Renewable Energy: Hydrogen - the Future of Energy has begun

Factsheet 15

Facts and Figures

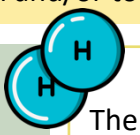
What is Hydrogen and how can Hydrogen be used?

Hydrogen is a chemical element (H) that occurs in nature, for example in combination with oxygen atoms as water (H_2O). It is the most common element on our planet. Hydrogen is gaseous at normal temperature.

Hydrogen as a climate-neutral gas can be used in energy-intensive sectors, for example:

- in steel production for the manufacture of "green steel".
- in the chemical industry for certain processes
- as a climate-friendly fuel in the transport sector
- as a gas it can replace natural and/or town gas in existing gas supply networks.

Different Kinds of Hydrogen



There are different ways to produce Hydrogene:

Green Hydrogen is produced when electricity from renewable energy is used to separate the hydrogen and oxygen molecules in water by electrolysis. This process does not produce climate-damaging CO2, which warms the earth.

Grey Hydrogen is produced when natural gas is converted into CO_2 and hydrogen using heat. This process produces climate-damaging CO_2 and releases it into the atmosphere.

Blue Hydrogen is produced in the same way as grey hydrogen. However, the CO_2 is bound. Blue hydrogen is considered climate-neutral.

Turquoise Hydrogen is produced by the thermal fission of methane. Solid carbon is produced, which must be permanently bound.

Attention!

The production of hydrogen is very energy-intensive and costly at the current state of the art.

The way in which hydrogen is produced determines whether the use of hydrogen as a whole is truly climate-neutral. So far, only green hydrogen is climate-neutral.

Question

Hydrogen produced with nuclear power – Can it be green hydrogen?

Please Note!

"Renewable energy, including renewable hydrogen, is a central pillar of the REPowerEU plan, the EU's strategy to get off Russian fossil fuels as soon as possible. Clear regulations and a reliable certification system are crucial for this emerging market to develop and establish itself in Europe."

Kadri Simson, EU Energy Commissioner, 13.02.2023

Some Good Reasons for Green Hydrogen!

- Green Hydrogen is an energy carrier of the future.
- When produced with renewable energies, hydrogen is a climate-friendly energy carrier.
- Green Hydrogene can be easily transported.
- Green Hydrogen can play a key role in the transformation and decarbonisation of energy, industry and transport.
- Green Hydrogen technology will create and secure numerous jobs.
- Green Hydrogen represents a high market potential.

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3 Country Check on Green Hydrogen

Greece

Greece is considered an ideal location for climate-neutral hydrogen production because of its large potential for solar and wind energy. Hydrogen is the key to decarbonisation and saying goodbye to lignite. Originally, Greece's largest energy company PPC wanted to say goodbye to coal-fired power generation in 2028. Prime Minister Kyriakos Mitsotakis announced at the end of April 2021 that the phase-out would be brought forward to 2025. In 2022, the company Linde Hellas started its own production of green hydrogen in Greece.

Sources: https://www.handelsblatt.com/technik/thespark/energieversorgung-mit-gruenem-wasserstoff-will-griechenland-2025-aus-der-braunkohle-aussteigen/27197672.html
https://www.ecoreporter.de/artikel/linde-startet-produktion-von-gr%C3%BCnem-wasserstoff-in-griechenland/

Slovakia

Slovakia adopted its own hydrogen strategy in 2021, which ties in with the European Hydrogen Strategy for a Climate Neutral Europe. The production of hydrogen is to be based on nuclear power. Slovakia is mainly testing the practical use of hydrogen. For example, a pilot project to blend hydrogen into the natural gas infrastructure has yielded positive results. With only minor adjustments, hydrogen can be distributed safely and effectively via existing pipelines, and the existing infrastructure can be used for hydrogen.

Sources: https://www.euractiv.de/section/energie/news/slovakia-takes-first-step-into-hydrogen-future/
https://www.gtai.de/de/trade/slowakei/branchen/die-slowakei-positioniert-sich-beim-wasserstoff-621334

Spain

With its abundance of sun and wind, Spain is positioning itself as Europe's future leader in green hydrogen production. Spain, for example, accounted for one-fifth of the world's green hydrogen projects in the first quarter of 2022 - more than the United States. Spain has already quadrupled its green hydrogen capacity targets - the country has 15.5 gigawatts of capacity in 2023 compared to the original 2030 target of four gigawatts.

Source: https://de.euronews.com/green/2023/04/05/spanien-steigert-die-produktion-von-grunem-wasserstoff

Remember

The production of renewable energy also involves the consumption of resources, interference with nature and environmental pollution. Save energy where possible.

Sources:
https://www.bundesregierung.de/breg-de/schwerpune/klimaschutz/wasserstoff-technologie-1732248
https://hydrogen.thyssenkrupp.com/
https://germany.representation.ec.europa.eu/news/eu-kommission-legt-definition-von-erneuerbarem-wasserstoff-vor-2023-02-13_de

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