

# REDHy project partners



## Facts and figures

Start date 1-1-2024  
Duration 48 months  
EU funding €2,990,238.75

Grant number 101137893

7 partners in  
5 European countries

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**Redox-Mediated  
economic, critical raw  
material free, low  
capex and highly  
efficient green  
hydrogen production  
technology**



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# Objectives

**Objective 1:** Develop highly efficient and durable materials free of critical raw and fluorine free materials for the REDHy technology, especially the membranes, ionomeres, electrodes, redox mediators and heterogenous oxygen and hydrogen evaluation catalysts to allow the development of a short stack with manufacturing quality guided by Europe's circular-economy action plan for a cleaner and more competitive Europe.

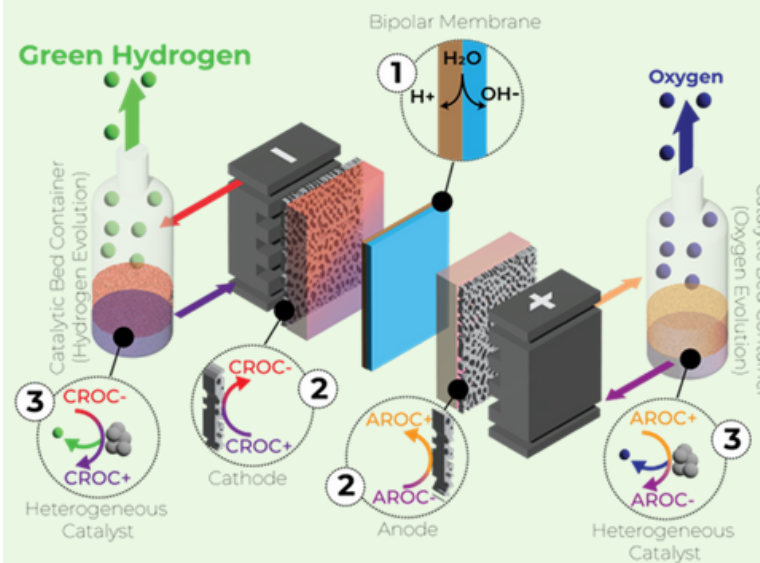
**Objective 2:** Validate the stack's efficiency and robustness to address dynamic situations frequently occurring when the electrical grid is fed by large proportion of renewable energy sources or if the system is directly interfaced with RES.

**Objective 3:** Eliminate the use of and the need for critical raw materials and fluorinated membranes and ionomers at stack level.

**Objective 4:** Demonstrate optimization strategies for the porous electrodes to enhance their mass transport characteristics and enhance energy efficiency.

## REDHy ...

... is a 4-year project  
... tackling the limitation of contemporary electrolyser technologies  
... reimagining water electrolysis ... allow to surpass the drawbacks of state- of-the-art electrolyser  
... become a pivotal technology in the hydrogen economy



Source: <https://redhy.eu/project/>

## Aim of the project:

... develop a large area short stack with 5 cells  
... active surface area of  $> 100 \text{ cm}^2/\text{cell}$   
... nominal power of  $> 1.5 \text{ kW}$   
... energy consumption of  $48 \text{ kWh/kg H}_2$   
... energy efficiencies  $> 82 \%$   
... nominal load of  $1.5 \text{ A/cm}^2$   
... degradation rate of  $0.1 \%/1000 \text{ h}$

**Objective 5:** Demonstrate a reduced energy consumption of at least  $48 \text{ kWh/kg H}_2$  by implementing highly reversible, stable redox mediators with enhanced kinetics.

**Objective 6:** Demonstrate a drastic reduction in interface resistances across all cell components leading to energy efficiencies  $> 82 \%$ .

**Objective 7:** Demonstrate the decoupling of oxygen and hydrogen production and enabling the REDHy system to operate at minimum  $5 \%$  of partial load operation (nominal load  $1.5 \text{ A/cm}^2$ ) without exceeding  $0.4 \%$  of H concentration in O .

**Objective 8:** Demonstrate that the REDHy technology is capable to perform efficient and direct seawater electrolysis.

**Objective 9:** Integrate the short stack in a prototype full system.

**Objective 10:** Demonstrate the operation of the REDHy electrolyzer at  $1.5 \text{ A/cm}^2$  with electricity consumption of  $48 \text{ kWh/kg H}_2$  over at least 1200 hours of operation with a degradation of  $0.1 \%/1000 \text{ h}$ .