

PHOTOelectrocatalytic systems for Solar fuels energy INTegration into the industry with local resources

Timeline | 09/2023 to 08/2023

ICIQ People | [J. Lloret Research Group](#)

Overall Budget | 4.993.752,50 €
ICIQ's Budget | 467.812,50 €

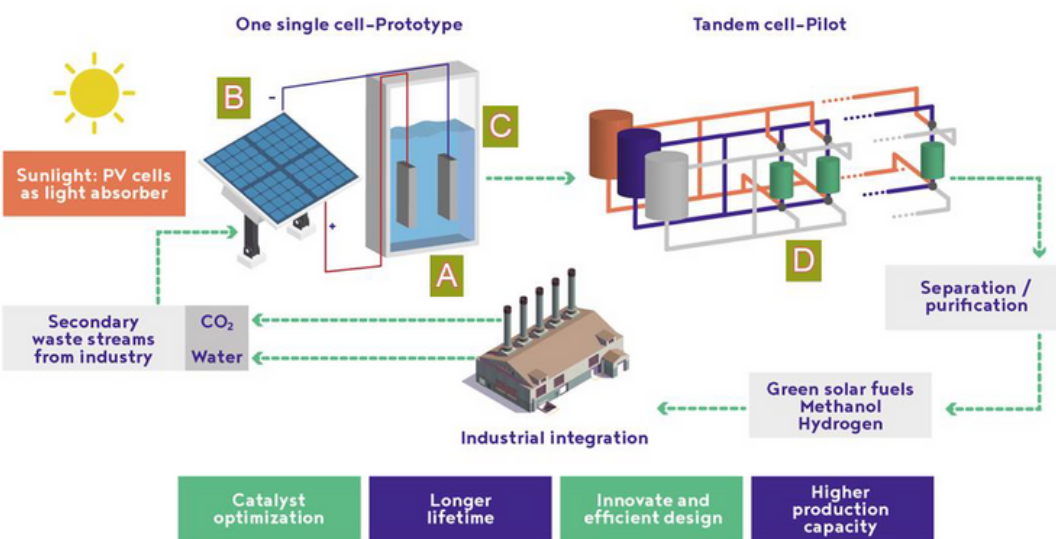
<https://cordis.europa.eu/project/id/101118129>

Call | HORIZON-CL5-2022-D3-02

SUMMARY

The **PHOTOSINT** project presents solutions to the challenges chemical industries are facing in integrating renewable energy sources into their processes. The project will deliver sustainable processes to produce hydrogen and methanol as energy vectors using only sunlight as an energy source and wastewater and CO₂ as feedstocks, making the industries more auto-sufficient. The pathway is based on solar-driven artificial photosynthesis, and aims to develop new catalytic earth-abundant materials and modifications of existing ones to improve catalytic processes. Design parameters of the PEC cell will be tuned to maximize solar to fuel (STF) efficiency. Moreover to improve the conversion for industrial implementation, **PHOTOSINT** will develop a novel way to concentrate and illuminate the semiconductor surface to maximize overall energy efficiency. Perovskite solar PV cells will be integrated to harvest the light to supply the external electrical voltage.

PHOTOSINT is an ambitious project due to precedents in research conducted to date and the low production rate of the desired products. For integrating sunlight energy into the industry, the catalyst will be studied, and then the best one/s will be implemented in prototypes. The obtained results will be used for making scale-up in pilots with tandem PEC cells. These steps are necessary to assess the industrial scale-up feasibility, promoting the increased competitiveness of renewable process energy technologies and energy independence. MeOH and H₂ will be tested in engines. Also, an HTPEM fuel cell will be used for electricity generation, and hydrogen will be tested as an alternative fuel for energy generation instead natural gas in melting furnaces avoiding CO₂ emissions.



"sustainable processes to produce hydrogen and methanol as energy vectors using only sunlight as an energy source and wastewater and CO₂ as feedstocks"

CONSORTIA

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SCIENTIFIC COMPUTING

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