Large-scale water electrolysis for green hydrogen production

A leading supplier for electrolysis plants & equipment

600 electrochemical projects worldwide

> 10 GW of power installed

1 GW/year supply chain established
Our business case: Climate neutral with green hydrogen. Industrial scale.

Scale up technology for efficient operations

1. Substitution of gray hydrogen in existing value chains already requires gigawatt scale

2. Power-to-X applications require scale to compete against gray commodity prices

3. Scaling up electrolysis plants shows significant cost reduction

4. Only at gigawatt scale global transport chains operate efficiently

20 MW module

- Design capacity $H_2$ 4000 Nm³/h
- Power consumption (DC) at start up 4.5 kWh/Nm³
- Water (demineralized) consumption <1 l/Nm³ $H_2$
- Standard operation window 10% - 100%
- $H_2$ product quality at electrolyzer outlet > 99.9% purity (dry basis)
- $H_2$ product pressure after treatment (optional) as required by customer, up to 99.999%
- Operating temperature up to 90 °C

All figures above are to be understood as “expected values” and may vary depending on operating conditions

Key benefits
- Modular, skid mounted design
- Low power consumption
- Fully automated operation possible
- Fast dynamics suitable to renewable power sources
- Mass production & supply chain at scale
- Current 1 GW electrolysis capacity p.a. under ramp-up to 5 GW p.a.
- Non-pressurized safety design avoids requirement of classified area
- Global service
Green hydrogen enables a comprehensive sector coupling

Industrial decarbonization and new green value chains from scratch
At thyssenkrupp nucera we offer world-leading technologies for high-efficiency electrolysis plants. We have extensive in-depth knowledge in the engineering, procurement, and construction of electrochemical plants and a strong track record of more than 600 projects with a total rating of over 10 gigawatts already successfully installed. With our water electrolysis technology to produce green hydrogen, we offer an innovative solution on an industrial scale for green value chains and an industry fueled by clean energy – a major step towards climate neutrality.
Building your business case with concept modeling & optimization

The key question in any project development process is the economic viability of the project. Especially at the early stages, many decisions have to be taken which later have a huge impact on CAPEX, OPEX and project execution. The aim is to identify the best opportunity for the lowest cost and to avoid late concept changes which incur costly rework as well as schedule delays. With our techno-economic studies, we investigate green hydrogen value chains and select the most appropriate concept for our clients based on our proprietary know-how.

Global footprint

We have planned, built and commissioned over 600 electrolysis plants and installations with a total capacity of 10 GW all over the world – experience you can rely on. As a globally renowned EPC specialist for electrochemical plants, we are a leading supplier of electrolysis equipment, solutions and services. You benefit from our proven competence in realizing complete plants which operate smoothly and safely over decades.

360° Service throughout the entire plant life-cycle

With our know-how we assist you throughout the plant’s life cycle – from start-up to on-site support by thyssenkrupp nucera engineers, specialists and trainers for your personnel. We are your single point of responsibility for all maintenance inspections, spare parts or capacity increases.

Key features

- Identify the most attractive hydrogen value chain concept flowsheets
- Identify material and energy sector coupling opportunities
- Develop strategies for energy monetization
- Estimate carbon emission intensity for the PtX concepts
- Identify risks and opportunities
- Assist in engagement with potential partners and financiers
- Develop ideas sufficiently to estimate capital cost and quantify preliminary economics
- Develop the selected concepts in sufficient detail to obtain funding
- Develop a project road map
With our strategic and long-term partner De Nora, we have a globally renowned specialist in electrochemistry for cell manufacturing, coatings and repairs at our side. Together with De Nora, we deliver fast and efficient value to our clients all over the world. Thanks to our long cooperation for our chlor-alkali electrolyzers, we can rely on a fully set-up supply chain for our water electrolysis cells. Today, we can deliver a total of 1GW electrolysis cells per year and have already set the course for expanding to a 5 GW supply chain.

In the upcoming years we will research to optimize the cell and stack design even further, in order to enable fully automated series production on the one hand and thus reduce the overall target costs of alkaline water electrolysis on the other. Also the full automation of manufacturing and assembly processes is at the center of our considerations in order to realize efficient supply chains in the gigawatt range in the long term. We are convinced that we can also significantly strengthen the competitiveness of hydrogen technology as a whole. We increase the availability of hydrogen, reduce costs – and establish a new market standard as well as a valuable contribution to a fully automated and integrated gigawatt supply chain.

Through continuous improvements and dedicated research and development, we deliver cutting-edge technologies for high-efficiency and maximum revenue.
We shape the new era.