

# Enzymatic CO<sub>2</sub> capture in a rotating packed bed and electrocatalytic CO<sub>2</sub> reduction to useful products

Call HORIZON-CL5-2024-D3-01

Grant Agreement no. 101172954

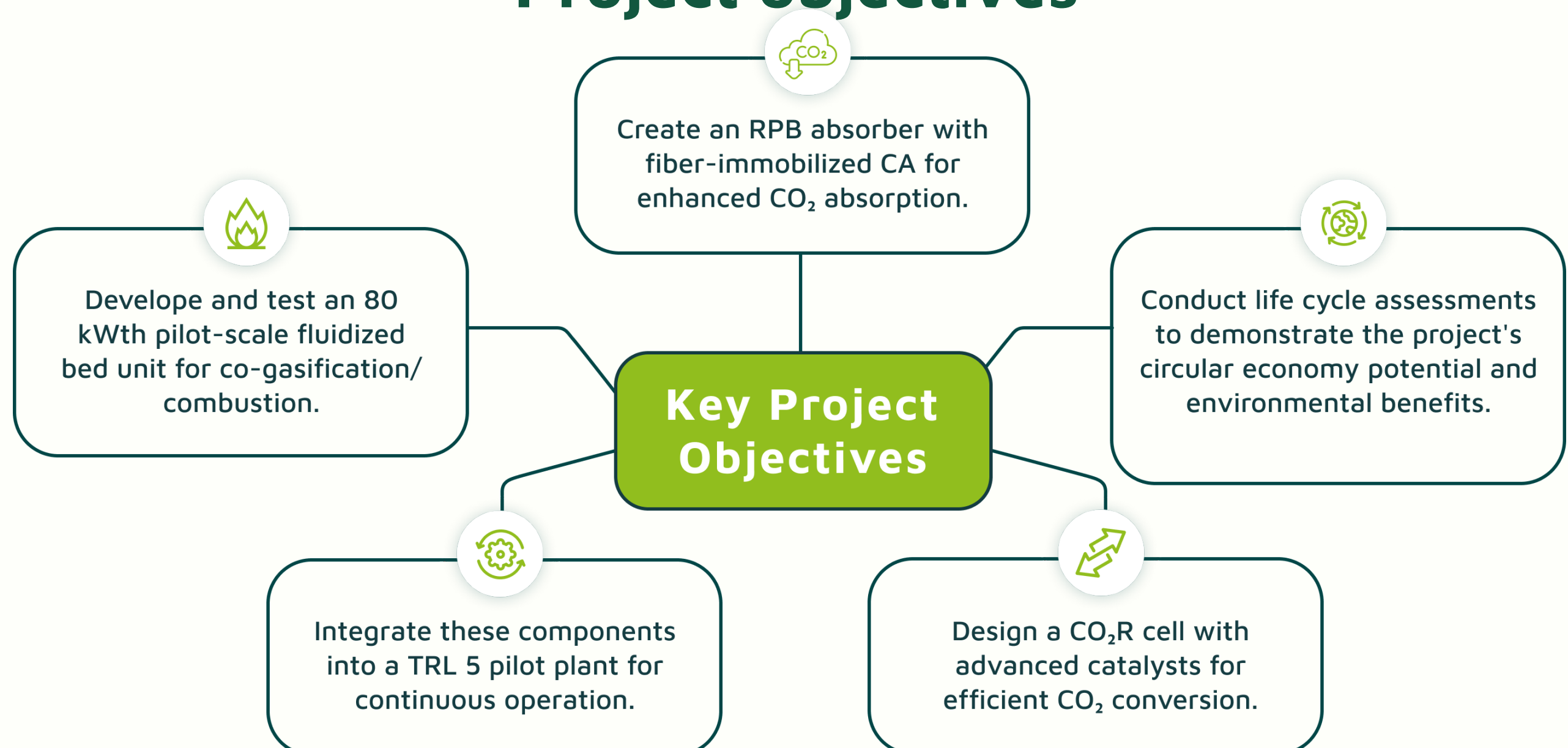
Timeline October 2024 - September 2027

EU Funding € 3 756 130,00

## About the project

The REUSE project aims to develop an innovative approach to capturing and utilizing CO<sub>2</sub> using a Rotating Packed Bed (RPB) system. The RPB employs immobilized Carbonic Anhydrase (CA) enzymes and advanced solvents to efficiently capture CO<sub>2</sub> from biogenic flue gases. The captured CO<sub>2</sub> is then turned into valuable products like carbon monoxide (CO) or formic acid (FA) through a CO<sub>2</sub> reduction (CO<sub>2</sub>R) cell.

## Project objectives



## Innovative Concepts

To address these challenges, the REUSE project will employ several innovative methods:



Test various biomass and RDF blends to optimize fuel use.



Explore sterically hindered and phase-change solvents for CO<sub>2</sub> capture.



Create comprehensive models to optimize integrated systems.



Use DoE and PoE to minimize flue gas variability.



Develop functionalized carbon surfaces and tin-based catalysts for CO<sub>2</sub>R.

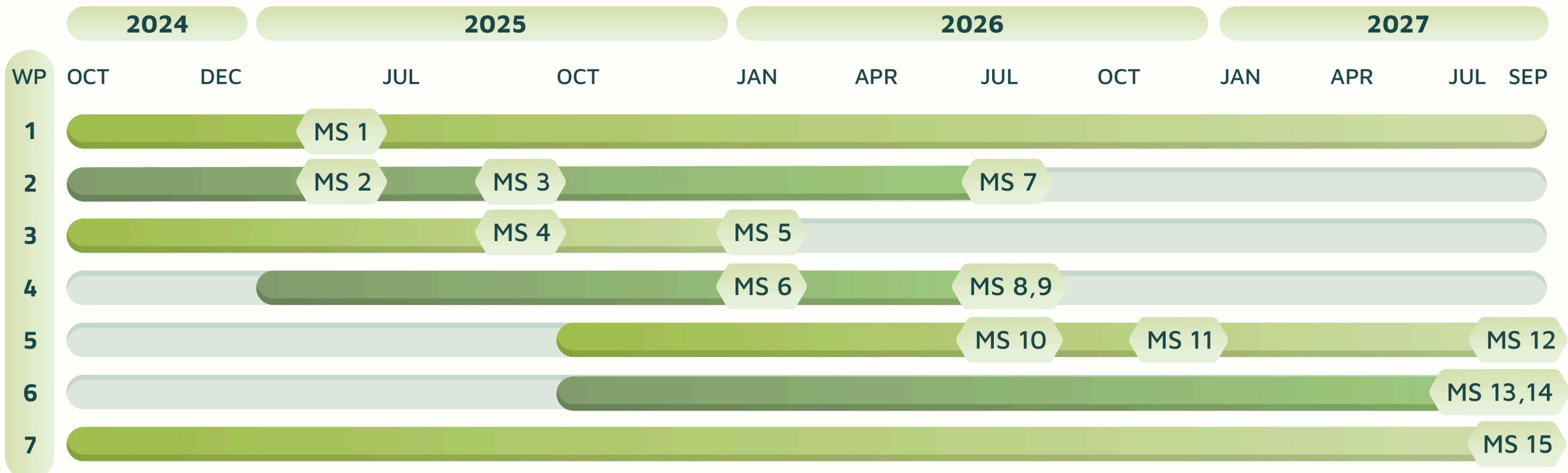


Introduce new Fe-Mn catalysts for better long-term performance.



Establish a pilot plant to evaluate BCS-RPB-CO<sub>2</sub>R interactions.

# Timeline



## M I L E S T O N E S

- |      |  |       |  |
|------|--|-------|--|
| MS 1 | Data Management Plan   | MS 8  | RPB testing campaigns concluded (packing and solvents)                         |
| MS 2 | Biomass selected, pretreated, blended, and characterized         | MS 9  | CO <sub>2</sub> R cell testing campaigns concluded (half-cell/full cell)       |
| MS 3 | Catalytic tar abatement testing campaigns concluded              | MS 10 | REUSE pilot plant completed  |
| MS 4 | CA-doped fibers completed and characterized                      | MS 11 | REUSE individual units tested  |
| MS 5 | Kinetic and equilibrium solvent characterization completed       | MS 12 | Validation and optimization of overall REUSE overall pilot plant system        |
| MS 6 | CO <sub>2</sub> R catalysts and MEAs developed and characterized | MS 13 | Recommendation guide for REUSE implementation in transition regions            |
| MS 7 | Gasification and combustion testing campaigns (TRL 5) completed  | MS 14 | Environmental, economic, and circularity assessment of REUSE concept concluded |
|      |  | MS 15 | REUSE business and exploitation plan   |

## Project Consortium

### Coordinator



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