Research and innovation projects
Filling the gap between research and industry

Hysytech Srl, R&D department

Filling the gap

Our company is fully active in R&D projects, in collaboration with major universities and national and international institutions

Research areas of interest

- Innovating technologies for **CO_2 valorization** → **CO_2 conversion and valorization**
- **H_2 storage** and **biomethane** production → **Energy efficiency technologies**
- **Municipal Bio-waste & chemical** conversion into added-value products → **Waste & biomass valorization**
- Novel exploiting **Thermo & electrochemical** approaches → **Ammonia production**

CO_2 conversion

- **Recode (2017-2022)**

CO_2 capture from the **cement industry** at TRL6 through absorption-desorption using Ionic liquids (T-1), and **CO_2 conversion** into calcium carbonate (T-2), **electrochemical CO_2 conversion** into glyoxylic acid (T-3), potassium formate (T-4), and zinc oxalate (T-5). Hysytech manufactured T-1, 3, 4, and 5.

RECODE — RECYCLE CARBON DYOXIDE IN CEMENT INDUSTRY TO PRODUCE ADDED-VALUE ADDITIVES: A STEP TOWARDS A CO2 CIRCULAR ECONOMY

- **Ocean (2017-2022)**

Oxalic acid from **CO_2** using **electrochemistry** at a demonstration scale. A **TRL6** technology for the **conversion of CO_2 into formate** will be developed. Hysytech is involved in the design, engineering, construction and commissioning of the prototypes.

ocean

- **EngiCOin (2018-2022)**

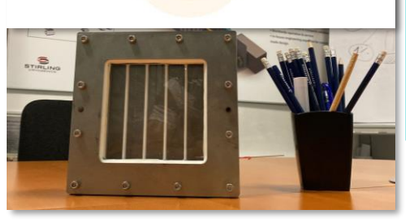
Development of integrated bioprocesses for the integration of three microbial factories for **CO_2 re-use** in the low carbon economy with an organic waste anaerobic digestion (AD) platform.

engicoin — ENGINEERED MICROBIAL FACTORIES FOR CO_2 EXPLOITATION IN AN INTEGRATED WASTE TREATMENT PLATFORM

- **Suncochem (2020-2024)**

This project aims to develop a Tandem Photoelectrocatalytic reactor for the conversion of **CO_2 into oxo products.** Hysytech is responsabile for the prototype manufacturing.

SunCO2Chem



Energy efficiency

- **ENDURUNS (2018-2023)**

Fuel cell stack development and manufacturing to recharge the lithium battery of an integrated hybrid AUV system.

- **LESGO (2020-2023)**

H_2 storage onto Graphene oxide through a photoelectrochemical process. Hysytech is responsible for the development and manufacturing of the PEC.

- **REGEN By Two (2020-2024)**

The project aims to develop a prototype for the trigeneration of heating, power, and cooling. Hysytech will manufacture the prototype.

- **FRESH (2022-2025)**

CO_2 conversion into Formic acid via electrochemical way for energy storage and utilization in a Direct formate fuel cell.

Waste/Chemical valorization

- **SATURNO (2019-2023)**

This project aims at the **valorization of wastes from the Municipal Waste Management Industry** for the production of added-value products, like fertilizers, fulvic and humic acids, etc. HST is responsible for the prototype development and construction.

- **PRIME (2019-2023)**

From renewable raw materials to bioproducts and materials.

- **PERFORM (2019-2023)**

A TRL6 electrochemical PowerPlatform for the valorization of biomass into building blocks (furfural to maleic acid, levulinic acid to valeric acid) and the paired tandem electrosynthesis of glucose to glucaric acid and further adipic acid will be also developed.

- **ROBINSON (2020-2024)**

ROBINSON will combine commercially available technologies and storage, novel technologies. A micro gas turbine-based Combined Heat and Power unit running on a mixture of local renewable fuels, **an Anaerobic Digestion system assisted by a bioelectrochemical process** producing bio-methane from wastewater, and an innovative wind turbine.

Ammonia production

- **HYSTRAM (2022-2025)**

NH_3 production by integrating the H_2 production through water splitting with an improved Haber-Bosch process with novel catalysts, which will start soon.

Stay tunned with our R&D progress

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