

Power-to-Kerosene

Green hydrogen for climate-neutral aviation

siemens-energy.com/electrolyzer

SIEMENS energy

Power-to-Kerosene project starts operations

October 4, 2021: The inauguration of the world's first plant for the production of CO2-neutral e-kerosene well above laboratory scale takes place in in the north-German town Werlte. The plant, which produces synthetic crude oil as a basic material for the manufacture of climate-neutral kerosene approved for aviation, is being commissioned. The Power-to-Liquid plant produces the synthetic crude oil by means of Fischer-Tropsch synthesis from carbon monoxide (CO, recovered from CO_2) and hydrogen. The CO_2 comes from biogas (waste valorization) or is directly captured from the ambient air with a specially installed direct air capture module. The electrical energy of 2.5 MW is supplied by additional wind energy plants in the surrounding area. The plant will produce approx. 350 tons of synthetic crude oil per year and save more than 1000 tons of CO_2 emissions.

Owner and operator of the plant is Solarbelt FairFuel gGmbH, a sister company of atmosfair. Siemens Energy is responsible for the complete solution to supply hydrogen for the Fischer-Tropsch process. Siemens AG provides the plant automation for the entire facility.

Overall solution for green hydrogen

With a production volume of 350 tons of crude oil per year, the Power-to-Fuel plant exceeds laboratory scale by far. The project therefore needed a partner which provides an electrolysis system at industrial standards and scale.



PEM-Elektrolyse von Siemens Energy in der Power-to-Kerosin Anlage in Werlte

The solution for hydrogen production comprises much more than the actual electrolysis system itself. Being a specialist for facilities to generate and transport energy, Siemens Energy took over the technical consulting as well as planning, installation and commissioning of the entire hydrogen system incl. power electronics, uninterruptible power supply, water treatment and cooling system.

Project Data Siemens Energy

- Supply of green hydrogen for the production of climate-neutral kerosene
- Planning, installation and commissioning of an electrolysis system incl. power electronics, uninterruptible power supply, water treatment and cooling system
- Silyzer 200 with highly dynamic PEM-technology
- Hydrogen production: approx. 160 tons / year

The electrolysis system

Silyzer 200 is the centerpiece for the hydrogen production. It is based on the efficient and flexible PEM electrolysis technology (PEM = Polymer Electrolyte Membrane). Thanks to its dynamic characteristic it is an ideal match for the volatile power generation of wind turbines. The electrolysis cells including membrane and diffusor layer are in-house developments and are produced by Siemens Energy at its site in Erlangen, Germany.

Silyzer 200 is a pressurized electrolysis system which delivers hydrogen with 35 bar and provides the gas suitable for the Fischer-Tropsch process.

Technische Daten Elektrolyse-System

PEM electrolyzer	Silyzer 200
DC power input	1.25 MW
Production capacity	20.7 kg H_2/hour
System efficiency*	ca. 70%
H_2 output pressure	35 bar

*depending on operation

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Further information:

- atmosfair: https://fairfuel.atmosfair.de/
- Siemens AG: Factsheet (only German)