

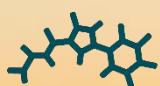
# Consortium



Ben-Gurion University  
of the Negev



LOMARTOV  
[Applied Innovation Engineering]



HZB Helmholtz  
Zentrum Berlin



ICIQ  
Institut  
Català  
d'Investigació  
Química



eChemicles

## Project Information

Topic : HORIZON-EIC-2021-  
PATHFINDERCHALLENGES-01-04 - Novel  
routes to green hydrogen production

Duration: from Oct 2022 to March 2026

EU funding: 3.2 M€

Funded under Horizon Europe and the  
European Innovation Council

Coordinated by: Universidad Jaume I

## HOW TO ENGAGE

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European  
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Council

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# OH<sub>2</sub>PERA

Optimised Halide Perovskite  
nanocrystalline based  
PhotoElectrolyser for clean,  
Robust, efficient and  
decentrAlised H<sub>2</sub> production

# INNOVATION POTENTIAL

Enabling perovskite-based PV technology deployment



Acting on stability and Pb-content



Valorisation of industrial wastes and wastewater treatment

Removing organic pollutants in anolyte

Retrofitting of current electrochemical systems



Replacing Pt-group electrocatalysts

## WIDER IMPACTS

▶ Zero-Carbon H<sub>2</sub> industry: decentralised and at competitive CAPEX/OPEX.

↓  
Cancelling 830 MtCO<sub>2</sub>e/year associated to grey H<sub>2</sub>.

↓  
Potential to reach hard-to-abate sectors (10% of final EU energy demand by 2050).

▶ Integrable on industrial value chains.

▶ Empowering citizens to participate in the energy transition.



# CONCEPT

OHPERA's main objective is to develop a proof-of-concept unbiased tandem photoelectrochemical cell integrating highly efficient and stable photoelectrodes based on halide perovskite nanocrystals and catalytic/passivation layers, minimizing the use of critical raw materials to achieve efficient solar-driven H<sub>2</sub> production and high added-value chemicals from valorization of industrial waste (glycerol).



Target current density 10 mA·cm<sup>-2</sup> @ > 100 hours @unbiased  
H<sub>2</sub> Faradic Efficiency > 90%



Stable Pb-free PNCs (PLQY > 70 %)



CRM-free Photoelectrodes



Computer-assisted design & optimisation



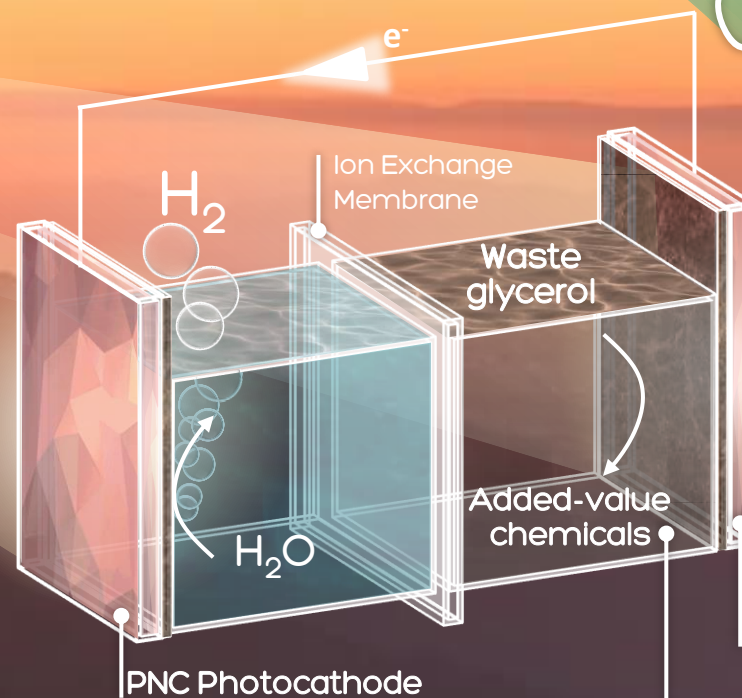
Boosted circularity



Triple Pillar sustainability optimisation  
ECODESIGN



Competitive LCOH (<4 €/kg)



Dihydroxyacetone  
Glyceric acid  
Lactic acid

New materials to boost Solar Hydrogen production under a Zero Waste Approach

