

H₂ Readiness

The path to your own hydrogen – electrolysis

The use of hydrogen as an energy carrier is gaining importance worldwide. With its potential for decarbonizing the industrial and energy sectors, hydrogen offers various opportunities to reduce greenhouse gas emissions. In particular, medium-sized companies can benefit from the advantages of this technology by integrating hydrogen into their production processes. As a clean energy carrier and commodity, hydrogen can not only help reduce CO₂ emissions but also create new economic opportunities. By using hydrogen in production processes, companies can become less dependent on fossil fuels and strengthen regional value chains. This can lead to new jobs and support the local economy. However, how can companies access hydrogen in the short and medium term? Import by ship, pipeline connection, rail delivery, or by truck? Additionally, producing hydrogen through electrolysis can also be a meaningful option and should be considered.



Own hydrogen production can be a good option for many industries to cover basic energy needs and to be more independent from grid operators and suppliers.

What is HydroHub?

HydroHub offers **consulting and engineering services**, specifically tailored to the **H₂ readiness** domain. Experts from various operational units* within the TÜV NORD GROUP are equipped with comprehensive expertise to assist you in the **construction** or **retrofitting of existing facilities**. Our services range from **preliminary assessments and feasibility studies to advice on grants and investments, as well as system integration, plant construction, and EPC/M** (Engineering, Procurement, Construction, and Management). In this context, we structure our evaluation of H₂ readiness of your projects for hydrogen utilization into **three levels of consideration**: The **technical assessment** focuses on overarching and specific aspects of hydrogen suitability, such as the suitability of individual components or materials. The **regulatory assessment** encompasses permit management, including engagement with regulatory authorities and compliance with regulations. Finally, the **economic assessment** involves assessment of necessary investment and operating costs, as well as potential revenue sources, to depict and evaluate the economic aspects of your project.

Electrolysis – an option for many markets?

Using water electrolysis and renewable energy sources, hydrogen can be produced simply and sustainably. By using electricity, such as that generated from wind or solar energy installations, water is split into hydrogen and oxygen in a climate-neutral manner. This valuable raw material can then be used in various sectors, including industry, transportation, and power generation, by converting it back into water.

Local collaborations among companies can lead to increased energy security in local supply. By joining forces and covering their energy needs for production processes with jointly shared electrolyzers that produce hydrogen, companies reduce their dependence on external energy sources and fossil fuels, thereby enhancing their independence and sustainability. This, in turn, promotes the regional economy in the short term.

Sector coupling, which involves linking various sectors such as electricity, heat, and mobility, contributes to increased energy ef-

iciency. By using hydrogen as an energy storage medium, surplus energy from renewable sources can be utilized in different sectors, rather than being stored expensively in battery systems or going to waste. This results in a more efficient use of resources and a comprehensive decarbonization approach.

The supply of various industrial sectors with electrolyzers has already reached a high level of technological maturity, making the implementation of such projects feasible on a serial basis and with predictable effort.

In summary, the integration of electrolyzers into industrial or energy parks enables the efficient utilization of renewable energy sources and the simultaneous development of a sustainable hydrogen economy. It represents a scalable and achievable solution for a green and future-oriented energy supply.

*e.g. companies like DMT GROUP, EE ENERGY ENGINEERS GmbH or ENCOS GmbH





Joint ramp-up in areas of demand

A hydrogen grid will connect industrial centers by the early 2030s. It will be supplied both by imports through coastal areas and from regional H₂ production. In regions with a high share of renewable energy sources, electrolyzers can produce sustainable hydrogen. At the same time, regions without immediate pipeline connections can also produce hydrogen themselves, ensuring self-sufficiency. The National Hydrogen Strategy sets a target of 10 GW of installed electrolysis capacity by 2030 – this can be achieved through many small and medium-sized projects. This approach decentralizes and regionalizes the energy transition. We assist (future) producers in identifying and evaluating their regional and company-specific needs. **We also provide comprehensive services for the subsequent implementation of derived import or electrolysis projects**, thereby contributing to sustainability, supply security, and energy requirements.

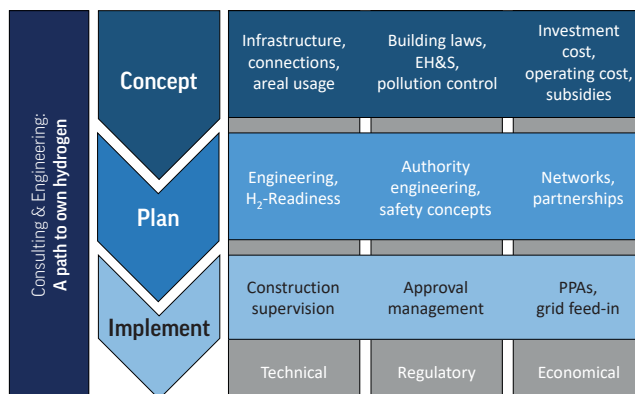
Conception

During the **conceptual phase**, fundamental questions, and feasibility of electrolyzers are examined. Initially, the framework conditions such as available land and corresponding property rights must be considered. Equally important are the connections for electricity, water, wastewater, and district heating, as well as the infrastructure links to road and rail networks.

The legal examination of electrolyzers is not yet routine at present. Therefore, questions regarding building law, occupational safety, accident prevention regulations, and emission control must be analyzed in detail to prepare the necessary approval planning. Economic viability also plays a crucial role. In this context, the costs for investments and operations are investigated and planned. Potential revenues arise from the sale of hydrogen from surplus production, the sale of generated oxygen, or process heat produced during production, as well as from subsidized Carbon Contracts for Difference and public subsidies.

Planning & implementation

In the **planning phase**, the previously identified areas need to be explored in more depth, and the technical assessment should be expanded. Both basic and detailed engineering tasks are undertaken, with an additional focus on assessing the hydrogen readiness (H₂-Readiness) of connected consumers. Simultaneously, communication with the relevant authorities is initiated to involve them early in the process. Safety considerations play a critical role, especially when dealing with a highly flammable substance like H₂. Existing explosion and fire safety regulations must be carefully considered, as well as the suitability and processing of the materials used. Another component involves analyzing potential partnerships with end-users in the nearby vicinity. In the subsequent **implementation phase**, we provide comprehensive expertise, paying close attention to the construction phase and compliance with regulations, among other aspects.



Together towards hydrogen

We accompany you from conception to commissioning at the end-user. Our experts provide comprehensive support on the mentioned topics, or they take on entire sub-projects based on your needs. **HydroHub combines consulting, engineering, and training and is pleased to assist you with extensive expertise. Whether it's technical, regulatory, or economic issues related to hydrogen facilities, don't hesitate to contact us!**

An initiative of TÜV NORD GROUP companies.



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