# C()2UOR

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COmbined suN-Driven Oxidation and CO<sub>2</sub> Reduction for renewable energy storage

## **CONSORTIUM**





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https://condor-h2020.eu/

Project funded by the European Union's Horizon 2020 research and innovation programme coordinated by the University of Bologna, Italy. CONDOR proposes an innovative approach for developing highly efficient solar-driven conversion of carbon dioxide into fuels and added-value chemicals

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#### **CONDOR** approach

CONDOR targets a modular device for solar-driven production of energy carriers and added value chemicals from biomass valorisation. Reactants are simple molecules and waste chemicals such as water and carbon dioxide or biomass derived alcohols. The only energy source to drive the process is sunlight. This is the most convenient way to store an intrinsically intermittent primary energy source (sunlight) into high energy density products that can be used whenever needed (fuels). The latter are termed solar fuels.

#### Ambition

CONDOR is an ambitious project in terms of research and engineering activities, as well as assessment of environmental impact and roadmap to commercialisation. Condor will target a technology readiness level (TRL) 4 for level (TRL) of 4 for integrated fuel production with high efficiency, opening the route to the industrial production of fuels within a decade after the end of the project, according to a specific roadmap. In addition, an analysis of energy consumption to produce the required materials and to run the overall process will be carried out to select the best solution not only in terms of costs, but also of energy resources and environmental impact.

#### Impact

- Contribute to accelerating and reducing the cost of the next generation of sustainable renewable energy generation.
- Advance the knowledge and scientific proofs of the technological feasibility of its concept including the environmental, social and economic benefits.
- Show contribution towards establishing a solid European innovation base and building a sustainable renewable energy system.



CONDOR's overall objective is accomplished through three Scientific and Technological Objectives:

#### **Compartment 1:**

C()=U)OR

CO<sub>2</sub>ODOR

COSU200R

C()= NOCU S

C()=NOOR

CO<sub>2</sub>OOR

ROCU

CO<sub>2</sub>ndor

COSU200A

SOCO<sub>5</sub>ODOR

CO2U2OB

Flow photoelectrochemical cell for the production of  $H_2$  and CO (syngas) and biomass valorisation.

#### Compartment 2:

(Photo)catalytic reactor for the conversion of syngas (produced in compartment 1) into fuel (CH<sub>3</sub>OH or DME)

#### **CONDOR device:**

Laboratory-scale prototype that couples Compartments 1 and 2, capable of three-months continuous outdoor operation with a solar-to-DME conversion efficiency of 4.5% (O<sub>2</sub> or Cl<sub>2</sub> evolution) or 6% (biomass oxidation).

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