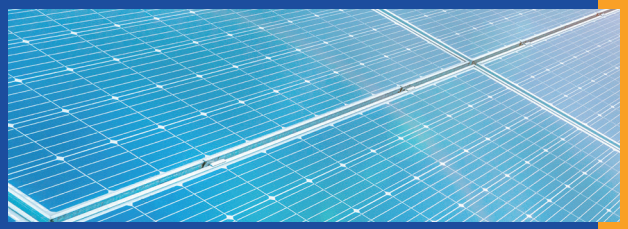
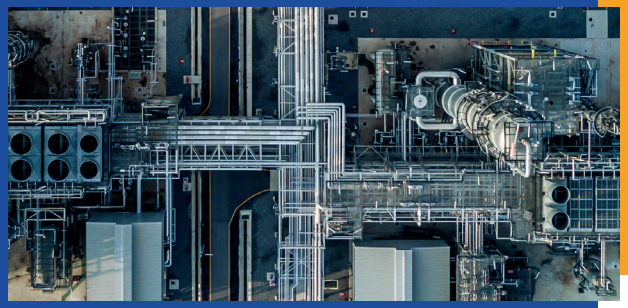
DECARBONIZING THE FUTURE OF THE HEAVY INDUSTRY

The approach of **PHOTOSINT** is based on electrocatalysis solar-driven, a very friendly technology that gives the industry fossil-free and sustainable solutions to greenhouse gas emissions and supports a climate neutral Europe by 2050.

PHOTOSINT is a European research initiative that aims to solve the problem of a secure, efficient and cost-competitive renewable energy integration in the chemical industry, to produce green energy from local resources that will cause a low environmental impact supporting the transition from fossil fuels to sustainable energy sources.





PARTNERS

PHOTOSINT is a project bringing together **14 partners from 8 countries** (Spain, Slovenia, France, Italy, Greece, Estonia, Sweden and Romania). 5 academic partners, 4 industrial organisations and 5 research entities are working together to cover all the steps for **PHOTOSINT's** methodology development.

idener · National Institute of Chemistry · ICIQ Institute of Chemical Research of Catalonia · RINA · Bioenergeia Nigritas A.E. · Hrastnik 1860 · Kneia · Eesti Maaülikool · Hysytech · Université de Paris · CNRS · CSIC · redox.me · Azomures · Torrecid

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PHOTOSINT

SOLAR-DRIVEN ARTIFICIAL PHOTOSYNTHESIS, UTILIZING LOCAL RESOURCES TO PRODUCE GREEN ENERGY (HYDROGEN & METHANOL) FROM WASTEWATER AND CO_2 TO MAKE CHEMICAL INDUSTRY MORE AUTO-SUFFICIENT.

OVERALL PROJECT BUDGET:
€ 4 993 752,50
START DATE:
1 SEPTEMBER 2023
END DATE:
31 AUGUST 2027
TOTAL MONTHS:
48

KEY CHALLENGES

PHOTOSINT project presents solutions to the challenges chemical industries are facing in integrating renewable energy sources into their processes to reach net zero emission goal set by the European Union.

Some of the hurdles to overcome include:

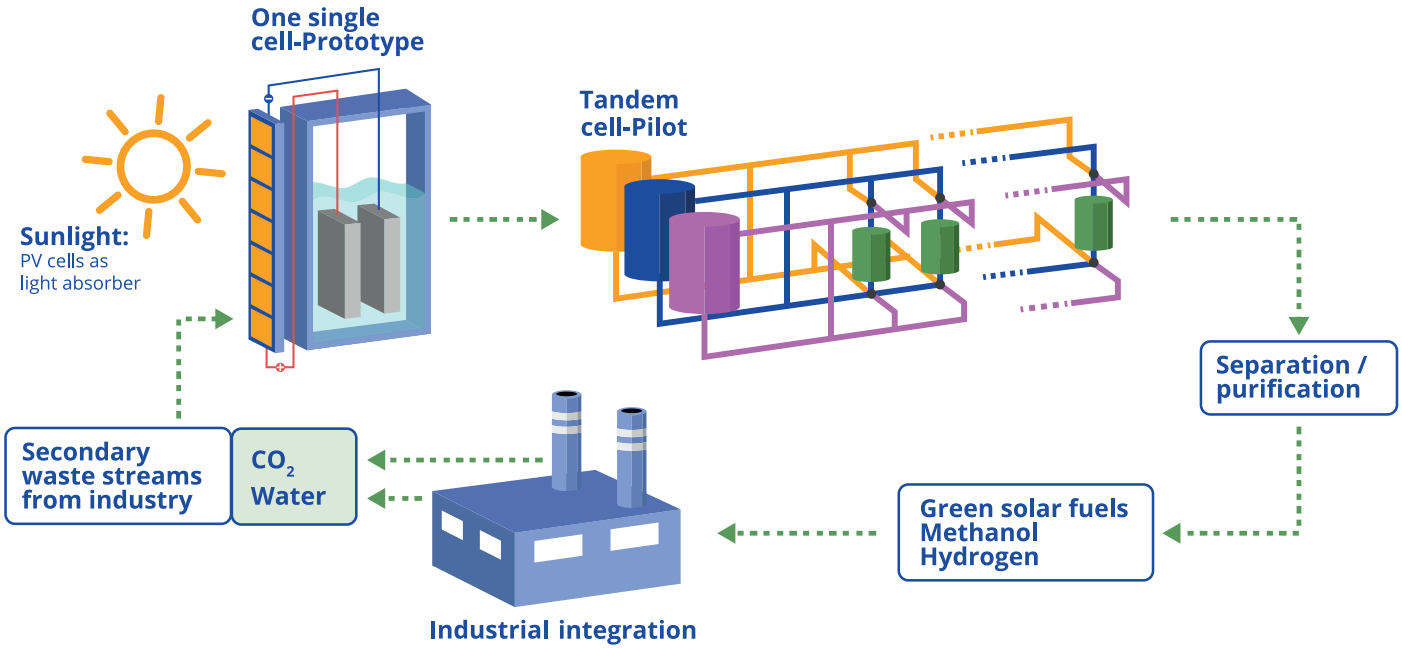
- The integration of renewable energy technology in energy-intensive industries that requires continuous operation.
- The use of local feedstocks for a circular economy approach.
- An efficient conversion rate of sunlight energy to power the industry high energy demands.
- The need of storable technologies for renewable and green energy production.

GOALS

PHOTOSINT's main objective is to integrate renewable energy sources and specifically maximise solar energy efficiency as the primary energy source, to convert wastewater and CO_2 into green fuels to meet the chemical industry energy demands and make it more auto-sufficient. For that purpose, green hydrogen and bio-methanol will be produced.

PROCESS

The project will deliver novel photoelectrochemical production methods to produce hydrogen and methanol as energy vectors using only sunlight as an energy source and wastewater and CO_2 as feedstocks. The pathway is based on solar-driven artificial photosynthesis, and aims to use catalytic earth-abundant materials, modifying them to improve catalytic processes.



Catalyst optimization | Longer lifetime | Innovate and efficient design | Higher production capacity

INDUSTRIAL VALIDATION

The systems developed in **PHOTOSINT** will be validated on industrial environments:

1. At the **BNIG** Biogas Plant, the produced methanol will be tested in an HTPEM fuel cell for direct electricity production.

2. Produced Hydrogen will be used at **TOR** for frit melting, and at **STE's** pilot glass furnace as an alternative fuel for glass melting.

3. EMU will test the produced methanol and Hydrogen in a dual fuel engine for energy production, for assessing the potential integration on chemical industries.

4. AZO will use Hydrogen as feedstock for fertilizers production and methanol as raw material for nitrogen reduction in wastewater treatment obtained from the fertilizer production process.