis cites many more examples of the hydrogen economy's momentum toward decarbonizing industry and mobility. These include European mega-project HyDeal, in which green hydrogen produced from solar power in Spain will be transported via pipelines to France, Spain, and Germany. The instigators want to build electrolysis capacities of 67 gigawatts in Spain by 2030. More than 230 electrolyzer projects have been announced in EU countries by 2040, totaling around 136 gigawatts. "We're at the beginning of a new era that is creating entirely new value chains," says Hydrogen Europe's CEO. Politicians are now called upon to think big and not get bogged down in the details.

INTERVIEW

Three Questions for ...



Joakim Wikeby, Executive Vice President of DEKRA Group, Head of Service Division Industrial Inspection

1 How do you assess the potential of hydrogen technology?

The fact is that phasing out fossil fuels in line with the Paris Climate Agreement can ultimately only succeed through the implementation of technology based on green hydrogen. Overall, the potential applications are very diverse – whether as fuel in the mobility sector, as raw material solution for emissions-intensive industries such as the fertilizer, chemical, steel, and cement industries, or as fuel for commercial and residential building heating. In addition, hydrogen is ideal as a storage and transport medium for green energy.

2 Where do you see the biggest challenges for the future?

For a reliable supply of green hydrogen, policymakers must create the necessary framework conditions in terms of infrastructure and economic efficiency as quickly as possible so that consumers, companies, and countries can

rely on uninterrupted access to sufficient quantities of hydrogen. At the same time, the highest standards of safety and environmental compatibility must be ensured for all parties involved in production and transport as well as storage and supply of hydrogen.

3 What services and solutions does DEKRA offer regarding hydrogen?

We're already well positioned in this area with hazard and risk analyses, certifications of pressure equipment, inspections of high-pressure gas pipelines and storage tanks, and services in the field of explosion protection. At the same time, we're working hard to sustainably expand our portfolio of competencies – for example, to include pipeline inspections. We have recently recruited new staff and appointed a hydrogen program manager specifically to coordinate our services across all DEKRA Service Divisions and to provide advice. Our goal is to offer customers a one-stop solution platform.