

Key to a sustainable future: thyssenkrupp launches advanced water electrolysis

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thyssenkrupp (0.10 MB)

As renewable energy sources continue their global success story, the demand for integrating them into the current South African energy and industry landscape grows.

thyssenkrupp now offers a key technology for renewables integration: Industrial scale water electrolysis for large projects. Developed by experts from thyssenkrupp, the solution which is based on worldwide leading electrolysis technologies makes large-scale hydrogen production from electricity economically attractive.

By splitting water into hydrogen and oxygen, this technology delivers “green” hydrogen, a clean, CO₂-free energy carrier. The only inputs needed are water and renewable electricity from wind, hydro power or photovoltaics. ‘Green’ hydrogen production is ideal for long-term energy storage, hydrogen mobility and other applications, making optimal use of renewable energy sources.

The advanced water electrolysis features a well-proven cell design paired with an especially large active cell area of 2.7 m². By further optimising the proven ‘Zero-Gap’ electrolysis technology (leaving virtually no gap between membrane and electrodes), very high efficiencies of more than 82% are achieved.

Sami Pelkonen, CEO of the Electrolysis & Polymers Technologies business unit at thyssenkrupp Industrial Solutions: “With our water electrolysis process, we have successfully brought a technology to market maturity which is of major significance for the energy transition. We are now able to offer our customers a wealth of sustainable solutions which will help to bridge the gap between renewable energy production and consumption. Green hydrogen as a clean, CO₂-free starting point can be used in a variety of ways: for energy storage, mobility, and the production of sustainable chemicals.”

Philipp Nellessen, CEO at thyssenkrupp Industrial Solutions Sub-Saharan Africa adds, “This thyssenkrupp technology has also been

developed in pre-fabricated skid mounted standard modules, which is a huge advantage for us. We can easily deploy these modules anywhere in the continent with minimal construction risks.”

The modules easily add up to the desired project size, potentially into the hundreds of megawatt range. The patented design is based on thyssenkrupp’s well proven, leading electrolysis technologies. To date, the Group company thyssenkrupp Uhde Chlorine Engineers has successfully completed more than 600 electrochemical plants worldwide.

“Based on decades of experience in developing and building electrolysis plants, we have designed our product to meet our client’s most important demands: Easy to deliver and install, highly efficient, with minimised investment and operation cost. And we have an industrial-scale supply chain of 600 MW per year already in place”, says Roland Käppner, Head of Energy Storage and Hydrogen at thyssenkrupp Uhde Chlorine Engineers.

Within the Carbon2Chem® project, one of the global flagship projects for carbon-neutral value chains, the advanced alkaline water electrolysis by thyssenkrupp was already commissioned successfully. It will provide the necessary hydrogen for producing chemicals from steel plant flue gas.

Hydrogen is not only a clean energy carrier, be it for long-term energy storage in the gas grid or for clean fuels e.g. for fuel cell mobility. When produced from renewable energy, it can make the production of key chemicals sustainable. One good example is ‘green’ ammonia: With the water electrolysis technology and its world-class ammonia process, thyssenkrupp can deliver integrated plants which can produce ammonia from nothing but water, air and sunlight or wind. The ammonia can be further processed into fertilizers.

Nellessen notes, “While renewables still form a small percentage of the South African energy landscape, this ground breaking technology is potentially a fundamental building block to a variety of renewable energy initiatives that are currently on the country’s Integrated Energy Plan agenda.”

In addition, as a specialist in chemical plant engineering and construction, thyssenkrupp can realise additional value chains, e.g. for 'green' methanol, which can enable carbon recycling to generate sustainable fuel. Further 'power-to-gas' solutions include methanation for the production of synthetic natural gas (SNG). As the starting point for all these solutions, water electrolysis by thyssenkrupp can help to convert today's carbon-based industry into a more sustainable, climate-friendly one.

thyssenkrupp SA will actively seek to build partnerships with South Africa's renewable energy stakeholders and invite interested parties who wish to better understand the new technology to make contact with us via our website www.thyssenkrupp-industrial-solutions.co.za.