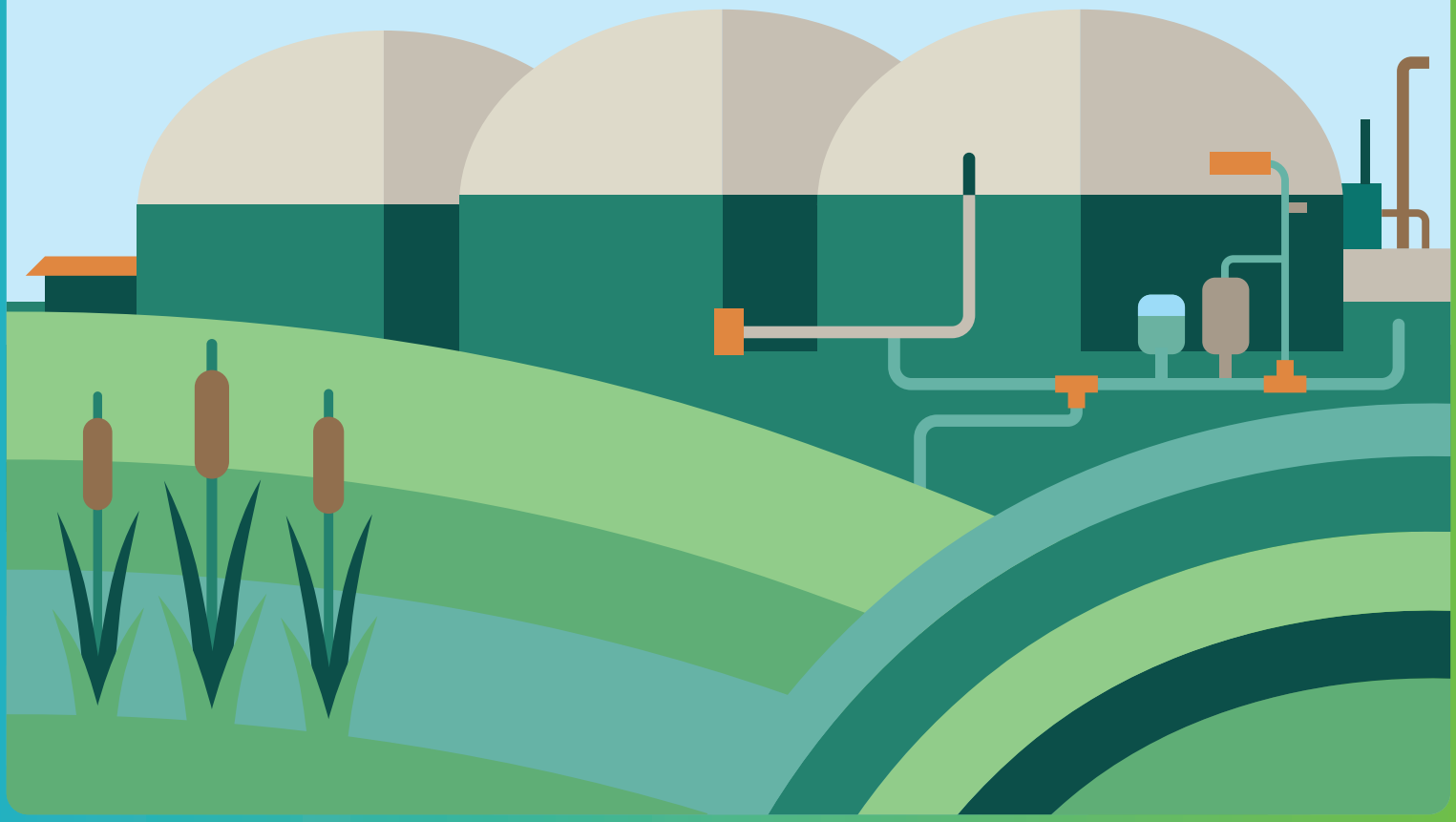
GreenCouple

Sustainable biogas purification by integration of a nature-based solution for digestate centrate treatment with biological H_2S removal



WHAT IS GREENCOUPLE?

LIFE GreenCouple is an EU-funded project that brings together two innovative technologies to turn anaerobic digestion (AD) byproducts into cleaner streams through a low impact and circular purification approach.
It aims to reduce costs, minimise environmental impacts, and demonstrate how digestate centrate and biogas sustainable purification can be effectively scaled up.

THE CHALLENGES

GreenCouple tackles a key environmental challenge: improving the sustainability and valorisation of waste streams generated by AD plants treating agro-industrial wastes and/or sewage sludge from wastewater treatment plants (WWTPs).

HIGH OPERATIONAL COSTS AND ENVIRONMENTAL IMPACTS

Conventional biogas and wastewater treatment processes are often resource-intensive, facing high operational costs and environmental footprints that require optimisation.

BARRIERS TO TECHNOLOGY DEPLOYMENT

Wider adoption of AD can be limited by the need for sustainable, more affordable, and scalable solutions for digestate and biogas treatment technologies.

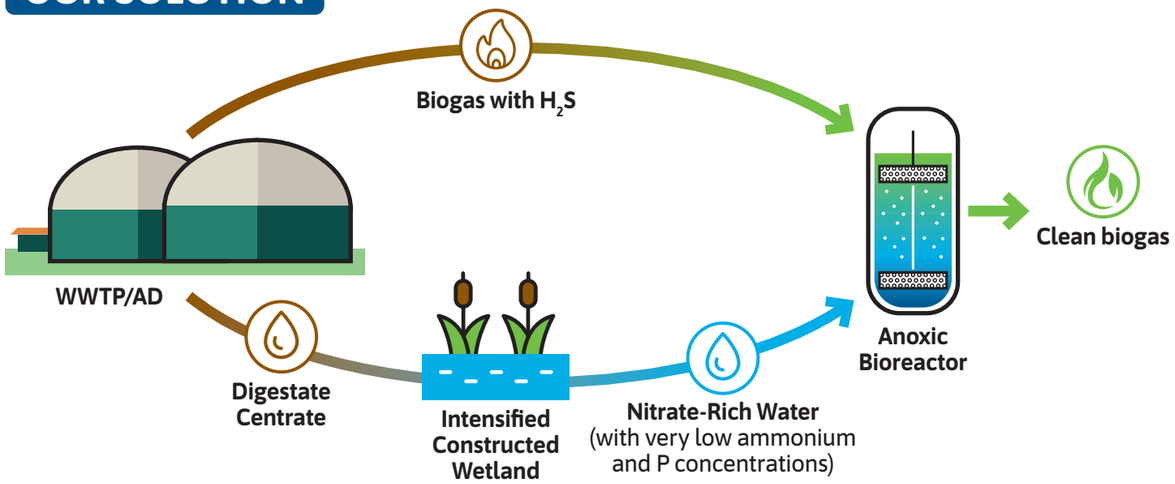
POLLUTANT LOADING

Centrate contains high nitrogen and phosphorous levels which, without proper treatment, can contribute to water pollution and harm aquatic ecosystems.

INEFFICIENT CURRENT PRACTICES

Biogas cleaning often relies on ferric salts and activated carbon, increasing both operational costs and environmental impacts.

OUR SOLUTION



WHEN TWO GREEN TECHNOLOGIES COUPLE

WHAT MAKES LIFE GREENCOUPLE UNIQUE?

LIFE GreenCouple links bioreactors and wetlands in a disruptive, never-before-reported combination to purify biogas and increase sustainability of anaerobic digestion.

INTENSIFIED CONSTRUCTED WETLANDS (CW)

Uses a nature-based process to treat digestate, transforming and removing contaminants, and obtaining a biogenic nitrate-rich-stream to be further valorised.

ANOXIC SUSPENDED BIOMASS BIOREACTOR (SBB)

Valorises the nitrified digestate centrate stream to biologically remove hydrogen sulphide (HS) from biogas.

FROM INNOVATION TO ACTION

Tested across three demo sites in Spain and Ireland, the system will show how a smart, nature-based and circular approach can boost anaerobic digestion implementation and pave the way for a cleaner bioenergy future.

THE IMPACTS

TECHNICAL

Design, build, test and validate the prototypes, developing design tools toward TRL9 and commercialisation deployment.

ECONOMIC

Reduce chemical use, lower sludge production, and rely on low-energy, nature-based treatment.

ENVIRONMENTAL

Recover value from sludge, remove nutrients, reduce emissions, improve air quality, and support biodiversity.

SOCIAL

Create jobs, engage stakeholders, and build public acceptance through outreach and visibility.

GREENCOUPLE FIGURES

6	2,5 M	48	4
Partners	Funding	Months	Countries

THE PARTNERS

Coordinator

global omnium Medioambiente S. L.

DTU

egevasa Diputació de València

bia energy

RINA

VNIVERSITAT DE VALÈNCIA — ICBiBE Institut Universitari Cavanilles de Biodiversitat i Biologia Evolutiva

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