

Factsheet Electrolysis Shaft

Energy Storage, Green Hydrogen & Oxygen Production

Current Situation

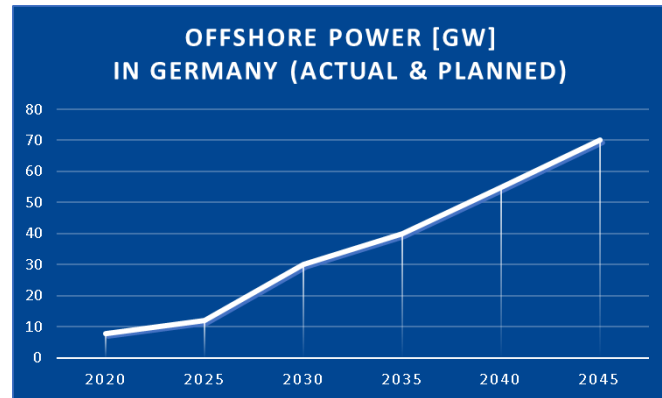
The situation is worldwide similar.

Here as example some German figures:

Since the end of 2021, German offshore wind farms have generated 7.8 GW of electricity per year, which is about 12% of Germany's total wind power generation, or the output of 6 nuclear power plants.

According to current plans, offshore power generation alone is expected to increase fivefold to 40GW by 2035 (approx. 22 nuclear power plants).

By 2045, 70GW are planned (approx. 55 NPPs).



Challenges

Solutions are required that can use and store very large amounts of MW of unneeded energy, e.g. night and weekend electricity from wind turbines (**Power-to-X technology**). Battery farms are not suitable for such large quantities, require a lot of space, precious raw materials and are expensive to maintain.

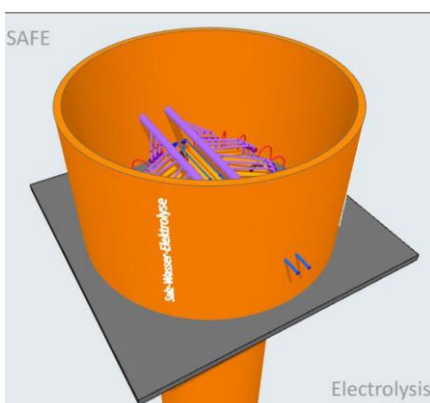
Solution

Electrolysis is a simple and efficient technique to produce green hydrogen as well as oxygen at the same time from the surplus (green) electricity. The hydrogen can be used for industrial applications, mobility and power generation, the oxygen as a technical gas. A flame of hydrogen and oxygen burns about 30% hotter than the combination of natural gas and ambient air. Among other things, this can relieve the burden on industries that require very large quantities of combustible gas.



Alternatively, fuel gas can be produced directly by adding carbon (methanation). This is a major step toward decarbonization. erzeugt werden. Dies ist ein großer Schritt in Richtung Dekarbonisierung.

Electrolysis plants in shaft construction



Benötigt werden Elektrolyseanlagen im Großformat. Anstelle sehr großer Anlagen an der Erdoberfläche, kann der überwiegende Teil unter die Erde verlegt werden, als ein tiefer Schacht. Diese Methode bietet gegenüber gängigen Anlagen folgende Vorteile

- Much larger volumes of electricity, water and oxygen
- Higher process safety and explosion protection
- Very high production volumes of combustible gases
- Less landscape consumption, use >300 years



The D.I.G. Electrolysis Shaft



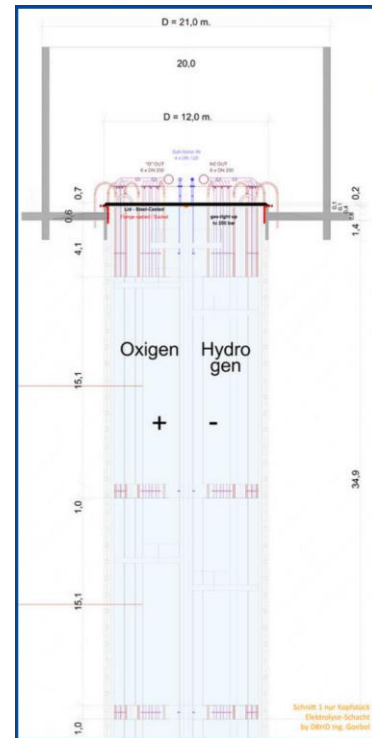
Based on the expertise of more than 15 years of work in the field of nuclear repositories and the associated know-how regarding rock strata, deep boreholes and associated supply facilities, D.I.G. (see left) has developed an electrolysis shaft in recent years.

This includes

- Technical design and detail plans for the manholes, plans for site, construction and operation (above & below ground).
- Supplementary framework information on market environment, duo-pipeline, site pre-selection, technical data
- Roadmap for such overall projects
- Scientifically validated feasibility studies
- Concrete site proposals in coastal proximity to wind farms
Konkrete Standort-Vorschläge in Küstennähe zu Windparks

Plans are available for the following sizes (current estimates):

Shaft depth [m]	Power consumption [MW]	H ₂ Production [m ³ /h]	O Production [m ³ /h]
50	100	11.000	5.500
700	1.020	154.000	77.000
1.100	1.600	352.000	176.000



Plans are currently being drawn up for a version with 1,600 m shaft depth and 2.3 GW power input. All sizes (except 50 m) are available with different electrode variants, which can further increase the quantities.

What can we do for you?

- You are interested in the shaft plans?
- You want possible site proposals?
- You are looking for a cooperation partner?
- You would like to develop the topic further with us?

*Remark: © Both construction drawings by D.I.G.

