EIC - CO_2 and Nitrogen Portfolio

CONFETI

ABOUT CONFETI

CONFETI project proposes the development of a lab-scale validated innovative technology that is able to utilise and electrochemically convert CO_2 and N_2 directly from air or flue gases minimizing the use of critical raw materials and using renewable energy sources.

By the production of urea from N (N_2 and/or NO_3-) and CO_2, the project aims to ensure a circular and renewable carbon and nitrogen economy by recycling and converting the NO_3- not consume by the plant into ammonia or urea using photocatalytic technologies based on sunlight.

European Innovation Council
Funded by the European Union

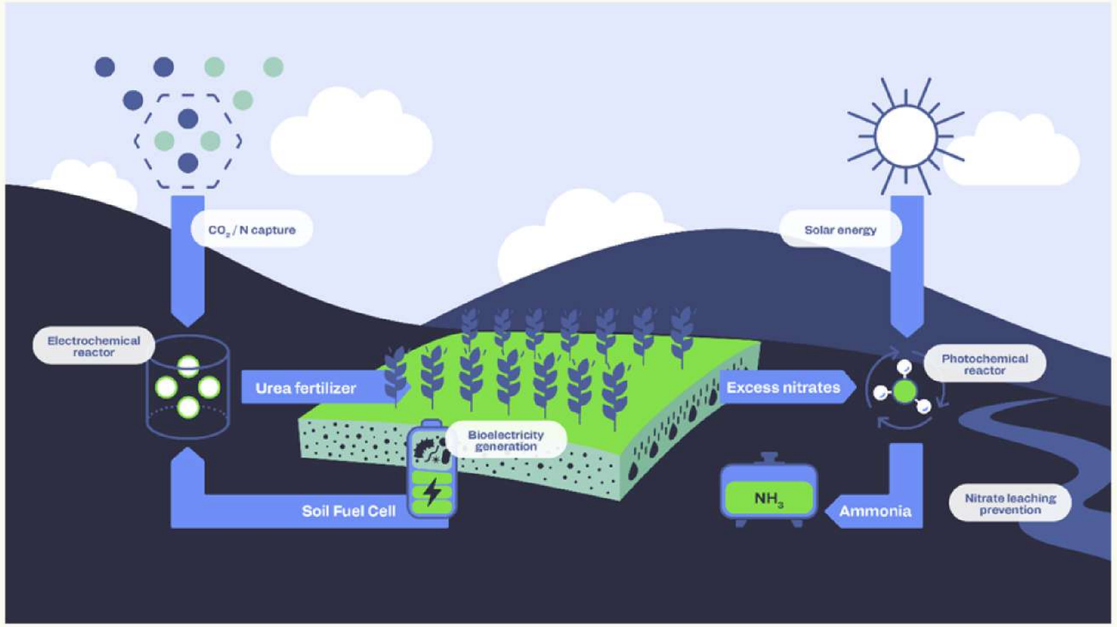


Figure 1. CONFETI approach to lab-scale cycle production of urea from N (N_2 and/or NO_3-) and CO_2.

CONFETI project aims to transform urea fertilizer production and use with a groundbreaking photo-electrochemical process. The scientists behind CONFETI seek to convert CO_2 and nitrogen (N_2) into urea, reducing both the need for fossil fuels and the environmental impact.

In addition, the project pursues the recovery of nitrogenous by-products generated from fertilization (e.g., nitrates), which are potentially polluting, and transform them back into other fertilizers (e.g., ammonia or urea). Resulting a cycle urea or amonia fertilizer production system (Figure 1).

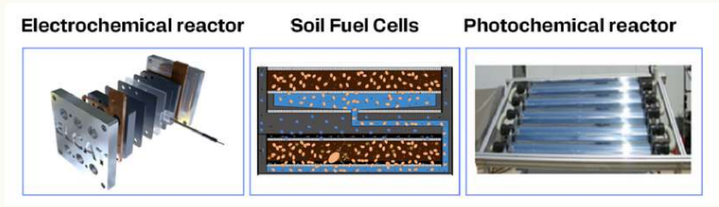


Figure 2. CONFETI research areas to reach technogical objectives.

Specifically, the final proof-of-concept system will combine three pocket-scale reactors:

1) an electrochemical reactor (Figure 2) for capturing, storing and converting CO_2 and N_2 into urea,

2) a soil microbial fuel cell (SMFC) (Figure 2) that generates energy from soil microorganisms, and

3) a photochemical reactor (Figure 2) for reducing nitrate (NO_3-) to ammonia/urea using photocatalytic technology with sunlight.

IN A NUTSHELL

CONFETI proposes an innovative, self-sufficient technology that will capture carbon dioxide and nitrogenous compunds convert them into eco-friendly urea or amonia fertilizer.

CONFETI PARTNERS

UAB Universitat Autònoma de Barcelona · CNM · CSIC · University of Antwerp · cnrs · Université Toulouse III Paul Sabatier · Università di Pisa · Bioo · Ciemat · Iowa State University

EIC - CO_2 and Nitrogen Portfolio

CONFETI

START 01 November 2023

END 31 October 2026

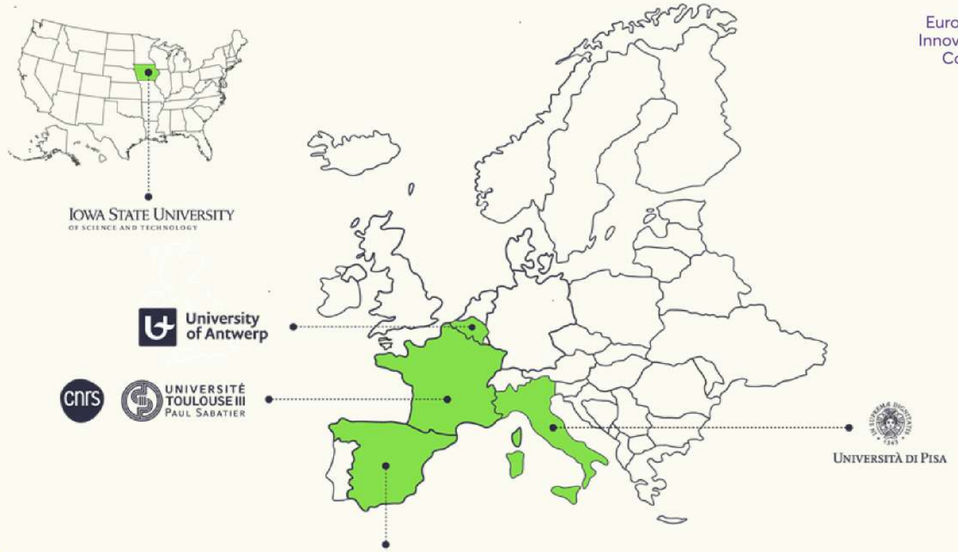
BUDGET €3.992.976

PROJECT WEBSITE

https://confetiproject.eu/

CORDIS LINK

https://cordis.europa.eu/project/id/101115182



European Innovation Council

Funded by the European Union

CONTACTS

Participating organization	Contact Person	Email
Universitat Autònoma de Barcelona (UAB)	Gonzalo Guirado	gonzalo.guirado@uab.cat
Fundació Privada Parc de Recerca UAB (PRUAB)	Virginia Mata / Beatriz de la Rica	virginia.mata@uab.cat / beatriz.delarica@uab.cat
Agencia Estatal Consejo Superior de Investigaciones Científicas (CSIC)	Xavier Muñoz	xavier.munoz@imb-cnm.csic.es
Universiteit Antwerpen (UANTWERPEN)	Tom Breugelmans	tom.breugelmans@uantwerpen.be
Centre National de la Recherche Scientifique (CNRS)	Christophe Coudret	christophe.coudret1@univ-tlse3.fr
Université Paul Sabatier Toulouse III (UPS)	Nancy Lauth-de Viguerie	nancy.de-viguerie@univ-tlse3.fr
Università di Pisa (UNIPI)	Paolo Bruschi	paolo.bruschi@unipi.it
Arkyne Technologies SL (Bioo)	Naroa Uria Moltó	naroa@bioo.tech
Centro de Investigaciones Energéticas, Medioambientales y tecnologías (CIEMAT)	Sixto Malato Rodriguez	sixto.malato@psa.es
Iowa State University (IOWA)	Javier Vela	vela@iastate.edu

EIC - CO_2 and Nitrogen Portfolio

Double Active Membranes for a Sustainable CO2 Cycle

European Innovation Council

Funded by the European Union

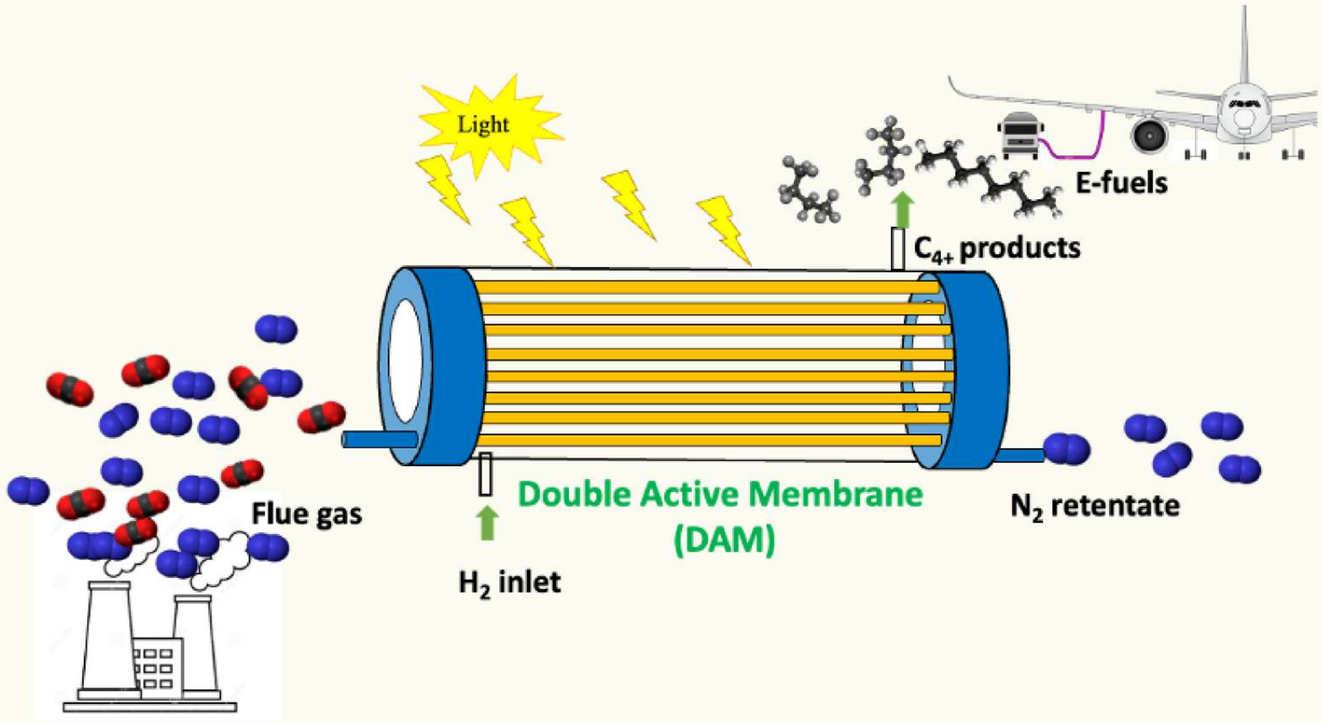
DAM4CO2

ABOUT DAM4CO2

The **DAM4CO2** project aims at the **simultaneous** carbon dioxide **capture** and **conversion** into added value products such as RFNBO (Renewable Fuel of Not Biologic Origin), also known as e-fuels with application in the production of fuel for aviation.

The project implementation will result in a lab-scale membrane reactor for proof-of-concept validation, tested in simulated relevant conditions. Close attention will be paid to:

- the **use of non-critical raw materials** at any stage of the process,
- **carbon-neutrality of the process**, which will be certified with a detailed full life cycle assessment (**LCA**).



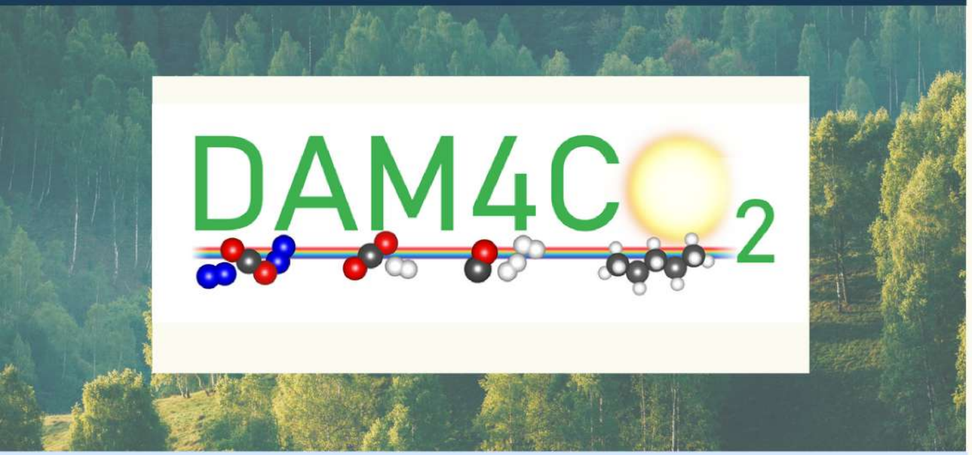
IN A NUTSHELL

DAM4CO$_2$ will develop a novel membrane technology for the simultaneous CO_2 separation and its photocatalytic conversion to C4+ molecules, as renewable fuels to achieve the goals of the European Green Deal.

DAM4CO2 PARTNERS

MeSep PRIMALCHIT

EIC - CO_2 and Nitrogen Portfolio



START 01 November 2023

END 31 October 2026

BUDGET €2.975.275 + £ 823.176 UKRI

PROJECT WEBSITE

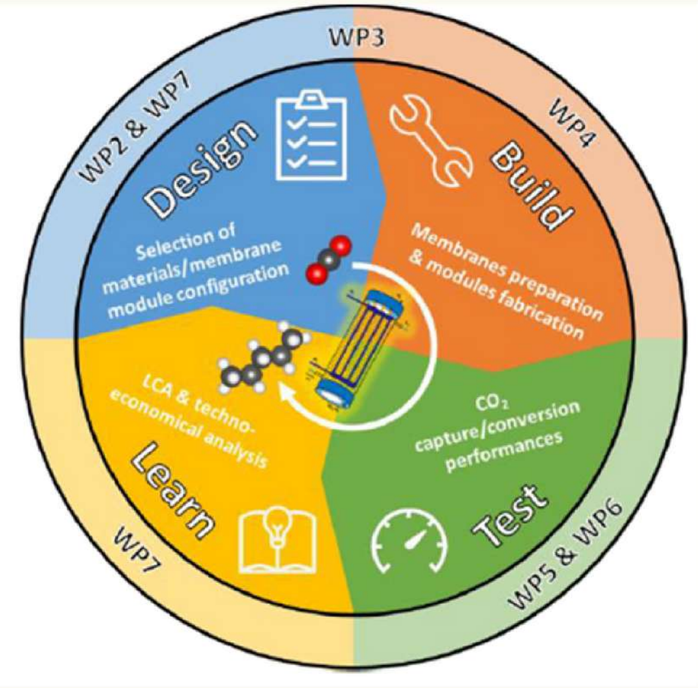
http://www.dam4co2.eu/

CORDIS LINK

https://cordis.europa.eu/project/id/101115488

Double Active Membranes for Sustainable CO_2 Cycle

European Innovation Council — Funded by the European Union



CONTACTS

Participating organization	Contact Person	Email
National Research Council of Italy (CNR)	Dr. Alessio Fuoco	alessio.fuoco@cnr.it
INSTM	Prof. Valentina Crocella'	valentina.crocella@unito.it
UPV - ITQ	Prof. Hermenegildo Garcia	hgarcia@qim.upv.es
Primalchit	Bárbara Llobell	barbarallobell@primalchit.com
Me-sep	Dr. Krzysztof Trzaskus	k.trzaskus@mesep.com
Swansea University	Dr. Mariolino Carta	mariolino.carta@swansea.ac.uk
The University of Edinburgh	Prof. Maria-Chiara Ferrari	m.ferrari@ed.ac.uk

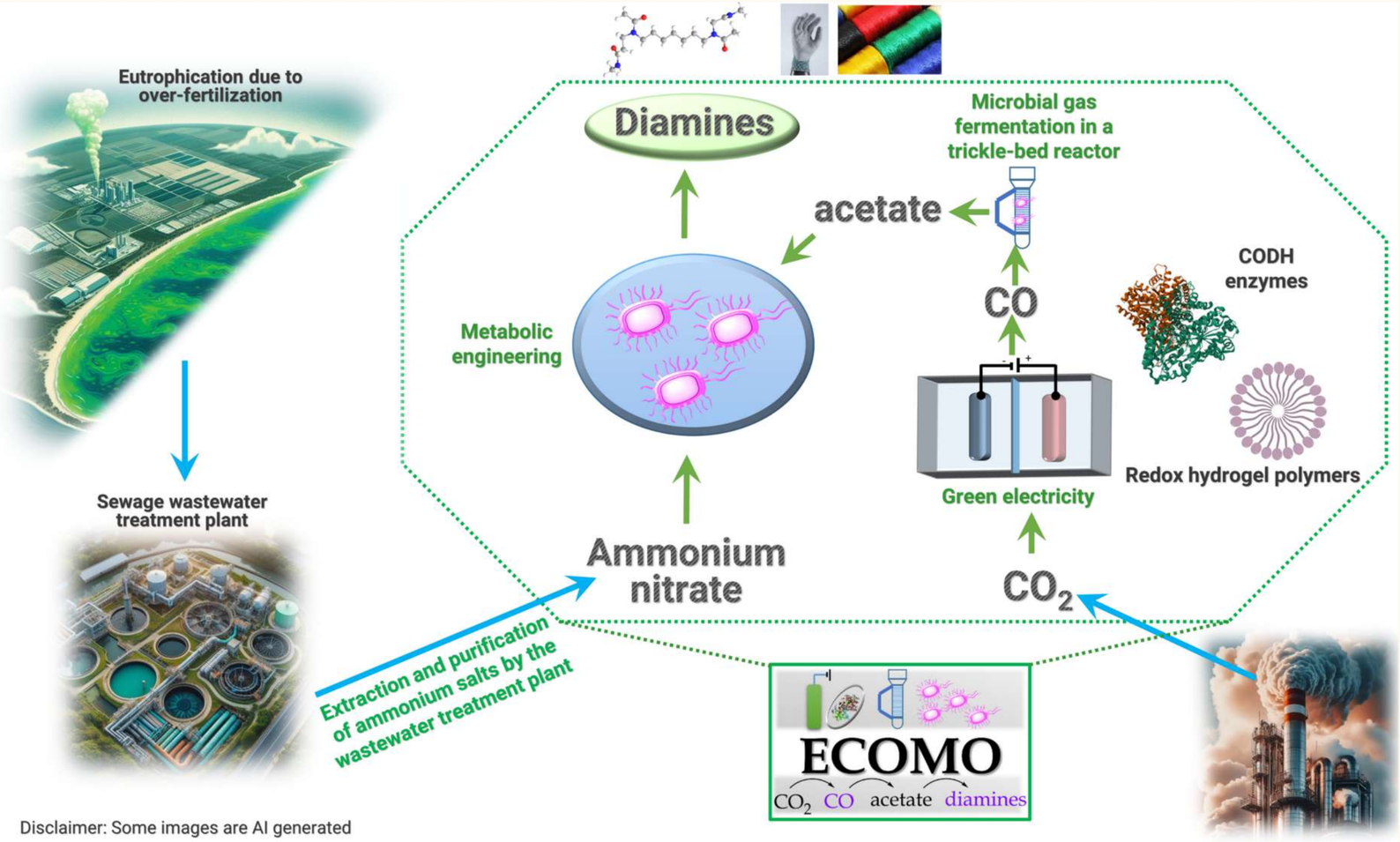
EIC - CO_2 and Nitrogen Portfolio

ABOUT ECOMO

ECOMO addresses the chemical industry sector by making it fossil-free, green and sustainable by converting waste carbon dioxide and ammonia (or nitrates) to diamines, making the diamine end-products renewable. The project adopts a hybrid technological approach through three unique innovation gates:

- Electrochemical conversion of carbon dioxide to carbon monoxide
- Converting carbon monoxide to acetate through gas fermentation
- Transforming acetate to the final product diamine through metabolic engineering

European Innovation Council
Funded by the European Union



Disclaimer: Some images are AI generated

IN A NUTSHELL

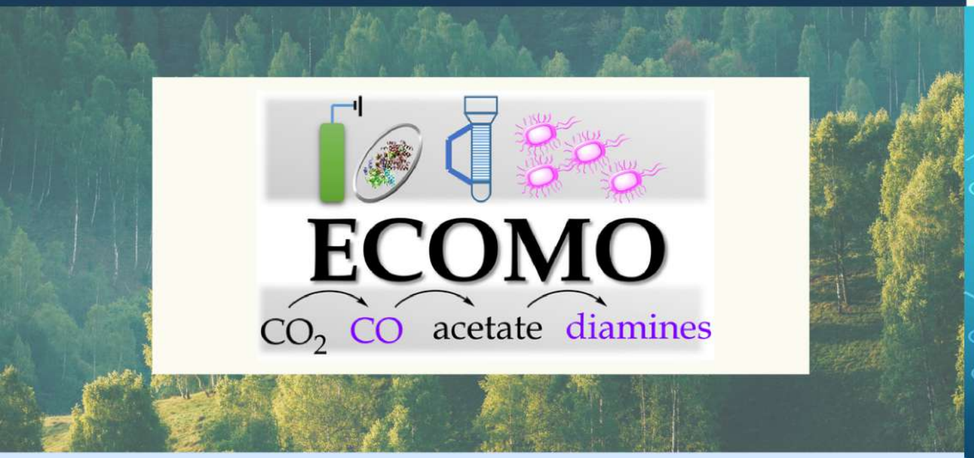
ECOMO brings together bioelectrochemistry and microbiology in a circular platform that turns carbon and nitrogen from waste streams into diamines, chemical products of high-value, promoting a greener future.

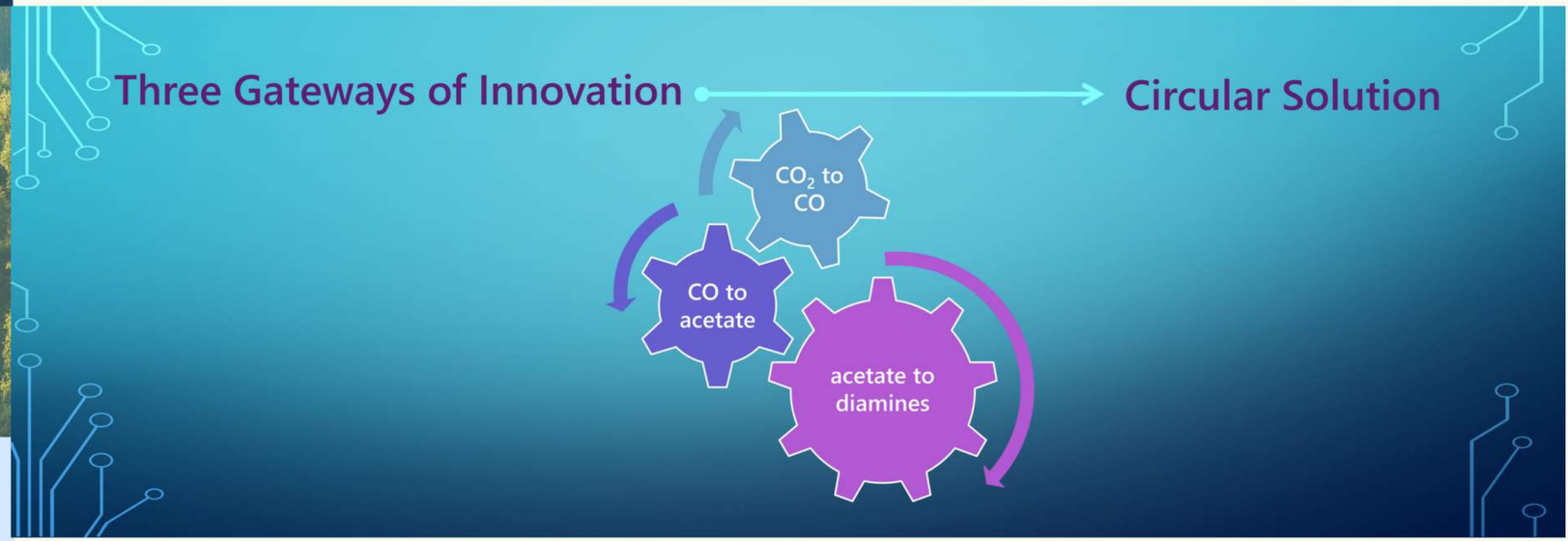
ECOMO PARTNERS

EIC - CO_2 and Nitrogen Portfolio

European Innovation Council

Funded by the European Union





START 01 November 2023

END 31 October 2026

BUDGET €3.784.201

PROJECT WEBSITE

https://www.ecomo-eic.eu/

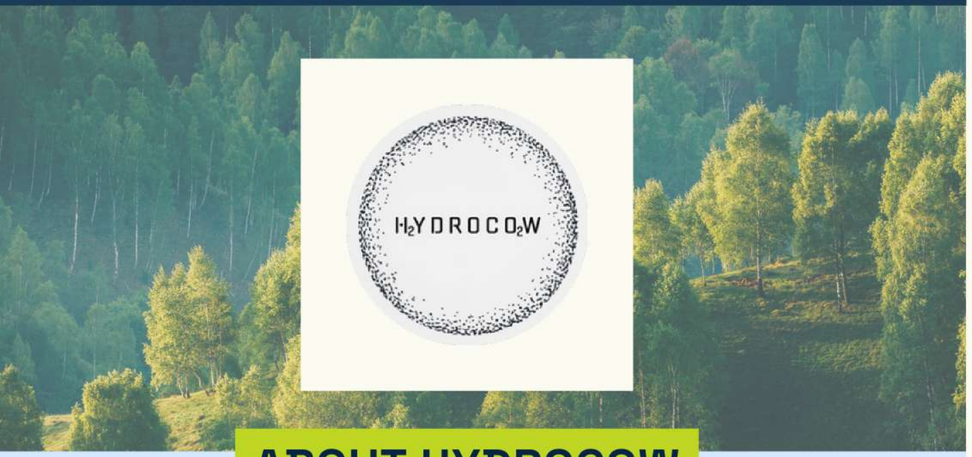
CORDIS LINK

https://cordis.europa.eu/project/id/101115403

CONTACTS

Participating organization	Contact Person	Email
Technische Universitaet Muenchen (TUM)	Nicolas Plumeré	nicolas.plumere@tum.de
	Hemlata Agarwala	hemlata.agarwala@tum.de
Fraunhofer Gesellschaft zur Forderung der Angewandten Forschung e.V.	Michael Richter	michael.richter@igb.fraunhofer.de
	Melanie Iwanow	melanie.iwanow@igb.fraunhofer.de
Danmarks Tekniske Universitet	Hariklia Gavala	hnga@kt.dtu.dk
Eilenburger Elektrolyse- und Umweltteknik GmbH	Jens Krümberg	jkruemberg@eut-eilenburg.de
Centre National de la Recherche Scientifique (CNRS)	Vincent Fourmond	vincent.fourmond@imm.cnrs.fr

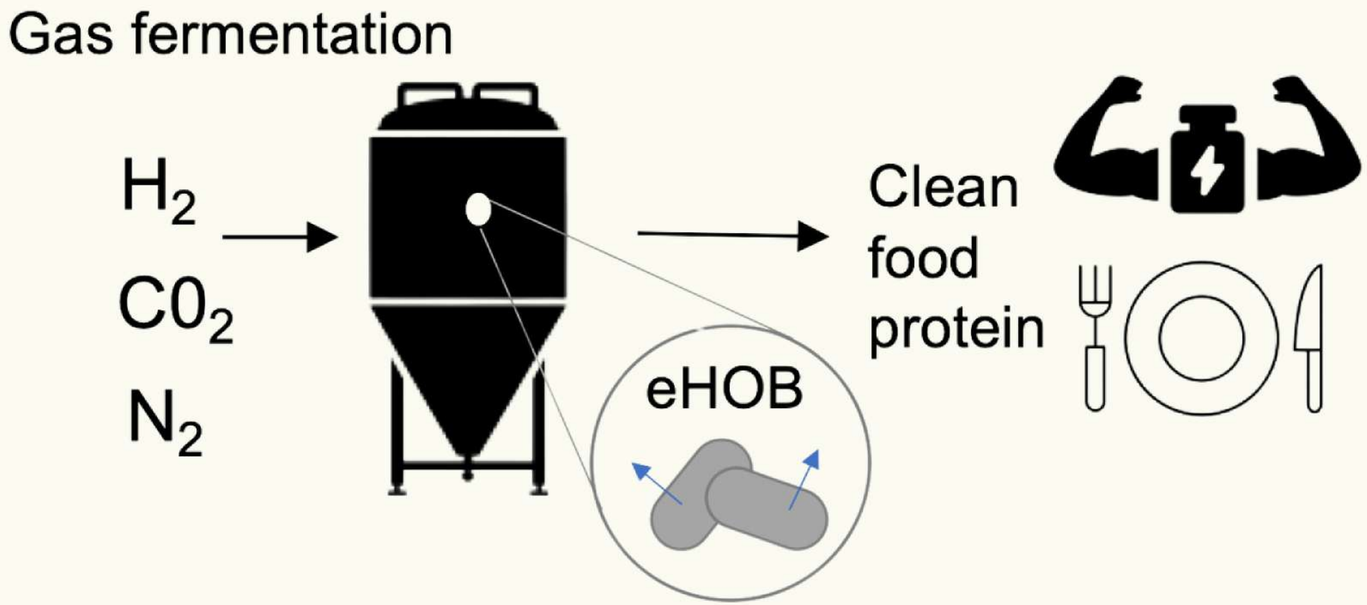
EIC - CO_2 and Nitrogen Portfolio



ABOUT HYDROCOW

Project HYDROCOW realizes a radically new technology that has the potential not only to address the global challenge of sustainability of food production and the resulting CO_2 emissions but also to create a totally new market in the food industry. The main impact of the project is through the **disconnection of food production from agriculture**. This leads to the development of a net-zero carbon, animal-free food product, with an estimated 99% reduction in land and water use in comparison to dairy cows - taking into consideration the land and water use of protein production, such as factory space.

European Innovation Council
Funded by the European Union



The main objective of the project is to develop and demonstrate **a first-of-a-kind** engineered hydrogen oxidizing bacterium (eHOB) Xanthobacter sp. SoF1-based protein secretion system, where CO_2 and soon N_2 is valorized into food-grade protein, decoupled from agriculture. In addition, HYDROCOW will generate significant knowledge for a growing research and application community about autotrophic, microbial production systems, their physiology, and sophisticated tools for genetically designing and screening them.

IN A NUTSHELL

Our goal is to engineer a microbe that converts carbon dioxide (CO_2) and hydrogen, produced from water using electricity, into beta-lactoglobulin, a major constituent of milk. In other words, HYDROCOW aims to produce milk with CO_2 and electricity, removing the cow from the process.

HYDROCOW PARTNERS

SOLAR FOODS · RWTH AACHEN UNIVERSITY · university of groningen · GINKGO BIOWORKS™ THE ORGANISM COMPANY

EIC - CO_2 and Nitrogen Portfolio

START 01 September 2023

END 31 August 2027

BUDGET €3,963,836

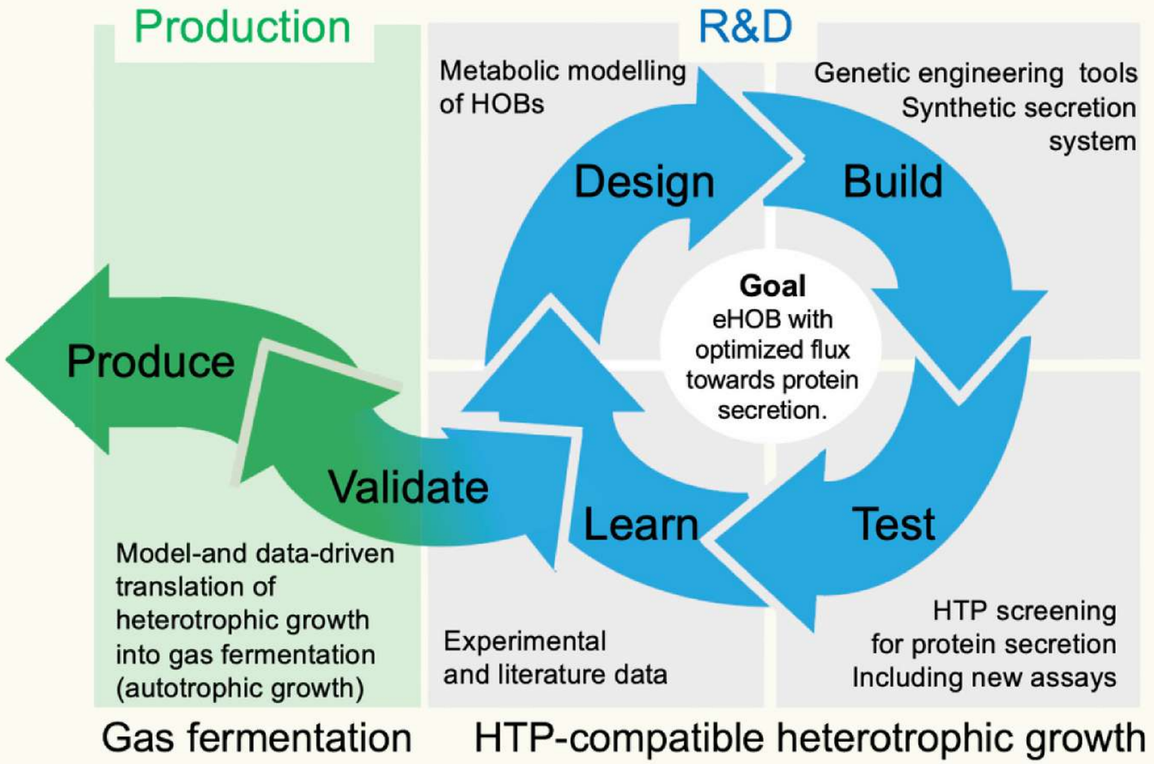
PROJECT WEBSITE

https://www.hydrocow.eu/

CORDIS LINK

https://cordis.europa.eu/project/id/101114746

European Innovation Council
Funded by the European Union



CONTACTS

Participating organization	Contact Person	Email
Solar Foods Oy	Arttu Luukkanen	arttu@solarfoods.com
Solar Foods Oy	Susanna Mäkinen	susanna@solarfoods.com
University of Groningen	Sonja Billerbeck	s.k.billerbeck@rug.nl
RWTH Aachen University	Tobias Alter	tobias.alter@rwth-aachen.de
Ginkgo Bioworks	Andy Meyer	ajmeyer@ginkgobioworks.com

EIC - CO_2 and Nitrogen Portfolio

ICONIC
Integrated COnversion of NItrate and Carbonate streams

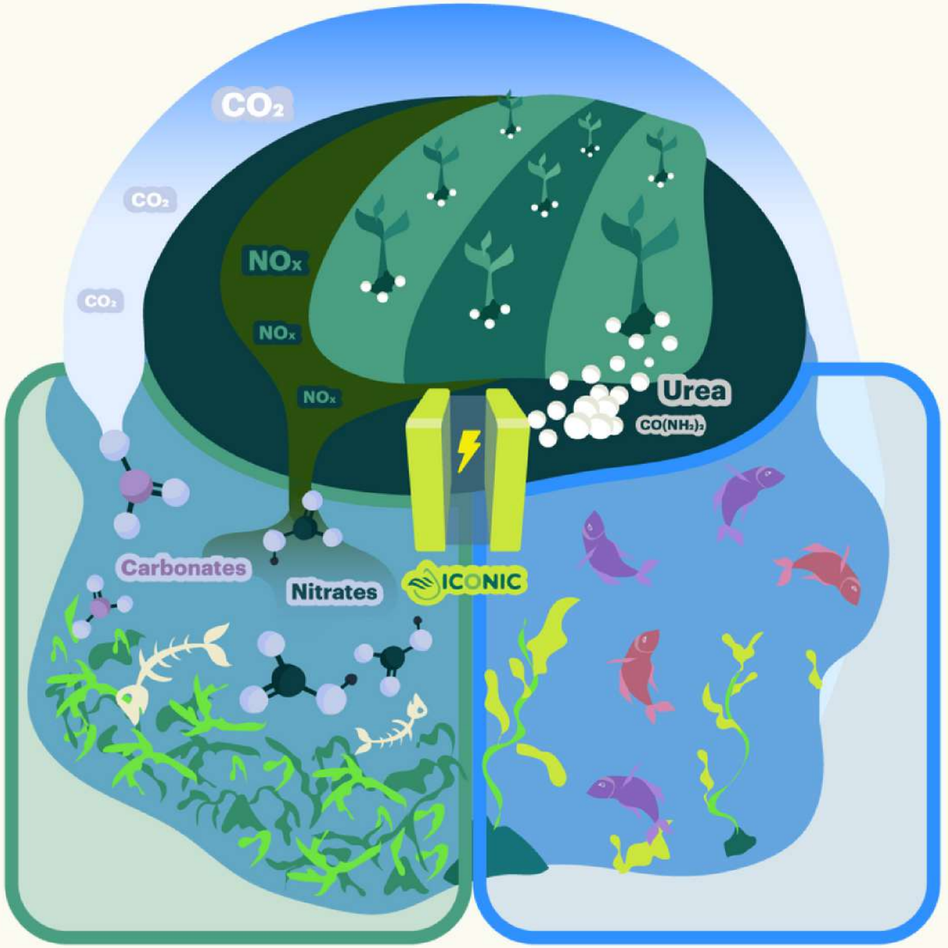
ABOUT ICONIC

Using as an inspiration how the natural carbon and nitrogen cycles operate, ICONIC presents itself as an **environmental remediation and a sustainable production technology.** We will help restore the ecosystem by capturing dissolved CO_2 and nitrates from seawater and transforming those chemicals into useful industry products, such as urea.

Our **strengths**:

- New catalysts based on non-critical raw materials.
- Direct co-electrolysis of CO_2 and nitrates from seawater
- Integrated and scalable prototype powered by renewables for on-site mitigation.

European Innovation Council
Funded by the European Union



IN A NUTSHELL

ICONIC helps to remediate the ocean ecosystem by converting seawater carbonates and nitrates, pollutants responsible for water acidification and eutrophication, into urea and other useful chemicals.

ICONIC PARTNERS

ICFO · ICN2 Institut Català de Nanociència i Nanotecnologia · ICMAB · Trinity College Dublin The University of Dublin · TUM · TU Delft

EIC - CO_2 and Nitrogen Portfolio

European Innovation Council

Funded by the European Union

ICONIC

Integrated COnversion of NItrate and Carbonate streams

START 01 November 2023

END 31 October 2026

BUDGET €3.964.666

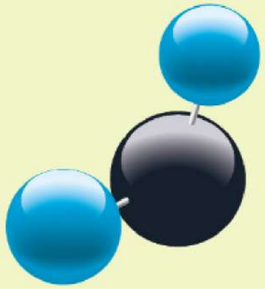
PROJECT WEBSITE

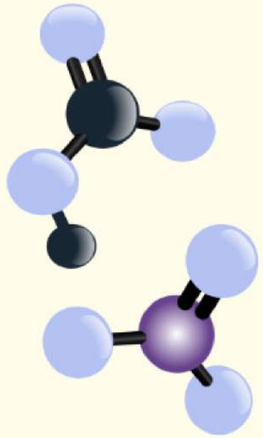
https://iconicproject.eu/

CORDIS LINK

https://cordis.europa.eu/project/id/101115204

Ocean restoration and capture & use of CO2





Reduce and recycle the nitrogen losses & C – N integrated management

CONTACTS

Participating organization	Contact Person	Email
ICFO	Pelayo García de Arquer	pelayo.garciadearquer@icfo.eu
ICFO	Luis Guillermo Gerling	luis-guillermo.gerling@icfo.eu
ICFO	Judith Salvador	judith.salvador@icfo.eu
ICFO	Marta Martín	marta.martin@icfo.eu

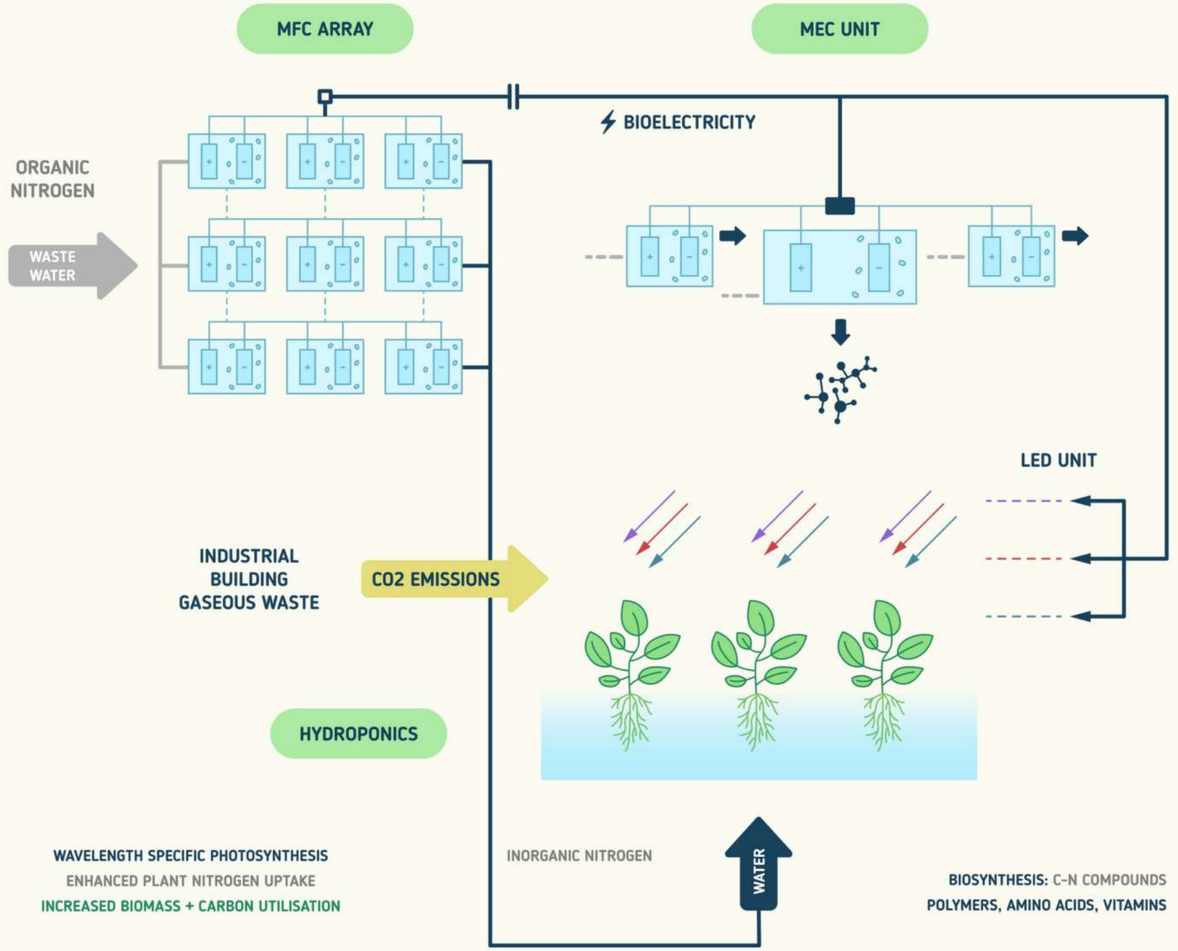
EIC - CO_2 and Nitrogen Portfolio

European Innovation Council
Funded by the European Union

ABOUT MI-HY

Mi-Hy represents an **innovative approach to hydroponics, waste treatment, and energy generation** by integrating processes which historically have been separate into a single ecosystem. This eliminates the need for external (fossil-fuel-based) energy or carbon and nitrogen sources. The novel integrated platform consists of:

- Bioelectricity-generating microbial fuel cells
- Wavelength-specific hydroponics LEDs
- Hydroponics system
- Microbial electrolysis cell (MEC)



IN A NUTSHELL

Mi-Hy brings together microbial fuel cell (MFC) technology and hydroponics in a circular platform that turns carbon into biomass and recycles nitrogen from wastewater, promoting a greener future.

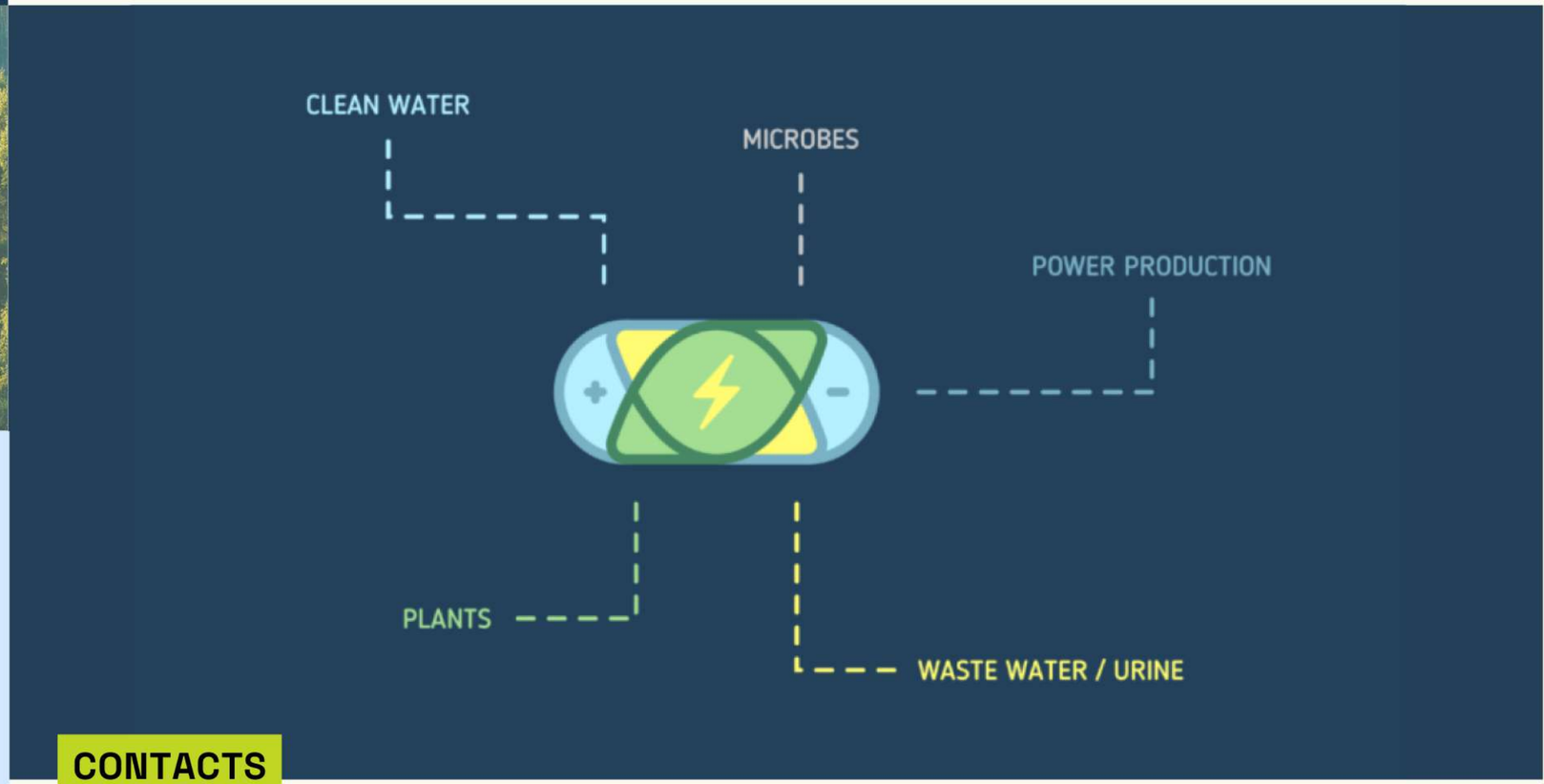
MI-HY PARTNERS

KU LEUVEN · Sony CSL · Biofaction · CSIC · University of Southampton · UWE Bristol University of the West of England

EIC - CO_2 and Nitrogen Portfolio

European Innovation Council

Funded by the European Union



START 01 November 2023

END 31 October 2027

BUDGET €5.968.000

PROJECT WEBSITE

https://www.mi-hy.eu

CORDIS LINK

https://cordis.europa.eu/project/id/101114746

CONTACTS

Participating organization	Contact Person	Email
KU LEUVEN	Prof. Rachel Armstrong	rachel.armstrong@kuleuven.b
Sony CSL	Dr. Peter Hanappe	peter.Hanappe@sony.com
BIOFACTION	KG Dr. Markus Schmidt	schmidt@biofaction.com
SPANISH NATIONAL RESEARCH COUNCIL	Dr. Jorge Barriuzo	jbarriuso@cib.csic.es
UNIVERSITY OF SOUTHAMPTON	Prof. Yannis Ieropoulos	I.Ieropoulos@soton.ac.uk
UNIVERSITY OF THE WEST OF ENGLAND	Prof. Neil Wiley	neil.Willey@uwe.ac.uk

EIC - CO_2 and Nitrogen Portfolio

European Innovation Council

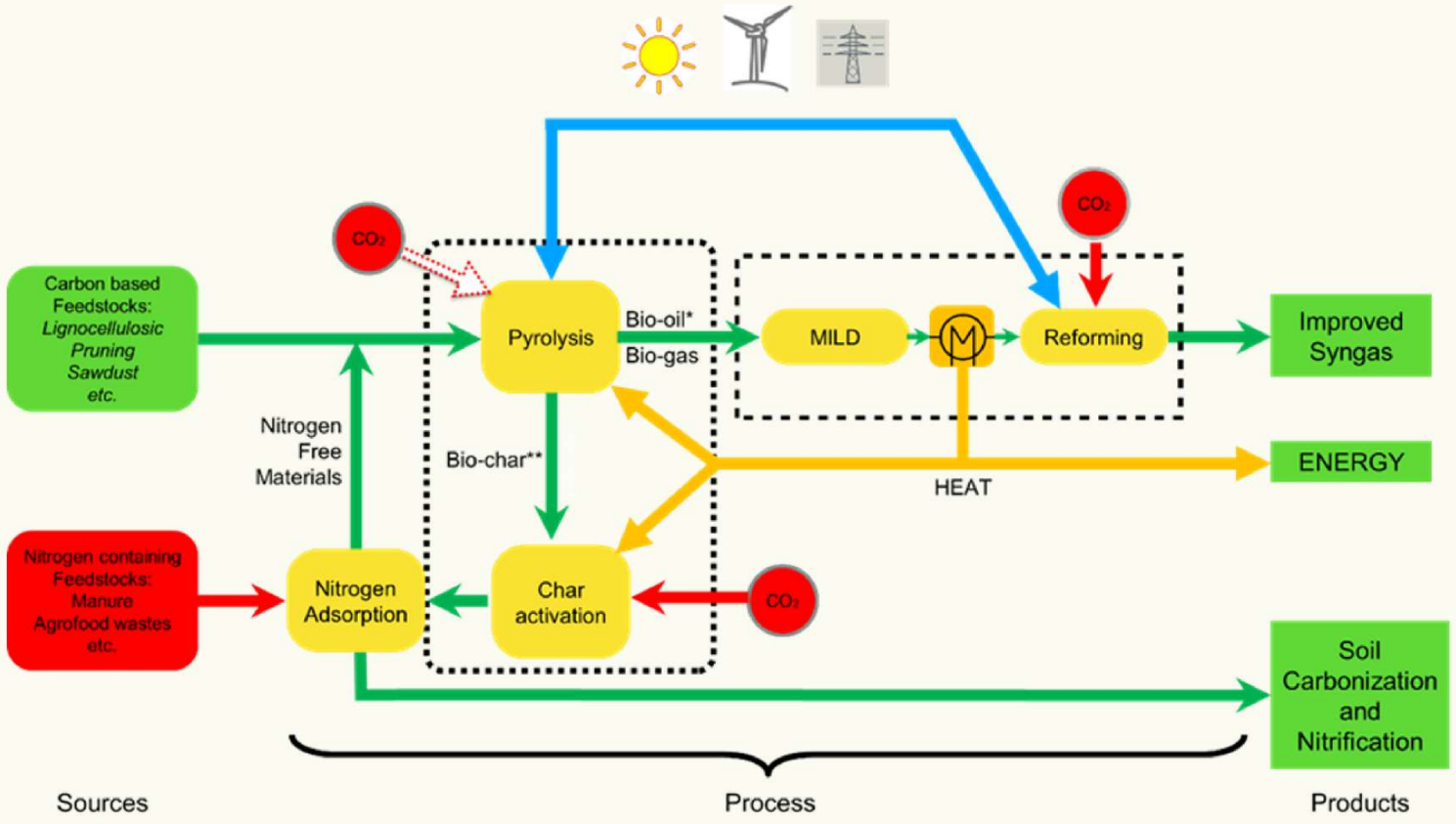
Funded by the European Union

MINICOR

ABOUT MINICOR

MINICOR aims to develop a versatile process for management and valorisation of CO_2 and nitrogen with efficient renewable resource deployment. The concept integrates pyrolysis, MILD-combustion and dry reforming with biomass residues as feedstock for production of syngas and biochar.

The concept adopts a circular approach as it employs biomass residues as raw material and combines the production of syngas with that of porous biochar materials for several possible applications such as soil amendment.



IN A NUTSHELL

MINICOR introduces circular biomass conversion for production of syngas from CO_2 via reforming, and biochar material for soil amendment. Thus adopting a circular approach for C- and N-compounds with efficient us of renewable resources.

MINICOR PARTNERS

Lund University · Consiglio Nazionale delle Ricerche STEMS · DTU · RI.SE

EIC - CO_2 and Nitrogen Portfolio

European Innovation Council

Funded by the European Union

MINICOR

START 01 November 2023

END 31 October 2028

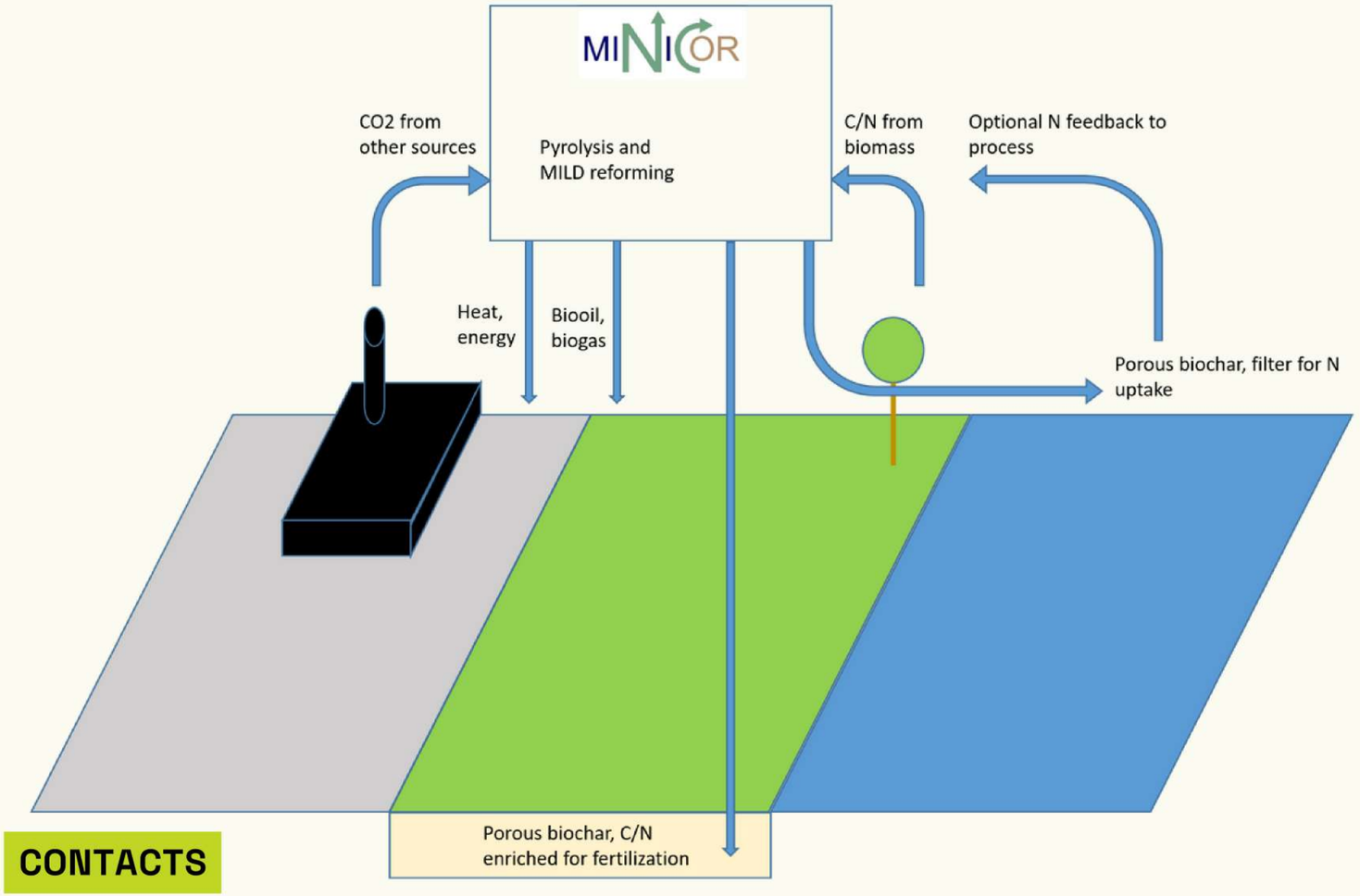
BUDGET €3.697.437

PROJECT WEBSITE

https://www.minicor-project.eu

CORDIS LINK

https://cordis.europa.eu/project/id/101115506



CONTACTS

Participating organization	Contact Person	Email
Lund University	Dr. Christian Brackmann	christian.brackmann@fysik.lu.se
CNR-STEMS	Dr. Mara deJoannon	mara.dejoannon@stems.cnr.it
Technical University of Denmark	Prof. Peter Glarborg	pgl@kt.dtu.dk
Research Institutes of Sweden AB (RISE)	Dr. Waqar Butt	waqar.butt@ri.se

EIC - CO_2 and Nitrogen Portfolio

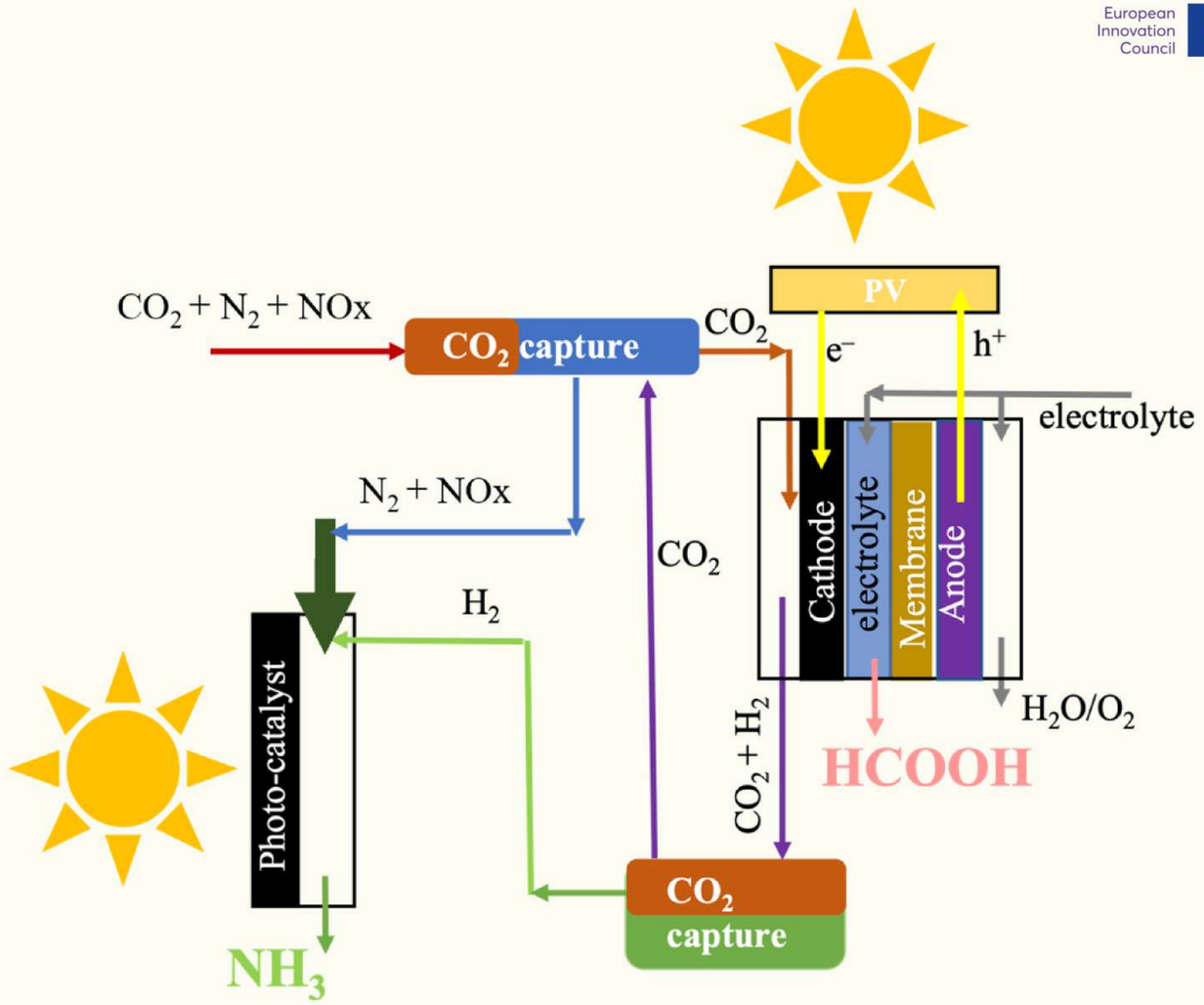
superval
sustainable photoelectrochemical valorization of flue gases

ABOUT SUPERVAL

Limiting postcombustion emissions is one of the most urgent environmental actions.

SUPERVAL overarching objective is to develop a breakthrough modular technology, built with non critical raw materials, able to capture and valorise the CO_2 and nitrogen components (NOx and N_2) of flue gas streams respectively to formate and ammonia, using sunlight as primary energy source, and water as source of hydrogen (protons and electrons).

European Innovation Council
Funded by the European Union



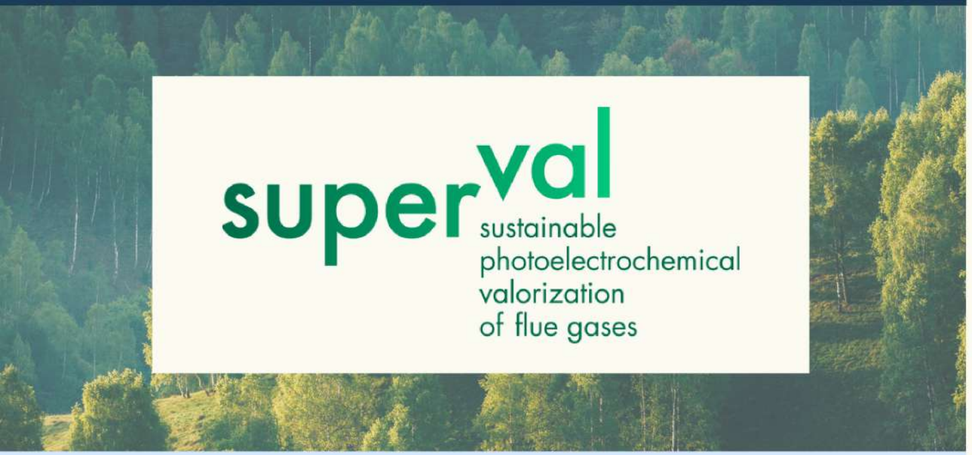
IN A NUTSHELL

SUPERVAL aims to turn CO_2 and Nitrogen from pollution and waste into useful products (like ammonia and formate) in a sustainable way

SUPERVAL PARTNERS

ICIQ Institut Català d'Investigació Química · Orchestra Sci. · Universitat Politècnica de València · Jülich · Università degli Studi di Messina · INSTM · TU/e Eindhoven University of Technology · vareser · 2i0 LCA consultants

EIC - CO_2 and Nitrogen Portfolio



superval
sustainable photoelectrochemical valorization of flue gases

START 01 November 2023

END 31 October 2027

BUDGET €3.571.708

PROJECT WEBSITE

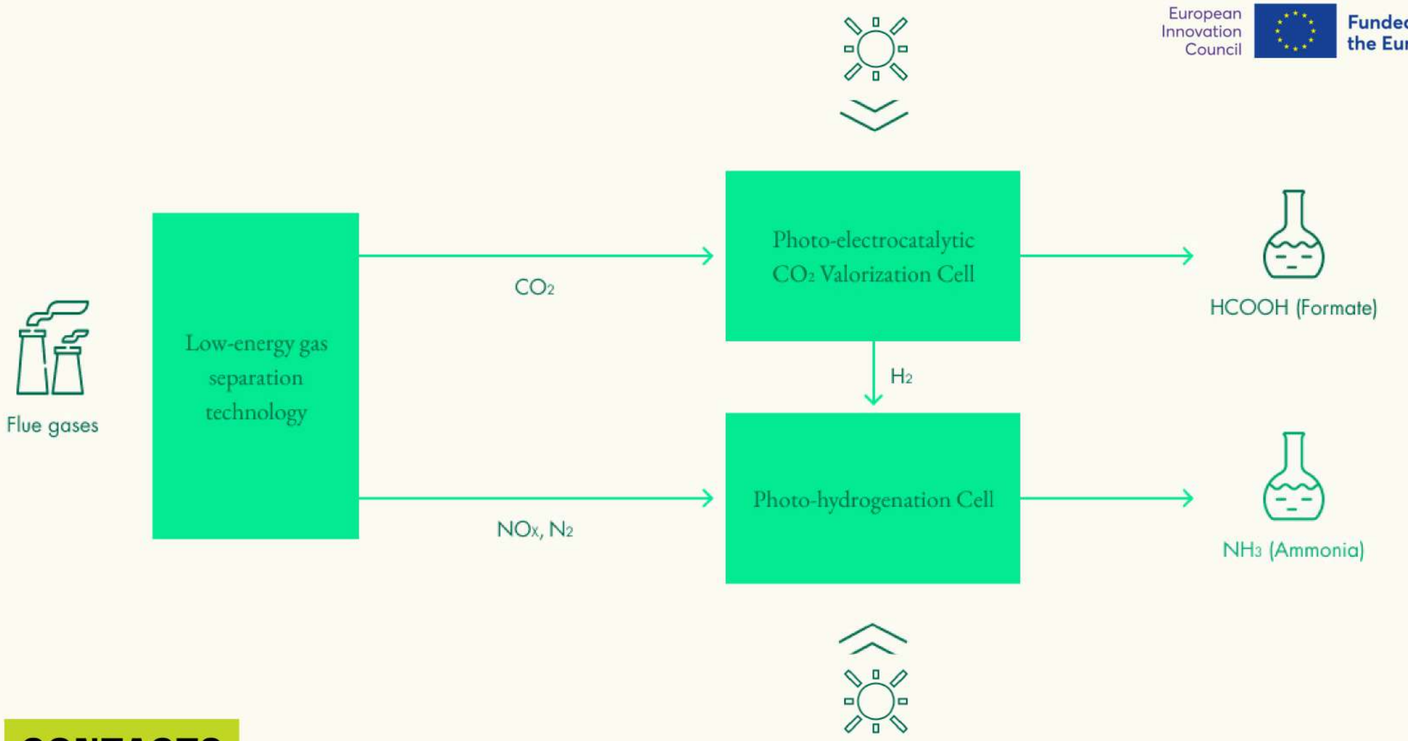
https://superval.eu/

CORDIS LINK

https://cordis.europa.eu/project/id/101115456

European Innovation Council

Funded by the European Union



CONTACTS

Participating organization	Contact Person	Email
ICIQ-CERCA	JR Galán-Mascarós	jrgalan@iciq.es
INSTM-UniMe	Claudio Ampelli	claudio.ampelli@unime.it
JÜLICH	Tsvetelina Merdzhanova	t.merdzhanova@fz-juelich.de
Orchestra Scientific	Stefano Giancola	sgiancola@orchestrasci.com
TU/e	Sofia Calero	s.calero@tue.nl
UPV	Hermenegildo García	hgarcia@qim.upv.es
Vareser	Gonzalo Molina	gmolina@vareser.net
2.-0 LCA	Martí Rufí	marti.rufi@lca-net.com