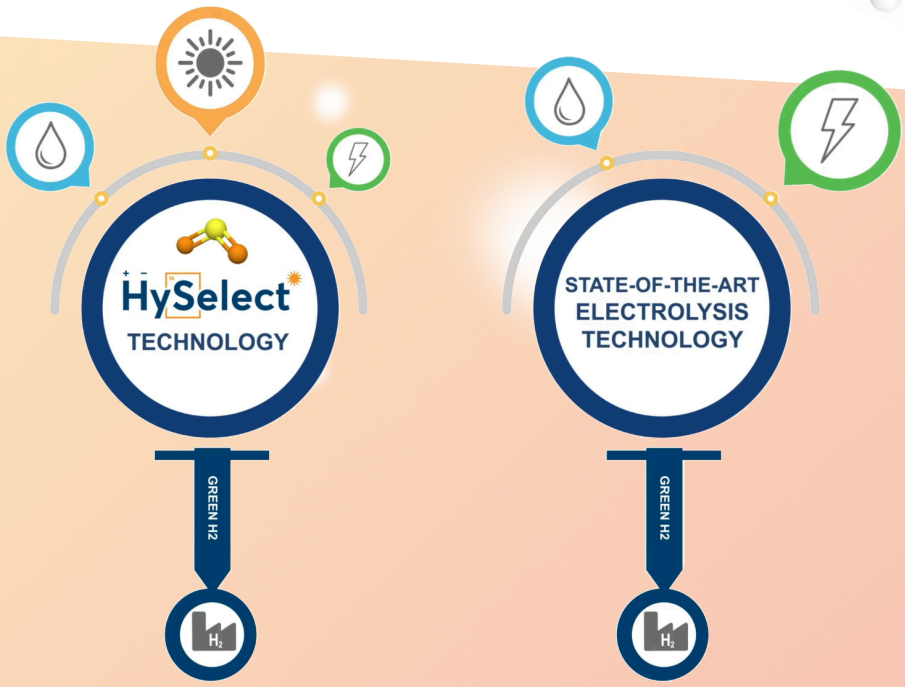
HySelect

Efficient water splitting via a flexible solar-powered **Hy**brid thermochemical-**S**ulphur dioxide depolarized **Elect**rolysis Cycle

www.hyselect.eu

HySelect EU-Project

@HySelect



An Innovative Approach

Green hydrogen can be produced at electrical cost lower than that of the state-of-the art electrolysis technology by combining concentrated solar radiation as a heat source through the innovative centrifugal particle receiver CentRec® developed and patented by DLR with the Hybrid Sulphur cycle technology concept.

Project Information

This European project will demonstrate the production of hydrogen (H_2) by splitting water through the Hybrid Sulphur cycle (HyS) via concentrated solar technologies (CST) with an attractive efficiency and cost. HySelect will introduce, develop and operate a complete H_2 production chain under industrially relevant conditions.

Solar Hydrogen Production

Recent developments and innovations will be implemented to achieve highly efficient, long-term & cost-competitive concentrated solar energy driven thermochemical hydrogen production.

Concentrated Solar Technology

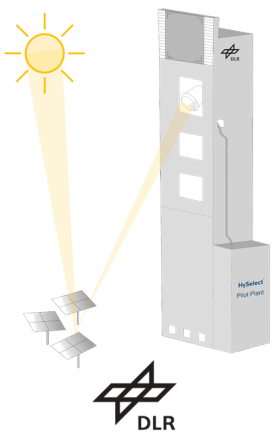
Use of concentrated solar radiation as a heat source through the solid particle receivers' technology and in particular the innovative centrifugal receiver CentRec® developed and patented by DLR.

Hybrid Sulphur Cycle

The ambition of HySelect is to close the technical gaps and provide the missing links in the overall, complete HyS cycle technology concept, for a realistic overall evaluation of the technology and its scaleup.

HySelect Jülich

At the HySelect Jülich site, all solar thermal & thermochemical processes are located.



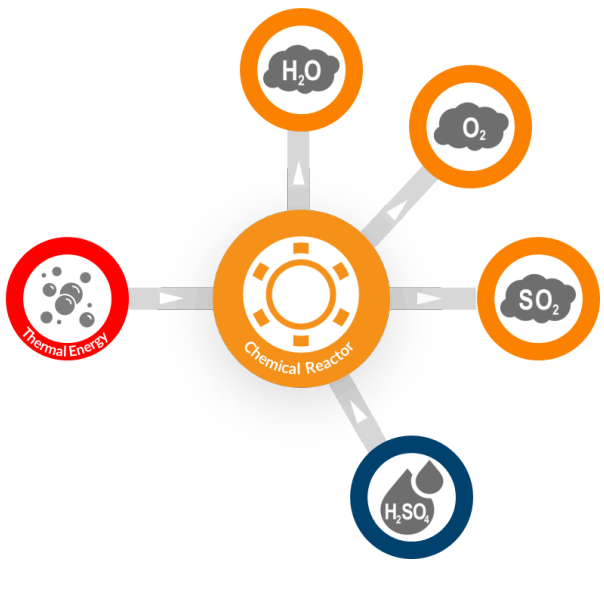
The Hybrid Sulphur Cycle

HySelect Duisburg

At the HySelect Duisburg site, all chemical & electrochemical processes are located.

Sulphuric Acid Splitting (SAS) reactor

SAS reactor is allothermally heated with solar-heated particles and spatially decoupled from the centrifugal particle solar receiver (HySelect Pilot Plant). The decomposition of the Sulphuric Acid (SA, H_2SO_4) in the reactor results in the formation of water vapour (H_2O), sulphur dioxide (SO_2) and oxygen (O_2).



SO_2 Depolarized Electrolyser (SDE)

The overall reaction involves the oxidation of SO_2 and water at the anode side resulting in the production of H_2SO_4 and H_2 at the cathode side. SDE can be performed at an operating voltage range between 0.5 V to 1.2 V, much lower than that for Polymer Electrolyte Membrane (PEM) water electrolyser (from 1.6 V to 2 V) and, hence, would only require 25-60 % of the respective electrical energy.

Project Consortium

An international project with partners from Germany, Greece, Finland, Italy and Austria.

Aalto University · CERTH Centre for Research & Technology Hellas · DLR · ENEA · fen research · GRILLO

The project has started at the beginning of 2023 and is planned to finish by the end of 2026.

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Clean Hydrogen Partnership

Co-funded by the European Union