

A photograph of a long, narrow tunnel formed by strings of warm white lights. The lights are arranged in a grid pattern, creating a perspective that draws the eye towards the center. The overall color palette is warm, with golden-yellow and orange tones. In the center of the tunnel, there is a white rectangular box with a thin black border containing the word "Appendix" in a bold, orange, sans-serif font.

Appendix



Appendix



Selection of R&D&i projects 2021-2023

Fact sheet, by organisation and project

| | |
|---|-----|
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**Selection of R&D&i projects 2021-2023
Fact sheet, by organisation and project**



| | | | |
|---|---|--------------------------------|--------------------------|
|  | R&D+i Group | | |
| | R&D+i PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 |
| PROJECT NAME | New Desalination EDR Stacks | | |
| ORGANIZATION | Ens d'Abastament d'Aigua Ter Llobregat (ATL) | | |
| WEB | https://www.atl.cat | | |
| PARTNERS IN THE PROJECT | | | |
| FUJIFILM Europe GmbH | | | |
| Start date of the Project | nov-19 | End date of the Project | nov-21 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| Operational study of the high-efficiency FUJIFILM technology of EDR at Llobregat DWTP. Despite operational data results were correct, supplier discarded the industrial stack production due to commercial reasons to focus on the production of its main cell pair elements: membranes and spacers | | | |
| IMAGE OF THE PROJECT | | | |
|  | | | |
| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| YES | NO | NO | NO |
| RESULTS ACHIEVED OR EXPECTED | | | |
| Main objective was to find new EDR equipment available on the market to replace or expand the brackish water desalination facilities of Llobregat DWTP. The supplier has decided to close the project because they didn't find it commercially competitive | | | |
| DETECTED NEEDS FOR FURTHER DEVELOPMENT | | | |
| | | | |
| ECONOMIC FIGURES | | | |
| Collaboration agreement with non-quantified internal costs | | | |

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|--|--|--------------------------------|--------------------|
|  | | R&D+I Group | |
| R&D+I PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 | |
| PROJECT NAME | DrinkIA-Supply | | |
| ORGANIZATION | Ens d'Abastament d'Aigua Ter Llobregat (ATL) | | |
| WEB | https://www.atl.cat | | |
| PARTNERS IN THE PROJECT | | | |
| Institut de Medi Ambient (IMA)- Grupo Lequia-Universitat de Girona | | | |
| Start date of the Project | oct-20 | End date of the Project | dic-22 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| Development of an application based on a decision support system (EDSS) to ATL drinking water distribution network. It includes the development and use of artificial intelligence (AI) tools applied to supply system. | | | |
| IMAGE OF THE PROJECT | | | |
|  | | | |
| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| YES | NO | NO | YES |
| RESULTS ACHIEVED OR EXPECTED | | | |
| Have a decision support system to ATL distribution network, which integrates water contributions from different production points (DWTP and SWRO), with different water qualities and changes in the flow and pipe direction, depending on the daily drinking water demand | | | |
| DETECTED NEEDS FOR FURTHER DEVELOPMENT | | | |
| (Empty space for further development needs) | | | |
| ECONOMIC FIGURES | | | |
| Research agreemnt: 220.000€ + VAT | | | |

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|---|---|--------------------------------|-------------|
|  | R&D+i Group | | |
| R&D+i PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 | |
| PROJECT NAME | Hydraulic Efficiency of the Distribution Network | | |
| ORGANIZATION | Ens d'Abastament d'Aigua Ter Llobregat (ATL) | | |
| WEB | https://www.atl.cat | | |
| PARTNERS IN THE PROJECT | | | |
| Departamento de "Enginyeria de Sistemes, Automàtica i Informàtica Industrial (DESAII)"- Universidad Politècnica de Catalunya (UPC) | | | |
| Start date of the Project | mar-20 | End date of the Project | dic-23 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| Evaluation of the hydraulic performance of the ATL distribution network based on the reliability of the flowmeters measurements and on the management and maintenance information of the supply system | | | |
| IMAGE OF THE PROJECT | | | |
|  | | | |
| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| YES | NO | NO | YES |
| RESULTS ACHIEVED OR EXPECTED | | | |
| Quantification of the hydraulic performance of the distribution network, as a whole unit and sectorized, considering the reliability of the flowmeters measurements through the use of specific algorithms. | | | |
| DETECTED NEEDS FOR FURTHER DEVELOPMENT | | | |
| ECONOMIC FIGURES | | | |
| Project costs: 72.500€ + VAT | | | |

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|---|------------|---|--------------------------------|--|
|  | | R&D+i Group | | |
| R&D+i PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 | | |
| PROJECT NAME | | Regenerable ion exchange resin system (SIX®) to reduce organic matter in drinking water treatment | | |
| ORGANIZATION | | Ens d'Abastament d'Aigua Ter Llobregat (ATL) | | |
| WEB | | https://www.atl.cat | | |
| PARTNERS IN THE PROJECT | | | | |
| ATL, PWNT | | | | |
| Start date of the Project | | oct-22 | End date of the Project | |
| | | | dic-23 | |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | | |
| <p>Treatment of water from the Llobregat River presents problems of formation of DBPs (mainly THMs) due to precursors such as organic matter (OM) and bromide. Since 2009, the THM-FP has been controlled through the use of partial desalination by Electrodialysis Reversal step (EDR), which reduces ions in general and bromide in particular. Considering the future enlargement of the Llobregat DWTP, exists the possibility to include new treatment steps that directly impacts on another DBPs precursor such as OM in previous stages of the process, through the use of SIX™ (suspended ion exchange) technology that uses ion exchange resins. This technology could reduce the need to expand the current EDR stage and, in this way, decrease the investment costs and reduce energy consumption, the use of reagents and the generation of by-products.</p> | | | | |
| IMAGE OF THE PROJECT | | | | |
|  | | | | |
| PROJECT APPROACH WITHIN THE WATER CYCLE | | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal | |
| YES | NO | YES | NO | |
| RESULTS ACHIEVED OR EXPECTED | | | | |
| (Empty space for results) | | | | |
| DETECTED NEEDS FOR FURTHER DEVELOPMENT | | | | |
| (Empty space for needs) | | | | |
| ECONOMIC FIGURES | | | | |
| Project Costs: 181.000€+ VAT | | | | |

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|---|---|----------------------------|-------------|
|  | | R&D+i Group | |
| | | R&D+i PROJECTS - PORTFOLIO | |
| | | PERIOD: 2021-2023 | |
| PROJECT NAME | Quantification and identification of microplastics in DWTP and SWRO process | | |
| ORGANIZATION | Ens d'Abastament d'Aigua Ter Llobregat (ATL) | | |
| WEB | https://www.atl.cat | | |
| PARTNERS IN THE PROJECT | | | |
| ATL, Universitat Rovira i Virgili, Universitat de Barcelona | | | |
| Start date of the Project | may-22 | End date of the Project | may-23 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| Analytical determination of the different types of microplastics (MPs) present in source water and in the different stages of the drinking water process, including recovery flows and sludge in 2 DWTP and 2 SWRO. It also includes materials and reagents introduced during the treatment process | | | |
| IMAGE OF THE PROJECT | | | |
|  | | | |
| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| YES | NO | NO | NO |
| RESULTS ACHIEVED OR EXPECTED | | | |
| Different types of MPs and different composition and sizes have been detected although their presence decreases from the source water to the final treated water. The MPs introduced by reagents dosage are also detected | | | |
| DETECTED NEEDS FOR FURTHER DEVELOPMENT | | | |
| ECONOMIC FIGURES | | | |
| Project costs: 18.500€+ VAT | | | |

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|--|---|-------------------------|-------------|
|  | R&D+I Group | | |
| R&D+I PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 | |
| PROJECT NAME | ATL Distribution Network Modelling | | |
| ORGANIZATION | Ens d'Abastament d'Aigua Ter Llobregat (ATL) | | |
| WEB | https://www.atl.cat | | |
| PARTNERS IN THE PROJECT | | | |
| ATL, Aigües de Catalunya, IDRICA | | | |
| Start date of the Project | feb-22 | End date of the Project | jun-23 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| Modelling of the distribution network pipe that connects Abrera and Font Santa. It includes information from other applications and new fields development, adapting the information to the user needs to enhance the supply system management | | | |
| IMAGE OF THE PROJECT | | | |
|  | | | |
| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| YES | NO | NO | NO |
| RESULTS ACHIEVED OR EXPECTED | | | |
| DETECTED NEEDS FOR FURTHER DEVELOPMENT | | | |
| ECONOMIC FIGURES | | | |
| Project costs: 30,000€ + VAT | | | |



R&D+i Group

R&D+i PROJECTS - PORTFOLIO

PERIOD: 2021-2023

PROJECT NAME

Recovery and Reuse of Reverse Osmosi Membranes

ORGANIZATION

Ens d'Abastament d'Aigua Ter Llobregat (ATL)

WEB

<https://www.atl.cat>

PARTNERS IN THE PROJECT

ATL, UNIVERSITAT DE GIRONA

Start date of the Project

may-21

End date of the Project

may-24

DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE

The RO membranes used in the seawater desalination for drinking water use must be changed periodically to maintain product quality and operation conditions. In a SWRO plant there are a large number of membranes that have a high weight and a high economic cost. Its replacement causes a significant economic expense and an equally important CO2 footprint, linked to its manufacture, transportation and rejection as a trivial waste that can end up in a landfill or incinerated. However, an RO membrane used to desalinate drinking water can be recovered by specific chemical treatment for industrial use, sometimes maintaining the RO properties, sometimes reducing them but being suitable for technologies such as NF or UF.

IMAGE OF THE PROJECT



PROJECT APPROACH WITHIN THE WATER CYCLE

Supply and Distribution

Sanitation

Energy and Waste

Transversal

YES

NO

YES

NO

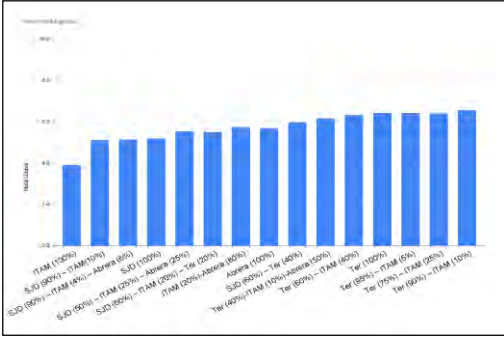
RESULTS ACHIEVED OR EXPECTED


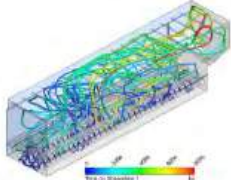
First results shows that RO membranes that have been previously used in drinking water desalination of seawater have been recovered for industrial uses


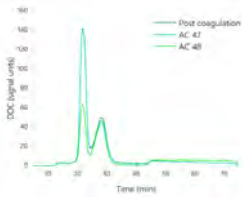
DETECTED NEEDS FOR FURTHER DEVELOPMENT



ECONOMIC FIGURES

Without internal costs



| | | | |
|--|---|--------------------------------|-------------|
|  | R&D+i Group | | |
| R&D+i PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 | |
| PROJECT NAME | Organoleptic perception of drinking water from different sources | | |
| ORGANIZATION | Ens d'Abastament d'Aigua Ter Llobregat (ATL) | | |
| WEB | https://www.atl.cat | | |
| PARTNERS IN THE PROJECT | | | |
| CETAQUA, AGBAR | | | |
| Start date of the Project | nov-22 | End date of the Project | dic-23 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| Expand and update the knowledge about factors influencing the organoleptic perception of drinking water in the metropolitan area of Barcelona. Water testing sessions have been carried out with the participation of 133 non-experts tasters from the three entities. The water resources studied are from Ter DWTP, Llobregat DWTP, Sant Joan Despí DWTP, and desalinated water from Llobregat SWRO, all of them as puure water and its most representative binary and ternary mixtures that can be usually found in the distribution network. | | | |
| IMAGE OF THE PROJECT | | | |
|  | | | |
| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| YES | NO | NO | NO |
| RESULTS ACHIEVED OR EXPECTED | | | |
| The water from Ter DWTP has received the best scores while the desalinated water has been the worst valued. The waters from Llobregat DWTP and SJD DWTP present similar scores, possibly due to their common origin, but with some variations in the treatment process of each plant. Considering the population groups studied, it can be concluded that the factors most influence the organoleptic perception are tobacco consumption and also water consumption habits. | | | |
| DETECTED NEEDS FOR FURTHER DEVELOPMENT | | | |
| | | | |
| ECONOMIC FIGURES | | | |
| 28.000,00 € | | | |


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|  | | R&D+I Group | |
| | | R&D+I PROJECTS - PORTFOLIO | |
| | | PERIOD: 2021-2023 | |
| PROJECT NAME | CFD Modelling | | |
| ORGANIZATION | Ens d'Abastament d'Aigua Ter Llobregat (ATL) | | |
| WEB | https://www.atl.cat | | |
| PARTNERS IN THE PROJECT | | | |
| Hydrens | | | |
| Start date of the Project | set-23 | End date of the Project | abr-24 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| Modelling the hydraulic operation of the current Ter DWTP and Llobregat DWTP clarifiers (Pulsator and Accentrifloc) through the application of computational fluid dynamics (CFD) analysis | | | |
| IMAGE OF THE PROJECT | | | |
|  | | | |
| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| YES | NO | NO | NO |
| RESULTS ACHIEVED OR EXPECTED | | | |
| | | | |
| DETECTED NEEDS FOR FURTHER DEVELOPMENT | | | |
| | | | |
| ECONOMIC FIGURES | | | |
| 14.560,00 € | | | |

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|---|---|--------------------------------|--------------------|
|  | R&D+i Group | | |
| R&D+i PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 | |
| PROJECT NAME | Natural Organic Matter (NOM) Characterization | | |
| ORGANIZATION | Ens d'Abastament d'Aigua Ter Llobregat (ATL) | | |
| WEB | https://www.atl.cat | | |
| PARTNERS IN THE PROJECT | | | |
| LEQUIA-Universitat de Girona | | | |
| Start date of the Project | dic-23 | End date of the Project | nov-25 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| Study the characteristics of natural organic matter in source water, along treatment process and in drinking water using advanced analytical techniques that allow the fractionation of organic matter and its relationship with the efficiency of the treatment processes and the formation of regulated disinfection byproducts | | | |
| IMAGE OF THE PROJECT | | | |
|  | | | |
| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| YES | NO | NO | NO |
| RESULTS ACHIEVED OR EXPECTED | | | |
| DETECTED NEEDS FOR FURTHER DEVELOPMENT | | | |
| ECONOMIC FIGURES | | | |
| 58.000,00 € | | | |

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|  | | R&D+i Group | | |
| R&D+i PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 | | |
| PROJECT NAME | | IntoDBP. INNOVATIVE TOOLS TO CONTROL ORGANIC MATTER AND DISINFECTION BYPRODUCTS IN DRINKING WATER | | |
| ORGANIZATION | | Ens d'Abastament d'Aigua Ter Llobregat (ATL) | | |
| WEB | | https://www.atl.cat | | |
| PARTNERS IN THE PROJECT | | | | |
| ICRA, UCY, UNICT, ISGLOBAL, WE, HUJI, AQUASOIL, EUROMARKET, CYII, WBL, SCAN, DCU, CSIC-CEAB | | | | |
| Start date of the Project | | ene-23 | End date of the Project | |
| | | | ene-27 | |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | | |
| Develop a comprehensive approach from source to tap for an optimum drinking water surveillance strategy. Formulate a new transformative approach to simultaneously remove precursors and disinfect drinking water, thus minimizing unwanted effects. Create a new open and ready-to-use workflow to better forecast the effects of climate extremes under current and future conditions. Increase the understanding of human exposure, taking into consideration the gender dimension Provide guidance to decision-makers to formulate optimized and future-proofed climate change adaptation pathways. Compile and present new business opportunities in the context of dissolved organic matter and disinfection by-products monitoring, modelling and control | | | | |
| IMAGE OF THE PROJECT | | | | |
|  | | | | |
| PROJECT APPROACH WITHIN THE WATER CYCLE | | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal | |
| YES | NO | NO | NO | |
| RESULTS ACHIEVED OR EXPECTED | | | | |
| (Empty space for results) | | | | |
| DETECTED NEEDS FOR FURTHER DEVELOPMENT | | | | |
| (Empty space for needs) | | | | |
| ECONOMIC FIGURES | | | | |
| 4.000.000,00 € | | | | |



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|--|---|-------------------------------------|-------------|
|  Bilbao Bizkaia Ur Partzuergoa Consorcio de Aguas Bilbao Bizkaia | | R&D Group | |
| | | R&D PROJECTS - PORTFOLIO | |
| | | PERIOD: 2021-2023 | |
| PROJECT NAME | "CABB/BBUP" WATER CLASSROOM IN THE BILBAO ENGINEERING SCHOOL for undertaking end of master/graduate course work | | |
| ORGANISATION | CONSORCIO DE AGUAS BILBAO BIZKAIA | | |
| WEB SITE | https://www.ehu.eus/es/web/bilboko-ingeniaritza-eskola/relaciones con la empresa/aulas de empresa/aula del agua cabb bbup | | |
| PARTNERS IN THE PROJECT | | | |
| Bilbao Engineering School (University of the Basque Country UPV/EHU) | | | |
| Project start date | May 19 | Project end date | Jul 23 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>Constituted within the ambit of the Framework Collaboration Agreement between the University of the Basque Country/Euskal Herriko Unibertsitatea and the Consorcio de Aguas Bilbao Bizkaia to contribute to the strengthening of education, training, research, development and scientific and technological innovation in the field of water management.</p> <p>The purpose is the creation, at the headquarters of the Bilbao EIB School of Engineering, of the "CABB/BBUP" Water Classroom. In this Classroom, the EIB and the CABB will collaborate in the fields of scientific and technological research and teaching, in the area of knowledge of water management, promoting the implementation of programmes, projects and activities and fostering the generation of knowledge, exchange and knowledge transfer between them. The EIB will carry out the following activities in the CABB Water Classroom:</p> <ul style="list-style-type: none"> • Scientific research or technological development programmes and projects, the content of which will be specified in each case. • Training courses, seminars and conferences, both specific and as part of a general continuous training plan. • Exchanges of teachers, experts and professionals for courses, seminars and postgraduate programmes organised by mutual agreement. • Use of the facilities provided for this purpose by either party for studies, models, prototypes, pilots and experimental or research work. • Specific joint scientific and technical research studies through the forming of joint working groups. • The reciprocal use of scientific and technological information. • Completion of doctoral theses and final projects in areas of knowledge related to their objectives at any time. | | | |
| PROJECT IMAGE | | | |
| | | | |
| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and distribution | Sanitation | Energy and waste | Transversal |
| YES | YES | YES | YES |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>Five TFMs have been carried out each year in the first two courses with subjects as versatile as the use of water in the supply system, the influence of radioactive discharges in WWTPs and the design of a LoRaWAN communications system for telemetry. Given the success of the first courses, the third course has been extended to eight TFMs. The Classroom's activities also include dissemination with technical conferences and training through specific courses.</p> | | | |
| NEEDS DETECTED TO EVOLVE | | | |
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| ECONOMIC FIGURES | | | |
| 52.500,00 euros/academic year. Total 3 years: 157.500,00 euros | | | |


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|--|--|-------------------------|--------------------------|
|  Bilbao Bizkaia Ur Partzuergoa Consorcio de Aguas Bilbao Bizkaia | R&D Group | | |
| | R&D PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 |
| PROJECT NAME | Operation of the Etxebarri pilot plant | | |
| ORGANISATION | CONSORCIO DE AGUAS BILBAO BIZKAIA | | |
| WEB SITE | | | |
| PARTNERS IN THE PROJECT | | | |
| SUEZ TREATMENT SOLUTIONS | | | |
| Project start date | Oct 19 | Project end date | Dec 21 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>The purpose of the project is to operate and maintain the plant for a period of twenty-four (24) months, to determine the implementations and changes to be made in the second phase of the Venta Alta DWTP so that it can treat the water from the River Nervión and produce water that complies with Royal Decree 140/2003, which sets out the sanitary criteria for the quality of water for human consumption.</p> <p>In detail, the objectives to be achieved through this contract are:</p> <ul style="list-style-type: none"> • Determine the adjustments and implementations that would have to be made in the second phase of the Venta Alta DWTP so that the water from the River Nervión can be treated, with the output water complying with Royal Decree 140/2003. • Study the operation of the plant with the various raw water quality scenarios that occur in the River Nervión. • To operate the plant in all possible configurations throughout the four seasons of the year as well as during special events (drought, exceptional rainfall, etc). • To study the performance of the pilot plant in its various configurations for the elimination of preferential and priority substances of the environmental quality standards as well as for the elimination of emerging substances or other pollutants. | | | |
| PROJECT IMAGE | | | |
|  | | | |
| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| YES | NO | NO | YES |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>Results achieved:</p> <ul style="list-style-type: none"> - The configurations have been tested with a mixture of water from the River Nervión and the Zadorra reservoirs, obtaining positive results in all configurations. - Tests have been carried out with various activated carbons to determine the optimum one to be installed in Venta Alta. - The phenomenon of THMs desorption on activated carbon filters has been studied. - Coagulation-flocculation processes with alternative reagents as well as with powdered activated carbon have been studied. | | | |
| NEEDS DETECTED TO EVOLVE | | | |
| The aim is to convert the pilot plant into the CATABB, Bilbao Bizkaia Advanced Water Treatment Centre, and to open it up to R&D with other bodies – universities, technology centres, start-ups, etc. | | | |
| ECONOMIC FIGURES | | | |
| €240.587,60/year. Total 2 years: 481.175,2 | | | |

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|  Bilbao Bizkaia Ur Partzuergoa Consorcio de Aguas Bilbao Bizkaia | R&D Group | | |
| | R&D PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 |
| PROJECT NAME | Management of the Bilbao Bizkaia Advanced Water Treatment Centre (CATABB) | | |
| ORGANISATION | CONSORCIO DE AGUAS BILBAO BIZKAIA | | |
| WEB SITE | | | |
| PARTNERS IN THE PROJECT | | | |
| Suez Treatment Solutions Gaiker Technology Centre | | | |
| Project start date | Dec 21 | Project end date | Dec 24 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>The objective of the project is the management of CATABB to carry out research projects related to drinking water treatment. Within CATABB, the aim is not only for projects to come from the Consortium or from the winning bidder (Suez-Gaiker joint venture), but also to open it up to R&D with other organisations such as universities, technology centres, start-ups, etc.</p> <p>CATABB is also a suitable platform for developing collaborative projects in European calls for proposals. It is intended to develop three projects in parallel: one main project, occupying more than 75% of the plant and two secondary projects occupying less than 25% of the plant. There is an advisory committee consisting of the Consortium, the successful bidder and the university that approves and supervises the projects that are developed.</p> | | | |
| PROJECT IMAGE | | | |
| | | | |
| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and distribution | Sanitation | Energy and waste | Transversal |
| YES | NO | NO | YES |
| RESULTS ACHIEVED OR EXPECTED | | | |
| It is planned to maximise the number of projects to be carried out, and therefore one main project and two secondary projects are being carried out simultaneously. Likewise, part of the projects carried out to date are being carried out with the University of the Basque Country (UPV/EHU), thus encouraging external collaborations. | | | |
| NEEDS DETECTED TO EVOLVE | | | |
| The centre and the research possibilities it offers must be disseminated to other bodies. For this, weekly publications are made on LinkedIn and papers will be presented at the IWA International Congress in Copenhagen and at the AEAS Congress in Cordoba, both in 2022. | | | |
| ECONOMIC FIGURES | | | |
| 384.364,43 €/year. Total 2021-2023: 763.128,60 euros | | | |


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|  Bilbao Bizkaia Ur Partzuergoa Consorcio de Aguas Bilbao Bizkaia | R&D Group | | |
| | R&D PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 |
| PROJECT NAME | DEVELOPMENT OF SENSORY WATER ANALYSIS METHODS: PERCEPTION OF "CHLORINE ODOUR" AND PRELIMINARY STUDY OF THE RELATIONSHIP BETWEEN CHEMICAL AND SENSORY MEASUREMENTS | | |
| ORGANISATION | CONSORCIO DE AGUAS BILBAO BIZKAIA | | |
| WEB SITE | | | |
| PARTNERS IN THE PROJECT | | | |
| UNIVERSITY OF THE BASQUE COUNTRY UPV/EHU | | | |
| Project start date | Dec 19 | Project end date | Dec 21 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>In accordance with Royal Decree 902/2018, laboratories with more than 5,000 samples of drinking water per year, as is the case of the Consorcio de Aguas Bilbao Bizkaia, are obliged to have their analysis methods accredited in accordance with the UNE-EN-ISO 17025 standard, including odour and taste determinations. For this reason, this project has been set up with the following objectives:</p> <ul style="list-style-type: none"> - To set up a trained panel for the undertaking of official sensory control activities of drinking water and descriptive sensory analysis of water in general. - Study the impact of "residual chlorine" on the odour and aroma of the water. - Start the construction of a database that allows the study of relationships between physical-chemical analysis measurements and sensory properties in drinking water. | | | |
| IMAGE OF THE PROJECT | | | |
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| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| YES | NO | NO | NO |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>The results obtained were:</p> <ul style="list-style-type: none"> - A revision of the UNE-EN 1622.2007 standard for the determination of odour (TON) and taste threshold (TFN) was carried out and it was proposed to introduce changes in relevant aspects of this standard for its uniform application in laboratories and to facilitate their work. - Based on the development of a specific procedure, a sufficient panel of sensory assessors has been set up to carry out analyses systematically and to develop further research and innovation projects. | | | |
| NEEDS DETECTED TO EVOLVE | | | |
| Further stability testing of the measurement of chlorine in water is necessary before the planned chlorine perception study is implemented as well as enriching the routine analysis database with more water samples to determine correlations between physical-chemical and sensory variables. | | | |
| ECONOMIC FIGURES | | | |
| €100,800.00 | | | |

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|  Bilbao Bizkaia Ur Partzuergoa Consorcio de Aguas Bilbao Bizkaia | | R&D Group | |
| R&D PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 | |
| PROJECT NAME | ASSESSMENT OF PROPERTIES OF GRANULAR ACTIVATED CHARCOAL AND SELECTION OF THE MOST SUITABLE FOR USE IN THE REMOVAL OF POLLUTANTS IN PILOT WATER PURIFICATION PLANT | | |
| ORGANISATION | CONSORCIO DE AGUAS BILBAO BIZKAIA | | |
| WEB SITE | | | |
| PARTNERS IN THE PROJECT | | | |
| UNIVERSITY OF THE BASQUE COUNTRY | | | |
| Project start date | Oct 20 | Project end date | Aug 21 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>Work is being carried out in the Venta Alta DWTP to reform the activated carbon filters with a budget of €8 M, which includes the removal of the activated carbon currently installed and its total replacement using virgin material. As part of the contract, the successful bidder is requested to supply two samples of approximately 1 m³ each of two different activated carbons proposed in the tender phase, to be installed in the pilot plant that CABB has in Etxebarri so that they can be tested and the most suitable one chosen, which will finally be installed in the Venta Alta DWTP filters.</p> <p>The project's objectives are:</p> <ul style="list-style-type: none"> - Determine which of the two types of carbon has better textural and behavioural properties (adsorption capacity at equilibrium, adsorption kinetics, for different pollutants). - Predict the estimated remaining life of the carbon to be able to predict future replacements. - Determine the behaviour of the two types of carbon at pilot plant scale using real water and doping it with different pollutants. | | | |
| PROJECT IMAGE | | | |
| | | | |
| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and distribution | Sanitation | Energy and waste | Transversal |
| YES | NO | NO | NO |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>The results obtained were:</p> <ul style="list-style-type: none"> - The properties of the two types of carbon have been analysed theoretically and tested empirically in the laboratory. - The behaviour as adsorbents has been studied at the laboratory level with different doping. It has not been possible to do so at the pilot plant level because doping with the large flows that are treated is complicated and uneconomical. - The validity and consistency of the results obtained in the laboratory were checked in the pilot plant. | | | |
| NEEDS DETECTED TO EVOLVE | | | |
| Predicting the estimated lifetime of the charcoals has proved to be one of the most complex parts of the project and one that could not be developed. Projects are therefore under way with students to design and build a laboratory column for experimentation with activated carbon. | | | |
| ECONOMIC FIGURES | | | |
| €70,000 | | | |


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|  Bilbao Bizkaia Ur Partzuergoa Consorcio de Aguas Bilbao Bizkaia | R&D Group | | |
| | R&D PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 |
| PROJECT NAME | CETHAP. CONTROL AND ELIMINATION OF TRIHALOMETHANES (THMs) IN DRINKING WATER TREATMENT PLANTS AND DISTRIBUTION SYSTEMS | | |
| ORGANISATION | CONSORCIO DE AGUAS BILBAO BIZKAIA | | |
| WEB SITE | | | |
| PARTNERS IN THE PROJECT | | | |
| UNIVERSITY OF THE BASQUE COUNTRY UPV/EHU CEIT TECHNOLOGY CENTRE | | | |
| Project start date | Sec 18 | Project end date | Dec 22 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>The "Control and elimination of trihalomethanes (THMs) in drinking water treatment plants and distribution systems" project comprises the following work blocks:</p> <ul style="list-style-type: none"> • PT1: Optimising the DWTP operations involved in the control of THMs precursors. • PT2: Monitoring of the formation of THMs in the drinking water supply and distribution system. • PT3: Optimising the operating conditions of the air stripping (AS) system in THMs removal. <p>The objectives are:</p> <ul style="list-style-type: none"> - Increase knowledge of the formation of THMs and their precursors. - Generate models to help predict the formation of THMs in both DWTPs and systems. - Design efficient systems for the disposal of THMs once they have been generated. | | | |
| PROJECT IMAGE | | | |
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| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and distribution | Sanitation | Energy and waste | Transversal |
| YES | NO | NO | NO |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>The project is under way and the results achieved as of the reporting date in each package are:</p> <ul style="list-style-type: none"> - PT1, DWTPs: The treatment lines with the highest performance in terms of precursor removal and control of THMs formation have been assessed and chosen. The DWTP model is being designed and calibrated. - PT2, systems: EPANET-MSX system model in the construction and verification phase. - PT3, elimination of THMs. Validation of the automatic operation strategy in the Borja tank. | | | |
| NEEDS DETECTED TO EVOLVE | | | |
| The next steps should be to get models online | | | |
| ECONOMIC FIGURES | | | |
| €510,964.00 | | | |


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|  Bilbao Bizkaia Ur Partzuergoa Consorcio de Aguas Bilbao Bizkaia | R&D Group | | |
| | R&D PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 |
| PROJECT NAME | emerGEN. DETECTION AND TREATMENT OF EMERGING POLLUTANTS, BACTERIA AND ANTIBIOTIC-RESISTANT GENES AND ENVIRONMENTAL AND HUMAN TOXICITY TESTS IN WATER SUPPLIES IN BISCAY | | |
| ORGANISATION | CONSORCIO DE AGUAS BILBAO BIZKAIA | | |
| WEB SITE | | | |
| PARTNERS IN THE PROJECT | | | |
| UNIVERSITY OF THE BASQUE COUNTRY UPV/EHU GAIKER TECHNOLOGY CENTRE CADAGUA, S.A. | | | |
| Project start date | Jun 20 | Project end date | Sept 20 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>The Consortium wishes to increase its knowledge of the problem of the so-called Contaminants of Emerging Concern (CECs) and their associated toxicity risks, both to the environment and to human health. For this, the study will focus on water intakes that feed various DWTPs.</p> <p>In addition to CECs, there is concern about the development of antibiotic resistant bacteria/antibiotic resistance genes (ARB/ARGs) and the effect of purification treatments on these.</p> <p>The following work will be carried out for this:</p> <ul style="list-style-type: none"> - Quarterly sampling campaign for the duration of the project in five water intakes. - Chemical analysis of non-targeted and targeted samples (including new drinking water directive compounds). - Human and environmental toxicity testing of samples. - Study of the elimination of substances detected with doping cocktails in a pilot plant with various configurations. - Study of the presence of antibiotic resistant bacteria (ARB) and antibiotic resistance genes (ARG) in raw and treated water from a WWTP, as well as in the water course (upstream and downstream) to study the influence of the WWTP on the water course. | | | |
| PROJECT IMAGE | | | |
| | | | |
| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and distribution | Sanitation | Energy and waste | Transversal |
| YES | YES | NO | NO |
| RESULTS ACHIEVED OR EXPECTED | | | |
| A true picture of the status of CABB's water sources in terms of emerging contaminants and resistant bacteria and genes has been obtained. | | | |
| NEEDS DETECTED TO EVOLVE | | | |
| The next step is to obtain reliable online sensors. | | | |
| ECONOMIC FIGURES | | | |
| €488,062.00 | | | |


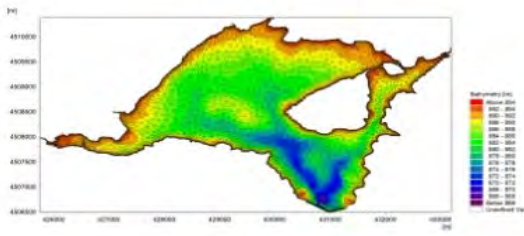
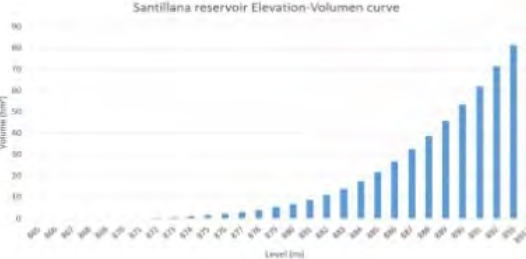
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|  Bilbao Bizkaia Ur Partzuergoa Consorcio de Aguas Bilbao Bizkaia | | R&D Group | |
| | | R&D PROJECTS - PORTFOLIO | |
| | | PERIOD: 2021-2023 | |
| PROJECT NAME | EXPERT WATER SUPPLY MANAGEMENT SUPPORT SYSTEM | | |
| ORGANISATION | CONSORCIO DE AGUAS BILBAO BIZKAIA | | |
| WEB SITE | | | |
| PARTNERS IN THE PROJECT | | | |
| BCAM. Basque Centre for Applied Mathematics | | | |
| Project start date | Jun 20 | Project end date | Jun 21 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>The Consortium has two reservoir systems, Zadorra and Ordunte. The project aims to provide an expert system to help it make decisions regarding the management of the two systems, based on statistical methods.</p> <p>The project comprises the following work blocks:</p> <ul style="list-style-type: none"> - Phase 1: Development of a statistical method for predicting the volume of contributions to the Zadorra and Ordunte systems and for estimating the frequencies for a given supply guarantee. - Phase 2: Development of a method for optimising the guarantee of supply and decision making in the exploitation of water resources. | | | |
| IMAGE OF THE PROJECT | | | |
| | | | |
| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| YES | NO | NO | NO |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>The probability of not touching the system's emergency curve for each day of the year has been determined by taking the contributions to the reservoirs as data. This calculation has been made for the joint system that includes three reservoirs and has made it possible to establish, according to the probabilities of failure, the withdrawal of water from the most efficient systems to avoid incurring unnecessary energy consumption.</p> <p>The main difference with the previous model is that this one was deterministic, based on the known 75-year history, while the new one is stochastic, having been carried out by six different methods, choosing the best fit for the real data, which turned out to be the additive model with a Bayesian approach.</p> | | | |
| NEEDS DETECTED TO EVOLVE | | | |
| <p>The study has developed calculation functions that are intended to be implemented in an application and integrated into the usual management systems of the water supply operation service. The model is self-feeding, that is, with new input values, it learns and modifies its predictions based on these new values so that in the medium term the quality of these predictions will have to be validated.</p> | | | |
| ECONOMIC FIGURES | | | |
| €41.500.00 | | | |


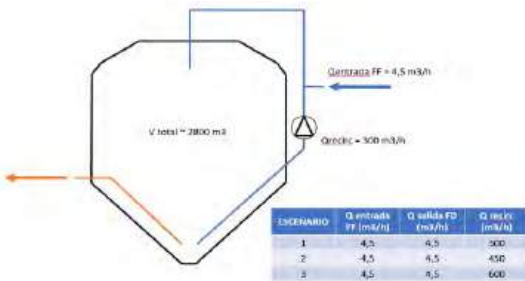
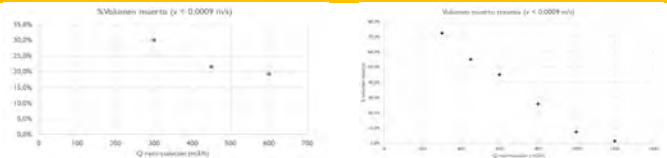
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|  Bilbao Bizkaia Ur Partzuergoa Consorcio de Aguas Bilbao Bizkaia | R&D Group | | |
| | R&D PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 |
| PROJECT NAME | PROTOTYPE TO ASSESS UNREGISTERED WATER (ANR) | | |
| ORGANISATION | CONSORCIO DE AGUAS BILBAO BIZKAIA | | |
| WEB SITE | | | |
| PARTNERS IN THE PROJECT | | | |
| BEAZ LAUBOR INALIA | | | |
| Project start date | Jul 20 | Project end date | Nov 22 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>The Consortium is currently managing 3,000 km of distribution system with a total of 3,636 fire hydrants and 9,541 irrigation outlets in service. Unlike consumer outlets, these outlets do not have a meter and therefore the volume of water used at these points is unknown.</p> <p>The challenge to be resolved is to know the volume of water used at the outlets, or an effective estimate, so that the flows consumed are known. Once these are known in a pilot experiment, it will be assessed whether it is necessary to know the volume of non-registered authorised consumption of the Consortium's entire system or whether it can be estimated from the pilot.</p> <p>Given that the Consortium's system is very extensive, it is proposed for one of the municipalities in the Consortium. The objective would be to find the volume of unregistered authorised uses that occur, either in the whole municipality or in certain sectors of it.</p> <p>For this, a challenge is posed in the innovation ecosystem together with BEAZ, belonging to the Provincial Council of Bizkaia. 22 solutions were presented to this challenge by companies, SMEs, start-ups, entrepreneurs and universities. Two of these were chosen and prototypes are being developed.</p> | | | |
| PROJECT IMAGE | | | |
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| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and distribution | Sanitation | Energy and waste | Transversal |
| YES | NO | NO | NO |
| RESULTS ACHIEVED OR EXPECTED | | | |
| The project did not reach expected results | | | |
| NEEDS DETECTED TO EVOLVE | | | |
| | | | |
| ECONOMIC FIGURES | | | |
| €29,759.00 | | | |



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|  Bilbao Bizkaia Ur Partzuergoa Consorcio de Aguas Bilbao Bizkaia | R&D Group | | |
| | R&D PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 |
| PROJECT NAME | ANALYSIS, VALIDATION AND CORRELATION OF SARS-COV2 GENE SAMPLES IN WASTE WATER AND INCIDENCE OF COVID-19 CASES | | |
| ORGANISATION | CONSORCIO DE AGUAS BILBAO BIZKAIA | | |
| WEB SITE | | | |
| PARTNERS IN THE PROJECT | | | |
| CONSORCIO DE AGUAS BILBAO BIZKAIA (CABB) BASQUE WATER AGENCY (URA) BASQUE CENTRE OF APPLIED MATHEMATICS (BCAM) | | | |
| Project start date | Oct 21 | Project end date | Dec 21 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>The project to be carried out by the BCAM research team consisted of developing and validating a procedure for the statistical analysis of genetic samples of SARS-COV2 in waste water collected since July 2020 at various sampling points in the Basque Region: four WWTPs (Galindo, Krispijana, Atalarreka and Loiola) and six points in the Galindo (Sestao) WWTP sewage system. The aim was also to establish a correlation analysis with the positive cases of COVID-19 in the population.</p> | | | |
| PROJECT IMAGE | | | |
| | | | |
| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and distribution | Sanitation | Energy and waste | Transversal |
| NO | SI | NO | YES |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <ul style="list-style-type: none"> • The set criterion has been taken which considers the 15-day cumulative incidence value calculated with the seven days before sampling, the day of sampling and the seven days after sampling. • The N1 target seems to show a target effect more in line with expectations than the other targets. A significant increase in the curve is observed from values around 6 log 10 cg/l. • The proposed robust GAM models allow modelling the effect of each target on the cumulative incidence at 15 per 100 thousand inhabitants of the population of the WWTPs and points of the sanitation system of Greater Bilbao. Having analysed the results of the models, in this final report only six models corresponding to only four sampling points have been considered sufficiently robust: Crispijana WWTP, PR2, PR5 and PR6. | | | |
| NEEDS DETECTED TO EVOLVE | | | |
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| ECONOMIC FIGURES | | | |
| €23,100.00 | | | |

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|  Bilbao Bizkaia Ur Partzuergoa Consorcio de Aguas Bilbao Bizkaia | | R&D Group | |
| | | R&D PROJECTS - PORTFOLIO | |
| | | PERIOD: 2021-2023 | |
| PROJECT NAME | Study and possible causes of the increase in turbidity in the treated water tanks of the Venta Alta DWTP with the use of chlorine dioxide as an oxidant. CONTUR. | | |
| ORGANISATION | CONSORCIO DE AGUAS BILBAO BIZKAIA | | |
| WEB SITE | | | |
| PARTNERS IN THE PROJECT | | | |
| UNIVERSITY OF THE BASQUE COUNTRY (UPV/EHU) | | | |
| Project start date | Dec 20 | Project end date | feb-23 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>The Venta Alta plant in Arrigorriaga is the main drinking water treatment plant in Bizkaia. It has been observed for years that on most occasions when chlorine dioxide is dosed as a pre-oxidant, the turbidity of the treated water in the storage tanks of the DWTP increases. The main objective of this project is to identify the compound(s) that form in the water and cause an increase in turbidity after storage in the tanks and always after treatment with ClO₂, and to propose corrective measures.</p> | | | |
| PROJECT IMAGE | | | |
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| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and distribution | Sanitation | Energy and waste | Transversal |
| YES | NO | NO | NO |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>Although 2021 was not a year in which the phenomenon of increased turbidity has occurred with the frequency of other years, the study has served to determine the variables to "monitor". The conclusion was that if residence time and temperature increase, so does turbidity. The second relates turbidity to the nature of the raw water and specifically to the water from the Urrunaga reservoir, the rainfall (very abundant in November 2021) and the contributions from the river Arratia (from the Itxina massif), which lower the conductivity of the raw water. Other aspects that have been found to be related to turbidity are the nature of the solids in the raw water and the continuous measurement of the Langelier index for a suitable adjustment of the calcium-carbon balance of the treated water.</p> | | | |
| NEEDS DETECTED TO EVOLVE | | | |
| The study of the variables to be monitored in future episodes of increased turbidity must be continued. | | | |
| ECONOMIC FIGURES | | | |
| €130,945.09 | | | |

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|  Bilbao Bizkaia Ur Partzuergoa Consorcio de Aguas Bilbao Bizkaia | R&D Group | | |
| | R&D PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 |
| PROJECT NAME | USE OF CHEMOTAXONOMY AS A MANAGEMENT TOOL IN RESERVOIRS AND DEEPENING THE KNOWLEDGE OF THE DOMINANT PHYTOPLANKTON SPECIES. CHEMOTEM. | | |
| ORGANISATION | CONSORCIO DE AGUAS BILBAO BIZKAIA | | |
| WEB SITE | | | |
| PARTNERS IN THE PROJECT | | | |
| UNIVERSITY OF THE BASQUE COUNTRY (UPV/EHU) | | | |
| Project start date | Dec 20 | Project end date | Jul 22 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>The microalgae or phytoplankton community is one of the most widely used indicators of water quality and trophic status. The monitoring of the phytoplankton community in the reservoirs of the CAPV is carried out with traditional optical microscope counts. However, this method has several disadvantages: the percentage of subjectivity can be high depending on the analyst, identification at species level is complicated due to the size of the organisms and the information obtained does not reveal aspects that allow for better management.</p> <p>This project aims to make use of chemotaxonomy as an alternative with the following objectives:</p> <ul style="list-style-type: none"> - To understand the structure and dynamics of the phytoplankton community of several reservoirs and ponds in the CAPV through chemotaxonomy and to assess the suitability of this new method for managing reservoirs and ponds, comparing it with the information obtained with traditional phytoplankton counts by microscopy with the aim of reducing costs, immediacy of response and reproducibility of the analyses. - To classify the dominant species in various reservoirs and ponds managed by CABB from a morphological and genetic points of view. | | | |
| IMAGE OF THE PROJECT | | | |
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| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| YES | NO | NO | NO |
| RESULTS ACHIEVED OR EXPECTED | | | |
| | | | |
| NEEDS DETECTED TO EVOLVE | | | |
| | | | |
| ECONOMIC FIGURES | | | |
| €22,940.00 | | | |



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|  | | R&D+I Group | |
| | | R&D+I PROJECTS - PORTFOLIO | |
| PROJECT NAME | | HYDRODYNAMIC AND QUALITY MODEL OF WATER MASSES IN RESERVOIRS. | |
| ORGANIZATION | | Canal de Isabel II | |
| WEB | | https://www.canaldeisabelsegunda.es | |
| PARTNERS IN THE PROJECT | | | |
| CANAL DE ISABEL II; DHI WATER & ENVIRONMENT SPAIN | | | |
| Start date of the Project | | may-20 | End date of the Project |
| | | | December-24 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>HYDRODYNAMIC AND QUALITY MODEL OF WATER MASSES IN RESERVOIRS. The project aims to model the quality of water in the reservoirs of the Community of Madrid through three-dimensional simulations of both the hydrodynamics of the reservoir and the quality processes that develop within the body of water itself. The objectives of the project include identifying sources of both point and diffuse pollution to improve the management of the resource and the protection of water bodies and improve the management of raw water collection based on the expected quality.</p> | | | |
| IMAGE OF THE PROJECT | | | |
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| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| YES | NO | NO | NO |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>Using a three-dimensional numerical model, we seek to identify, for a reservoir, the different factors that govern the hydrodynamic behavior and quality parameters, as well as their validation, both in time and space, which will allow prioritization between potential solutions in a justified manner. analytically. Knowledge about the behavior of water masses, and, above all, the prediction of their physical, chemical, biological evolution before unexpected events or contributions, allows us to make decisions about the future management of the mass, both in the short and medium term. Thus, better water quality will be sought and when possible, reduce the purification processes while maintaining the same quality standards of water for human consumption. Therefore, both hydrodynamic and quality models have been carried out.</p> | | | |
| DETECTED NEEDS FOR FURTHER DEVELOPMENT | | | |
| Studies will be carried out in other reservoirs. | | | |
| ECONOMIC FIGURES | | | |
| BUDGET OF € 340.789,77 ; WITH SUBSIDY OF € 0 | | | |

|  | R&D+I Group | | | | | | | | | | | | | | | | | |
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| | R&D+I PROJECTS - PORTFOLIO | PERIOD: 2021-2023 | | | | | | | | | | | | | | | | |
| PROJECT NAME | DEVELOPMENT OF 3D HYDRODYNAMIC MODELS WITH NON-NEWTONIAN FLUIDS FOR THE OPTIMIZATION OF THE DESIGN AND OPERATION OF PURIFICATION DIGESTERS. | | | | | | | | | | | | | | | | | |
| ORGANIZATION | Canal de Isabel II | | | | | | | | | | | | | | | | | |
| WEB | https://www.canaldeisabelsegunda.es | | | | | | | | | | | | | | | | | |
| PARTNERS IN THE PROJECT | | | | | | | | | | | | | | | | | | |
| CANAL DE ISABEL II; | | | | | | | | | | | | | | | | | | |
| Start date of the Project | January-23 | End date of the Project | March-24 | | | | | | | | | | | | | | | |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | | | | | | | | | | | | | | | | |
| <p>DEVELOPMENT OF 3D HYDRODYNAMIC MODELS WITH NON-NEWTONIAN FLUIDS FOR THE OPTIMIZATION OF THE DESIGN AND OPERATION OF PURIFICATION DIGESTERS. The purpose is to optimize the equipment and exploitation of the infrastructure. Calculations with traditional engineering methods fail to illustrate the design and sizing of solutions for optimizing the operation of large digesters in purification stations.</p> <p>The aim is to evaluate the efficiency of agitation in anaerobic digesters in order to reduce the dead volume inside. For this, they will be evaluated:</p> <ul style="list-style-type: none"> - Different agitation technologies (pumping, rotamix, scaba). - Different recirculation flow rates. <p>Modeling the behavior of fluids in digesters, considered non-Newtonian, provides the necessary precision to address the necessary improvements."</p> | | | | | | | | | | | | | | | | | | |
| IMAGE OF THE PROJECT | | | | | | | | | | | | | | | | | | |
|  <table border="1" data-bbox="470 1377 726 1456"> <thead> <tr> <th>ESCENARIO</th> <th>Q entrada FF (m³/h)</th> <th>Q salida FD (m³/h)</th> <th>Q recirc (m³/h)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>4,5</td> <td>4,5</td> <td>300</td> </tr> <tr> <td>2</td> <td>4,5</td> <td>4,5</td> <td>450</td> </tr> <tr> <td>3</td> <td>4,5</td> <td>4,5</td> <td>600</td> </tr> </tbody> </table> | | | ESCENARIO | Q entrada FF (m ³ /h) | Q salida FD (m ³ /h) | Q recirc (m ³ /h) | 1 | 4,5 | 4,5 | 300 | 2 | 4,5 | 4,5 | 450 | 3 | 4,5 | 4,5 | 600 |
| ESCENARIO | Q entrada FF (m ³ /h) | Q salida FD (m ³ /h) | Q recirc (m ³ /h) | | | | | | | | | | | | | | | |
| 1 | 4,5 | 4,5 | 300 | | | | | | | | | | | | | | | |
| 2 | 4,5 | 4,5 | 450 | | | | | | | | | | | | | | | |
| 3 | 4,5 | 4,5 | 600 | | | | | | | | | | | | | | | |
| PROJECT APPROACH WITHIN THE WATER CYCLE | | | | | | | | | | | | | | | | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal | | | | | | | | | | | | | | | |
| NO | YES | YES | NO | | | | | | | | | | | | | | | |
| RESULTS ACHIEVED OR EXPECTED | | | | | | | | | | | | | | | | | | |
| <p>Study carried out with typologies 1 (pumping) and 2 (rotamix).</p>  | | | | | | | | | | | | | | | | | | |
| DETECTED NEEDS FOR FURTHER DEVELOPMENT | | | | | | | | | | | | | | | | | | |
| <p>In view of the results, two steps forward are proposed:</p> <ul style="list-style-type: none"> - Model this same digester with rotamix, but with a vertical recirculation outlet pipe, which takes the flows from approximately the upper third of the domain. - Investigate the modeling that would require an agitated digester with scaba (mechanical agitators). | | | | | | | | | | | | | | | | | | |
| ECONOMIC FIGURES | | | | | | | | | | | | | | | | | | |
| BUDGET OF €, WITH SUBSIDY OF €0 (internal) | | | | | | | | | | | | | | | | | | |



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|  | R&D+I Group | | |
| | R&D+I PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 |
| PROJECT NAME | COMPREHENSIVE MONITORING OF LOSSES, TRANSIENTS AND WATER QUALITY IN A SUPPLY SYSTEM. | | |
| ORGANIZATION | Canal de Isabel II | | |
| WEB | https://www.canaldeisabelsegunda.es | | |
| PARTNERS IN THE PROJECT | | | |
| CANAL DE ISABEL II; MEJORAS ENERGÉTICAS | | | |
| Start date of the Project | January-23 | End date of the Project | December-24 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>COMPREHENSIVE MONITORING OF LOSSES, TRANSIENTS AND WATER QUALITY IN A SUPPLY SYSTEM. Continuous monitoring of the structural state and operating conditions in an upstream network of the supply system, in the area of Soto del Real and Miraflores de la Sierra, with leak, transient and water quality sensors.</p> | | | |
| IMAGE OF THE PROJECT | | | |
|  | | | |
| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| YES | NO | NO | YES |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>The supply is remotely controlled for early diagnosis of leaks, and for monitoring the efforts and requests to which the infrastructure is subjected.</p> | | | |
| DETECTED NEEDS FOR FURTHER DEVELOPMENT | | | |
| ECONOMIC FIGURES | | | |
| BUDGET OF € 40.000 ; WITH SUBSIDY OF €0 | | | |


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|  | | R&D+IGroup | |
| R&D+I PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 | |
| PROJECT NAME | CONSTRUCTION AND COMMISSIONING OF AN INDUSTRIAL PLANT FOR THE PRODUCTION OF GREEN HYDROGEN FROM RECLAIMED WATER. | | |
| ORGANIZATION | Canal de Isabel II | | |
| WEB | https://www.canaldeisabelsegunda.es | | |
| PARTNERS IN THE PROJECT | | | |
| CANAL DE ISABEL II; | | | |
| Start date of the Project | June-23 | End date of the Project | December-26 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>DESIGN, CONSTRUCTION, COMMISSIONING AND OPERATION OF AN INDUSTRIAL PLANT FOR THE PRODUCTION OF GREEN HYDROGEN FROM RECLAIMED WATER. Design, construction, commissioning and exploitation for two years, including marketing of the hydrogen produced in a green hydrogen production plant at the Arroyo Culebro Cuenca Media Alta WWTP. The necessary electricity will come from two sources: photovoltaic during the day and biogas cogeneration at night. The oxygen separated during electrolysis will also be used to cover the oxygen needs of the biological reactors of the treatment plant.</p> | | | |
| IMAGE OF THE PROJECT | | | |
|  | | | |
| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| NO | NO | YES | NO |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>It is intended to contrast all the potential uses of producing green hydrogen: heavy and light mobility; generation of products directly usable in purification such as methanol; products to decarbonize Madrid's industry such as ammonia; methanation of CO2 produced in the digesters. In addition, the oxygen coming from the process will be used in the wastewater treatment plant itself.</p> | | | |
| DETECTED NEEDS FOR FURTHER DEVELOPMENT | | | |
| (Empty space for further development needs) | | | |
| ECONOMIC FIGURES | | | |
| BUDGET OF € 6.031.539,79 ; WITH A SUBSIDY FROM FEDER FUNDS | | | |



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|  | R&D+i Group | | |
| | R&D+i PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 |
| PROJECT NAME | QUANTITATIVE MICROBIOLOGICAL RISK EVALUATION (QMRA) IN WATER TREATMENT PLANTS IN CANAL DE ISABEL II, STUDY OF PATHOGENS AND CONTROL INDICATORS. | | |
| ORGANIZATION | Canal de Isabel II | | |
| WEB | https://www.canaldeisabelsegunda.es | | |
| PARTNERS IN THE PROJECT | | | |
| CANAL DE ISABEL II; VISAVET UNIVERSIDAD COMPLUTENSE; LABAQUA, S.A | | | |
| Start date of the Project | July-19 | End date of the Project | October-25 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>QUANTITATIVE MICROBIOLOGICAL RISK EVALUATION (QMRA) IN WATER TREATMENT PLANTS IN CANAL DE ISABEL II, STUDY OF PATHOGENS AND CONTROL INDICATORS. The studies carried out in Canal de Isabel II reflect that the necessary future investment will range between 73 million euros (without investment in membranes ultrafiltration) and 418 million euros (investing in membranes for all DWTPs). The QMRA project tries to provide light to make the most appropriate decision for each case study.</p> <p>An analysis of the presence, viability and infectivity of PATHOGENS in raw water (Cryptosporidium, Giardia, Campylobacter jejuni, Enterovirus), and the presence of microbiological INDICATORS in raw, filtered and treated water will be carried out.</p> <p>Finally, stochastic statistical methods will be applied to determine the QMRA microbiological risk, advocated by the WHO in the Canal DWTPs. The information derived from this analysis will be useful to determine whether or not additional treatment technologies are needed in our treatment plants.</p> | | | |
| IMAGE OF THE PROJECT | | | |
|  | |  | |
| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| YES | NO | NO | NO |
| RESULTS ACHIEVED OR EXPECTED | | | |
| The project has a duration of three years. At the moment it has not been necessary to carry out infectivity tests, since the results for the presence of pathogens have always been negative. However, the number of samples of pathogenic organisms has been increased, in order to have more data to feed the statistical model. | | | |
| DETECTED NEEDS FOR FURTHER DEVELOPMENT | | | |
| The project has a duration of three years. At the moment it has not been necessary to carry out infectivity tests, since the results for the presence of pathogens have always been negative. However, the number of samples of pathogenic organisms has been increased, in order to have more data to feed the statistical model. | | | |
| ECONOMIC FIGURES | | | |
| BUDGET OF € 1.400.000 ; WITH SUBSIDY OF €0 | | | |


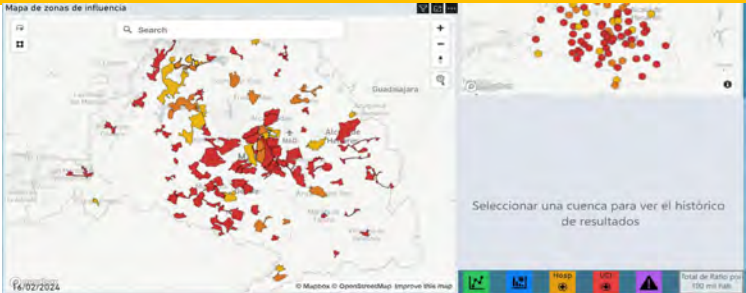
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|  | R&D+I Group | | |
| | R&D+I PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 |
| PROJECT NAME | RECOVERY OF ALUMINUM FROM WATER TREATMENT PLANT SLUDGE AND SUBSEQUENT USE AS COAGULANT IN WATER TREATMENT PLANTS OR WWTP OF CANAL DE ISABEL II. | | |
| ORGANIZATION | Canal de Isabel II | | |
| WEB | https://www.canaldeisabelsegunda.es | | |
| PARTNERS IN THE PROJECT | | | |
| CANAL DE ISABEL II; FERALCO SLU | | | |
| Start date of the Project | January-21 | End date of the Project | January-23 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>RECOVERY OF ALUMINIUM FROM WATER TREATMENT PLANT SLUDGE AND SUBSEQUENT USE AS COAGULANT IN DWTP OR WWTP OF CANAL DE ISABEL II. Proof of concept and on a laboratory scale of different methods for the recovery of aluminium sulfate that is eliminated with the Treatment Plant sludge for its reuse as a WWTP coagulant, in a circular economy scenario. Analysis of acid pathway and basic pathway.</p> | | | |
| IMAGE OF THE PROJECT | | | |
|  | | | |
| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| YES | NO | YES | NO |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>Based on the results obtained on a laboratory scale, the tested materials can serve as a source of aluminium for reuse in waste treatment plants. It is considered necessary to continue working on a larger scale to confirm its viability.</p> | | | |
| DETECTED NEEDS FOR FURTHER DEVELOPMENT | | | |
| Continue testing on a larger scale to confirm laboratory-scale results. | | | |
| ECONOMIC FIGURES | | | |
| CANAL DE ISABEL II BUDGET, WITHOUT SUBSIDY | | | |

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|--|---|-------------------------|-------------------|
|  | R&D+i Group | | |
| | R&D+i PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 |
| PROJECT NAME | FLOOD RISK IDENTIFICATION AND QUANTIFICATION SYSTEM. | | |
| ORGANIZATION | Canal de Isabel II | | |
| WEB | https://www.canaldeisabelsegunda.es | | |
| PARTNERS IN THE PROJECT | | | |
| CANAL DE ISABEL II; UTE TPF GETINSA & AQUA-CONSULT ING | | | |
| Start date of the Project | September-18 | End date of the Project | December-21 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>FLOOD RISK IDENTIFICATION AND QUANTIFICATION SYSTEM. Canal de Isabel II is evaluating the risk of impact that flooding caused by the overflow of the sanitation network can cause in the urban and peri-urban environment of 134 municipalities in the Community of Madrid. Those points identified with the greatest risk of impact are considered in the plan of priority actions to be developed in the short and medium term to improve services.</p> | | | |
| IMAGE OF THE PROJECT | | | |
|  | | | |
| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| NO | YES | NO | NO |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>The water accumulation zones are identified through a two-dimensional hydraulic-hydrological distribution model where a safety zone and the time that the water remains accumulated are also identified. Finally, the vulnerable areas with the greatest risk in the event of flooding are the areas of access to basic services, strategic infrastructure, public transport network and centers of population concentration at specific times but that can affect the regular functioning of the city.</p> | | | |
| DETECTED NEEDS FOR FURTHER DEVELOPMENT | | | |
| ECONOMIC FIGURES | | | |
| BUDGET OF € 356.740 ; WITH SUBSIDY OF €0 | | | |




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|  | R&D+i Group | | |
| | R&D+i PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 |
| PROJECT NAME | MASSIVE DEPLOYMENT OF SMART METERING AND IMPLEMENTATION OF COMPUTER SYSTEMS AND CORPORATE AND CUSTOMER APPS FOR THEIR EXPLOITATION. | | |
| ORGANIZATION | Canal de Isabel II | | |
| WEB | https://www.canaldeisabelsegunda.es | | |
| PARTNERS IN THE PROJECT | | | |
| CANAL DE ISABEL II; | | | |
| Start date of the Project | January-18 | End date of the Project | December-25 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>MASSIVE DEPLOYMENT OF SMART METERING AND IMPLEMENTATION OF COMPUTER SYSTEMS AND CORPORATE AND CUSTOMER APPS FOR THEIR EXPLOITATION. The project began with the development and validation of communication solutions and assessment of consumption data in individual and community water meters. The communication is based on NB-IoT (Narrow Band - Internet of Things) technology, which standardizes this technology in the urban water sector, with the main telephone communications companies operating in Spain as partners. The deployment covers the entire meter park of Canal de Isabel II, of 1.6 million meters. The project includes the necessary IT support and the digitalization of the customer experience.</p> | | | |
| IMAGE OF THE PROJECT | | | |
|  | | | |
| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| YES | NO | NO | YES |
| RESULTS ACHIEVED OR EXPECTED | | | |
| The entire park of supply meters will be covered with the remote reading system, for the use of disaggregated information by both the Canal de Isabel II company and the users. | | | |
| DETECTED NEEDS FOR FURTHER DEVELOPMENT | | | |
| ECONOMIC FIGURES | | | |
| BUDGET OF € 225.000.000 ; WITH SUBSIDY OF € 6.500.000 | | | |



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|  | R&D+i Group | | |
| | R&D+i PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 |
| PROJECT NAME | EXPERIMENTAL STUDY AND MODELING OF PRESSURE TRANSIENTS IN SUPPLY PIPES AND THEIR RELATIONSHIP WITH THE SERVICE LIFE AND DETERIORATION OF PIPES AND FACILITIES. | | |
| ORGANIZATION | Canal de Isabel II | | |
| WEB | https://www.canaldeisabelsegunda.es | | |
| PARTNERS IN THE PROJECT | | | |
| CANAL DE ISABEL II; AQUATEC PROY. SECTOR AGUA S.A.U. | | | |
| Start date of the Project | February-19 | End date of the Project | November-21 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>EXPERIMENTAL STUDY AND MODELING OF PRESSURE TRANSIENTS IN SUPPLY PIPES AND THEIR RELATIONSHIP WITH THE SERVICE LIFE AND DETERIORATION OF PIPES AND FACILITIES.</p> <p>This involves the analysis of hydraulic transients generated by pumps in the supply and reclaimed water network with the aim of diagnosis and determining guidelines for their mitigation. The study is carried out by implementing specific sensors for continuous monitoring of hydraulic transients at different points in the network, capable of recording events at 100Hz, and modelling these events using specialized calculation algorithms. In addition to the analysis of real cases, modelling and simulation of various theoretical scenarios have been conducted to cover the most probable range of events.</p> | | | |
| IMAGE OF THE PROJECT | | | |
|  | | | |
| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| YES | NO | NO | NO |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>The study of real cases has allowed us to highlight the problems suffered by the analyzed stations, proposing solutions based on the development of validated and calibrated models with field values. Additionally, from these real case studies, the most common scenarios in this type of facility have been identified.</p> <p>On the other hand, the development of studies for theoretical cases in different scenarios has made it possible to define general proposals for each typology of cases identified in the previous phase, facilitating their extrapolation to the rest of the lifting stations managed by Canal de Isabel II.</p> | | | |
| DETECTED NEEDS FOR FURTHER DEVELOPMENT | | | |
| Detailed analysis of each of the supply areas to evaluate the measures to be adopted based on the proposals made. | | | |
| ECONOMIC FIGURES | | | |
| BUDGET OF € 199.410 ; WITH SUBSIDY OF €0 | | | |



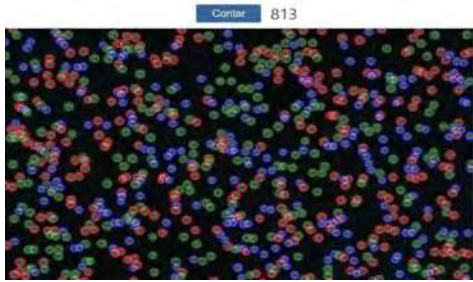
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|  | R&D+I Group | | |
| | R&D+I PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 |
| PROJECT NAME | FEASIBILITY STUDY OF VERMICOMPOST FOR SLUDGE VALORIZATION. | | |
| ORGANIZATION | Canal de Isabel II | | |
| WEB | https://www.canaldeisabelsegunda.es | | |
| PARTNERS IN THE PROJECT | | | |
| CANAL DE ISABEL II; SEEKING EXCELLENCE, S.L. | | | |
| Start date of the Project | October-21 | End date of the Project | April-23 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>FEASIBILITY STUDY OF VERMICOMPOST FOR SLUDGE VALORIZATION. A project aimed at analyzing the application of Vermiculture to produce humus as a complement to composting and thermal drying at the sludge plant in Loeches, using sludge from wastewater treatment plants in the municipalities of the Community of Madrid, and studying the optimal conditions necessary for its generation and use. The goal is to validate this procedure for the development of a potential pilot-scale production.</p> | | | |
| IMAGE OF THE PROJECT | | | |
|  | | | |
| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| NO | NO | YES | NO |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>The study conducted at the thermal drying facilities in Loeches concludes with the feasibility of using vermicompost for wastewater treatment plant sludge. Throughout the project's monitoring, the rapid adaptation of the worms to this environment has been observed.</p> | | | |
| DETECTED NEEDS FOR FURTHER DEVELOPMENT | | | |
| Continue studying on a larger scale in order to analyze the improvement in performance in humus production. | | | |
| ECONOMIC FIGURES | | | |
| BUDGET OF € 7.895 ; WITH SUBSIDY OF €0 | | | |


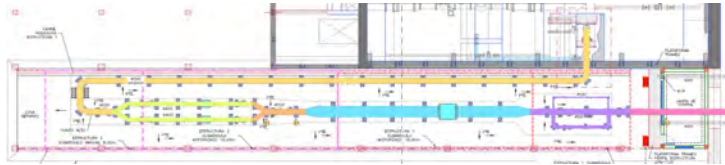

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|  | | R&D+i Group | |
| | | R&D+i PROJECTS - PORTFOLIO | |
| | | PERIOD: 2021-2023 | |
| PROJECT NAME | PERMANENT SEWER MONITORING SYSTEM FOR THE DETECTION OF EMERGING MICROCONTAMINANTS AND PATHOGENS. | | |
| ORGANIZATION | Canal de Isabel II | | |
| WEB | https://www.canaldeisabelsegunda.es | | |
| PARTNERS IN THE PROJECT | | | |
| CANAL DE ISABEL II; | | | |
| Start date of the Project | January-22 | End date of the Project | December-24 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>PERMANENT SEWER MONITORING SYSTEM FOR THE DETECTION OF EMERGING MICROCONTAMINANTS AND PATHOGENS. Permanent sewer monitoring system for detection and quantification of the presence of micropollutants and pathogens in wastewater. The samples are extracted with the appropriate periodicity, and the analyzes are appropriate for each substance to be controlled. The control points are selected so that they are representative of certain territories, covering the entire Community of Madrid.</p> | | | |
| IMAGE OF THE PROJECT | | | |
|  | | | |
| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| NO | YES | NO | YES |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>Previously, there was a pioneering system for the detection and surveillance of SARS-CoV-1 (virus that caused the COVID-19 pandemic) in the wastewater of the Community of Madrid. There was also a visualization platform on the Canal de Isabel II website, which included permanently updated maps, by drainage basins and by color. All of this is still active, and is at the service of health authorities for use as an alert, prevention and control system for the virus. It is based on the secretion of virus remains in wastewater prior to the manifestation of the symptoms of the disease. This system is a sewer network monitoring system, which can also be used to detect other contaminants and other diseases.</p> | | | |
| DETECTED NEEDS FOR FURTHER DEVELOPMENT | | | |
| <p>A study of the scientific literature is being carried out to analyze which emerging pathogens and micropollutants can be monitored through this technology.</p> | | | |
| ECONOMIC FIGURES | | | |
| Internal budget. | | | |


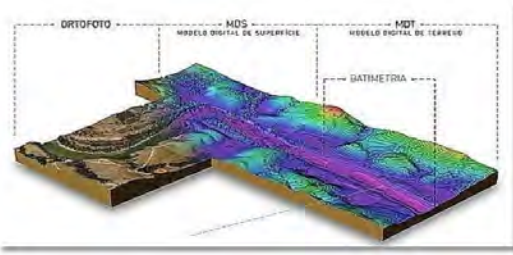
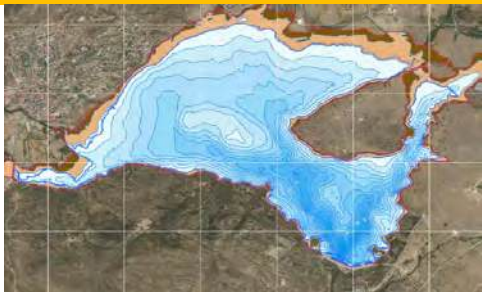
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|  | R&D+I Group | | |
| | R&D+I PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 |
| PROJECT NAME | SENSORIZATION OF WATER DISTRIBUTION WITH DISTRIBUTED FIBER OPTIC SENSING DFOS. | | |
| ORGANIZATION | Canal de Isabel II | | |
| WEB | https://www.canaldeisabelsegunda.es | | |
| PARTNERS IN THE PROJECT | | | |
| CANAL DE ISABEL II | | | |
| Start date of the Project | June-23 | End date of the Project | June-28 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>SENSORIZATION OF WATER DISTRIBUTION WITH DISTRIBUTED FIBER OPTIC SENSING DFOS. Fiber Optic “Distributed Fiber Optic Sensing” (DFOS). Following the conclusions of the relevant pilot project, the specifications have been prepared to carry out an advanced validation of the DFOS fibre optic technology to study the viability of all its possible applications for real-time distributed monitoring and event detection in the hydraulic infrastructure managed by Canal de Isabel II. The characteristics of the cable and the interrogator vary depending on the type of event to be monitored, so the contract will include the validation of two DFOS technologies: the H-DAS distributed acoustic detection technology, for detecting water leaks in pipes, threats, intrusions and interference in infrastructure, and DTSS distributed temperature and deformation sensing technology to monitor the structural health of infrastructure. A period of five years is expected.</p> | | | |
| IMAGE OF THE PROJECT | | | |
|  | |  | |
| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| YES | NO | NO | NO |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>It is expected to confirm whether DFOS technology is capable of identifying, geolocating and visualizing the events described in real-time, to facilitate the management of operators and thereby reduce water losses, improve the safety of the facilities and guarantee supply, and increase efficiency in infrastructure management and investment planning by providing a distributed monitoring and early warning system for different events that are relatively economical compared to current monitoring systems.</p> | | | |
| DETECTED NEEDS FOR FURTHER DEVELOPMENT | | | |
| Scaling the project on a larger scale if the results are favourable. | | | |
| ECONOMIC FIGURES | | | |
| BUDGET OF € 1.900.000 ; WITH SUBSIDY OF €0 | | | |


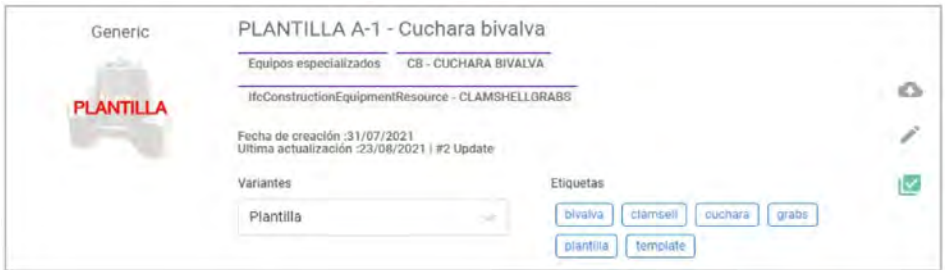
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|---|---|--|-------------------|
|  | R&D+i Group | | |
| | R&D+i PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 |
| PROJECT NAME | EARLY WARNING SYSTEM FOR SEVERE RAINFALL EVENTS, INCLUDING METEOROLOGICAL RADARS. | | |
| ORGANIZATION | Canal de Isabel II | | |
| WEB | https://www.canaldeisabelsegunda.es | | |
| PARTNERS IN THE PROJECT | | | |
| CANAL DE ISABEL II | | | |
| Start date of the Project | April-19 | End date of the Project | December-24 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>EARLY WARNING SYSTEM FOR SEVERE RAINFALL EVENTS, INCLUDING METEOROLOGICAL RADARS. Advanced very short-term discharge and flood prediction system (radars). The works include the installation of a new and more modern meteorological radar and the improvement of the short-term prediction system for rainfall intensities and, what is more innovative, a flood prediction system (with speed and depth values) and discharge flows with modeling in quasi-real time.</p> | | | |
| IMAGE OF THE PROJECT | | | |
|  | |  | |
| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| NO | YES | NO | YES |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>The final result will culminate in a visualization platform that allows the vision of the precipitation forecast in the Community of Madrid in one layer, the results of a real-time mathematical model of floods in a second layer, and the risk values associated with early time alerts in the third.</p> | | | |
| DETECTED NEEDS FOR FURTHER DEVELOPMENT | | | |
| ECONOMIC FIGURES | | | |
| BUDGET OF € 757.000 ; WITH SUBSIDY OF € 0 | | | |


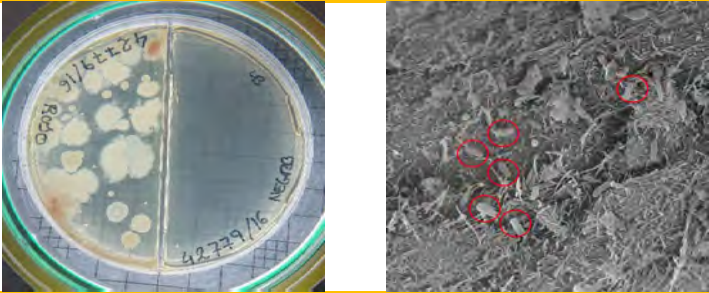
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|  | R&D+I Group | | |
| | R&D+I PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 |
| PROJECT NAME | EXPERIMENTATION AND TECHNOLOGICAL VALIDATION UNDER REAL CONDITIONS OF THE USE OF EXPANDED CLAYS IN THE DRINKING WATER TREATMENT PROCESS IN CANAL DE ISABEL II. | | |
| ORGANIZATION | Canal de Isabel II | | |
| WEB | https://www.canaldeisabelsegunda.es | | |
| PARTNERS IN THE PROJECT | | | |
| CANAL DE ISABEL II | | | |
| Start date of the Project | September-20 | End date of the Project | November-21 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>EXPERIMENTATION AND TECHNOLOGICAL VALIDATION UNDER REAL CONDITIONS OF THE USE OF EXPANDED CLAYS IN THE DRINKING WATER TREATMENT PROCESS IN CANAL DE ISABEL II. Experimentation and technological validation in real conditions of the use of expanded clays in the drinking water treatment process. The key to the project is the controlled use of new materials in purification techniques, and on a full scale in real functional facilities.</p> | | | |
| IMAGE OF THE PROJECT | | | |
|  | | | |
| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| YES | NO | NO | NO |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>Regarding the washing cycles, the average interval of hours between washing in the filters with a bed of expanded clay compared to that of siliceous sand is practically in the order of 2.36 times. The filter that offers the best results, is 2.79 times. There is a considerable OPEX saving, as filter washing consumes between 55% and 65%.</p> | | | |
| DETECTED NEEDS FOR FURTHER DEVELOPMENT | | | |
| It evolved into an economic study for real-scale implementation, with very diverse results depending on the treatment plants, but all of them were very positive. | | | |
| ECONOMIC FIGURES | | | |
| BUDGET OF € 74.180 ; WITH SUBSIDY OF € 0 | | | |

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|  | R&D+I Group | | |
| | R&D+I PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 |
| PROJECT NAME | STUDY OF THE EFFECT OF BIRDS ON THE WATER QUALITY OF THE SANTILLANA RESERVOIR. | | |
| ORGANIZATION | Canal de Isabel II | | |
| WEB | https://www.canaldeisabelsegunda.es | | |
| PARTNERS IN THE PROJECT | | | |
| CANAL DE ISABEL II | | | |
| Start date of the Project | January-21 | End date of the Project | December-21 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>STUDY ON THE EFFECT OF BIRDS ON THE WATER QUALITY OF THE SANTILLANA RESERVOIR. The aim of this project is to quantify the number of birds (specifically seagulls of two different species) whose depositions affect the water quality in the Santillana reservoir. The study is based on the interpretation of images obtained through unmanned flights, drones. The interpretation of the images concludes with the counting of the birds, and is carried out using specialized software based on artificial intelligence. There were 2 "manual" contrast counts. From the count, the resulting mass of deposition is deduced, with its respective amount of phosphorus and nitrogen contributed to the reservoir.</p> | | | |
| IMAGE OF THE PROJECT | | | |
|  | |  | |
| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| YES | YES | NO | NO |
| RESULTS ACHIEVED OR EXPECTED | | | |
| The result consists of the bird count, and the annual tons of nitrogen and phosphorus contributed to the reservoir. | | | |
| DETECTED NEEDS FOR FURTHER DEVELOPMENT | | | |
| The analysis is validated, and its extrapolation is possible, in any case counting on experts in ornithology. | | | |
| ECONOMIC FIGURES | | | |
| BUDGET OF € 5.000 ; WITH SUBSIDY OF € 0 | | | |



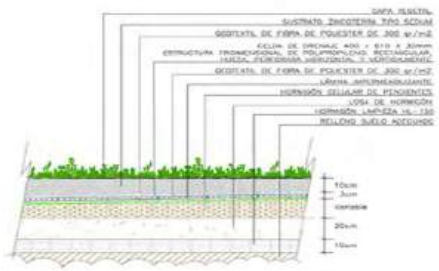
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|  | R&D+i Group | | |
| | R&D+i PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 |
| PROJECT NAME | DESIGN, CONSTRUCTION AND COMMISSIONING OF A TEST BENCH FOR FLOWMETERS UP TO DN1000. | | |
| ORGANIZATION | Canal de Isabel II | | |
| WEB | www.canaldeisabelsegunda.es; https://congresodemetrologia.cem.es/documentos/T-S5-3-R13-OP.pdf | | |
| PARTNERS IN THE PROJECT | | | |
| CANAL DE ISABEL II | | | |
| Start date of the Project | January-18 | End date of the Project | April-23 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>DESIGN, CONSTRUCTION AND COMMISSIONING OF A TEST BENCH FOR FLOWMETERS UP TO DN1000. The project aims to provide a test bench for water flow measurement devices of up to 1000mm nominal diameter, being the first of a public nature in European territory. For its operation, all aspects of the facility's operation have been considered, including water circulations and material movements with their respective equipment.</p> | | | |
| IMAGE OF THE PROJECT | | | |
|  | |  | |
| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| YES | NO | NO | NO |
| RESULTS ACHIEVED OR EXPECTED | | | |
| The test bench is operational. The installation and all the necessary equipment for its operation are available. | | | |
| DETECTED NEEDS FOR FURTHER DEVELOPMENT | | | |
| ECONOMIC FIGURES | | | |
| BUDGET OF € 2.010.000 ; WITH SUBSIDY OF €0 | | | |



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|  | R&D+i Group | | |
| | R&D+i PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 |
| PROJECT NAME | OBTAINING RESERVOIR BATHYMETRY USING DEVICES IMPLEMENTED ON DRONES. | | |
| ORGANIZATION | Canal de Isabel II | | |
| WEB | https://www.canaldeisabelsegunda.es | | |
| PARTNERS IN THE PROJECT | | | |
| CANAL DE ISABEL II; INGENIO SINCE EL AIRE S.L. (ENGINEERING IDEA); CLAB SERVICIOS Y SOLUCIONES TÉCNICAS, S.L.; CLAB SERVICES AND TECHNICAL SOLUTIONS, S.L. | | | |
| Start date of the Project | October-21 | End date of the Project | November-23 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>OBTAINING THE BATHYMETRY OF RESERVOIRS USING DEVICES IMPLEMENTED ON DRONES. Bathymetric studies using single-beam probes of the 13 reservoirs managed by Canal de Isabel II. Objective: eliminate uncertainty about what the stored volumes really are and the regulation capacity currently available to operators, and analyze the sedimentation in each reservoir.</p> | | | |
| IMAGE OF THE PROJECT | | | |
|  | |  | |
| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| YES / NO | YES / NO | YES / NO | YES / NO |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>Obtaining raw data from the dry zone with an aerial drone, with a resolution of 10 cm or better. Processing and georeferencing of the three-dimensional model of the dry zone, quantifying errors, according to fixed references. Obtaining raw bathymetric data with a drone or boat, with a resolution of 10 cm or better. Processing and georeferencing of the three-dimensional model of current depths, quantifying errors according to fixed references. Assembling and overlapping of the dry zone and bathymetric models. Delivered in three-dimensional formats to later apply in mathematical models, as well as updated contour lines. Currently we are analyzing the sedimentable layers in them through double single-beam probes.</p> | | | |
| DETECTED NEEDS FOR FURTHER DEVELOPMENT | | | |
| Improvement in the sedimentable layer detection systems if they are desired to be more accurate. | | | |
| ECONOMIC FIGURES | | | |
| BUDGET OF € 121.474,38 ; WITH SUBSIDY OF €0 | | | |


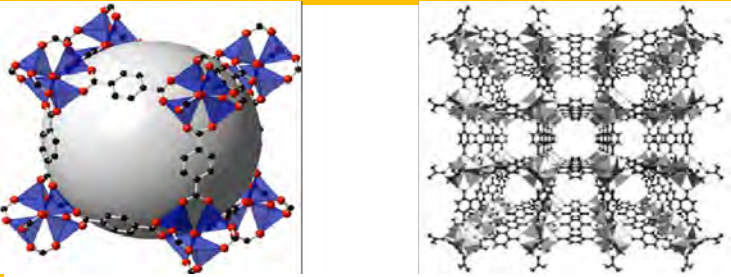
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|  | R&D+i Group | | |
| | R&D+i PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 |
| PROJECT NAME | STANDARDIZATION OF PARAMETERS OF BIM OBJECTS IN THE URBAN WATER SECTOR. | | |
| ORGANIZATION | Canal de Isabel II | | |
| WEB | https://www.canaldeisabelsegunda.es | | |
| PARTNERS IN THE PROJECT | | | |
| CANAL DE ISABEL II; ACERI TRACESOFTWARE SLU-BIM & CO GROUP | | | |
| Start date of the Project | November-20 | End date of the Project | July-21 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>The purpose of the project is to analyze the applicability and potential that the parameterization of object properties in BIM models of assets may have and to verify if this allows optimizing workflows throughout their life cycle (measurements, modifications, documentation, efficiency when structuring the asset information, etc.). The parameterization has been carried out, following commonly used standards, of the properties of the most relevant BIM objects in a Wastewater Pumping Station type.</p> <p>The parameterization has been carried out following the IFC, eCOB and Canal de Isabel II, S.A. standards, whose main objective is to structure the information of the objects in a uniform manner, to guarantee interoperability between different software and complete transmission of information between all the agents that can participate in any phase of the life cycle of an asset. In this process of normalization of the information structure, each agent involved will know from the first moment what information will be required, at what time and in what detail.</p> | | | |
| IMAGE OF THE PROJECT | | | |
|  | | | |
| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| NO | NO | NO | YES |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <ol style="list-style-type: none"> Parameterization of 31 equipment usually present in Canal de Isabel II facilities with the IFC standard; with the eCOB standard and, ultimately, as a proposal for Canal de Isabel II's own standard. Digitization of the 31 objects analyzed using Autodesk Revit software in version 2019, for creation in both native (*.RFA) and open (*.IFC) formats. Creation of a collaborative cloud space where the developed BIM objects are displayed, with their corresponding data and parameters. | | | |
| DETECTED NEEDS FOR FURTHER DEVELOPMENT | | | |
| It has been a great effort to make only 31 objects from the total set of objects in the water sector. It would be necessary to join forces with other companies in the water sector to jointly develop the parameterization of the set of specific objects in the sector. | | | |
| ECONOMIC FIGURES | | | |
| BUDGET OF € 19.580 ; WITH SUBSIDY OF € 0 | | | |



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|  | R&D+I Group | | |
| | R&D+I PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 |
| PROJECT NAME | CHARACTERIZATION OF BIOFILM IN THE SUPPLY SYSTEM. | | |
| ORGANIZATION | Canal de Isabel II | | |
| WEB | https://www.canaldeisabelsegunda.es | | |
| PARTNERS IN THE PROJECT | | | |
| CANAL DE ISABEL II | | | |
| Start date of the Project | June-19 | End date of the Project | December-24 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>CHARACTERIZATION OF BIOFILM IN THE SUPPLY SYSTEM. The project seeks the characterization of the biofilm in the supply system through the use of controlled extraction coupons and with the consequent battery of analysis on the quantity and identification of species detected. It also includes the internal cleaning of certain pipes that make up the drinking water supply network, carrying out a study of the state of the biofilm before and after cleaning, as well as the diagnostic study through sampling campaigns in the active carbon filters and the drainage channel outlet of the drinking water treatment stations, in the drinking water storage tanks, and in the existing pipes of the distribution network that derive from them. Additionally, the feasibility of new biofilm detection systems based on the installation of continuous monitoring sensor equipment is being investigated, the results will be compared with the real biofilm data obtained in the coupons.</p> | | | |
| IMAGE OF THE PROJECT | | | |
|  | | | |
| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| YES | NO | NO | NO |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>It is expected to improve knowledge about biofilm in the Canal supply system, including its quantification and level of activity, as well as the causes that favour its appearance and the factors that influence its development.</p> <p>We also want to know the evolution of the biofilm over time and find sensor equipment capable of continuously monitoring it.</p> <p>With all the information, it is planned to determine the most probable location of the biofilm and the generation of an associated risk map that will allow establishment of priorities of the action plan for conservation and maintenance.</p> | | | |
| DETECTED NEEDS FOR FURTHER DEVELOPMENT | | | |
| Based on the knowledge generated, an action program can be defined for conserving the different components and identifying and appropriately scheduling maintenance and cleaning tasks. | | | |
| ECONOMIC FIGURES | | | |
| BUDGET OF € 1.500.000 ; WITH SUBSIDY OF € 0 | | | |




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|  | R&D+i Group | | |
| | R&D+i PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 |
| PROJECT NAME | CALIBRATION OF TECHNICAL STANDARDS FOR OVERFLOW OF SANITATION SYSTEMS (DSS) AND CONTAMINATED RAINFALL RUNOFF. | | |
| ORGANIZATION | Canal de Isabel II | | |
| WEB | https://www.canaldeisabelsegunda.es | | |
| PARTNERS IN THE PROJECT | | | |
| CANAL DE ISABEL II; UNIVERSIDADE DA CORUÑA FOUNDATION | | | |
| Start date of the Project | January-21 | End date of the Project | December-24 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>CALIBRATION OF TECHNICAL STANDARDS FOR OVERFLOW OF SANITATION SYSTEMS (DSS) AND CONTAMINATED RAINFALL RUNOFF. Canal de Isabel II collaborates with the AEAS group to calibrate the technical standards for overflow of sanitation systems and contaminated stormwater runoff in order to comply with the environmental objectives of the receiving environment. This project is part of the transposition process of the European directive 91/271/EEC. This standard will be used in establishing the conditions of discharge authorizations for overflows from sanitation systems in rainy weather. Spillways are identified according to the risk of impact that the upstream population exerts on the affected receiving environment when a discharge occurs. Canal de Isabel II is working, together with other water management companies throughout Spain, on the definition and calibration of these standards.</p> | | | |
| IMAGE OF THE PROJECT | | | |
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| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| NO | YES | NO | NO |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>The calibration of these standards has a relevant importance in view of future implications in national and European directives, which is why it has a high impact. Spillways are infrastructures whose behavior is difficult to predict, since their regime can change and the discharge through the lip not the linear one, so their characterization and the risk of their impact is important for the environment susceptible to being affected. . Due to climate change, the arrival hydrographs are increasingly higher and occur in a shorter period of time, which leads to greater discharge. This study will result in the conditions of discharge authorizations to avoid affecting natural channels, considering adaptation to climate change.</p> | | | |
| DETECTED NEEDS FOR FURTHER DEVELOPMENT | | | |
| ECONOMIC FIGURES | | | |
| BUDGET OF € 25.000 ; WITH SUBSIDY OF €0 (internal) | | | |


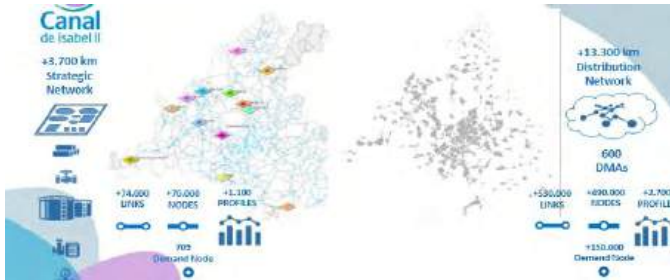
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|  | | R&D+i Group | |
| | | R&D+i PROJECTS - PORTFOLIO | |
| PROJECT NAME | | CENTER OF EXCELLENCE IN SUSTAINABLE URBAN DRAINAGE TECHNIQUES (SUDS). | |
| ORGANIZATION | | Canal de Isabel II | |
| WEB | | https://www.canaldeisabelsegunda.es | |
| PARTNERS IN THE PROJECT | | | |
| CANAL DE ISABEL II; TALHER, S.A.; UTE TYPASA-GBM-PAVASAL | | | |
| Start date of the Project | | January-22 | End date of the Project |
| | | | December-24 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>CENTER OF EXCELLENCE IN SUSTAINABLE URBAN DRAINAGE TECHNIQUES (SUDS). Canal de Isabel II Research Center of Excellence to test and evaluate different Sustainable Urban Drainage Techniques (SUDS). Conventional drainage systems increasingly require purifying a greater volume of rainwater, which implies a need to address stormwater management from different points of view: hydrological, environmental and social. For this purpose, a SUDS pilot plant has been built. in the Meco WWTP, where the impact that SUDS have on the amount of runoff and pollutants can be analyzed in addition to maximizing landscape integration.</p> | | | |
| IMAGE OF THE PROJECT | | | |
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| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| NO | YES | NO | NO |
| RESULTS ACHIEVED OR EXPECTED | | | |
| The facility has sensorized spaces for the purpose of validating and comparing techniques, and has devices for generating rain programs. It will also allow the analysis of different pavements, manufacturers... | | | |
| DETECTED NEEDS FOR FURTHER DEVELOPMENT | | | |
| ECONOMIC FIGURES | | | |
| BUDGET OF € 750.000 ; WITH SUBSIDY OF €0 | | | |

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|  | | R&D+I Group | |
| | | R&D+I PROJECTS - PORTFOLIO | PERIOD: 2021-2023 |
| PROJECT NAME | PILOT PROJECT OF A SYSTEM FOR THE QUANTIFICATION OF WATER INFILTRATION IN THE AQUIFER OF MADRID. | | |
| ORGANIZATION | Canal de Isabel II | | |
| WEB | https://www.canaldeisabelsegunda.es | | |
| PARTNERS IN THE PROJECT | | | |
| CANAL DE ISABEL II; AMPHOS 21 CONSULTING, S.L. | | | |
| Start date of the Project | February-22 | End date of the Project | may-23 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>PILOT PROJECT OF A SYSTEM FOR THE QUANTIFICATION OF WATER INFILTRATION IN THE AQUIFER OF MADRID.</p> <p>Pilot installation in the Fuencarral well field, in an area close to the El Calverón work center (Madrid). The project includes:</p> <ul style="list-style-type: none"> • Literature review on the measurement of natural recharge in detrital aquifers. • Battery of in situ tests to determine the infiltration capacity of the soil at different depths. • Design, execution and start-up of the pilot installation for measuring natural recharge using lysimeters and other types of sensors: lysimetric plate, sensors for measuring temperature, suction, relative humidity and volumetric water content; and passive lysimeters. • Precipitation - natural recharge model. | | | |
| IMAGE OF THE PROJECT | | | |
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| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| YES | NO | NO | NO |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>A pilot plant for a complete lysimetric station has been designed, built, instrumented and put into operation at the El Calverón facilities. A bibliographic compilation was made about the aquifer terrain and the values that can be expected for recharge and that therefore are intended to be measured. The most suitable equipment and sensors on the market were sought and different equipment was redundantly installed at different depths up to 1.2 m deep. All this next to a new weather station. Currently, almost a hundred parameters and measurements can be obtained continuously and controlled and stored telematically. There are short series of data that at the moment do not allow us to assess the natural hydrodynamic functioning of the soil-subsoil system, but they have allowed performance tests and verifications to be carried out on the information provided by each sensor and equipment.</p> | | | |
| DETECTED NEEDS FOR FURTHER DEVELOPMENT | | | |
| <p>In the short term, it is recommended to finish fine-tuning all the sensors and data obtained. Given the enormous amount of data that is generated, it is necessary to implement a data collection, storage, treatment and post-processing system. This database must allow the extraction of the necessary information to understand and visualize the processes and to feed the numerical models that are developed.</p> | | | |
| ECONOMIC FIGURES | | | |
| BUDGET OF € 65.000 ; WITH SUBSIDY OF € 0 | | | |


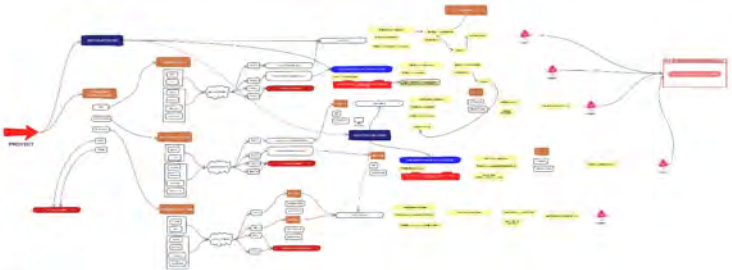
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|  | R&D+i Group | | |
| | R&D+i PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 |
| PROJECT NAME | POROUS MATERIALS FOR THE MINIMIZATION OF CHLORATES AND CHLORITES IN TREATED WATERS. | | |
| ORGANIZATION | Canal de Isabel II | | |
| WEB | https://www.canaldeisabelsegunda.es | | |
| PARTNERS IN THE PROJECT | | | |
| CANAL DE ISABEL II; IMDEA ENERGÍA ; REY JUAN CARLOS UNIVERSITY | | | |
| Start date of the Project | January-20 | End date of the Project | January-24 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>The objective is to work on the production of advanced porous materials to design, optimize and build a complete and continuous system that allows the elimination of chlorates in drinking water, in collaboration with the Advanced Porous Materials Unit of IMDEA Energía (IMDEA), in a joint research project of the Call for Industrial Doctorates of the Community of Madrid.</p> <p>The challenges addressed in this project are varied, including the synthesis of new multifunctional porous materials for the selective removal of chlorates following 4 strategies based on two porous beds: cationic porous solids, supported enzymes, biomimetic materials, and materials doped with metal cores. Subsequently, the optimization of a porous column on a laboratory scale that works continuously, the scaling of the synthesis of the most efficient materials and the implementation of the selected materials through a pilot in a DWTP of the Canal will be analyzed.</p> | | | |
| IMAGE OF THE PROJECT | | | |
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| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| YES | NO | NO | NO |
| RESULTS ACHIEVED OR EXPECTED | | | |
| The test is being developed on a pilot scale at the Colmenar DWTP. The results are very promising, especially with the newly designed MOFs. Chlorate reductions and clogging times are being achieved, the results are better than expected. | | | |
| DETECTED NEEDS FOR FURTHER DEVELOPMENT | | | |
| The possibility of designing and evolving new tests and piloting various arrangements of carbon and MOF products used together is being considered. | | | |
| ECONOMIC FIGURES | | | |
| BUDGET OF € 209.803,44 ; WITH SUBSIDY OF € 45.000 | | | |

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|  | R&D+I Group | | |
| | R&D+I PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 |
| PROJECT NAME | AUTONOMOUS DRONE FOR INSPECTION OF SEWER NETWORKS AND GALLERIES. | | |
| ORGANIZATION | Canal de Isabel II | | |
| WEB | https://www.canaldeisabelsegunda.es | | |
| PARTNERS IN THE PROJECT | | | |
| CANAL DE ISABEL II; UAV AUTOSYSTEMS HOVENING S.E, SL | | | |
| Start date of the Project | February-20 | End date of the Project | December-22 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>AUTONOMOUS DRONE FOR INSPECTION OF SEWER NETWORKS AND GALLERIES. It is necessary to reduce occupational risks in the inspection of sanitation galleries (sewers). The DRON replaces the workers inside the sewers. There was no truly self-guided drone to carry out these tasks. An autonomous flight drone capable of making decisions in real time has been obtained. Developed through an innovative public procurement process. It is the first known project of true autonomous and self-guided flight of inspection drones, which has sensors that allow structural and functional diagnosis of the galleries and sewers inspected.</p> | | | |
| IMAGE OF THE PROJECT | | | |
|  | | | |
| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| NO | YES | NO | NO |
| RESULTS ACHIEVED OR EXPECTED | | | |
| In the current phase, inspections will be carried out through this method. | | | |
| DETECTED NEEDS FOR FURTHER DEVELOPMENT | | | |
| Application of artificial intelligence algorithms to detect defects in sewer inspections through viewing videos using drones. | | | |
| ECONOMIC FIGURES | | | |
| BUDGET OF € 138.000 ; WITH SUBSIDY OF € 0 | | | |


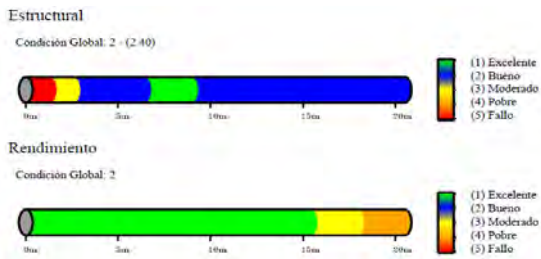
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|  | | R&D+I Group | |
| R&D+I PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 | |
| PROJECT NAME | PREDICTION OF FLOW CONTRIBUTIONS TO THE PINILLA RESERVOIR WITH MACHINE LEARNING TECHNIQUES. | | |
| ORGANIZATION | Canal de Isabel II | | |
| WEB | https://www.canaldeisabelsegunda.es | | |
| PARTNERS IN THE PROJECT | | | |
| CANAL DE ISABEL II; EFOR | | | |
| Start date of the Project | March-21 | End date of the Project | March-23 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>For the management of dammed water, it can be advantageous to have a tool for predicting contributions to each reservoir. The tools available on the market are based on hydrological models that are very time-consuming and difficult to calibrate. A.I. provides a modelling solution much faster, based on supervised machine learning. A methodology that can be extrapolated to other reservoirs is also developed.</p> <p>The project is based on the use of digital enabling technologies such as artificial intelligence in the exploitation of reservoirs. Specifically, the use of machine learning based on artificial neural networks, for the prediction of inflow flows to reservoirs.</p> <p>Based on meteorological information, an artificial neural network has been trained to predict the flow contributions in the Pinilla reservoir (Canal de Isabel II) in normal and flood hydrological situations.</p> <p>Using rainfall, temperature and input data, a Machine Learning model is trained to predict input to the reservoir 1, 2 and 3 hours in advance.</p> | | | |
| IMAGE OF THE PROJECT | | | |
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| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| YES | NO | NO | NO |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>Three models were generated that predict the inflow to the reservoir 1, 2 and 3 hours in advance. Visualizer of all the information of the input and output variables of the model.</p> | | | |
| DETECTED NEEDS FOR FURTHER DEVELOPMENT | | | |
| Re-entry of the models due to anomalous behaviour in rainfall. | | | |
| ECONOMIC FIGURES | | | |
| BUDGET OF €12.000 ; WITH SUBSIDY OF €0 | | | |

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|  | R&D+I Group | | |
| | R&D+I PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 |
| PROJECT NAME | DIGITAL TWIN OF THE ISABEL II CANAL WATER SUPPLY SYSTEM BASED ON REAL-TIME MATHEMATICAL HYDRAULIC MODELING. | | |
| ORGANIZATION | Canal de Isabel II | | |
| WEB | https://www.canaldeisabelsegunda.es | | |
| PARTNERS IN THE PROJECT | | | |
| CANAL DE ISABEL II ; TÉCNICAS DEL MEDIOAMBIENTE Y DEL AGUA, S.A.; TÉCNICAS DE INNOVACIÓN Y SOFTWARE | | | |
| Start date of the Project | January-23 | End date of the Project | December-26 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>DIGITAL SUPPLY TWIN BASED ON REAL-TIME MATHEMATICAL HYDRAULIC MODELING OF THE ISABEL II CANAL SUPPLY SYSTEM. Model of the hydraulic behavior of the Canal de Isabel II supply and distribution system, improving the current calculation power. This allows the simulation of the operating conditions desired by the company, and allows the prediction of conditions before the execution of the scheduled maneuvers even in contingencies.</p> | | | |
| IMAGE OF THE PROJECT | | | |
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| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| YES | NO | NO | NO |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>The model takes into account all the boundary conditions existing in this type of system: reservoirs, lifting stations, DWTP, tanks, valves, flowmeters... The results achieved demonstrate the ability to model in a short period of time all the recorded changes, and offer results for decision making in real time.</p> | | | |
| DETECTED NEEDS FOR FURTHER DEVELOPMENT | | | |
| Completion of the transfer through the migration of the old Synergi model. | | | |
| ECONOMIC FIGURES | | | |
| BUDGET OF € 14.999 ; WITH SUBSIDY OF € 0 | | | |



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|  | R&D+I Group | | |
| | R&D+I PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 |
| PROJECT NAME | STUDY OF GEOSMINE PRODUCING COMPOUNDS THROUGH METAGENOMICS. | | |
| ORGANIZATION | Canal de Isabel II | | |
| WEB | https://www.canaldeisabelsegunda.es | | |
| PARTNERS IN THE PROJECT | | | |
| CANAL DE ISABEL II; UAM METAGENOMICS. FUNDACIÓN PARQUE CIENTÍFICO DE MADRID | | | |
| Start date of the Project | February-21 | End date of the Project | July-22 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>STUDY OF GEOSMINE-PRODUCING COMPOUNDS THROUGH METAGENOMICS. Project for the determination of geosmin-producing compounds through Metagenomics in Raw Water in the supply sources of the Community of Madrid (reservoirs). A survey is carried out for samples and characterization of odour-producing organisms in all reservoirs, through a metagenomic analysis applying the 16S rDNA gene marker (bacteria and cyanobacteria), which allows us to determine the CPO species present in our waters under normal conditions, and in episodes of emergence of CPO, mainly geosmin.</p> <p>The intention is to determine the potential CPO-producing species, making a general sweep of the species of bacteria and cyanobacteria present in the raw water of the Canal de Isabel II reservoirs, using new generation metagenomic massive sequencing techniques, under normal environmental conditions. and at times of CPO appearance, particularly geosmin.</p> <p>The last phase of the project includes the development of a continuous sensor to detect the presence of geosmin in raw water. It will generate an alarm at the entrance of the DWTP so that the treatment is adequate for its elimination, and thus avoid episodes of odour in the drinking water."</p> | | | |
| IMAGE OF THE PROJECT | | | |
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| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| YES | NO | NO | NO |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>Sampling and massive sequencing were carried out over a year, but subsequent bioinformatic analyses were inconclusive due to a lack of data, particularly in positive events. Regarding sensors, no technological developments have been found that may be applicable.</p> | | | |
| DETECTED NEEDS FOR FURTHER DEVELOPMENT | | | |
| <p>More raw water samples are being taken for an additional year, to re-apply massive sequencing techniques and repeat the bioinformatics study. Workshops has been held with agents involved to approximate possible technological developments for in situ sensors.</p> | | | |
| ECONOMIC FIGURES | | | |
| BUDGET OF € 9.663 ; WITH SUBSIDY OF € 0 | | | |



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|  | R&D+i Group | | |
| | R&D+i PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 |
| PROJECT NAME | DEFINITION, DEVELOPMENT AND IMPLEMENTATION OF A METHODOLOGY FOR THE PRIORITIZATION OF INVESTMENTS IN INFRASTRUCTURES OF THE WHOLE URBAN WATER CYCLE, INCLUDING A COMPUTER APPLICATION FOR CORPORATE EXPLOITATION. | | |
| ORGANIZATION | Canal de Isabel II | | |
| WEB | https://www.canaldeisabelsegunda.es | | |
| PARTNERS IN THE PROJECT | | | |
| CANAL DE ISABEL II | | | |
| Start date of the Project | January-21 | End date of the Project | December-24 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>DEFINITION, DEVELOPMENT AND IMPLEMENTATION OF A METHODOLOGY FOR THE PRIORITIZATION OF INVESTMENTS IN INFRASTRUCTURES OF THE WHOLE URBAN WATER CYCLE, INCLUDING A COMPUTER APPLICATION FOR CORPORATE EXPLOITATION. Development of a novel methodology for the objective weighting and assessment of the infrastructures that must be undertaken or renewed in the future, of any phase of the urban water cycle (General Infrastructure Plan).</p> | | | |
| IMAGE OF THE PROJECT | | | |
|  | | | |
| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| NO | NO | NO | YES |
| RESULTS ACHIEVED OR EXPECTED | | | |
| The results generate a database ordered according to priorities as results of your score. This facilitates decision making for construction and project managers regarding an order with a joint value. | | | |
| DETECTED NEEDS FOR FURTHER DEVELOPMENT | | | |
| The databases will be improved in terms of information on the different infrastructures to provide values with greater precision if possible. | | | |
| ECONOMIC FIGURES | | | |
| BUDGET OF 35.000 €, WITH SUBSIDY OF €0 | | | |

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|  | R&D+i Group | | |
| | R&D+i PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 |
| PROJECT NAME | INNOVATIVE TOOLS FOR THE CONTROL OF ORGANIC MATTER AND BY-PRODUCTS OF DISINFECTION IN DRINKING WATER. | | |
| ORGANIZATION | Canal de Isabel II | | |
| WEB | https://intodbp.eu/ | | |
| PARTNERS IN THE PROJECT | | | |
| CANAL DE ISABEL II; ICRA; IS GLOBAL; ATL; CSIC | | | |
| Start date of the Project | October-21 | End date of the Project | December-26 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>INNOVATIVE TOOLS FOR THE CONTROL OF ORGANIC MATTER AND DISINFECTION BY-PRODUCTS IN DRINKING WATER. It focuses on the study of disinfection by-products (DBP disinfection by-products), such as trihalomethanes and NDMA. Some are potentially dangerous, and although we comply with the regulations, they represent a great challenge for Canal de Isabel II. The aim is to work on detection, measurement systems, monitoring, prevention, processes and technologies for treatment, distribution, etc. Canal would participate in WP 4, carrying out tests on equipment to improve the dosage of reagents in the treatment at the Valmayor DWTP, in the pilot plant that is currently available and in the distribution network to implement and test spectrophotometric real-time sensors for DBP in the water network.</p> | | | |
| IMAGE OF THE PROJECT | | | |
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| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| YES | NO | NO | NO |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>The project will improve scientific knowledge of precursors and the formation of disinfection by-products (DBP) and it is planned to develop innovative tools for their detection and control (new meters) to prevent their appearance (new dosage adjustment equipment of reagents, as well as promoting their elimination (new treatment technologies). It also aims to be a source of information for European and State legislation bodies. In addition, the project seeks to involve society, collect data on watershed protection initiatives, and raise awareness and promote sustainable behaviour among consumers, such as reducing bottled water consumption.</p> | | | |
| DETECTED NEEDS FOR FURTHER DEVELOPMENT | | | |
| The evolution involves the adoption of products developed in Europe and a global scale, to strengthen Europe's position and role in the global water market. | | | |
| ECONOMIC FIGURES | | | |
| BUDGET OF € 3.994.707 ; WITH SUBSIDY OF € 97.459 | | | |

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|  | | R&D+i Group | |
| | | R&D+i PROJECTS - PORTFOLIO | |
| PROJECT NAME | | PERIOD: 2021-2023 | |
| IMPLEMENTATION OF ARTIFICIAL INTELLIGENCE ALGORITHMS FOR THE MASSIVE PROCESSING OF THE SEWER REVIEW VIDEOS IN CANAL DE ISABEL II. | | | |
| ORGANIZATION | | Canal de Isabel II | |
| WEB | | https://www.canaldeisabelsegunda.es | |
| PARTNERS IN THE PROJECT | | | |
| CANAL DE ISABEL II; INLOC ROBOTICS S.L. | | | |
| Start date of the Project | June-21 | End date of the Project | June-22 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>IMPLEMENTATION OF ARTIFICIAL INTELLIGENCE ALGORITHMS FOR THE MASSIVE PROCESSING OF THE SEWER REVIEW VIDEOS IN CANAL DE ISABEL II. Manual review of the huge amount of videos generated by the systematic review of sewer networks consumes an enormous amount of resources. The automation and standardization of the reviews of these videos originating from the inspections is necessary. The A.I. undertakes this task with satisfactory results and at an enormously advantageous cost.</p> | | | |
| IMAGE OF THE PROJECT | | | |
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| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| NO | YES | NO | NO |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>The system automatically detects, through the interpretation of images from inspection videos, up to 16 types of defects classified into 4 groups: structural defects, capacity defects, structural elements and other defects, in addition to their subtypes.</p> <p>As a result, a classification is obtained according to: name of the defect and description, possible causes, degree of severity, statistics of each defect within its category, incidence and impact on structural integrity or operational performance among others, thus providing an assessment of the condition of the inspected section.</p> | | | |
| DETECTED NEEDS FOR FURTHER DEVELOPMENT | | | |
| <p>This system will be applied to the urban drainage network managed by Canal de Isabel II. In this way, it will be possible to have a diagnosis of the urban drainage network to proceed with optimized asset management that facilitates decision making, reducing expenses such as maintenance.</p> | | | |
| ECONOMIC FIGURES | | | |
| BUDGET OF € 14.850 ; WITH SUBSIDY OF € 0 | | | |

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|  | R&D+I Group | | |
| | R&D+I PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 |
| PROJECT NAME | SATELLITE INFORMATION FOR THE OPTIMIZATION OF THE MANAGEMENT OF DAMAGED WATER AND SNOW RESERVES, AND OF DAMS. | | |
| ORGANIZATION | Canal de Isabel II | | |
| WEB | https://www.canaldeisabelsegunda.es | | |
| PARTNERS IN THE PROJECT | | | |
| CANAL DE ISABEL II; LAND WATER AND DAMS, S.L. | | | |
| Start date of the Project | April-20 | End date of the Project | April-21 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>The objective of the project was to obtain data from the processing of satellite images that would increase knowledge of the quality of the reservoir water, improve the structural and hydrological safety of the dams and optimize the planning of the Canal reservoir exploitation system. of Elizabeth II.</p> <p>Thus, the project proposed the achievement of three specific objectives:</p> <ol style="list-style-type: none"> 1) A quarterly evolutionary bulletin of Din-SAR data at the El Atazar dam (Community of Madrid) and at the Guadiloba dam (province of Cáceres), based on the history of the last two years. 2) Generate a weekly snowological information bulletin for optical data, and biweekly for radar data, during the snow events of 2019/2020 and 2020/2021. 3) Provide a weekly bulletin of data on water quality (chlorophyll, turbidity and temperature) in the reservoirs of the water system. <p>supply of Canal de Isabel II to the Community of Madrid (Pinilla, Riasequillo, Puentes Viejas, El Villar, El Atazar, Pozo de los Ramos, El Vado, Navacerrada, Manzanares, Pedrezuela, Las Nieves, Valmayor, Navalmedio, La Jarosa, La Aceña), and to the city of Cáceres (Guadiloba).</p> | | | |
| IMAGE OF THE PROJECT | | | |
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| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| YES | NO | NO | YES |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>This project has allowed us to validate the remote sensing techniques used and their usefulness for the exploitation and safety of dams and reservoirs on Canal de Isabel II:</p> <ul style="list-style-type: none"> - Detection of movements through Interferometry of time series of radar images using PS-InSAR in the El Atazar and Guadiloba dams. - Estimation of snow in the drainage basins of the Sierra de Guadarrama through the NDSI index obtained from Sentinel-2 multispectral products, or through the application of the radar image backscatter quotient (GRD) method when cloudiness did not allow the application of the first method. - Evaluation of Chlorophyll-A, Suspended Solids and Turbidity through algorithms applied to Sentinel-2 band values in all reservoirs that supply both the Community of Madrid and the city of Cáceres. | | | |
| DETECTED NEEDS FOR FURTHER DEVELOPMENT | | | |
| It is necessary to continue in the line of research and testing of remote sensing techniques, as well as expand the scope of variables and applications of interest in reservoir management, and their integration with other tools and sources of information, so that a fully operational service level. | | | |
| ECONOMIC FIGURES | | | |
| BUDGET OF € 7.400 ; WITH SUBSIDY OF € 0 | | | |

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|  | R&D+i Group | | |
| | R&D+i PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 |
| PROJECT NAME | CORPORATE IoT SIGNAL INTEGRATION SYSTEM IN CANAL DE ISABEL II. | | |
| ORGANIZATION | Canal de Isabel II | | |
| WEB | https://www.canaldeisabelsegunda.es | | |
| PARTNERS IN THE PROJECT | | | |
| CANAL DE ISABEL II | | | |
| Start date of the Project | January-23 | End date of the Project | June-24 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>CORPORATE IOT SIGNAL INTEGRATION SYSTEM IN CANAL DE ISABEL II. This system allows the acquisition of all types of IoT sensors and the integration into all types of corporate systems (SCADA Novata via OPC-UA and Substrate via MQTT broker), in addition to monitoring their correct operation. The infrastructure (machines and networks) it uses is called CORSARIO. In the first half of the year, an exclusive private APN was created for ISOT systems with the aim of having a private NB-IoT, LTE-M1 and 4G network for all devices that enter the IoT-HUB and expandable to future communication technologies. This system will allow the telecontrol system to evolve towards a scenario without limits.</p> | | | |
| IMAGE OF THE PROJECT | | | |
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| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| NO | NO | NO | YES |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>The project is in the implementation phase and is receiving signals from equipment of various types: Hydra, tankers and RTU-SIEMENS, although the integration of various types of devices and instrumentation considered as dispersed remote control" is planned and with cellular communication (GPRS, NB-IoT and LTE-M1).</p> | | | |
| DETECTED NEEDS FOR FURTHER DEVELOPMENT | | | |
| <p>Additionally, the evolution of the website for general use is planned with a unified display of all systems as well as tabs for each type of device for specific configuration and operations. "</p> | | | |
| ECONOMIC FIGURES | | | |
| BUDGET OF € 811.000 ; WITH SUBSIDY OF € 0 | | | |

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|  | | R&D+I Group | |
| | | R&D+I PROJECTS - PORTFOLIO | |
| | | PERIOD: 2021-2023 | |
| PROJECT NAME | VALIDATION OF A NEW DESIGN AND MANUFACTURING METHOD OF LAMELLAES FOR DECANTATION IN DRINKING WATER TREATMENT, REAL-SCALE EXPERIENCE IN ACCELATOR DECANTER AT LA JAROSA DWTP. | | |
| ORGANIZATION | Canal de Isabel II | | |
| WEB | https://www.canaldeisabelsegunda.es | | |
| PARTNERS IN THE PROJECT | | | |
| CANAL DE ISABEL II; ATCA Asesoría Proyectos | | | |
| Start date of the Project | October-23 | End date of the Project | March-26 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>Two experiences: VALIDATION OF A NEW DESIGN AND MANUFACTURING METHOD OF LAMELLAES FOR DECANTATION IN DRINKING WATER TREATMENT, REAL-SCALE EXPERIENCE AT THE MAJADAHONDA DWTP; and VALIDATION OF A NEW DESIGN AND MANUFACTURING METHOD OF LAMELLAES FOR DECANTATION IN WATER TREATMENT DRINKING WATER, REAL-SCALE EXPERIENCE IN ACCELATOR DECANTER AT LA JAROSA PLANT.</p> <p>To increase the treatment capacity at La Jarosa DWTP, the hybridization of the accelator decanters with lamellae was proposed. Technologically, the lamellae as they were known until now could be problematic for this type of decanters due to the cleaning needs, and the difficulties caused in the accelator decanters if they are stopped to perform it (decantation of the sludge bed).</p> <p>To carry out the project, the lamella model recently patented by Wssdynamics and its cleaning team was chosen.</p> <p>The objective of the project is to increase treatment capacity, and for this, the following targets will be studied and analyzed:</p> <ul style="list-style-type: none"> - Assessment of the fouling of the lamellae. - Possibility of automatic cleaning. - Decantation performance. - Assess the economic cost and alternatives. - Learning about installation. | | | |
| IMAGE OF THE PROJECT | | | |
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| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| YES | NO | NO | NO |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>The new lamellar model has made it possible to increase the flow rate treated by the lamellar settlers which has been tested by 40% without any deterioration in the quality of the water produced (TOC and Turbidity have been analyzed). It is currently in the assembly phase in the accelator decanter.</p> | | | |
| DETECTED NEEDS FOR FURTHER DEVELOPMENT | | | |
| ECONOMIC FIGURES | | | |
| BUDGET OF € 525.000 ; WITH SUBSIDY OF € 0 | | | |


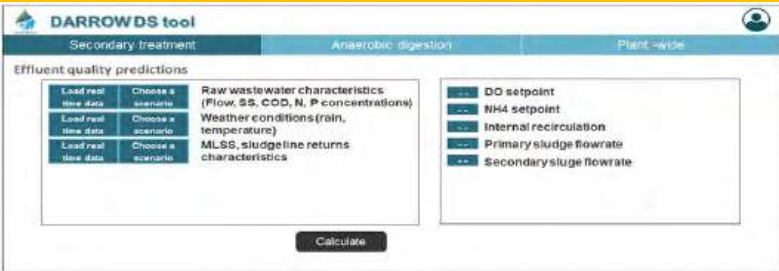
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|  | R&D+I Group | | |
| | R&D+I PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 |
| PROJECT NAME | LIFE RUBIES: PROJECT FOR THE CREATION OF INTELLIGENT URBAN DRAINAGE SYSTEMS, BASED ON THE MEASUREMENT OF POLLUTION IN REAL TIME. Project with European funding LIFE20 ENV/000179 | | |
| ORGANIZATION | Canal de Isabel II | | |
| WEB | https://life-rubies.eu/ | | |
| PARTNERS IN THE PROJECT | | | |
| CANAL DE ISABEL II; SUEZ; AQUATEC; CSIC; CETAQUA | | | |
| Start date of the Project | February-21 | End date of the Project | December-25 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>LIFE RUBIES: PROJECT FOR THE CREATION OF INTELLIGENT URBAN DRAINAGE SYSTEMS, BASED ON THE MEASUREMENT OF POLLUTION IN REAL TIME. Development and implementation at pilot project scale of a decision support tool that allows integrated real-time operation of the sanitation and drainage system, focused on reducing pollution of surface water masses from discharges from the drainage network. drainage in precipitation episodes. To implement this solution, a tool is developed to have a short- and long-term precipitation forecast, continuous reading sensors are installed to characterize the quality of effluents and urban runoff water, and mathematical algorithms are developed to process this information. , model the behavior of the sanitation system and identify the best network management solution. As the scope of application of this pilot study, among its sanitation infrastructures, Canal de Isabel II has selected the final section of the Manzanares System, which includes the La Gavia and Butarque WWTPs, the Abroñigales and Butarque Storm tanks and the of associated collectors.</p> | | | |
| IMAGE OF THE PROJECT | | | |
|    | | | |
| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| NO | YES | NO | NO |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>This approach is an alternative to the construction of storage basins and other concrete health infrastructures that have a high financial and environmental cost. In fact, this approach makes it possible for more communities to reduce their environmental footprint.</p> | | | |
| DETECTED NEEDS FOR FURTHER DEVELOPMENT | | | |
| <p>LIFE RUBIES will allow communities to improve with respect to the objective of good ecological status dictated by the Water Framework Directive of the European Commission. The objective is to improve biodiversity around rivers by reoxygenating, reducing nitrogen (toxic) and nitrates that have the effect of eutrophication rivers. The repopulation and improvement of the quality of waterways will also benefit various uses such as fishing, swimming or enabling other nautical activities. Finally, LIFE RUBIES participates in the protection of Europe's water resources and in guaranteeing the supply of drinking water to citizens.</p> | | | |
| ECONOMIC FIGURES | | | |
| BUDGET OF € 3.337.607 ; WITH SUBSIDY OF € 462.760 + 7% for general expenses | | | |




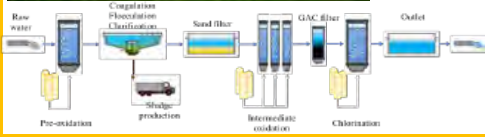
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|  | R&D+i Group | | |
| | R&D+i PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 |
| PROJECT NAME | LIFE SAFE-T-WATER (LIFE19 ENV/ES000049) funded by the European Union: NEW ECO-INNOVATIVE WATER TREATMENT BASED ON ONE STEP CHEMICAL TECHNOLOGY, USING A MULTIFUNCTIONAL NATURAL POLYMER. | | |
| ORGANIZATION | Canal de Isabel II | | |
| WEB | https://safetwater.eu/ | | |
| PARTNERS IN THE PROJECT | | | |
| CANAL DE ISABEL II; EMIVASA; SERVYECO | | | |
| Start date of the Project | September-20 | End date of the Project | August-24 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>LIFE SAFE-T-WATER (LIFE19 ENV/ES000049) funded by the European Union: NEW ECO-INNOVATIVE WATER TREATMENT BASED ON ONE STEP CHEMICAL TECHNOLOGY, USING A MULTIFUNCTIONAL NATURAL POLYMER. Natural coagulants have proven to be safer for human health than those currently being used based on metal, such as aluminium sulfate. The main objective is to validate, on a pilot scale, a new, innovative and environmentally friendly technology for the production of drinking water at the DWTP La. Dam in Valencia and the Colmenar DWTP in Madrid.</p> <p>The new technology is applied in a single step and eliminates the use of all corrosive and dangerous chemicals in the purification treatment, which will be replaced by a single product based on natural extracts. It is expected to achieve the elimination of aluminium (from alumina sulfate) in water and sludge, as well as an improvement in the quality of the treated water turbidity and suspended solids. From a technical point of view, an increase in coagulation/flocculation performance of around 60-70% is expected. Likewise, its results can improve turbidity reduction by 55-65%.</p> <p>From an environmental standpoint, they are biodegradable, thereby avoiding the use of hazardous products subject to strict legislation regarding transportation, storage, and handling. Furthermore, the elimination of iron and aluminum products improves the quality of the produced sludge, as it will not contain these metals, enhancing its suitability for agricultural use or any other potential recovery purposes.</p> | | | |
| IMAGE OF THE PROJECT | | | |
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| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| YES | NO | NO | NO |
| RESULTS ACHIEVED OR EXPECTED | | | |
| It is currently being tested on a pilot scale. The results are promising. | | | |
| DETECTED NEEDS FOR FURTHER DEVELOPMENT | | | |
| It is also being tested in the WWTP and the possibility of testing it in the sludge treatment process has been raised. | | | |
| ECONOMIC FIGURES | | | |
| BUDGET OF € 1.970.735 ; WITH SUBSIDY OF € 192.404 | | | |

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|  | R&D+I Group | | |
| | R&D+I PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 |
| PROJECT NAME | LIFE ZERO WASTE WATER: WASTEWATER TREATMENT WITH POSITIVE ENERGY BALANCE, COMBINING WASTEWATER TREATMENT WITH ORGANIC WASTE. Project with European funding LIFE19ENV/ES/000631 | | |
| ORGANIZATION | Canal de Isabel II | | |
| WEB | https://lifezerowastewater.com/ | | |
| PARTNERS IN THE PROJECT | | | |
| CANAL DE ISABEL II; AQUALIA; USC; UV; SIMBIENT; VW. | | | |
| Start date of the Project | September-20 | End date of the Project | August-24 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>LIFE ZERO WASTE WATER: WASTEWATER TREATMENT WITH POSITIVE ENERGY BALANCE, COMBINING WASTEWATER TREATMENT WITH ORGANIC WASTE. The project aims to demonstrate an innovative, profitable solution with a positive energy balance in the treatment of wastewater in municipalities of less than 50,000 inhabitants. It is based on the combination of technologies and methodologies independently validated at different scales but never combined and applied in the specific context of the project.</p> <p>a) Obtaining the organic fraction of municipal solid waste (OFSMW). Incorporation into wastewater, and design of a management strategy.</p> <p>b) Design of a new process for the Treatment of Wastewater. Development of three modules:</p> <ul style="list-style-type: none"> - Anaerobic membrane bioreactor (AnMBR). Developed by the University of Valencia and supported by 6 theses. - Partial nitrification reactor-Anammox (PN / AMX) and Nutrient extraction and recovery module. Developed by the University of Santiago and supported by 5 theses, 30 publications and 2 previous European projects. - The integration of AnMBR, PN/AMX and nutrient extraction and recovery module in a compact solution with synergistic results and minimal requirements in terms of energy and surface area. | | | |
| IMAGE OF THE PROJECT | | | |
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| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| NO | YES | NO | NO |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>It is expected to obtain results that prove:</p> <ul style="list-style-type: none"> • 50% reduction of biosolids • 60% reduction in energy consumption in nitrogen oxidation • Achievement of a positive energy balance in the WWTP. • Increased nutrient recovery. | | | |
| DETECTED NEEDS FOR FURTHER DEVELOPMENT | | | |
| ECONOMIC FIGURES | | | |
| BUDGET OF € 2.454.512 ; WITH SUBSIDY OF € 198.983 | | | |

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|  | | R&D+i Group | |
| | | R&D+i PROJECTS - PORTFOLIO | |
| PERIOD: 2021-2023 | | | |
| PROJECT NAME | PROJECT FOR PERMANENT CONTROL AND IDENTIFICATION OF INDIVIDUAL DRINKING WATER CONSUMPTION WITH ARTIFICIAL INTELLIGENCE TOOLS, PLUS CONTROL AND IDENTIFICATION OF EFFLUENTS RESULTING IN INDIVIDUALIZED SEWER CONNECTIONS. | | |
| ORGANIZATION | Canal de Isabel II | | |
| WEB | https://www.canaldeisabelsegunda.es | | |
| PARTNERS IN THE PROJECT | | | |
| CANAL DE ISABEL II; AQUALOGY SOLUTIONS SAU; AQUATEC | | | |
| Start date of the Project | January-21 | End date of the Project | December-24 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>PROJECT FOR PERMANENT CONTROL AND IDENTIFICATION OF INDIVIDUAL DRINKING WATER CONSUMPTION WITH ARTIFICIAL INTELLIGENCE TOOLS, PLUS CONTROL AND IDENTIFICATION OF EFFLUENTS RESULTING IN INDIVIDUALIZED SEWER CONNECTIONS. Development of a consumption pattern recognition system, including identification of residual flows, using neural networks.</p> | | | |
| IMAGE OF THE PROJECT | | | |
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| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| YES | YES | NO | YES |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>The work consists of Continuous Monitoring of water consumption over a period of two years, on a representative sample of homes in the Community of Madrid, the processing of the collected data and the preparation of evaluation reports on the results and conclusions. Calibration and in situ determination of the supply flows of each consumer device in the home, and, where appropriate, the volume associated with each use. This information will be used for the subsequent identification of the particular flow-time pattern of cisterns, taps, bathtubs, showers, washbasins, sinks, washing machine outlets, dishwashers, etc. Registration of information, Surveys, Maintenance, preparation of monthly reports and a final report, with the Correlation between consumption with the different characteristics of housing (surface area, occupation, age, existence of energy-saving devices, etc. Variability of consumption at hourly, daily, weekly and annual levels. Observed trend changes: for this, the data collected in the previous phases of the project (since 2008) will also be considered.</p> | | | |
| DETECTED NEEDS FOR FURTHER DEVELOPMENT | | | |
| <p>Maximum and minimum peak hour consumption. Minimum night consumption: identification of its origin (leaks, intentional consumption, consumption tempted, etc.). Losses due to internal leaks. Relationship with the age of the homes and their facilities. Parameter influence climatological in consumption. Evaluation of outdoor uses. Water consumption in irrigation of gardens, patios or terraces. Relationship with the type of irrigation used. Relationship with the theoretical irrigation needs of plants. Schedules of water use in irrigation. Detailed analysis of the histograms consumption, and in particular consumption at low flow rates, between the start-up flow rate and the minimum flow rate of the measuring equipment. Analysis of possible changes in consumption patterns induced by advertising and information actions. Characterization of consumption water in different end uses. Extrapolation of results to the group of users of Canal de Isabel II.</p> | | | |
| ECONOMIC FIGURES | | | |
| BUDGET OF € 1.564.880 ; WITH SUBSIDY OF € 0 | | | |

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|  | R&D-I Group | | |
| R&D-I PROJECTS - PORTFOLIO | | PERIOD: 2021-2022 | |
| PROJECT NAME | TREATMENT OF SLUDGE THROUGH THERMOPHILIC ANAEROBIC DIGESTION: STUDY AND OPTIMIZATION OF THE TECHNOLOGY FROM MICROBIOLOGY, ENGINEERING, AND SIMULATION PERSPECTIVES | | |
| ORGANIZATION | Ceit-BRTA | | |
| WEB | https://www.ceit.es/en/areas-investigacion/agua-salud/agua-residuos/thermogas | | |
| PARTNERS IN THE PROJECT | | | |
| NILSA (coordinador), U. de Barcelona, U. de Zaragoza, GyD - Tecnología del agua, Ceit | | | |
| Start date of the Project | 01/09/2022 | End date of the Project | 31/08/2025 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>The ThermoGas project is conceived to address the existing deficiencies in the technology of anaerobic digestion of sludge under thermophilic conditions (DAT), tackle the challenges posed, and develop an integrated solution to facilitate its implementation. This project aims to analyse, optimize, assess and validate in a real environment the technical feasibility of thermophilic anaerobic digestion (TAD) of sewage sludge for nutrient recovery, energy production, and effective and safe hygienisation. Key stages include: (i) designing operational strategies, (ii) validating initialization strategies for semi-industrial scale digesters, (iii) demonstrating the process stability against disturbances, (iv) developing specific engineering technology for TAD at various dryness levels, and (v) creating a digital decision-support tool for operational management. A critical aspect of this project involves deepening the understanding of the biomass involved and identifying critical inhibition factors, which is essential for accurately modelling these transitory states and thereby facilitating the development of highly efficient and innovative tools for industry applications. These objectives will be addressed through a multidisciplinary project combining engineering, microbiology, and simulation.</p> | | | |
| IMAGE OF THE PROJECT | | | |
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| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| NO | NO | YES | NO |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>The project results will provide a holistic view of TAD (Thermophilic Anaerobic Digestion), which will serve to optimize its operation and as a technology reference at the state level for widespread implementation. Nilisa will obtain an optimized TAD technology that will be implemented on a real scale. Universities will expand their knowledge in advanced sludge treatment, thus favoring publications and participation in future projects. Ceit will increase its model libraries with a technology of great potential and will obtain a prototype of an operational support tool, while GyD will expand its technology offering in the market.</p> | | | |
| DETECTED NEEDS FOR FURTHER DEVELOPMENT | | | |
| The project is ongoing, and the detected needs are being solved by the working team. | | | |
| ECONOMIC FIGURES | | | |
| Public-private collaboration project, part of the State Program to Promote Scientific-Technical Research and its Transfer, within the State Plan for Scientific, Technical, and Innovation Research 2021-2023. Overall budget of €457,197. | | | |

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|  | | R&D+i Group | |
| R&D+i PROJECTS - PORTFOLIO | | PERIOD: 2021-2022 | |
| PROJECT NAME | DARROW (Data-driven Resource Recovery frOm Wastewater) | | |
| ORGANIZATION | Ceit-BRTA | | |
| WEB | https://www.wastewater.ai/ | | |
| PARTNERS IN THE PROJECT | | | |
| Ceit-BRTA (Spain), Ghent University (Belgium), IMEC (Belgium), VITO (Belgium), Cobalt Eater EU (Netherlands), Royal Haskoning DHV (Netherlands), EU Science Communication Institute (Germany) y Waterschap De Dommel (Netherlands) | | | |
| Start date of the Project | 01/09/2022 | End date of the Project | 01/02/2026 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>Wastewater treatment sector is experiencing a relevant transformation as wastewater treatment plants (WWTP) are being reconceived as water resource recovery facilities (WRRF). Artificial intelligence (AI) can help to develop tools for assessment and real-time decision making, that will accelerate this transition. The working team in the DARROW project, funded by the EU, is working on the development of an innovative AI-based solution. This solution is modular and flexible, and it will be implemented in the WWTP of Tillburg (Netherlands). The solution being developed aims to become a tool that will help to make WWTP more autonomous, energy efficient and, in general, better prepared for their transformation into WRRF. The initiative will exploit existing AI and data analysis techniques, combined with the use of mechanistic models, to reduce energy consumption and greenhouse gas emissions from WWTPs, increase resource recovery and improve effluent water quality.</p> | | | |
| IMAGE OF THE PROJECT | | | |
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| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| NO | YES | YES | YES |
| RESULTS ACHIEVED OR EXPECTED | | | |
| The expected results are to have a decision support system tool that will integrate advanced data treatment techniques and predictive capacity in order to improve effluent quality, energy consumption and greenhouse gas emissions at the Tillburg plant (Netherlands). | | | |
| DETECTED NEEDS FOR FURTHER DEVELOPMENT | | | |
| The project is ongoing, and the detected needs are being solved by the DARROW working team. | | | |
| ECONOMIC FIGURES | | | |
| Programme HORIZON.2.4.5 - Artificial Intelligence and Robotics. Total budget: 3.531.446 €. Ceit budget: 689.864 €. | | | |

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|  | | R&D-I Group | |
| R&D-I PROJECTS - PORTFOLIO | | PERIOD: 2021-2022 | |
| PROJECT NAME | Control and Elimination of Trihalomethane in Drinking Water Treatment Facilities (CETHAP) | | |
| ORGANIZATION | Ceit-BRTA | | |
| WEB | | | |
| PARTNERS IN THE PROJECT | | | |
| Bilbao Bizkaia Water Consortium, University of the Basque Country | | | |
| Start date of the Project | 01/04/2020 | End date of the Project | 01/04/2023 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>The operation of the drinking water supply systems (DWTP and distribution networks), will have to be optimized in the future if two of the biggest challenges that the entities responsible for drinking water treatment are facing want to be solved. The first challenge is related to water scarcity: climate change and the expected increase in the world's population will put greater pressure on water resources in the near future. The second challenge has to do with increasingly restrictive legislation. In Spain, Royal Decree 3/2023, of January 10, was recently approved, which tightens the technical-sanitary criteria for the quality of drinking water, its control and supply. In the CETHAP project, simulation tools for DWTP and distribution networks have been developed. These tools can simulate the evolution of different quality parameters over the systems. Therefore, developed tools allow predicting different quality parameters and can help to optimize the operation of the DWTP and the network to meet water quality requirements.</p> | | | |
| IMAGE OF THE PROJECT | | | |
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| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| YES | NO | YES | YES |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>The main results of the project were: 1) Complete DWTP simulator (Plant Wide Model methodology). Its ability to reproduce 19 experimental conditions tried in the CATABB pilot plant was contrasted for the concentration of organic matter, absorbance, THM, etc. 2) Distribution network simulation tool, based on Epanet, capable of reproducing chlorine and trihalomethane concentrations in the Bilbao network. Contrasted with experimental measurements from one year of operation.</p> | | | |
| DETECTED NEEDS FOR FURTHER DEVELOPMENT | | | |
| It would be very interesting to develop online simulation tools based on the already developed simulation tools. This would help on the real-time decision making. | | | |
| ECONOMIC FIGURES | | | |
| Ceit Budget: 199,200 € | | | |

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|  | R&D+i Group | | |
| | R&D+i PROJECTS - PORTFOLIO | | PERIOD: 2021-2022 |
| PROJECT NAME | MAGNYFOS - Use of magnesium oxide by-products for phosphorus recovery in WWTPs by struvite precipitation | | |
| ORGANIZATION | Ceit-BRTA | | |
| WEB | https://www.ceit.es/soluciones-industria/medio-ambiente | | |
| PARTNERS IN THE PROJECT | | | |
| NILSA (Coordinator), Universidad of Barcelona, Ceit-BRTA, Magna S.A. | | | |
| Start date of the Project | 01/09/2022 | End date of the Project | 01/02/2026 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>The main objective of the project is to design, develop and validate in a real environment a new technological solution that allows the efficient recovery of phosphorus contained in urban wastewater using industrial by-products with high magnesium content. These byproducts are low-reactivity magnesium oxides, generated during the calcination of natural magnesite by Magnesitas Navarras S.A. The project has combined experimental work at laboratory, pilot and industrial pilot scales, with the development of mathematical models and simulation tools. The combination of both methodologies has allowed us to understand in depth the mechanisms of action of magnesium oxides in the recovery of struvite and will allow the optimal implementation of the developed technology in different WWTP.</p> <p>R+D+i Project Challenges Collaboration of the State R+D+i Program. Ref.: RTC2019-007257-5</p> | | | |
| IMAGE OF THE PROJECT | | | |
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| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| NO | YES | YES | YES |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>The result of this project is a significant advance in closing the magnesium and phosphorus cycle. NILSA validates an optimized phosphorus recovery technology in WWTPs that can be exploited in its facilities, Magnesitas Navarras S.A. expands the market for its byproducts, Ceit obtains a methodology based on mathematical models that will allow it to promote the installation of this technology and the University of Barcelona expands and validates its knowledge in the precipitation of struvite from magnesium oxides.</p> | | | |
| DETECTED NEEDS FOR FURTHER DEVELOPMENT | | | |
| ECONOMIC FIGURES | | | |
| Project total budget: 697,899 €. Ceit Budget: 112,974 €. | | | |



R&D+I PROJECTS - PORTFOLIO

PERIOD: 2021-2022

PROJECT NAME

Research and Development in Digital Technologies to Optimize Energy Management in WWTPs.

ORGANIZATION

CICLAGUA

WEB

<https://www.ciclagua.com>

PARTNERS IN THE PROJECT

CICLAGUA

ITI - UNIVERSIDAD POLITÉCNICA DE VALENCIA

Start date of the Project

jun-22

End date of the Project

jul-24

DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE

Wastewater treatment plants (WWTPs) have increased their energy consumption due to factors such as population growth and new regulations on wastewater quality and treatment. According to IDAE figures, the average specific energy consumption of WWTPs is estimated at 0.5 kWh/m³ in treatment processes. Energy consumption in wastewater treatment plants depends on the technology used, the size of the served population, and the required effluent quality.

As a cost-saving measure, urban wastewater treatment plants (WWTPs) are improving their efficiency through technological innovation. Large treatment plants, for example, have higher investments and are designed to optimize size and control, achieving an energy consumption of approximately 20-30 kWh per resident per year.

In contrast, small wastewater treatment plants consume over 50 kWh per resident per year. This is due to their low level of regulation and the absence of automatic energy optimization systems. They often lack aeration control systems and are designed based on seasonal population changes, which leads to oversized electromechanical equipment.

IMAGE OF THE PROJECT



PROJECT APPROACH WITHIN THE WATER CYCLE

| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
|-------------------------|------------|------------------|-------------|
| NO | YES | YES | YES |

RESULTS ACHIEVED OR EXPECTED

Standardization of Data Collection Formats to ensure practical and useful information at all times. Ready-to-use data.

Development of Predictive Models for Energy Optimization in WWTPs through in-depth data analysis, applying Industry 4.0 digital technologies.

Real-World Validation of the Developed Predictive Model.

Predictive Model Ready for Inference and Deployment as a service.

Reduction of Operating Costs through the development of monitoring and control strategies for WWTP energy management.




Development of Decision Support Tools (DSS) for wastewater treatment plants.

DETECTED NEEDS FOR FURTHER DEVELOPMENT

Massive and Efficient Use of Operational Data to Optimize WWTP Performance.

ECONOMIC FIGURES

Total costs: 333.140,00 euros

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|  | | R&D+I PROJECTS - PORTFOLIO | | PERIOD: 2021-2022 | |
| PROJECT NAME | | Colorimetric Nanobiosensors for the Early and Specific Detection of E. Coli and Other Emerging Contaminants in Reclaimed Water at WWTPs. | | | |
| ORGANIZATION | | CICLAGUA | | | |
| WEB | | https://www.ciclagua.com | | | |
| PARTNERS IN THE PROJECT | | | | | |
| CICLAGUA | | | ITENE | | |
| Start date of the Project | | mar-21 | | End date of the Project | |
| | | | | jul-23 | |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | | | |
| <p>CICLAGUA, through this project, aims to implement a new early detection tool that allows for rapid and effective control of the quality of reclaimed water by detecting emerging contaminants such as E. Coli and Clostridium bacteria. The project plans to define an optimal sampling and pre-treatment process for analysis using biosensors.</p> <p>The automation and miniaturization of the sampling and pre-treatment process will be carried out to integrate it with the biosensor into a single device. This approach is expected to reduce microbiological analysis response time, enabling near real-time determination of whether reclaimed water samples are suitable and compliant with increasingly stringent water reuse regulations.</p> <p>Early warning in the detection of waterborne contaminants is becoming increasingly important to ensure that the use of reclaimed water is safe. This is a matter of public health and building public trust in the reuse of this water resource for agriculture and other purposes.</p> <p>Providing real-time information on specific pathogenic microorganisms is one of the key elements of the WA3 project. The goal is to develop biosensors for detecting E. Coli and Clostridium perfringens and to visualize the results quickly and efficiently through the development of a mobile app. The information obtained will help monitor water quality and optimize disinfection processes.</p> | | | | | |
| IMAGE OF THE PROJECT | | | | | |
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| PROJECT APPROACH WITHIN THE WATER CYCLE | | | | | |
| Supply and Distribution | | Sanitation | | Energy and Waste | |
| YES | | YES | | NO | |
| | | | | NO | |
| RESULTS ACHIEVED OR EXPECTED | | | | | |
| <p>Robust Early Warning System for Determining the Microbiological Quality of Reclaimed Water.</p> <p>New Colorimetric Detection System for E. Coli with High Specificity and Sensitivity in Solution or Substrate Format.</p> <p>New Colorimetric Detection System for C. Perfringens Spores with High Specificity and Sensitivity Based on Color Change in Solution or Substrate Format.</p> | | | | | |
| DETECTED NEEDS FOR FURTHER DEVELOPMENT | | | | | |
| Reduction of analysis time compared to conventional laboratory analysis. Validation in WWTPs. | | | | | |
| ECONOMIC FIGURES | | | | | |
| total costs 278.910,00 euros | | | | | |

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|  | R&D group | | |
| | REPOSITORY OF R+D+I PROJECTS | | PERIOD 2021-2023 |
| PROYECT | Bioelectrochemical system for the comprehensive recovery of wastewater and sludge from the WWTP. VIOE- | | |
| ORGANIZATION | DEPURACIÓN DE AGUAS DEL MEDITERRÁNEO (DAM) | | |
| WEB | https://www.dam-aguas.es/portfolio-posts/vioe/ | | |
| ORGANIZATIONS PARTICIPATING IN THE PROJECT | | | |
| AINIA Centro tecnológico | | | |
| Project start date | 01/11/2017 | Project end date | 28/02/2021 |
| DETAILED DESCRIPTION. SUMMARY OF OBJECTIVES AND PURPOSE | | | |
| <p>The VIOE- project aims to develop an innovative process for the effective recovery of organic matter and nutrients present in sludge and wastewater from WWTP through the integration of an anaerobic digestion (AD) with a third generation bioelectrochemical process, electromethanogenesis (EMG), to which an autotrophic aquatic biomass culture system is coupled. Through this process, three products with high added value, biomethane (ie, around 90% methane), an aquatic biomass and an organic amendment (ie, biosolid) will be obtained from a waste such as WWTP sludge. Thus, the VIOE- system takes advantage of the symbiosis of the DA and EMG processes and biomass cultivation, to close the cycle of nutrient and energy recovery within the framework of the Circular Economy concept.</p> | | | |
| PROJECT IMAGE | | | |
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| PROJECT FOCUS WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation and purification | Energy and Waste | Transverse |
| | yes | yes | |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>The VIOE- system encompasses the concept of circular economy in WWTP and has helped with its demonstration pilot to determine the potential for valorization of currents offering value-added products. Among them, the gaseous fraction of DA stands out, which has increased its methane concentration by 30% after the application of an EMG cell, achieving concentrations of 81% of CH4. In addition, the liquid fraction of the digester has been used in the recovery of nutrients (>90% for N and P) through the use of microalgae cultivation, which after the end of its useful life can be used as an organic amendment.</p> | | | |
| NEEDS DETECTED TO EVOLVE | | | |
| ECONOMIC DATA | | | |
| <p>Total Budget: 862.104€ Company budget: 668.130,30€ Grants: 193.973,40€</p> | | | |

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|  | R&D group | | |
| | REPOSITORY OF R+D+I PROJECTS | | PERIOD 2021-2023 |
| PROJECT | FIBERCLEAN: Minimization of microfibers in the life cycle of textile products | | |
| ORGANIZATION | DEPURACIÓN DE AGUAS DEL MEDITERRÁNEO (DAM) | | |
| WEB | http://www.fiberclean.es/ | | |
| ORGANIZATIONS PARTICIPATING IN THE PROJECT | | | |
| Angles Textil, S.A., Polysistec S.L. (PYME), Suavizantes y Plastificantes Bituminosos, S.L, E.G.O. Appliance Controls, S.L.U, Magtel Operaciones S.L.U. | | | |
| Project start date | 01/09/2017 | Project end date | 28/02/2022 |
| DETAILED DESCRIPTION. SUMMARY OF OBJECTIVES AND PURPOSE | | | |
| <p>The general objective of the FIBERCLEAN project is to obtain new solutions that will reduce the emission of microfibers throughout the entire value chain, both in the manufacture and maintenance of fabrics and garments and in the treatment of wastewater where a large part of these microfibers. Microfibers are particles that are released from all kinds of textiles (openwork fabrics, knits, non-wovens, etc.), especially when their components come from staple fiber or continuous filament cut in subsequent processes and that finally end up in the media. receptors (rivers, seas, lakes, etc.) or worse still, inside aquatic animals (fish, turtles, lobsters, etc.). A large part of the microfibers that pollute the sea come from synthetic garments from textile washing, reach the wastewater and go through the purification process.</p> <p>The project will be approached from two different perspectives:</p> <ul style="list-style-type: none"> · Research and development of new yarns, fabrics and finished products with properties that prevent the release of microfibers during various phases of the product's life cycle or that allow them to be revalued. · Research and development of new technologies for the elimination or reduction of microfibers during washing and purification that are compatible with conventional systems. | | | |
| PROJECT IMAGE | | | |
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| PROJECT FOCUS WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation and purification | Energy and Waste | Transverse |
| | yes | yes | |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>The results in the area of action of DAM within the project have been the establishment of a system for the separation of microplastics through the combination of an elutriation-hydrocyclone that has proven to be very effective separating more than 87% of the PM present less than 150 microns. Next, 153 strains were isolated and 70 were selected, of which they formed biofilm on pieces of PET plastic. The isolated bacteria belong to the genera Microbacterium, Brevibacterium, Glutamicibacter and Bacillus, the last 2 being the most abundant. Of the 70 strains, 37 with potential to degrade plastic (PE and PET) were identified, presenting good efficacy. These strains were studied by analyzing the growth capacity on saline media without the presence of carbon, showing this possibility for the S.setoni and Rhodococcus strains. In addition, the SEM visualization carried out where these strains form biofilm on the surface of the plastics is highlighted.</p> <p>Separation yields for wastewater and sludge greater than 90% have been observed.</p> | | | |
| NEEDS DETECTED TO EVOLVE | | | |
| ECONOMIC DATA | | | |
| <p>Total Budget: 5.178.382€ Company budget: 566.860,51€ Grants: 186.442,49€</p> | | | |


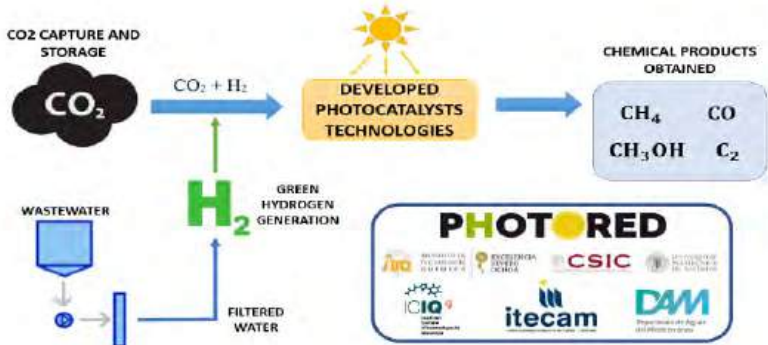
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|  | R&D group | | |
| | REPOSITORY OF R+D+I PROJECTS | | PERIOD 2021-2023 |
| PROJECT | NUTRIMAN: Thematic Network for Nutrient Management and Recovery | | |
| ORGANIZATION | DEPURACIÓN DE AGUAS DEL MEDITERRÁNEO (DAM) | | |
| WEB | https://nutriman.net/ | | |
| ORGANIZATIONS PARTICIPATING IN THE PROJECT | | | |
| EFFoST,ZLTO, APCA, UGent, INAGRO, AREFLH, Vlaco, CARTIF, UNITO, FEHS, IUNG-PIB, NAK | | | |
| Project start date | 01/10/2018 | Project end date | 30/09/2021 |
| DETAILED DESCRIPTION. SUMMARY OF OBJECTIVES AND PURPOSE | | | |
| <p>It is a transnational action of coordination and support whose purpose is to stimulate standardization, diffusion, awareness and communication, creation of networks, coordination of support services, political dialogues, studies and mutual learning activities.</p> <p>The NUTRIMAN project, lasting two and a half years, aims to capture and disseminate ideas and the latest scientific advances arising from research projects in order to promote their integration into agricultural and forestry practice at a European level, building bridges between research academic and sectoral practice. The project therefore opens up new opportunities for farmers to apply the results of the most cutting-edge European research on sustainable agriculture and circular economy in the priority area of nutrient management and recovery. It will allow, for example, the transfer of the results of successful projects such as LIFE PHORWater, which offers a solution to the environmental problems of eutrophication associated with discharges of phosphorus discharged into the environment, also offering an alternative source of phosphorus that allows reducing its mineral extraction.</p> <p>The actions developed will promote a more competitive and sustainable agriculture by minimizing the use of non-renewable raw materials and replacing them with secondary raw materials such as recycled phosphorus and nitrogen.</p> | | | |
| PROJECT IMAGE | | | |
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| PROJECT FOCUS WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation and purification | Energy and Waste | Transverse |
| | yes | yes | |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>This project will open up new opportunities for farmers to develop connections between applied research with practical results and farming practices in the priority area of nutrient management and recovery. Use a bottom-up approach to identify incentives and bottlenecks for adoption and prioritize between technologies and products and will ensure a greater willingness to adopt innovations and enhance multiplier effects. In short, it seeks the large-scale adoption of innovative nutrient recovery processes such as specific fertilizers, produced from untapped resources of organic or secondary raw materials in accordance with the circular economy. It also aims to carry out the effective dissemination and exploitation promoted by a multilingual web platform, other communications and demonstrations in the field of best practices for farmers. This project will contribute to the successful deployment of the vast reservoir of existing scientific/practical knowledge on the recovery of the N/P, including multilingual summaries in EIP-AGRI format.</p> | | | |
| NEEDS DETECTED TO EVOLVE | | | |
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| ECONOMIC DATA | | | |
| <p>Total Budget:1.999.925,50€ Grants: 86.281,00€</p> | | | |

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|  | R&D group | | |
| | REPOSITORY OF R+D+I PROJECTS | | PERIODO 2021-2023 |
| PROJECT | PHERTILIZER: Circular system for the recovery and agronomic evaluation of phosphorus | | |
| ORGANIZATION | DEPURACIÓN DE AGUAS DEL MEDITERRÁNEO (DAM) | | |
| WEB | https://www.dam-aguas.es/portfolio-posts/phertilizer/ | | |
| ORGANIZATIONS PARTICIPATING IN THE PROJECT | | | |
| Universitat de València, Timac Agro, Universidad de Navarra, Hispatec, CEBAS-CSIC | | | |
| Project start date | 01/07/2018 | Project end date | 31/12/2021 |
| DETAILED DESCRIPTION. SUMMARY OF OBJECTIVES AND PURPOSE | | | |
| <p>The project will develop a new struvite-based fertilizer that allows the recovery and agronomic valorisation of the phosphorus recovered in a Wastewater Treatment Plant (WWTP). This new fertilizer will integrate struvite into complex NPK fertilizers to favor its properties and its subsequent use on a commercial scale.</p> <p>In addition, the physiological and agronomic pathways of the mineral nutrition of crops will be studied when they are subjected to a fertilization program with this new struvite-based fertilizer, and an online virtual computer tool will be defined to help take decisions on fertilization strategies that will optimize the use of this new fertilizer and support the farmer in its application.</p> <p>The main objective of the project is to encourage and promote the recovery of nutrients in the WWTP and their sustainable use, for which work will be carried out fundamentally in three fields:</p> <ol style="list-style-type: none"> 1. In the treatment of wastewater through the investigation of advanced techniques to maximize the recovery of phosphorus in the WWTP and its integration into the exploitation strategies of the WWTP. 2. In mineral nutrition with the development of a new fertilizer whose component is struvite recovered in WWTP and the study of the physiological and agronomic mechanisms that promote the sustainable use of this new fertilizer. 3. In agriculture through the development of a computer tool that facilitates the farmer to make efficient use of water and sustainable fertilizers simultaneously. | | | |
| PROJECT IMAGE | | | |
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| PROJECT FOCUS WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation and purification | Energy and Waste | Transverse |
| | yes | yes | |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>The following results are expected to be achieved:</p> <ul style="list-style-type: none"> - Advanced techniques for phosphorus recovery in WWTP. - Processes for efficient P recovery in WWTP. - Study of the effect of P recovery in WWTP. - Study of the characteristics of struvite. - Agronomic trials, which showed that plant fresh weight production is similar with the three fertilisation protocols. It can be said that, according to the results obtained, the application of struvite allows yields similar to those of traditional bottom fertilisers. In addition, struvite fertilisation reduced the concentration of nitrates in the soil, reducing the risk of aquifer contamination. - Development of an on-line decision making system that facilitates the end-user (farmers) to make efficient use of water and fertilisers simultaneously. | | | |
| NEEDS DETECTED TO EVOLVE | | | |
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| ECONOMIC DATA | | | |
| Total Budget: 1.916.898,78€ | | | |
| Company budget: 392.980€ | | | |


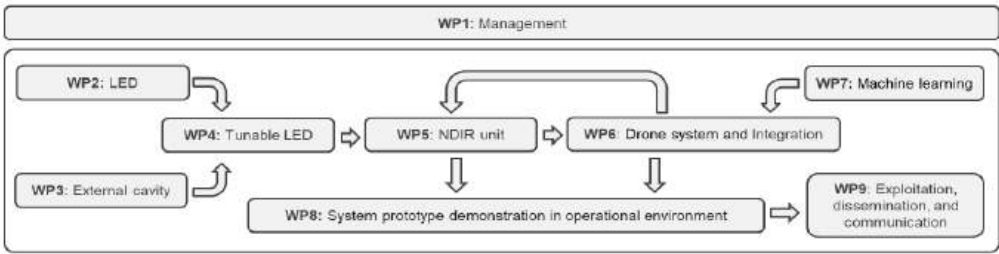
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|  | | R&D group | |
| REPOSITORY OF R+D+I PROJECTS | | PERIOD 2021-2023 | |
| PROJECT | ENZYCLE: Microbial enzymes for the treatment of non-recycled plastic fractions | | |
| ORGANIZATION | DEPURACIÓN DE AGUAS DEL MEDITERRÁNEO (DAM) | | |
| WEB | https://www.enzycle.eu/ | | |
| ORGANIZATIONS PARTICIPATING IN THE PROJECT | | | |
| ITENE, UNIVERSITAET LEIPZIG, STICHTING WAGENINGEN RESEARCH UNIVERSITAET FUER BODENKULTUR WIEN, ACIB GmbH, DARWIN BIOPROSPECTING EXCELLENCE SL, ASA SPEZIALENZYME GMBH , FEYCON DEVELOPMENT & IMPLEMENTATION BV, SOPREMA, Greiner Packaging International GmbH, ALIPLAST SPA, Indorama Ventures Europe B.V. | | | |
| Project start date | 01/11/2020 | Project end date | 31/10/2023 |
| DETAILED DESCRIPTION. SUMMARY OF OBJECTIVES AND PURPOSE | | | |
| <p>The general objective of the European project ENZYCLE is to develop new enzymes and advanced processes for the enzymatic treatment of non-recycled plastic fractions in order to produce new improved materials, such as virgin PET, polyurethane foam and polyols, and reduce the environmental impact generated by microplastics. Within this global European project, DAM will play a very relevant role, since it will carry out the implementation and monitoring of one of the pilots corresponding to the technology developed for the separation, quantification and enzymatic degradation of microplastics in wastewater treatment plants, affecting both to the water line and to the sludge line. In this way, it is also intended to study the elimination of microplastics in the sludge through the biodegradation of with enzymes.</p> | | | |
| PROJECT IMAGE | | | |
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| PROJECT FOCUS WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation and purification | Energy and Waste | Transverse |
| | yes | yes | |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>The objectives that the project estimate to achieve are detailed below:</p> <ul style="list-style-type: none"> - Reduction of microplastics in the wastewater stream through the development and implementation of a microplastic separation and degradation system (MDS) by more than 30% in the wastewater stream, based on free and immobilized enzymes. - Eliminate the presence of microplastics in the compost by 50% through the biodegradation of the microplastics present in the sewage sludge. | | | |
| NEEDS DETECTED TO EVOLVE | | | |
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| ECONOMIC DATA | | | |
| <p>Total budget 4.445.880€ company budget: 416.642,80€ Grant: 85.326,2€</p> | | | |



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|  | R&D group | | |
| REPOSITORY OF R+D+i PROJECTS | | PERIOD 2021-2023 | |
| PROYECT | ESENCE: New technologies for the removal and in-situ detection of priority pollutants in wastewater | | |
| ORGANIZATION | DEPURACIÓN DE AGUAS DEL MEDITERRÁNEO (DAM) | | |
| WEB | https://www.dam-aguas.es/portfolio-posts/esence/ | | |
| ORGANIZATIONS PARTICIPATING IN THE PROJECT | | | |
| CETIM (development of MIP for identification and potential use in the elimination of emerging contaminants); IMDEA Energy (collaboration in the synthesis and development of MOF for the elimination of emerging contaminants. Collaboration in the prototyping in WWTP) | | | |
| Project start date | 01/09/2020 | Project end date | 31/12/2023 |
| DETAILED DESCRIPTION. SUMMARY OF OBJECTIVES AND PURPOSE | | | |
| <p>The study of the integration of MIPs and MOFs will be carried out for the identification and elimination of Emerging Contaminants (ECs) in real urban wastewater. Specifically, the synthesis, development and optimization of Molecularly Imprinted Polymers (MIPs) will be studied, which are molecular recognition polymers, synthesized on demand, capable of selectively and specifically binding analytes of interest and related families. Those will be used as mechanisms for capturing CE, with fixation methodologies in photonic detectors to be used for rapid online detection. The CE adsorption capacity of MIPs systems for eliminating hazardous compounds will be studied too. On the other hand, the selection and synthesis of porous coordination polymers will be carried out, also known as MOFs (Metal-Organic Frameworks), which are porous solids formed by metal ions or clusters linked by organic ligands in such a way that a crystal lattice accessible to molecules is generated. MOFs have demonstrated to be capable of adsorbing and/or degrading emerging contaminants present in wastewater.</p> | | | |
| PROJECT IMAGE | | | |
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| PROJECT FOCUS WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation and purification | Energy and Waste | Transverse |
| | yes | | |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>The expected results of the project are the following:</p> <ul style="list-style-type: none"> - Study of the development of analytical methods that allow the characterization of wastewater and the selection of contaminants of interest from different families (antibiotics, insecticides, pesticides and drugs) due to their presence and impact in WWTP. - Study, development and optimization of MIPs for emerging pollutants and their use in sensorization and elimination systems. - Study, development and optimization of detection systems based on the combination of MIPs with photonic crystals (MIP-PCB) and surface plasmon resonance (MIP-SPR) (sensor coupled to MIPs): detection limit <1 µg/L; measurement time < 120 s). - Study and evaluation of solid phase extraction systems for the removal of ECs in wastewater based on MIPs (specificities > 1 and selectivities ≈ 1; binding with low concentrations of ECs (<1 µg/L); collection efficiencies > 80% in terms of rebinding; elution of emerging components > 80%). - Selection and synthesis of MOFs systems that allow an efficient removal (>80%) of the pollutants of interest considering concentrations between ng-mg/L. - Study of the scaling of MOFs (on a multigram scale) and its validation with urban wastewater. - Study of the integration of MIPs and MOFs on a pilot scale with real water through | | | |
| NEEDS DETECTED TO EVOLVE | | | |
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| ECONOMIC DATA | | | |
| <p>Total Budget: 619.899,08€ Company budget: 385.182€</p> | | | |


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|  | | R&D group | |
| REPOSITORY OF R+D+I PROJECTS | | PERIOD 2021-2023 | |
| PROYECT | TRANSACT: Transformation of critical cyber-physical systems into distributed solutions for WWTPs | | |
| ORGANIZATION | DEPURACIÓN DE AGUAS DEL MEDITERRÁNEO (DAM) | | |
| WEB | https://transact-ecsel.eu/ | | |
| ORGANIZATIONS PARTICIPATING IN THE PROJECT | | | |
| <p>PHILIPS MEDICAL SYSTEMS NEDERLAND BV, TECHNISCHE UNIVERSITEIT EINDHOVEN, PS-TECH B.V., VINOTION BV, NEDERLANDSE ORGANISATIE VOOR TOEGEPAST NATUURWETENSCHAPPELIJK ONDERZOEK TNO, FLEETONOMY.AI OY, TEKNOLOGIAN TUTKIMUSKESKUS VTT OY, F-SECURE OYJ, NODEON FINLAND OY, AVL SOFTWARE AND FUNCTIONS GMBH, ECLIPSE FOUNDATION EUROPE GMBH, OFFIS EV, PHILIPS GMBH, DENSO AUTOMOTIVE DEUTSCHLAND GMBH, FRAUNHOFER GESELLSCHAFT ZUR FOERDERUNG DER ANGEWANDTEN FORSCHUNG E.V, POLITECHNIKA GDANSKA, DAC Spolka Akcyjna, TECHNISCHE UNIVERSITAET GRAZ, CISC SEMICONDUCTOR GMBH, NAVTOR AS, SIMULA RESEARCH LABORATORY AS, INSTITUTO TECNOLOGICO DE INFORMATICA, NUNSYS SL, KUMORI SYSTEMS, SINGLAR INNOVACION SL, FUNDACIO PER A LA UNIVERSITAT OBERTA DE CATALUNYA, FEOPS NV, DANMARKS TEKNISKE UNIVERSITET Y TOITWARE APS</p> | | | |
| Project start date | 01/06/2021 | Project end date | 30/06/2024 |
| DETAILED DESCRIPTION. SUMMARY OF OBJECTIVES AND PURPOSE | | | |
| <p>TRANSACT aims to develop a universal and distributed solution architecture for the transformation of security-critical cyber-physical systems from localized stand-alone systems to secure distributed solutions, while ensuring flexible yet secure deployment of new applications in a manner that ensures performance, security and data privacy.</p> <p>Lastly, by integrating AI-based services into distributed CPS, TRANSACT will enable rapid development of new business models leading to faster introduction in the various markets targeted by the project.</p> <p>The TRANSACT European project will be applied and demonstrated in 5 use cases:</p> <ul style="list-style-type: none"> - Remote management of autonomous vehicles in urban environments - Support for decision-making in maritime navigation - Cloud battery management systems - Cloud-based clinical application platform for medical diagnostic imaging systems - Support system for decision making in critical processed at WWTPs | | | |
| PROJECT IMAGE | | | |
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| PROJECT FOCUS WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation and purification | Energy and Waste | Transverse |
| | | yes | yes |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>The participation of DAM in TRANSACT project aims to promote digitization in the wastewater treatment sector on the basis of cybersecurity and artificial intelligence, investigating lower-cost and easy-to-implement solutions. The project will investigate cloud and edge technologies for intelligent data analysis, leveraging cloud ecosystems, and studying safe and secure distributed solutions. Specifically, the use case led by DAM will be implemented around three axes: Early detection of industrial discharges; Comparative analysis of the operating ratios between different WWTPs and Development of Machine Learning for predictive maintenance operations.</p> | | | |
| NEEDS DETECTED TO EVOLVE | | | |
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| ECONOMIC DATA | | | |
| <p>Total budget: 26.544.588,75€ Company budget: 336.321€ Grant: 224.214€</p> | | | |

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|  | R&D group | | |
| REPOSITORY OF R+D+I PROJECTS | | PERIOD 2021-2023 | |
| PROJECT | PHOTORED: PHOTOCATALYTIC CO2 REDUCTIONS WITH GREEN HYDROGEN | | |
| ORGANIZATION | DEPURACIÓN DE AGUAS DEL MEDITERRÁNEO (DAM) | | |
| WEB | https://www.dam-aguas.es/portfolio-posts/photored/ | | |
| ORGANIZATIONS PARTICIPATING IN THE PROJECT | | | |
| Instituto de Tecnología Química (ITQ, UPV-CSIC) y Centro Tecnológico Industrial de Castilla – La Mancha (ITECAM) | | | |
| Project start date | 01/10/2021 | Project end date | 01/11/2024 |
| DETAILED DESCRIPTION. SUMMARY OF OBJECTIVES AND PURPOSE | | | |
| <p>PHOTORED opens up new opportunities in the capture of CO2 emissions and the use of renewable energies to obtain new products such as fuels and chemical products. In this way, the principles of the circular economy are promoted by understanding gas emissions as a source of resources and the conditioning of wastewater to be used in the generation of green hydrogen, thus avoiding the use of potable water resources. Specifically, DAM will focus on the development of a pre-treatment based on filtration processes to condition wastewater for use in the generation of green hydrogen, thus avoiding the use of potable water resources. In addition, they will support the development of techniques for capturing and storing CO2, one of the main gases generated in the different water purification processes, with a special focus on processes for obtaining synthetic fuels by reacting in contact with H2-rich streams by means of different photocatalytic processes.</p> | | | |
| PROJECT IMAGE | | | |
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| PROJECT FOCUS WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation and purification | Energy and Waste | Transverse |
| | | yes | |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>Photored contributes to the development of the catalytic transformation of CO2 into synthetic fuels and chemical products (C1, C2 or larger fuels and alcohols). Industries are expected to be able to use a new economic model that has a positive impact on society and the environment. The project aims to address high selectivity products and photocatalytic reduction of CO2 to fuels at room temperature and atmospheric pressure that still remain a scientific and technological challenge.</p> <p>The objectives that are expected to be achieved are the following:</p> <ul style="list-style-type: none"> - Preparation of materials for sequestration and separation of CO2 - Green H2 generation using water electrolysis - Synthesis and characterization of photocatalysis - Catalyst charge - Light intensity (photon light management) - Evaluation of the use of promoters to improve catalytic performance and selectivity. - Development of a pilot-scale photocatalyst | | | |
| NEEDS DETECTED TO EVOLVE | | | |
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| ECONOMIC DATA | | | |
| <p>Total budget: 669.146,75 € Company budget: 69.200 €</p> | | | |

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|  | | R&D group | |
| | | REPOSITORY OF R+D+I PROJECTS | |
| | | PERIOD 2021-2023 | |
| PROJECT | REGENERA: Research into hybrid storage technologies and predictive models to transform industries into delocalised renewable energy management points | | |
| ORGANIZATION | DEPURACIÓN DE AGUAS DEL MEDITERRÁNEO (DAM) | | |
| WEB | https://www.dam-aguas.es/portfolio-posts/regenera/ | | |
| ORGANIZATIONS PARTICIPATING IN THE PROJECT | | | |
| ACSA OBRAS E INFRAESTRUCTURAS, S.A.U., ENGIE SERVICIOS ENERGÉTICOS, S.A., HIDROQUIMIA TRACTAMENTS I QUIMICA INDUSTRIAL SLU, TYRIS AI S.L, EXOLUM SOLUTIONS S.L., H2B2 ELECTROLYSIS TECHNOLOGIES S.L., SISTEMES AVANÇATS ENERGIA SOLAR I TERMICA, SCCL | | | |
| Project start date | 01/09/2021 | Project end date | 31/12/2024 |
| DETAILED DESCRIPTION. SUMMARY OF OBJECTIVES AND PURPOSE | | | |
| <p>Research of innovative technologies to efficiently and economically store surplus renewable energy (RE) through its use in existing industrial processes for the production of renewable fuels. This use will offer flexibility to the industry for energy storage. On the one hand, P2G technologies will be investigated that allow the recovery of industrial waste and the production of renewable fuels (H2 and CH4) through the stationary storage of RE surpluses. On the other hand, an energy optimization process will be investigated to work in periods of RE surpluses or low electricity prices. This will allow: i) to reduce the cost of storing surplus RE by 33%; ii) reduce the cost of production of renewable fuels (H2 and CH4) by 35%; iii) promote the decarbonization of industries by 25%. Resulting in an increase in the competitiveness of the industrial fabric. DAM will lead the studies on i) wastewater usage for obtaining H2, ii) more sustainable materials for the development of electrolysis electrodes as well as (iii) the integration of the technology to the catalytic methanation of CO2 from biogas.</p> | | | |
| PROJECT IMAGE | | | |
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| PROJECT FOCUS WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation and purification | Energy and Waste | Transverse |
| | | yes | |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>The results that are expected to be achieved in the project are detailed below:</p> <ul style="list-style-type: none"> - Investigate three reliable, functional, robust technologies with high adaptability to delocalized use in industries for the storage of RE surpluses in the form of fuels. - Investigate solutions for the use or storage of renewable H2 - Research and develop an energy management system, based on predictive energy optimization models, suitable for integration into industrial processes to optimize energy efficiency, balance energy supply with demand and decarbonisation - Build and validate three laboratory pilots, one for each investigated P2G technology, for more than 10 months and in an industrially relevant environment (TRL5). Operation through guidelines of the new energy management models for the generation of relevant and reliable data for the validation of the REGENERA objectives and indicators - Research and develop economic models and potential implementation studies to maximize the return on investment of industries that apply decarbonization technologies, guaranteeing a return on investment of less than 15 years, using sensitivity analyzes on CO2 prices, taking into account account the extension of the national emissions market to all industries" | | | |
| NEEDS DETECTED TO EVOLVE | | | |
| ECONOMIC DATA | | | |
| Total budget: 6.610.650 € | | | |

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|  | R&D group | | |
| REPOSITORY OF R+D+I PROJECTS | | PERIOD 2021-2023 | |
| PROYECT | Drone based air pollution mapping for environmental monitoring and improvement of quality of life. SNIFFIRDRONE | | |
| ORGANIZATION | DEPURACIÓN DE AGUAS DEL MEDITERRÁNEO (DAM) | | |
| WEB | not available at the moment | | |
| ORGANIZATIONS PARTICIPATING IN THE PROJECT | | | |
| University of Barcelona, University of Lancaster, Institute for Bioengineering of Catalonia, Gas Sensing Solutions and Microsystems and Nanotechnology. SINTEF Digital | | | |
| Project start date | 01/05/2022 | Project end date | 31/07/2024 |
| DETAILED DESCRIPTION. SUMMARY OF OBJECTIVES AND PURPOSE | | | |
| <p>Air pollution is a raising global concern due to its long-term environmental and health impacts. The main sources for environmental pollution are related to a range of human activities, such as waste treatments, agriculture, traffic and industrial processing. In particular, the gas emissions of waste water treatment plants (WWTP) occasionally generates episodes of unpleasant odours that are often related to toxic gases (e.g. H₂S) that may affect the health of plant operators. Furthermore, these occasional emissions have a negative impact in the welfare of neighbouring populations. The mitigation of these episodes is very limited due to the difficulty and cost of monitoring these odours as well as the complexity of predicting when they will occur. In this project, we propose to build and demonstrate a drone-based system to monitor the air pollution emitted by WWTP to the environment. The main objectives of this project are the following. First, to develop and build a new generation multi-gas sensing system with advanced sensing capabilities for the measurement of H₂S, CH₄, CO₂, SO₂. To build this sensor, we will exploit the latest advances in infrared optoelectronics and nanotechnology. Second, to generate real-time highly dense 3D pollution maps of WWTP emissions. The high-speed measurements of the NDIR sensor (response time < 5ms) will allow the drone-base system, flying at a relative fast speed of 5m/s, to generate an unprecedented dense 3D grid with 0,25m distance between measurements. Third, to generate real time 3D odour maps of WWTP emissions that, to the best of our knowledge, has been never done before in industrial plants. The subjective perception of the odour is what represents a nuisance for the population and this has no easy correlation with the use only of highly specific gas detectors as the NDIR unit. For this reason, we will complement the NDIR unit readings with those of a custom e-nose integrated also into the drone. We will train a machine learning algorithm to predict the hedonic tone and/or the odour intensity from the e-nose and the NDIR unit readings. Fourth, it is a strong commitment of this project to bring the developed technologies to TRL 7. With this objective in mind, we will demonstrate the advanced pollution and odour monitoring capabilities of the drone-based system in a number of measurement campaigns in a WWTP. The flexibility of the system will be validated also measuring the emissions of a composting plant. The NDIR-based sensing unit will be demonstrated as well with the pollution emissions of a WWTP. As a final note, highlight that the route to the market of the instruments developed in this project (drone based system and NDIR sensing unit) will be highly facilitated by the industrial partners of our consortium DAM and GSS.</p> | | | |
| PROJECT IMAGE | | | |
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| PROJECT FOCUS WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation and purification | Energy and Waste | Transverse |
| | | yes | |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>It is expected to achieve 6 objectives during the development of the project:</p> <ol style="list-style-type: none"> 1. Achieve high performance in NDIR multigas sensor unit 2. Carry out a demonstration in a relevant environment of the NDIR multigas unit 3. Carry out a 3D mapping of the WWTP emissions 4. Make an estimate of the perception of odor from the emissions of a WWTP 5. Perform a 3D mapping of odor perceptions in composting plants 6. Carry out a demonstration in a relevant environment on the drone-based system | | | |
| NEEDS DETECTED TO EVOLVE | | | |
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| ECONOMIC DATA | | | |
| <p>Total budget: 1.976.297,02 € Company budget:177.474,29 €</p> | | | |

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|  | R&D group | | |
| | REPOSITORY OF R+D+I PROJECTS | | PERIOD 2021-2023 |
| PROYECT | Research and development of new advanced applications of compost generated from sewage sludge in WWTP. Compost-up | | |
| ORGANIZATION | DEPURACIÓN DE AGUAS DEL MEDITERRÁNEO (DAM) | | |
| WEB | https://www.dam-aguas.es/portfolio-posts/compost-up/ | | |
| ORGANIZATIONS PARTICIPATING IN THE PROJECT | | | |
| ITENE | | | |
| Project start date | 01/09/2021 | Project end date | 01/08/2023 |
| DETAILED DESCRIPTION. SUMMARY OF OBJECTIVES AND PURPOSE | | | |
| <p>The project focuses on the development and research of advanced applications for the use of compost from sewage sludge, enriching it with microbial populations through the bioaugmentation process. To this end, biofilters will be generated to mitigate odoriferous compound emissions (VOCs, NH₄ and H₂S) from sewage sludge recovery plants and organic waste, thus improving and enriching the agronomic properties of said compost and increasing the biofertilizing and biostimulant potential of the same.</p> <p>The development of the biofilter will be carried out through beds that use compost enriched with microbial consortiums with a high potential for degradation into volatile compounds (VOCs), NH₃ and H₂S (which are the ones that mainly cause bad odors in wastewater treatment plants from wastewater treatment plants and composting plants) and enrichment of the agronomic potential of the compost used, in order to establish a new management and recovery process for these bio-waste in a more efficient, profitable and sustainable way.</p> | | | |
| PROJECT IMAGE | | | |
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| PROJECT FOCUS WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation and purification | Energy and Waste | Transverse |
| | | yes | |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>* Reduction of environmental impacts due to new developments. With the consequent reduction in the carbon footprint and reduction in greenhouse gas emissions. As well as its application to other industrial sectors.</p> <p>* Savings in waste management, increase in the useful life of current filtration systems and creation of new markets and economic opportunities.</p> <p>* Advanced recovery of sewage sludge allowing to close the circle and creating high added value products with biofertilizer/biostimulant capacity.</p> | | | |
| NEEDS DETECTED TO EVOLVE | | | |
| ECONOMIC DATA | | | |
| Total budget: : 180.017,30 € | | | |

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|  | | R&D group | |
| REPOSITORY OF R+D+I PROJECTS | | PERIOD 2021-2023 | |
| PROYECT | Renewable bio-hydrogen production technologies from lignocellulosic waste and sewage sludge co-fermentation | | |
| ORGANIZATION | DEPURACIÓN DE AGUAS DEL MEDITERRÁNEO (DAM) | | |
| WEB | https://www.dam-aguas.es/portfolio-posts/life-reptes/ | | |
| ORGANIZATIONS PARTICIPATING IN THE PROJECT | | | |
| AINIA (AINIA), GENIA BIOENERGY SL (GENIA) y CONSORCI DE LA RIBERA (CRIB) | | | |
| Project start date | 01/08/2022 | Project end date | 31/01/2026 |
| DETAILED DESCRIPTION. SUMMARY OF OBJECTIVES AND PURPOSE | | | |
| <p>The LIFE REPTES project «Renewable bio-hydrogen production technologies from lignocellulosic waste and sewage sludge co-fermentation» (GA 101074329) aims to reduce the massive emission of greenhouse gases (GHG) and particulate matter from burning rice straw, which affects the quality of life of nearby populations, by implementing a new circular model that integrates the production of biohydrogen from pre-treated lignocellulosic by-products and WWTP sludge through a dark fermentation process.</p> <p>In the Albufera Natural Park (Spain), between 5 and 6 tonnes of straw are produced annually from each of the 14,700 hectares under cultivation. The management of this bio-waste entails a high economic cost for farmers when techniques other than burning or burying are used. The Albufera park accounts for around 20% of the rice straw at national level, with Spain being the second largest rice producing country in the EU.</p> <p>The new circular model proposed by LIFE REPTES allows the rice straw, together with sewage sludge, to be used for the production of renewable gaseous biofuels (biohydrogen and biogas) thanks to the application of a combination of technologies.</p> | | | |
| PROJECT IMAGE | | | |
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| PROJECT FOCUS WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation and purification | Energy and Waste | Transverse |
| | | yes | |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <ul style="list-style-type: none"> * To design, construct and implement a demonstration plant at Pinedo WWTP including 3 different modules: Pre- treatment module for rice straw by bioextrusion of previously ensiled rice straw, Dark fermentation reactor and Pilot anaerobic digester module for the demonstration of the enhancement of the biogas generation by using the fermented steam as a co-substrate. * To provide new solutions to the problem of the removal of rice straw from the fields based in a cost effective and environmentally efficient process that can be transferred to the treatment with other lignocellulosic residues. * To provide local authorities with new tools for reaching a climate neutral economy by increasing the generation and use of renewable energy and improving the energy efficiency. * To promote the use of green hydrogen in the agricultural sector, while encouraging the sustainable management of bio-waste and the social acceptance of new Circular models based on waste valorisation. * Highlight the transferability of the LIFE REPTES project to other locations and/or sectors. | | | |
| NEEDS DETECTED TO EVOLVE | | | |
| | | | |
| ECONOMIC DATA | | | |
| Total budget: 1.159.880,00 € | | | |

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|  | R&D group | | |
| | REPOSITORY OF R+D+I PROJECTS | | PERIOD 2021-2023 |
| PROJECT | Biofiltration of odoriferous emissions in WWTPs through the reuse of byproducts of the integral water cycle | | |
| ORGANIZATION | DEPURACIÓN DE AGUAS DEL MEDITERRÁNEO (DAM) | | |
| WEB | https://www.dam-aguas.es/portfolio-posts/biofiltration/ | | |
| ORGANIZATIONS PARTICIPATING IN THE PROJECT | | | |
| UNIVERSIDAD DE VALLADOLID | | | |
| Project start date | 01/09/2022 | Project end date | 31/05/2025 |
| DETAILED DESCRIPTION. SUMMARY OF OBJECTIVES AND PURPOSE | | | |
| <p>The correct management of odors in wastewater treatment plants (WWTPs) is a growing concern for facility managers, as well as for public administrations, which must ensure that the social and environmental impact of these facilities is the lowest possible. Bad odors are often a source of complaints from both plant workers and neighbors, while posing a serious occupational risk and a source of corrosion of the main WWTP equipment. Currently, a clear trend is beginning to be observed in abandoning odor treatment systems in WWTPs based on towers of chemical scrubbers and moving towards a widespread implementation of systems based on biological processes such as biofilters or trickling biofilters.</p> <p>This project proposes an innovative model based on the circular economy within the integral water cycle that will allow the conversion of chemical scrubber towers to biotrickling-type systems with a moderate investment, using reused and recycled filling materials. The project also aims to develop new, more sustainable bioreactor configurations for the deodorization of WWTPs, waste management facilities and certain industries (e.g. paper mills, agri-food industries).</p> <p>In addition to the reuse of chemical towers through their reconversion and adaptation to biotrickling systems, this project will investigate the use of recycled plastic filling materials collected in the WWTPs themselves (in biotricklings) and compost generated by DAM from supplemented WWTP sludge, with iron-rich sludge derived from water purification or phosphorus precipitation (in biofilters). Within the context of continuous innovation that underlies all DAM operations, this project also proposes the development of innovative bioreactor configurations with the objective of improve deodorization efficiency and reduce the operating costs of odor treatment in WWTPs.</p> | | | |
| PROJECT IMAGE | | | |
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| PROJECT FOCUS WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation and purification | Energy and Waste | Transverse |
| | | yes | |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <ul style="list-style-type: none"> * Reduction of the odor impact of your WWTPs and waste recovery plants in relation to potentially dangerous odorous compounds, such as hydrogen sulfide (H₂S), ammonia (NH₃) or volatile organic compounds (VOCs), with lower operating costs than those existing on the market. * Reduction of corrosion of the metal and concrete parts of the facilities (grit channels and float area) due to the action of odoriferous compounds. Implementation and use of more environmentally friendly technologies (biological technologies) and in line with the circular economy philosophy applied in the context of comprehensive water management. * Elimination of the consumption and handling of highly dangerous chemical reagents in deodorization towers (e.g. chemical towers). * Reduction of maintenance needs of the deodorization system (e.g. regeneration and replacement of active carbons, increase in the useful life of biofilter filling materials and biotricklings). * Reduction of risks to the safety and health of workers derived from the emission of odoriferous compounds, such as hydrogen sulfide. * Reduce the energy consumption of deodorization systems by confining the treatment areas and automating their operation depending on the ambient levels of hydrogen sulfide (e.g. considering input loads and carrying out scheduled stops). * Development of own filling materials generated from byproducts of the integral water cycle, generating the possibility of a new line of business for the company. | | | |
| NEEDS DETECTED TO EVOLVE | | | |
| ECONOMIC DATA | | | |
| Total budget: 529.681,00€ | | | |

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|  | R&D group | | |
| | REPOSITORY OF R+D+I PROJECTS | | PERIOD 2021-2023 |
| PROJECT | Study of the generation, prediction and minimization of atmospheric pollutants in sanitation systems using artificial intelligence tools. | | |
| ORGANIZATION | DEPURACIÓN DE AGUAS DEL MEDITERRÁNEO (DAM) | | |
| WEB | https://www.dam-aguas.es/portfolio-posts/atmosphair/ | | |
| ORGANIZATIONS PARTICIPATING IN THE PROJECT | | | |
| ACSA, Obras e Infraestructuras, S.A.U, SORIGUE, AERIS Tecnologías Ambientales S.L, BGEO OPEN GIS S.L y SPIN S.A. | | | |
| Project start date | 01/07/2022 | Project end date | 30/04/2023 |
| DETAILED DESCRIPTION. SUMMARY OF OBJECTIVES AND PURPOSE | | | |
| <p>Air pollution is a growing global concern due to its long-term environmental and health impacts. The main sources of environmental pollution are related to a series of human activities, such as waste treatment, agriculture, traffic and industrial processing.</p> <p>Monitoring emissions into the atmosphere is a key element to prevent and reduce pollution from industrial facilities, to ensure a high level of environmental protection, and to minimize the impact of odor on the surrounding population. Industrial activities such as waste management are sources of greenhouse gases, dangerous air pollutants and unpleasant odors.</p> <p>The project seeks to investigate the generation and emission of these odoriferous gases (GO) and greenhouse gases (GHG) in sanitation networks and wastewater treatment plants, to subsequently design digital tools based on artificial intelligence (AI) with the objective to predict the production of said gases. Likewise, the project also contemplates the possibility of optimizing and defining novel strategies for minimizing or eliminating these atmospheric pollutants through the use of biologically produced oxidants.</p> <p>The atmosphAir project seeks to generate knowledge and lay the foundations for the development of a future digital platform that allows real-time control and future prediction of the generation and emission of atmospheric pollutants, which can be transferred to other pollution systems. sanitation in future phases of the project.</p> <p>This line of work is fully aligned with the innovation and R&D plans at the European, national and regional level and contribution to the transition towards climate neutrality, as it aims to reduce and eliminate greenhouse gases generated in this type of plants that have a direct relationship with climate change and the increase in global temperatures.</p> | | | |
| PROJECT IMAGE | | | |
|  | | | |
| PROJECT FOCUS WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation and purification | Energy and Waste | Transverse |
| | | SI | |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <ul style="list-style-type: none"> * Research and identification, qualitatively and quantitatively, of polluting gases emitted in sanitation systems and, in particular, in the Torredembarra WWTP and associated network. Specifically, greenhouse gases and odor-generating gases (hereinafter GO) will be investigated. * Research and identification of the critical variables involved in the generation and emission of GHG and GO and the interaction between them. * Investigation and identification of the main processes and sources of polluting gas emissions (GO and GHG). * Identification of sensors and optimal means for monitoring polluting emissions. * Research and validation of optimal polluting gas prediction algorithms based on machine learning, ML and Artificial Intelligence. * Research and validation of a novel biological process to reduce the generation and emission of H2S at critical points in the WWTP. | | | |
| NEEDS DETECTED TO EVOLVE | | | |
| ECONOMIC DATA | | | |
| Total budget: 305.816,00€ | | | |

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|  | R&D group | | |
| | REPOSITORY OF R+D+I PROJECTS | | PERIOD 2021-2023 |
| PROJECT | Hydrogen production from purified wastewater through electrochemical treatments (RES2H2) | | |
| ORGANIZATION | DEPURACIÓN DE AGUAS DEL MEDITERRÁNEO (DAM) | | |
| WEB | https://www.dam-aguas.es/portfolio-posts/res2h2/ | | |
| ORGANIZATIONS PARTICIPATING IN THE PROJECT | | | |
| Fundación Instituto de Ciencias Fotónicas (ICFO), APRIA System, SIXSENSE y ICSCO | | | |
| Project start date | 01/07/2023 | Project end date | 31/07/2026 |
| DETAILED DESCRIPTION. SUMMARY OF OBJECTIVES AND PURPOSE | | | |
| <p>Water is the main ingredient in the production of H₂ based on electrolysis. Current electrolysis systems require the use of highly purified water flows, with a minimum presence of ionic content. The presence of contaminants can damage the electrolyzer systems, deteriorating their membranes and deactivating the anodic and cathodic catalysts. Currently, electrolyzer plants require special units dedicated to water purification until reaching conductivities of the order of $\mu\text{S}/\text{cm}$.</p> <p>The development of electrolyzers that obviate the need for additional modules for high water purification treatments would have a strong impact on the cost of the system at the plant balance level and therefore the H₂ value chain. On the one hand, allowing the implementation of H₂ generation systems in different non-specialized environments at different scales required depending on the application: for example, in agricultural facilities directly using irrigation water, with less complexity, in a versatile way. On the other hand, this would allow the reduction of both the plant cost (CAPEX) and the operation cost (OPEX), by obviating the need to obtain and treat highly purified water.</p> <p>Under this context, RES2H2 pursues the development of water electrolyzers based on anion exchange systems (AEM) that, unlike standard systems, do not depend on highly purified and deionized water, yet offer energy efficiency, H₂ productivity, and stability, comparable with standard systems.</p> | | | |
| PROJECT IMAGE | | | |
|  <p>The diagram illustrates the RES2H2 process. It starts with 'aguas residuales' (wastewater) entering an electrolyzer system. The system consists of a cathode, a membrane, and an anode. At the anode, 'agua tratada con procesos de electro-oxidación' (water treated with electro-oxidation processes) is produced, containing contaminants like C_2O_4, NO_3, and SO_4. This water is then used for 'agua de potencial uso' (water of potential use). The process also involves 'análisis en línea' (online analysis) and 'tanque ancilto' (ancillary tank). The electrolyzer system is labeled 'resAEM' and shows 'H₂' production at the cathode and 'Cl₂' at the anode. The process aims for 'eficiencia energética ↑' (increased energy efficiency) and 'CAPEX ↓' and 'OPEX ↓' (decreased capital and operating expenses). The final output is 'agua de potencial uso' which has a lower 'impacto ambiental ↓' (environmental impact). Logos for ICFO, APRIA, and sixsenso are also present.</p> | | | |
| PROJECT FOCUS WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation and purification | Energy and Waste | Transverse |
| | | Y | |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <ul style="list-style-type: none"> * Analysis and comparison of the operation and efficiency of AEM electrolyzers of power (1-10 kW) and real operation with ideal water flows analyzing dissolved and suspended content, ionic, inorganic, microbiological and organic content. * Analysis and comparison of the operation and efficiency of AEM electrolyzers of power (1-10 kW) and real operation with water flows of different levels of purification ionic, inorganic, microbiological and organic content * Characterization of the main failure modes, mean time between failures, and degradation mechanisms of AEM systems operating under the aforementioned conditions. * Development of AEM systems with improved catalysts, membranes, and electrolytes that allow efficient operation in environments and water flows with different levels of purification. * Development of AEM systems that maximize the purification of wastewater with H₂ cogeneration. | | | |
| NEEDS DETECTED TO EVOLVE | | | |
| ECONOMIC DATA | | | |
| <p>Presupuesto total proyecto: 1.632.338,20 €</p> <p>Presupuesto de la compañía: 121.620,00€</p> | | | |



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|  | R&D group | | |
| | REPOSITORY OF R+D+I PROJECTS | | PERIOD 2021-2023 |
| PROJECT | Investigation of predictive models for monitoring atmospheric pollutants and deminimization strategies in sanitation systems | | |
| ORGANIZATION | DEPURACIÓN DE AGUAS DEL MEDITERRÁNEO (DAM) | | |
| WEB | | | |
| ORGANIZATIONS PARTICIPATING IN THE PROJECT | | | |
| ACSA, Obras e Infraestructuras, S.A.U, SORIGUE, AERIS Tecnologías Ambientales S.L, BGEO OPEN GIS S.L y SPIN S.A. | | | |
| Project start date | 01/05/2023 | Project end date | 30/04/2024 |
| DETAILED DESCRIPTION. SUMMARY OF OBJECTIVES AND PURPOSE | | | |
| <p>The atmosphAir 2.0 project seeks to expand knowledge and adjust the AI tools obtained in phase 1, expanding the databases for different conditions in order to develop a future resilient digital platform. This will allow real-time control and prediction of the generation, emission and dispersion of atmospheric pollutants (GHG and GO) in the Torredembarra and Montornés WWTPs in all possible operating conditions that may occur during the year, and would also allow their replicability to other sanitation systems (Phase 3) In this sense, the general objectives of the project will be the following:</p> <ul style="list-style-type: none"> * Work with the artificial intelligence tools developed in phase 1, expanding the database obtained to adjust the prediction of N2O concentrations in the Montornés WWTP. * Adjust the algorithms obtained to improve the prediction of H2S concentrations taking into account all seasonal variations, also expanding the study of NH3, one of the most important gases in relation to odors in treatment plants, and thus evaluate the impact on environment through dispersion models applied to the deodorization chimneys of the facilities. * Achieve an experimental graphical interface on a web platform that allows viewing the results of the algorithm depending on the input parameters. * Test and validate the proof of concept of the use of biologically produced and in-situ oxidants for odor mitigation based on the results obtained in the previous phase and the feasibility of the proposed technology will be studied to be implemented in other treatment plants. | | | |
| PROJECT IMAGE | | | |
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| PROJECT FOCUS WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation and purification | Energy and Waste | Transverse |
| | | SI | |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <ul style="list-style-type: none"> * Investigation and identification, qualitatively and quantitatively, of the polluting gases emitted in sanitation systems and, in particular, in the Torredembarra WWTP and associated network, as well as in the Montornés WWTP. Specifically, greenhouse gases and odor-generating gases. * Expand the analytical campaign carried out in phase 1 with the variables and measurement points selected in phase 1. * Fine-tune AI tools with expanded N2O database * Improve predictions of odoriferous gases and understand their impact on the environment. * Generate a graphical interface of the model to simply visualize its results. * Validate the proof of concept for odor mitigation at critical points in WWTPs through the use of biologically produced oxidants. | | | |
| NEEDS DETECTED TO EVOLVE | | | |
| ECONOMIC DATA | | | |
| Total budget: 250.640,00€ | | | |

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|  | Grupo de I+D+i | | |
| | REPOSITORIO DE PROYECTOS I+D+I | | PERIODO 2021-2023 |
| PROYECTO | All-To-Gas. Biomasa y residuos como precursores de producción de hidrógeno y metano en un nuevo escenario de transición energética | | |
| ORGANIZACIÓN | EMASESA | | |
| WEB | https://www.emasesa.com | | |
| ORGANIZACIONES PARTICIPANTES EN EL PROYECTO | | | |
| <p>Centro Tecnológico CARTIF Empresa Metropolitana de Abastecimiento y Saneamiento de Aguas de Sevilla, S.A. (EMASESA) Ciemat (Centro de Investigaciones Energéticas, Medioambientales y Tecnológicas) Universidad de Sevilla (US) Universidad de Valladolid (UVa)</p> | | | |
| Fecha de inicio del proyecto | 01/09/2022 | Fecha de fin del proyecto | 31/08/2025 |
| DESCRIPCIÓN DETALLADA. RESUMEN DE OBJETIVOS Y FINALIDAD | | | |
| <p>El proyecto consiste en el desarrollo de un proceso técnica y económicamente viable y sostenible mediante la integración de tecnologías (HTC, pirogasificación, metanación biológica, reformado) para la conversión de biomasa y residuos, tanto secos como con un alto contenido en humedad, en metano verde e hidrógeno verde.</p> <p>De esta forma se fomentará el uso de estos gases renovables en la industria, al facilitar su disponibilidad en el punto de demanda (instalación industrial), con producción insitu apoyada por la red de gas cuando sea necesario</p> | | | |
| IMAGEN DEL PROYECTO | | | |
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| ENFOQUE DEL PROYECTO DENTRO DEL CICLO DEL AGUA | | | |
| Abastecimiento y Distribución | Saneamiento y Depuración | Energía y Residuos | Transversales |
| NO | NO | SI | NO |
| RESULTADOS ALCANZADOS O PREVISTOS | | | |
| <ul style="list-style-type: none"> • Desarrollo del proceso de pirogasificación para la valorización posterior del Syngas Biooil y Biochar. • Desarrollo del proceso HTC para la valorización de residuos húmedos. • Enriquecimiento de comunidades metanogénicas anaerobias de alta afinidad por el H₂, CO₂ y CO. • Optimización del reformado de metano mediante el empleo de catalizadores. • Optimización de un sistema de limpieza del gas de síntesis en los procesos de pirogasificación y HTC. | | | |
| NECESIDADES DETECTADAS PARA EVOLUCIONAR | | | |
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| DATOS ECONÓMICOS | | | |
| <p>Presupuesto total: 950.110,67 €. Presupuesto EMASESA: 107.500,00 €. Financiado parcialmente por la Orden CIN/533/2022, de 6 de junio, para la concesión de ayudas públicas a proyectos en líneas estratégicas, del Plan Estatal de Investigación Científica, Técnica y de Innovación 2021-2023, en el marco del Plan de Recuperación, Transformación y Resiliencia y la convocatoria correspondiente al año 2022</p> | | | |

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|  | Grupo de I+D+i | | |
| | REPOSITORIO DE PROYECTOS I+D+I | | PERIODO 2021-2023 |
| PROYECTO | Sistema de inspección en espacios confinados mediante el uso de UAS (IDRON) | | |
| ORGANIZACIÓN | EMASESA | | |
| WEB | https://www.emasesa.com | | |
| ORGANIZACIONES PARTICIPANTES EN EL PROYECTO | | | |
| EMASESA, ELIMCO AEROSPACE, GRUPO DE ROBÓTICA, VISIÓN Y CONTROL DE LA UNIVERSIDAD DE SEVILLA, CENTRO AVANZADO DE TECNOLOGÍAS AEROSPACIALES. | | | |
| Fecha de inicio del proyecto | 01/06/2018 | Fecha de fin del proyecto | 31/03/2021 |
| DESCRIPCIÓN DETALLADA. RESUMEN DE OBJETIVOS Y FINALIDAD | | | |
| <p>El proyecto tiene como objetivo desarrollar un sistema aéreo no tripulado (UAS) que permita la realización de las inspecciones en espacios confinados, sin la necesidad de introducción del personal en dichos espacios, con la consiguiente reducción de los riesgos laborales asociados a este tipo de inspección y el aumento de productividad.</p> | | | |
| IMAGEN DEL PROYECTO | | | |
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| ENFOQUE DEL PROYECTO DENTRO DEL CICLO DEL AGUA | | | |
| Abastecimiento y Distribución | Saneamiento y Depuración | Energía y Residuos | Transversales |
| NO | SI | NO | NO |
| RESULTADOS ALCANZADOS O PREVISTOS | | | |
| <p>El proyecto pretende obtener como resultado un sistema de inspección basado en el uso de un dron, con un sistema de navegación semiautónomo capaz de realizar las funciones para las cuales se había diseñado. Control de distancia a paredes y detección de obstáculos a través de sensores lidar. con un interfaz de misión que permite su control desde el exterior.</p> | | | |
| NECESIDADES DETECTADAS PARA EVOLUCIONAR | | | |
| <p></p> | | | |
| DATOS ECONÓMICOS | | | |
| Presupuesto total: 955,060,05€. Presupuesto EMASESA: 182,477,10€. Financiado parcialmente por Ministerio de Ciencia, Innovación y Universidades. | | | |

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|  | Grupo de I+D+i | | |
| | REPOSITORIO DE PROYECTOS I+D+I | | PERIODO 2021-2023 |
| PROYECTO | MITLOP: GESTIÓN INTEGRAL DE LODOS Y RESIDUOS ORGÁNICOS | | |
| ORGANIZACIÓN | EMASESA | | |
| WEB | https://mitlop.com/ | | |
| ORGANIZACIONES PARTICIPANTES EN EL PROYECTO | | | |
| EMASESA | | | |
| Fecha de inicio del proyecto | 01/12/2020 | Fecha de fin del proyecto | 31/12/2023 |
| DESCRIPCIÓN DETALLADA. RESUMEN DE OBJETIVOS Y FINALIDAD | | | |
| <p>El objetivo del proyecto es el desarrollo e implantación, en EMASESA, de un nuevo modelo integrado de gestión de los lodos procedentes de la depuración de aguas residuales urbanas, los resultantes de la potabilización de agua y de otros residuos orgánicos no peligrosos.</p> | | | |
| IMAGEN DEL PROYECTO | | | |
|  | | | |
| ENFOQUE DEL PROYECTO DENTRO DEL CICLO DEL AGUA | | | |
| Abastecimiento y Distribución | Saneamiento y Depuración | Energía y Residuos | Transversales |
| NO | SI | SI | NO |
| RESULTADOS ALCANZADOS O PREVISTOS | | | |
| <p>Implementar un sistema de gestión de lodos de depuración nuevo o significativamente mejorado. Este nuevo sistema de gestión de lodos de depuración debe ser adecuado para el largo plazo, sostenible en sus tres dimensiones (social, económica y medioambiental) y debe facilitar un correcto cierre el ciclo urbano del agua.</p> <p>Preferiblemente, el nuevo sistema debe estar basado en circuitos de economía circular que, conforme a recogido en el Borrador de Estrategia Española de Economía Circular, permitan crear valor en el entorno a partir de los residuos generados por el servicio público de abastecimiento y depuración de agua a la población.</p> | | | |
| NECESIDADES DETECTADAS PARA EVOLUCIONAR | | | |
| <p> </p> | | | |
| DATOS ECONÓMICOS | | | |
| Presupuesto Total: 18.000.000€. Financiado parcialmente por Ministerio de Ciencia, Innovación y Universidades. | | | |

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|  | Grupo de I+D+i | | |
| | REPOSITORIO DE PROYECTOS I+D+I | | PERIODO 2021-2023 |
| PROYECTO | CITYLOOPS. CLOSING THE LOOP FOR URBAN MATERIAL FLOWS | | |
| ORGANIZACIÓN | EMASESA | | |
| WEB | https://cityloops.eu/ | | |
| ORGANIZACIONES PARTICIPANTES EN EL PROYECTO | | | |
| EMASESA y otras 28 organizaciones europeas procedentes de 9 países. Proyecto liderado por ICLEI-Local Governments for Sustainability | | | |
| Fecha de inicio del proyecto | 01/11/2019 | Fecha de fin del proyecto | 30/09/2023 |
| DESCRIPCIÓN DETALLADA. RESUMEN DE OBJETIVOS Y FINALIDAD | | | |
| <p>El proyecto Cityloops tiene como objetivos específicos, los siguientes:</p> <ul style="list-style-type: none"> - Desarrollar una serie de procedimientos, enfoques y herramientas de libre acceso para facilitar e integrar el concepto de economía circular en los procesos de planificación y toma de decisiones para los residuos orgánicos y los RCD. - Demostrar y validación de estos enfoques innovadores en unos en seis pequeñas/medianas ciudades europeas, bajo una continua monitorización y optimización en términos de reducción del uso de materiales y generación de residuos, consumo de recursos naturales, incremento de la capacidad regenerativa en términos de creación de recursos naturales y materiales. - Desarrollar una metodología de evaluación de la circularidad urbana, basada el Análisis de los flujos de materiales y stocks y mapeado de los grupos de interés. - Establecimiento de indicadores económicos y ambientales para la medición de la circularidad de las ciudades. - Explotar el potencial de la compra pública para apoyar el desarrollo de los procesos establecidos en el proyecto. - Fomentar el escalado y replicado de las medidas, herramientas y plataforma a otras ciudades y regiones europeas | | | |
| IMAGEN DEL PROYECTO | | | |
|  | | | |
| ENFOQUE DEL PROYECTO DENTRO DEL CICLO DEL AGUA | | | |
| Abastecimiento y Distribución | Saneamiento y Depuración | Energía y Residuos | Transversales |
| NO | NO | SI | NO |
| RESULTADOS ALCANZADOS O PREVISTOS | | | |
| Desarrollar herramientas y procesos para la integración del concepto de economía circular en 5 ciudades europeas. En la ciudad de Sevilla se trabajará en el flujo de dos residuos, los RCD y los residuos orgánicos procedentes de las viviendas. | | | |
| NECESIDADES DETECTADAS PARA EVOLUCIONAR | | | |
| | | | |
| DATOS ECONÓMICOS | | | |
| Presupuesto total: 10.618.296,25. Presupuesto EMASESA: 169.262,50€. Financiado parcialmente por programa H2020 | | | |

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|  | Grupo de I+D+i | | |
| | REPOSITORIO DE PROYECTOS I+D+I | | PERIODO 2021-2023 |
| PROYECTO | LIFE-WATERCOOL: WATER EFFICIENT SYSTEMIC CONCEPT FOR THE CLIMATE CHANGE ADAPTATION IN URBAN AREAS | | |
| ORGANIZACIÓN | EMASESA | | |
| WEB | https://www.lifewatercool.com | | |
| ORGANIZACIONES PARTICIPANTES EN EL PROYECTO | | | |
| EMASESA, SDOS, AGENCIA EFE (EFE VERDE), AYUNTAMIENTO DE SEVILLA Y UNIVERSIDAD DE SEVILLA. | | | |
| Fecha de inicio del proyecto | 01/06/2019 | Fecha de fin del proyecto | 29/12/2024 |
| DESCRIPCIÓN DETALLADA. RESUMEN DE OBJETIVOS Y FINALIDAD | | | |
| <p>El objetivo genérico es demostrar la eficiencia de un concepto integrado y sistémico de gestión urbana del agua con efectos de amortiguación relevantes a los eventos estocásticos, mejorando la calidad de vida de los ciudadanos. El sistema actual de agua urbana se reforzará con una matriz estructural de elementos para acumular, drenar e interconectar el agua no tratada (pluviales y fluviales), para ser testado a pequeña escala (calle).</p> | | | |
| IMAGEN DEL PROYECTO | | | |
|  | | | |
| ENFOQUE DEL PROYECTO DENTRO DEL CICLO DEL AGUA | | | |
| Abastecimiento y Distribución | Saneamiento y Depuración | Energía y Residuos | Transversales |
| SI | SI | SI | SI |
| RESULTADOS ALCANZADOS O PREVISTOS | | | |
| <p>Acelerar la transformación urbana, inspirada en el uso de la ciudad como una dinámica social, mejorándola e involucrando la transformación pública, privada y ciudadana en un sistema de gobierno revolucionario. Watercoolj construirá un modelo de gobierno y participación pioneros en la mejora del entorno urbano basado en el legado cultural, de manera sostenible, rentable y eficiente y con la participación de todos en la adaptación al cambio climático.</p> | | | |
| NECESIDADES DETECTADAS PARA EVOLUCIONAR | | | |
| <p> </p> | | | |
| DATOS ECONÓMICOS | | | |
| Presupuesto total: 3.779.705€. Financiado parcialmente por programa LIFE | | | |

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|--|--|---------------------------|-------------------|
|  | Grupo de I+D+i | | |
| | REPOSITORIO DE PROYECTOS I+D+I | | PERIODO 2021-2023 |
| PROYECTO | CARTUJAQANAT: RECUPERACIÓN DE LA VIDA EN LA CALLE EN UN MUNDO CLIMATOLÓGICAMENTE CAMBIANTE | | |
| ORGANIZACIÓN | EMASESA | | |
| WEB | cartujaqanat.com | | |
| ORGANIZACIONES PARTICIPANTES EN EL PROYECTO | | | |
| EMASESA, Ayuntamiento de Sevilla, Gerencia de Urbanismo y Medio Ambiente de Sevilla, Universidad de Sevilla, Instituto Eduardo Torroja (CSIC), PCT Cartuja, Centro Tecnológico Innovarcilla. | | | |
| Fecha de inicio del proyecto | 01/11/2018 | Fecha de fin del proyecto | 01/10/2021 |
| DESCRIPCIÓN DETALLADA. RESUMEN DE OBJETIVOS Y FINALIDAD | | | |
| <p>Acelerar la transformación urbana, usando la urbe como dinamizador social, merjorándola, logrando una temperatura de confort para la vida en el exterior e involucrando en esa transformación a agentes públicos y privados así como al ciudadano en un revolucionario Sistema de Gobernanza.</p> | | | |
| IMAGEN DEL PROYECTO | | | |
|  | | | |
| ENFOQUE DEL PROYECTO DENTRO DEL CICLO DEL AGUA | | | |
| Abastecimiento y Distribución | Saneamiento y Depuración | Energía y Residuos | Transversales |
| SI | SI | SI | SI |
| RESULTADOS ALCANZADOS O PREVISTOS | | | |
| <p>Desarrollar un ecosistema urbano en dos fases, un piloto donde se modificará la misma estructura de la calle para facilitar un entorno de demostración en la combinación de diferentes enfoques tecnológicos y un nuevo modelo de gobernanza público-privada para la promoción y expansión del nuevo ecosistema a lo largo del tejido de la ciudad. Este ecosistema se basará en 3 pilares:</p> <ul style="list-style-type: none"> -Restauración de instalaciones (galerías bioclimática) -Galería subterránea (zoco) -Anfiteatro bioclimático <p>Los elementos integrados son: Luces frías naturales, Cubiertas solares fijas y móviles, Superficies frías, Grado de confinamiento, Impulsión del aire a través de medios naturales e híbridos, -Uso de la porosidad controlada de cerámica</p> | | | |
| NECESIDADES DETECTADAS PARA EVOLUCIONAR | | | |
| <p> </p> | | | |
| DATOS ECONÓMICOS | | | |
| Presupuesto total: 4.998.884,95€. Presupuesto EMASESA: 2.978.947,15€. Financiado parcialmente por programa UIA | | | |

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|---|---|---------------------------|-------------------|
|  | Grupo de I+D+i | | |
| | REPOSITORIO DE PROYECTOS I+D+I | | PERIODO 2021-2023 |
| PROYECTO | THERM2. HIDRÓLISIS TÉRMICA&DIGESTIÓN TERMÓFILA | | |
| ORGANIZACIÓN | EMASESA | | |
| WEB | https://www.emasesa.com | | |
| ORGANIZACIONES PARTICIPANTES EN EL PROYECTO | | | |
| Empresa Metropolitana de Abastecimiento y Saneamiento de Aguas de Sevilla, S.A. (EMASESA) FACSA (HYDRENS) Universidad de Valladolid (UVa) Universidad de Sevilla (US) TECH4+ | | | |
| Fecha de inicio del proyecto | 01/10/2022 | Fecha de fin del proyecto | 30/09/2025 |
| DESCRIPCIÓN DETALLADA. RESUMEN DE OBJETIVOS Y FINALIDAD | | | |
| <p>Objetivo general: Identificar la configuración óptima de digestión anaerobia avanzada en base a datos experimentales que ahora mismo no existen de configuraciones innovadoras de Digestión anaerobia Mesófila+ Hidrólisis térmica + Digestión Anaerobia Termófila, con el objetivo principal de mejora nuestra eficiencia energética y avanzar en el desarrollo de la economía circular</p> <p>Beneficios esperados: Maximizar la producción de biogás Reducción de costes de operación, en particular energéticos Caracterizar reológicamente los lodos tratados mediante digestión anaerobia para aumentar la eficiencia del proceso Estudiar la viabilidad de la hidrólisis térmica como método de destrucción de contaminantes emergentes Mejorar las propiedades agronómicas del biosólido, mediante la higienización del lodo. Analizar la posibilidad de adición de cosustratos en procesos de digestión anaerobia avanzada</p> | | | |
| IMAGEN DEL PROYECTO | | | |
|  | | | |
| ENFOQUE DEL PROYECTO DENTRO DEL CICLO DEL AGUA | | | |
| Abastecimiento y Distribución | Saneamiento y Depuración | Energía y Residuos | Transversales |
| NO | SI | SI | NO |
| RESULTADOS ALCANZADOS O PREVISTOS | | | |
| Incremento de la producción de biogás - Disminución de la producción de lodos - Incremento de la deshidratabilidad de lodo final - Disminución del consumo energético del proceso de agitación de la digestión anaerobia - Reducción de los costes de operación - Asegurar la higienización del lodo final, obteniéndose un producto final que asegure el cumplimiento de los requisitos normativos. | | | |
| NECESIDADES DETECTADAS PARA EVOLUCIONAR | | | |
| DATOS ECONÓMICOS Presupuesto total: 1.254.730,39 €. Presupuesto EMASESA: 489.532,40€. Financiado parcialmente convocatoria CPP-2021 del Ministerio de Ciencia e Innovación | | | |

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|---|---|---------------------------|-------------------|
|  | Grupo de I+D+i | | |
| | REPOSITORIO DE PROYECTOS I+D+i | | PERIODO 2021-2023 |
| PROYECTO | mobiMET: Nuevas estrategias para la producción sostenible de agua regenerada mediante humedales electroactivos modulares: METland | | |
| ORGANIZACIÓN | EMASESA | | |
| WEB | https://www.emasesa.com | | |
| ORGANIZACIONES PARTICIPANTES EN EL PROYECTO | | | |
| <p>METflitler Empresa Metropolitana de Abastecimiento y Saneamiento de Aguas de Sevilla, S.A. (EMASESA) IMDEA Agua Universidad de Alcalá de Henares</p> | | | |
| Fecha de inicio del proyecto | 01/10/2022 | Fecha de fin del proyecto | 30/09/2025 |
| DESCRIPCIÓN DETALLADA. RESUMEN DE OBJETIVOS Y FINALIDAD | | | |
| <p>Es un proyecto que aborda especialmente el desafío de la acción climática, el medio ambiente y la eficiencia de los recursos, y de igual forma contribuye al desafío de la agricultura sostenible al generar reutilización agua para riego en zonas con escasez de agua.</p> <p>La tecnología Modular METland®, representa una solución sostenible (técnica, económico y ambiental), además de ser una solución móvil y eficiente para limpiar y reutilizar aguas residuales urbanas a coste de energía cero mediante la combinación de microorganismos capaces de convertir contaminantes en corriente eléctrica con un material electroconductor.</p> <p>El sistema se basa en la degradación biológica de los contaminantes mediante una comunidad microbiana suministrada en forma de biopellets capaces de colonizar un lecho de electricidad.</p> <p>Para generar agua reutilizada para riego, como pieza singular del proyecto y de economía circular, se utiliza una metodología de reciclaje de unos filtros de ósmosis inversa para ofrecer tratamientos terciarios a los efluentes generados por la tecnología METland®</p> | | | |
| IMAGEN DEL PROYECTO | | | |
|  | | | |
| ENFOQUE DEL PROYECTO DENTRO DEL CICLO DEL AGUA | | | |
| Abastecimiento y Distribución | Saneamiento y Depuración | Energía y Residuos | Transversales |
| NO | SI | NO | NO |
| RESULTADOS ALCANZADOS O PREVISTOS | | | |
| <ul style="list-style-type: none"> • Eliminación de contaminantes orgánicos seleccionando el nivel de nutrientes que se quiere que tenga el efluente final • Empleo de una estrategia de economía circular a través de: 1) la producción de pellets electroconductores a partir de residuos vegetales y 2) el uso de membranas de ósmosis inversa recicladas para la filtración final del efluente, como tratamiento terciario. • El empleo de sensores bioelectroquímicos para medir la corriente eléctrica generada por las bacterias, parámetro correlacionado con la calidad de depuración del agua residual. | | | |
| NECESIDADES DETECTADAS PARA EVOLUCIONAR | | | |
| <p> </p> | | | |
| DATOS ECONÓMICOS | | | |
| Presupuesto total: 670.613,00 €. Presupuesto EMASESA: 170.915,20 €. Financiado parcialmente convocatoria CPP-2021 del Ministerio de Ciencia e Innovación | | | |

PROJECT NAME TRINEFLEX - HORIZON-CL4-2021-TWIN-TRANSITION-01-21

ORGANIZATION ESAMUR

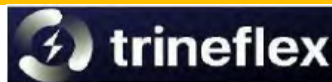
WEB
LOCATION Alcantarilla (Spain)

PARTNERS IN THE PROJECT

- 1º Asociación de Investigación Metalúrgica del Noroeste (AIMEN)
- 2º CORE Innovation Centre NPO (CORE)
- 3º Tampereen korkeakoulusaatio sr (TAU)
- 4º Software Competence Center Hagenberg GmbH (SCCH)
- 5º Aristotelio Panepistimio Thessalonikis (AUTH)
- 6º NORCE Norwegian Research Centre (NORCE)
- 7º Institute of Communication and Computer Systems (ICCS)
- 8º National Technical University of Athens (NTUA)
- 9º Linz Center of Mechatronics(LCM)
- 10º SINTEF AS (SINTEF)
- 11º SINTEF ENERGI AS (SINTEF LTP) (SINFE)
- 12º Tecnologie innovative per il controllo ambientale e lo sostenibile societa consortile responsabilitate limitata (TICASS)
- 13º Syxis VSI (SYXIS)
- 14º Fundacion IMDEA Agua Alcalá de Henares (IMDEA)
- 15º VENTIVE Ltd (VENTI)
- 16º STAM Srl (STAM)
- 17º R2M Solution SRL (R2M)
- 18º Simvouli Igieinis kai Asfalias Geniki Exoteriki Ypipesia (GEP)
- 19º TSK Electrónica y Electricidad, S. A(TSK)
- 20º UrsaLeo UK Ltd (ULUK)
- 21º UrsaLeo Inc (ULUK LTP) (UL)
- 22º IDENER Research & Development Agrupacion de Interes Economico (IDEN)
- 23º Mytilinaios Anonimi Etaireia (MYTIL)
- 24º Etaireia Ydreuseos kai Apochetefseos Proteyousis(EYDAP)
- 25º DGS SPA (DGS)
- 26º Verallia Italia SpA (VERAL)
- 27º ELVALHALCOR Hellenic Copper and Aluminium Industry S.A. (HALCOR)
- 28º Refineria de Aluminio SL (REFIAL)
- 29º Fundacion Innovacion Ambiental y Tecnologica (REFIAL LTP) (INATEC)
- 30º Entidad Regional De Saneamiento y Depuracion de Aguas Residuales de la region de Murcia (ESAMUR)

Start date of the Project
01/09/2022
End date of the Project
31/08/2026
DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE

TRINEFLEX will function as an end-to-end service managing the plant's digital lifecycle and the process of transition to flexible and sustainable operation. This process will be enabled by advanced and green data acquisition, Big Data Infrastructures, process analysis, model development and finally Digital Twins with integrated multi-agent decision support systems. TRINEFLEX will be implemented in five demonstration sites, in the glass, aluminium, water and copper sectors, supported through the integration of transformative technologies (from the energy efficiency, clean energy, sustainable fuels and feedstocks, water energy nexus and CCUS sectors), that synergise with the powerful digital solutions. Beyond the plant's boundaries, TRINEFLEX will mobilise local stakeholders and communities into new ways of interacting with REIs: Capacity building, open science, and introducing new forms of sustainable economic activity. Service- and community-based demand/response will be employed to leverage local energy resources, coupled with emphasis on sustainable fuels and feedstocks, accelerating the adoption of industrial@urban symbiosis.

IMAGE OF THE PROJECT

PROJECT APPROACH WITHIN THE WATER CYCLE

| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
|-------------------------|------------|------------------|-------------|
| NO | SI | SI | NO |

RESULTS ACHIEVED OR EXPECTED

- 1- Improve and modernize the infrastructures related to the energy system and data acquisition.
- 2- The technology applied will reduce energy demand by 20-40%.
- 3- Energy flexibility, combining the reduction of energy demand of the processes and increasing the share of renewable energy supply.
- 4- Reduction of CO2 emissions.
- 5- Optimization of waste generated and wastewater management.

NEEDS DETECTED TO EVOLVE
ECONOMIC FIGURES
ESAMUR

TOTAL COSTS OF THE ACTIONS: 1.271.000 €

AMOUNT OF EU CONTRIBUTION: 762.600 €

PROYECTO

TOTAL COSTS OF THE ACTIONS: 20.963.015 €

AMOUNT OF EU CONTRIBUTION: 17.296.464 €

PROJECT NAME

LIFE21-ENV-ES-PRISTINE

ORGANIZATION

ESAMUR

WEB

<https://eurecat.org/portfolio-items/life-pristine/>

LOCATION

Ceutí (Spain)

PARTNERS IN THE PROJECT

- 1- ACCIONA AGUA SAU
- 2- FUNDACIO EURECAT
- 3- NX FILTRATION BV
- 4- ESAMUR
- 5- XYLEM SERVICES GMBH
- 6- DANMARKS TEKNISKE UNIVERSITET
- 7- TRINITY COLLEGE DUBLIN
- 8- CSIC - AGENCIA ESTATAL CONSEJO SUPERIOR DE INVESTIGACIÓN CIENTÍFICA
- 9- UNIVERSITÀ DEGLI STUDI DI MILANO-BICOCCA
- 10- INSTITUTO DE SALUD CARLOS III
- 11- KOMPETENZENTRUM WASSER BERLIN GMBH
- 12- ZABALA BRUSSELS
- 13- WATER EUROPE
- 14- DANMARKS TEKNISKE UNIVERSITET

Start date of the Project

01/08/2022

End date of the Project

31/07/2026

DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE

LIFE PRISTINE project aims to develop the PRISTINE Integrated Solution to remove Contaminants of Emerging Concern (CECs) from water streams. The PRISTINE Integrated Solution will be adaptable on a case-by-case basis for drinking water (DW), to protect humans from CECs, and for wastewater (WW), to protect the environment and remove these contaminants from the water cycle. In opposition to other existing technologies, the PRISTINE Integrated Solution, will permanently remove CECs from water, thus directly applying Zero Waste and Circular Economy principles and coming ahead of existing and near future CECs regulations. The PRISTINE Integrated Solution is based on the synergistical combination of individual technologies: i) encapsulated adsorbent technology, ii) hollow-fibre NF membrane, and iii) AOP processes (UV-LED combined with ozonation and/or H2O2), being these technologies controlled and optimized by a Decision Support System fed by AI-based soft-sensors for the online estimation of CECs concentration levels. LIFE PRISTINE will focus on PFAS, pesticides, PPCPs, toxins, antibiotic resistance genes and microplastics, as main CECs families, designated according previous studies in the two demo sites and existing literature. LIFE PRISTINE goal is to effectively remove >80% of every CECs in WW and DW scenarios, going further if requested by existing legislation. Furthermore, the PRISTINE Integrated Solution will be cost-effective, 30 % lower OpEx cost that comparable technologies. PRISTINE Integrated Solution will be demonstrated in DW and WW representative scenarios during a year each, allowing the technology to reach a TRL7. Dissemination and communication actions of LIFE PRISTINE will prosecute the awareness raising of the public towards the use and fate of CEC, and to be the background and support for new policies and legislations to protect EU citizens and their environment in the near future.

IMAGE OF THE PROJECT



PROJECT APPROACH WITHIN THE WATER CYCLE

| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
|-------------------------|------------|------------------|-------------|
| NO | SI | NO | NO |

RESULTS ACHIEVED OR EXPECTED

The main objective of LIFE PRISTINE is to develop and demonstrate an innovative and versatile integrated solution to remove emerging contaminants from water streams. Pristine's integrated solution will be adapted, on a case-by-case basis, to drinking water to protect humans from contamination, and to wastewater to protect the environment and remove these contaminants from the water cycle. Unlike other existing technologies, the PRISTINE integrated solution will permanently remove pollutants from water, thus directly applying the principles of zero waste and circular economy and anticipating existing and future regulatory laws.

- To contribute to the achievement of an environment free of Emerging Contaminants through the development of the PRISTINE integrated solution capable of eliminating at least 80% of contaminants in water treatment and sanitation systems.
- Conduct an analysis campaign in plants that are key points to create a short list of PRISTINE Emerging Contaminants that establishes a basis for technical developments in SO1, SO2 and SO3.
- Develop an adsorption system for the removal of a wide range of Emerging Contaminants in drinking water and sanitation. The technology will encapsulate different adsorbents with different sized capsules with different affinities to CECs, thus covering a wide range of CECs. It will also include magnetic separation that will allow recovery of lost adsorbent (>98%) associated with backwashing and system regeneration, thus reducing operating costs and waste production.

NEEDS DETECTED TO EVOLVE

ECONOMIC FIGURES

ESAMUR

TOTAL COSTS OF THE ACTIONS: 191.972,98 €

AMOUNT OF EU CONTRIBUTION: 115.183,79 €

PROYECTO




TOTAL COSTS OF THE ACTIONS: 3.764.689,07 €

AMOUNT OF EU CONTRIBUTION: 2.258.813,45 €

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|  | | R&D+I Group | |
| R&D&I PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 | |
| PROJECT NAME | AMIA - LIFE 18 ENV/ES/000170 | | |
| ORGANIZATION | ESAMUR | | |
| WEB | https://www.lifeamia.eu | | |
| LOCATION | Alhama de Murcia (Spain) | | |
| PARTNERS IN THE PROJECT | | | |
| FASCA Atlantis Perivallon & Kainotomia LTD Arvia Technology LTD CEBAS - CSIC ESAMUR IPROMA | | | |
| Start date of the Project | 01/09/2019 | End date of the Project | 31/12/2022 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>The objectives of the LIFE AMIA project are in line with different strategic actions framed within the European Union that pursue energy efficiency and sustainable rural development.</p> <ol style="list-style-type: none"> 1- Compact anaerobic-Aerobic treatment with biogas production. 2- Advanced adsorption-electrooxidation tertiary treatment supplied with renewable energy. 3- Microalgae-based treatment for nutrient recovery. <p>Specific objectives:</p> <ul style="list-style-type: none"> - To reuse wastewater in agricultural according to the new European Water Reuse Directive. - To provide an energy self-sufficient system to treat municipal wastewater. - To reduce the environmental impact of the produced sludge, educing sludge production and minimizing the management costs. - To reduce the carbon footprint and greenhouse gas emissions. - To remove micropollutants and pathogens from the wastewater. - To recover nutrients (algae) to be used as biofertilizer. - To introduce metagenomic techniques for the quantification of microorganisms. | | | |
| IMAGE OF THE PROJECT | | | |
|   | |  | |
| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| NO | SI | NO | NO |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <ol style="list-style-type: none"> 1- An energy self-sufficient plant which can produce more energy than it consumes (1.69 kWh/day vs 1.30 kWh/day). 2- High quality wastewater to reuse in agricultural irrigation in accordance with the new legal requirements. 3- Reduction of total sludge production by 40%, minimizing sludge management cost. 4- GHG emissions reduction of 0.045 tons/year: 25% CO₂ and 90% N₂O. 5- It is expected that more than a half of the total COD will be removed anaerobically, which will save about 0.25 kWh/kgCODremoved compared to 0.47 kWh/kgCODremoved in the aerobic treatment. A reduction up to 70% of the nutrient removal aeration demand is expected compared to extended aeration. Algae can save about 2.5 kWh/kg Ntotal removed. 6- Continuous operation in a municipal WWTP with OLR of 8 kg COD/m³d with a reduction of 87% of COD in the A2C process, and the subsequent increase of OLR up to 12 kg COD/m³ by means of codigestion. 7- Global COD efficiency removal of at least of 98% in the complete system due to the AOP process will also remove COD. 8- Production of 0.36 m³CH₄/kg COD removed from a biogas stream with CH₄ content of 68% which implies energy production of 1.45 kWh/day. 9- Combination of anaerobic treatment with post aerobic process in a novel vertical configuration. 10- Proposal of a novel system that offers solution to treat co-substrates of the zone, transforming wastes to energy in a sustainable way, able to generate renewable energy by biogas production. 11- Reduction of 90% of priority substances. 12- Anaerobic digestion of aerobic excess biomass in the same tank which involves saving a further 10% of cationic polyelectrolyte due to its better dewaterability. 13- Reduction of nutrient removal energy consumption from 0.35 kWh/m³ of extended aeration system to 0.18 kWh/m³ of the HRAP (49%). 14- A 10% increase in phosphorus removal efficiency due to the implementation of HRAP process. Algal biomass will be richer in nutrient content as biofertilizer. 15- An optimized hydraulic HRAP configuration. 16- AOP technology which reduces energy consumption by 45% compared to conventional UV lamps. Additionally, solar panels will power it. 17- Specific protocols for microorganism analysis in WWTPs with metagenomic technique. 18- New system replication in European market to improve the performance of existing WWTPs and to implement in new WWTPs, with high impact for European Water Agencies. | | | |
| NEEDS DETECTED TO EVOLVE | | | |
| ECONOMIC FIGURES | | | |
| TOTAL COSTS OF THE ACTIONS: 1.945.914 € AMOUNT OF EU CONTRIBUTION: 1.070.250 € | | | |

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|---|---|---|-------------|
|  | | R&D+i Group | |
| R&D&I PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 | |
| PROJECT NAME | DRY4GAS - LIFE 16 ENV/ES/000342 | | |
| ORGANIZATION | ESAMUR | | |
| WEB | http://dry4gas.ciemat.es | | |
| LOCATION | San Javier (Spain) | | |
| PARTNERS IN THE PROJECT | | | |
| CIEMAT AITESA CEBAS-CSIC EC INNOVA EHS ESAMUR RANK | | | |
| Start date of the Project | 03/07/2017 | End date of the Project | 31/12/2022 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>The main objectives of the DRY4GAS project are the following:</p> <ol style="list-style-type: none"> Reduction of CO2 emissions due to: <ul style="list-style-type: none"> The use of renewable energy in the drying process. The electric power generation in the ORC from sewage sludge, which will reduce the electrical power consumption. The reduction in transportation associated to sludge management, as a consequence of its volume reduction. Reduction in acoustic emissions associated to sludge transportation. Reduction in odor nuisance by reducing volatile compounds. Development of a green circular economy by promoting the reuse of sludge and ashes, both for energy recovery and for the manufacture of construction materials such as concrete, as well as for the amendment of sludge intended for agricultural use. Improved hygienic conditions of the sludge because solar dried sludge is more biologically stable and easy to handle. | | | |
| IMAGE OF THE PROJECT | | | |
|   | |  | |
| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| NO | SI | SI | NO |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>The expected results of DRY4GAS project, in line with the objectives set, can be quantified according to the following parameters:</p> <ol style="list-style-type: none"> Reduction of CO2 emissions between 880 and 1111 t/yr as a result of the use of renewable energy to carry out the drying process against the use of natural gas whose emissions are estimated as baseline at 242 t CO2/yr. Electricity generated in the gasification process without burning fossil fuels, and the reduction in transportation of wet sludge. The baseline considered is the emissions of 11 t CO2/yr produced currently by the 129 transportations per year of the sludge to be valorized in agriculture. Production of electrical and thermal energy of 320 and 640 MWh/year, respectively. Reduction between 67 and 83%, depending on the dryness of the sludge after the drying process, of wet sludge valorization in agriculture. Reduction of both acoustic emissions and odor nuisance, due to volatile compounds present in the sludge. This parameter undergoes a variable shrinkage between 53 and 72%, depending on the dryness level of the dried sludge. Este parámetro sufrirá una merma variable entre el 53 y el 72%, en función de la sequedad del lodo seco. The equivalent population affected while carrying out the project will be reduced between 67 and 83%, compared with the baseline status by reducing the negative environmental impacts associated with using sludge in agriculture. <p>Reduction of 20% in the use of chemical fertilizers as well as water consumption and increased carbon sequestration in soil in the same proportion.</p> | | | |
| NEEDS DETECTED TO EVOLVE | | | |
| ECONOMIC FIGURES | | | |
| TOTAL COSTS OF THE ACTIONS: 2.962.426 € AMOUNT OF EU CONTRIBUTION: 1.678.239 € | | | |

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|---|---|---|-------------|
|  | | R&D+I Group | |
| | | R&D&I PROJECTS - PORTFOLIO | |
| | | PERIOD: 2021-2023 | |
| PROJECT NAME | AQUACYCLE - A_B.4.1_0027 ENI CBC Mediterranean Sea Basin Programme | | |
| ORGANIZATION | ESAMUR | | |
| WEB | http://www.enicbcmed.eu/projects/aquacycle | | |
| LOCATION | Blanca (Spain) | | |
| PARTNERS IN THE PROJECT | | | |
| <p>*- Lead beneficiary: Centre for Research and Technology, Hellas. *- Partner 1: Plataforma Solar de Almeria (PSA) - Energy Department - Solar Treatment of Water Unit. *- Partner 2: INTEGRATED RESOURCES MANAGEMENT (IRM) COMPANY LIMITED. *- Partner 3: Lebanese University / Doctoral School in Sciences and Technology & Azm Center for Research in Biotechnology and its Applications. *- Partner 4: Water Research and Technologies Center. *- Partner 5: Tunis International Center for Environmental Technologies. *- Partner 6: The Regional Entity for Wastewater Sanitation and Treatment in Murcia (ESAMUR).</p> <p>Associates: Associate 1: Société des Eaux et de l'Assainissement d'Alger - SEAL Associate 2: CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE Associate 3 : Association des Enseignants des Sciences de la Vie de la Terre (AESVT) Associate 4: Public Power Corporation Renewables S.A. (PPCR)</p> | | | |
| Start date of the Project | 03/07/2017 | End date of the Project | 31/08/2022 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>The purpose of AQUACYCLE is to design an eco-innovative wastewater treatment technology consisting of anaerobic digestion, constructed artificial wetlands and solar treatment for efficient and viable urban wastewater treatment, with minimum operating costs and maximum environmental benefits.</p> <p>The new technology will be tested in 3 pilot plants located in Lebanon, Spain (Blanca) and Tunisia.</p> <p>The AQUACYCLE project will change the paradigm of viewing wastewater as an unsafe effluent to that of an abundant year-round resource that has multiple uses. AQUACYCLE addresses this through a system that has a low operating and maintenance cost, as it uses solar panels for energy, produces biogas and fertilizer, and the constructed wetlands will allow biodiversity to thrive and be a tourist attraction. As the new technology will allow the recovery of valuable substances from the treated effluent, i.e. fertilizer and biogas, AQUACYCLE is poised to showcase a leading example in relation to the transition to the circular economy.</p> | | | |
| IMAGE OF THE PROJECT | | | |
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| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| NO | SI | SI | NO |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>The purpose of AQUACYCLE is to design an eco-innovative wastewater treatment technology consisting of anaerobic digestion, constructed wetlands and solar treatment for efficient and viable treatment of urban wastewater, with minimum operating costs and maximum environmental benefits.</p> | | | |
| NEEDS DETECTED TO EVOLVE | | | |
| ECONOMIC FIGURES | | | |
| Budget 2.838.680 € EU Contribution 2.554.812€ | | ESAMUR Budget: 273,998 € EU Contribution 246.598,25 € | |

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|  | | R&D+I Group | |
| R&D&I PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 | |
| PROJECT NAME | Spread Sewer Sensing for Sustainable Management (4SM) | | |
| ORGANIZATION | FACSA | | |
| WEB | https://www.facsa.com/idi-2/4sm/ | | |
| PARTNERS IN THE PROJECT | | | |
| FACSA as project leader, ICRA and EURECAT | | | |
| Start date of the Project | 2021 | End date of the Project | 2024 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>The main objective of 4SM is to create a new set of sensors and tools for the advanced and sustainable management of sewer systems. 4SM will address four of the most important challenges/opportunities for optimal sewer management such as i) promote the digitalization process of sewer networks, ii) improve capabilities of current monitoring tools, iii) explore resource and energy recovery from sewers, and iv) develop highly innovative methods for corrosion, toxicity, and odours control.</p> <p>4SM will contribute to maximizing the functioning of urban water systems in relation to: the reduction of environmental impact, the warning against the risk of floods, the resilience of infrastructures to climate changes, the efficient use of resources and long-term management of infrastructure capital assets.☒</p> | | | |
| IMAGE OF THE PROJECT | | | |
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| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| NO | YES | YES | NO |
| RESULTS ACHIEVED OR EXPECTED☒ | | | |
| <p>The project strives to connect the digital and physical worlds of sewerage infrastructure through digitalization, improved sulphide control, autonomous drones, smart sensors and energy recovery. The results and findings of the project will contribute to the development of efficient, sustainable and environmentally friendly sewer management practices.</p> | | | |
| NEEDS DETECTED TO EVOLVE | | | |
| <p>The urban water sector is facing the critical challenge of operating its systems at the highest treatment standards and simultaneously reduce its footprint and costs. But to do so, they are still using limited knowledge and a narrow set of tools-instruments. According to the European Directive, 2008/114/CE, Urban Water Systems are critical infrastructure, essential for the maintenance of vital social functions in cities such as health, environmental and economic well-being of the population. Sewerage infrastructure, commonly known as sewers, is a crucial part of the urban wastewater systems.</p> | | | |
| ECONOMIC FIGURES | | | |
| Project 4SM with reference PLEC2021-007794 is financed by MCIN/AEI /10.13039/501100011033 and by the European Union NextGenerationEU/PRTR with a total budget of 765,454.83 € | | | |




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|  | | R&D+I Group | |
| R&D&I PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 | |
| PROJECT NAME | Interdisciplinary cross-sectoral approach to effectively address the removal of contaminants of emerging concern from water (AQUALITY) | | |
| ORGANIZATION | FACSA | | |
| WEB | https://www.facsa.com/idi-2/proyecto-aquality/ | | |
| PARTNERS IN THE PROJECT | | | |
| <p>The consortium is made up of the coordinator Università degli Studi di Torino (UNITO) together with 10 beneficiary partners between universities and research centers, Università degli Studi del Piemonte Orientale Amedeo Avogadro (UNIPMN), Aalborg Universitet (AAU), Center National de la Recherche Scientifique (CNRS), École Polytechnique (EP), Karadeniz Teknik Üniversitesi (KTU), LiqTech International A / S (LQT), Società Metropolitana Acque Torino SpA (SMAT), Center for Energy, Environmental and Technological Research (CIEMAT), Panepistimio Ioanninon (UOI), Universitat Politècnica de València (UPV) and 7 collaborating organizations, Sociedad Fomento Agrícola Castellonense S.A. (FACSA), IRIS s.r.l. (IRIS), VBM Laboratoriet A / S (VBM), INERIS (INERIS), Materials Industrial Research & Technology Center (MIR), NIVA (NIVA) and ISALIT (ISALIT)</p> | | | |
| Start date of the Project | 2017 | End date of the Project | 2021 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>AQUALITY pursues success through the synergies obtained between all its collaborators. The aim is to achieve the development of new water treatment technologies innovative enough to replace the current ones. The linchpin of the project is the creation of a structured training program through research conducted by original individual projects.</p> | | | |
| IMAGE OF THE PROJECT | | | |
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| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| YES | YES | NO | YES |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>This project has made it possible to provide a comprehensive training offer to future water treatment professionals, raise the scientific competence of researchers and contribute to European competitiveness in the field of tertiary water treatment. This has allowed FACSA to stay at the forefront of the most innovative technologies related to membrane processes, hybrid nanofiltration and advanced oxidation systems, as well as solar photocatalysis processes.</p> | | | |
| NEEDS DETECTED TO EVOLVE | | | |
| <p>Currently, both the ecological environment and human beings can be affected by various emerging pollutants (CEC), compounds that contain the aqueous systems that we use on a daily basis. Despite being presented in small amounts, they have enough potential to cause adverse effects.</p> | | | |
| ECONOMIC FIGURES | | | |
| <p>The project with file number H2020-MSCA-ITN-2016 has been funded by the framework program H2020 for research and development Innovative Training Networks (ITN) MARIE SKŁODOWSKA-CURIE ACTIONS.</p> | | | |

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|  | | R&D+I Group | |
| R&D&I PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 | |
| PROJECT NAME | Advanced Recovery of Nutrients from sewage sludge to obtain value-added products for Agriculture: biostimulants and liquid fertilizers (BIOFERES) | | |
| ORGANIZATION | FACSA | | |
| WEB | https://www.facsas.com/idi-2/bioferes/ | | |
| PARTNERS IN THE PROJECT | | | |
| FACSA as project leader, BIOVIC Consulting and INDEREN. | | | |
| Start date of the Project | 2021 | End date of the Project | 2023 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>The main objective of the BIOFERES project is the industrial research of a new process based on the advanced recovery of nutrients and transformation of sludge from Wastewater Treatment Plants (WWTP) into products with high added value for use in agriculture: liquid biofertilizers and biostimulants. Thanks to BIOFERES, the new process developed for WWTP sludge will mean a paradigm shift with respect to the conventional treatment of WWTP sludge, using said sludge as raw material for the manufacture of agronomic bioproducts.</p> <p>The BIOFERES process proposes combining different technologies such as anaerobic digestion in double temperature phase, membrane technologies such as ultrafiltration and membrane contactors and solid state fermentation reactors to obtain different currents and products with high value for the agriculture: liquid biofertilizers with high nutrient content and solid biostimulants to promote crop growth.</p> <p>This new concept of biorefinery will allow obtaining products for agricultural use in a renewable way from waste, reducing the consumption of raw materials and the carbon footprint of the WWTP - agriculture environment, which allows to approximate the wastewater management model to the principles sustainability and circular economy.</p> | | | |
| IMAGE OF THE PROJECT | | | |
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| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| NO | NO | YES | YES |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>The great challenge has been to simultaneously achieve nutrient recovery and biogas production through co-digestion. The Bioferes team has used anaerobic digestion to jointly treat different organic wastes, mainly agri-food, together with WWTP sludge to simultaneously obtain a final digested sludge with a high nutrient content (between 50% and 800% higher than WWTP sludge) and a high production of biogas, tripling production compared to a conventional case. As part of this biorefinery system, the use of membrane technologies for the recovery of nutrients (nitrogen, phosphorus and potassium) contained in the digested sludge as liquid biofertilizers or ammonium salts has been studied, as well as solid-state fermentation with bioaugmentation to obtain a solid biostimulant, both capable of reducing and partially replacing the consumption of conventional fertilizers from non-renewable sources.</p> | | | |
| NEEDS DETECTED TO EVOLVE | | | |
| <p>WWTP sludge has been considered the waste produced from the water purification process, and the objectives of the applied treatments have been mainly focused on maximizing the reduction of its volume in order to reduce management costs from the WWTP at your final disposal.</p> | | | |
| ECONOMIC FIGURES | | | |
| Project financed by the Valencian Innovation Agency (AVI) under the reference BIOFERES Project (INNCAD / 2021/74) with a total budget of 605,512.2 €. | | | |




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|  | | R&D+I Group | |
| R&D&I PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 | |
| PROJECT NAME | Recuperación y valorización de CELulosa de rEsiduos urbanos y aguas residuales para la producción de Biocombustibles Renovables (CELEBRE) | | |
| ORGANIZATION | FACSA | | |
| WEB | https://www.facsa.com/idi-2/celebre/ | | |
| PARTNERS IN THE PROJECT | | | |
| Facsa, Fovasa y la Ingeniería para el Desarrollo Tecnológico SL (INDETEC). | | | |
| Start date of the Project | 2022 | End date of the Project | 2024 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| The general objective of the project is to investigate new techniques for the recovery of cellulosic waste from different origins for its recovery in renewable biofuels. The new process applied to wastewater from Wastewater Treatment Plants (WWTP), pruning waste and waste from diapers and intimate hygiene products will mean a paradigm shift with respect to conventional treatment, using them as raw material for the manufacture of bioethanol. CELEBRE will be a new process based on the recovery of high value-added products. The project will combine different innovative treatment typologies that allow for more efficient valorisation, including: (1) Chemical treatment techniques (chemical washing and disinfection), (2) Heat treatment techniques (thermal hydrolysis) and (3) Biological treatment techniques (enzymatic hydrolysis and fermentation). | | | |
| IMAGE OF THE PROJECT | | | |
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| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| NO | YES | YES | YES |
| RESULTS ACHIEVED OR EXPECTED | | | |
| As a result of the CELEBRE project, it will be possible to develop a combination of innovative technologies for the treatment of cellulosic waste from different origins that will allow its recovery to be homogenized towards the production of bioethanol, through a versatile methodology that can be adapted to the different sources of cellulose waste generated in the urban environment, to obtain value-added products in a new biorefinery model framed in the circular economy. | | | |
| NEEDS DETECTED TO EVOLVE | | | |
| Research into new techniques for recovering cellulosic waste from different sources for its recovery into renewable biofuels. | | | |
| ECONOMIC FIGURES | | | |
| Project financed by the Valencian Innovation Agency in the Value Chain call (Project No. INNCAD/2022/144). | | | |

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|  | | R&D+i Group | |
| R&D&I PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 | |
| PROJECT NAME | Inkjet technology in the water sector (CEMINK) | | |
| ORGANIZATION | FACSA | | |
| WEB | https://www.facsa.com/idi-2/proyecto-cemink/ | | |
| PARTNERS IN THE PROJECT | | | |
| FACSA as project leader, the University Institute of Ceramic Technology of the Jaume I University of Castellón and the University Institute of Industrial, Radiophysical and Environmental Safety of the Polytechnic University of Valencia. | | | |
| Start date of the Project | 2018 | End date of the Project | 2021 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>The CEMINK project aims to develop and validate a technology focused on the manufacture of low-cost microfiltration and ultrafiltration ceramic membranes, as well as membranes with special requirements (anti-biofouling, catalytic, ...), by combining ceramic materials from low cost and application of digital ink printing technology (inkjet). The fact of being able to apply different types of ink makes it possible to develop a wide range of specific membranes according to the requirements of the subsequent application.</p> | | | |
| IMAGE OF THE PROJECT | | | |
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| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| YES | NO | NO | YES |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>Digital printing technology (inkjet) turned out to be a promising solution for the elaboration of the selective layer in ceramic membranes, since it allowed to deposit layers of a few microns thick on a substrate according to a pattern previously defined in a digital file. This contribution analyzed the elaboration of the selective layer in low cost membranes by means of inkjet.</p> | | | |
| NEEDS DETECTED TO EVOLVE | | | |
| <p>Reuse water has been marked as a consequence of climate change and increased water stress, mainly in the Mediterranean area. Water scarcity is estimated to affect 40% of the world's population and may continue to increase given population growth, industry demand, and the impact of climate change. This fact has promoted great interest in membrane technologies, which allow obtaining high quality treated water, which can be reused in sectors such as agriculture or industry.</p> | | | |
| ECONOMIC FIGURES | | | |
| Project funded by ERDF / Ministry of Science, Innovation and Universities - State Research Agency / _CEMINK Project (RTC-2017-5897-5). | | | |




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|  | | R&D+I Group | |
| R&D&I PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 | |
| PROJECT NAME | Real-time monitoring of pathogens to guarantee the quality of bathing water in the city of Valencia (COLICE) | | |
| ORGANIZATION | FACSA | | |
| WEB | https://www.facsas.com/idi-2/colice/ | | |
| PARTNERS IN THE PROJECT | | | |
| FACSA | | | |
| Start date of the Project | 2022 | End date of the Project | 2022 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>The objective of the project is to be able to monitor the presence of <i>E. coli</i> through different techniques: a multiparametric probe that performs an indirect measurement in real time and a low-cost biosensor. Both measurements will be contrasted with culture analysis in the laboratory. The advantage offered by the development of the low-cost device is that it will allow microbiological control to be extended to numerous ditches in a simple and validated way.</p> <p>In this project, will develop an innovative integrated platform that combines high-performance preconcentration elements with miniaturized fluorescence detection optics and validate it for the detection of <i>E. coli</i>. In addition, the most appropriate treatment system that would eliminate microbiological contamination from the water will be evaluated technically and economically.</p> <p>COLICE will evaluate nature-based technologies (NBS) in order to be able to integrate them in a sustainable way in the urban/rural environment interfaces, the city of Valencia and the orchard. The proposal will be developed in the Séquia del Ribàs, this being an agricultural drainage ditch that runs parallel to the Túria River and discharges its waters into the sea next to Pinedo Beach.☒</p> | | | |
| IMAGE OF THE PROJECT | | | |
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| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| NO | YES | NO | YES |
| RESULTS ACHIEVED OR EXPECTED☒ | | | |
| <p>Once the COLICE project has been completed, the objective of improving two of the relevant areas of Missions 2030 has been achieved. On the one hand, to try to guarantee bathing water by monitoring the water that is discharged into the sea in the vicinity of the beach, based on the data obtained in real time on the load of faecal contamination and, on the other hand, to enhance and interweave the green and water areas of Valencia and its surroundings, for which it was intended to design a nature-based solution (NBS) for water treatment, so that it becomes an area visitable by citizens.</p> | | | |
| NEEDS DETECTED TO EVOLVE | | | |
| <p>The presence of faecal bacteria such as <i>E.coli</i> in bathing areas can lead to the closure of certain beaches when their concentration levels do not guarantee good water quality. In this case, the application of sensors that allow the early detection of pathogenic microorganisms would make it possible to continuously assess the quality of the water and determine the necessary actions to protect public health. Given the inexistence of a tool for evaluating the state of water masses in microbiological terms, which allows improving the management of bathing areas and reducing the risk of the appearance of pathogens COLICE will carried out.</p> | | | |
| ECONOMIC FIGURES | | | |
| <p>COLICE has been subsidized by the Valencia City Council under the Regidoria de Innovació i Gestió de Coneixement, to carry out innovation projects aimed at Missions in the City of Valencia 2021. The total budget of the project is 52,000€</p> | | | |

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|  | | R&D+i Group | | |
| R&D&I PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 | | |
| PROJECT NAME | | Alert on the incidence of SARS-CoV-2 in urban settlements | | |
| ORGANIZATION | | FACSA | | |
| WEB | | https://www.facsa.com/idi-2/covidwater/ | | |
| PARTNERS IN THE PROJECT | | | | |
| FACSA | | | | |
| Start date of the Project | | 2020 | End date of the Project | |
| | | | 2021 | |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | | |
| <p>The COVIDWATER project seeks to improve the preventive capacity of the Spanish state in the face of the current COVID-19 epidemic, generated by the SARS-CoV-2 virus. The wastewater treatment plants (WWTPs) and sewerage networks allow monitoring centralized at the population level of urban settlements, being a very useful complement in the epidemiological control of the present pandemic and the prevention of future outbreaks of this disease.</p> <p>This project will make it possible to evaluate the state of the dispersion of SARS-CoV-2 in the Valencian Community, through the elaboration of an epidemiological map that combines the experimental results obtained by analysis in the wastewater, the clinical diagnosis data and other indicators of interest such as the socioeconomic and environmental.</p> | | | | |
| IMAGE OF THE PROJECT | | | | |
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| PROJECT APPROACH WITHIN THE WATER CYCLE | | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal | |
| NO | YES | NO | YES | |
| RESULTS ACHIEVED OR EXPECTED | | | | |
| Detection of COVID in the purification processes of a WWTP and work has been done to materialize the results in digital format by creating a digital tool that provides the information collected on the detection of SARS-CoV-2 in the different urban settlements of the Spanish state . | | | | |
| NEEDS DETECTED TO EVOLVE | | | | |
| Detection of the SARS-Cov 2 virus in the purification processes of a WWTP. | | | | |
| ECONOMIC FIGURES | | | | |
| Project financed by the Valencian Agency for Innovation under the program "Scientific-Innovative Solutions for the fight against COVID-19" (Project No. COVID-19_114). | | | | |

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|  | R&D+I Group | | |
| R&D&I PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 | |
| PROJECT NAME | Digitization and control of cyanobacteria applied to the management of the quality of reservoirs, including water collection and purification systems (CYANO) | | |
| ORGANIZATION | FACSA | | |
| WEB | https://www.facsa.com/idi-2/cyanoa/ | | |
| PARTNERS IN THE PROJECT | | | |
| Facsa(Coordinator), Universidad Complutense de Madrid (UCM), Universidad Autónoma de Madrid (UAM) and EUROFINs IPROMA. | | | |
| Start date of the Project | 2022 | End date of the Project | 2025 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| The global aim of CYANOproject is to transform water quality management in reservoirs, through the real-time monitoring of cyanobacteria blooms and the optimization of the decisions in the drinking water treatment plants, with the purpose of mitigating the potential health risks associated to their toxic compounds and of improving the quality of the drinking water, reducing the management costs. | | | |
| IMAGE OF THE PROJECT | | | |
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| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| YES | YES | NO | YES |
| RESULTS ACHIEVED OR EXPECTED | | | |
| The project will provide new technologies and tools to help water treatment plants anticipate when and where cyanobacterial blooms may arise. This will make it possible to improve decision-making on when and where water should be obtained, as well as the treatments needed to ensure the good quality of drinking water. During the project, the following will be developed: – An Autonomous Surface Vehicle (ASV, a kind of robotic boat) capable of monitoring the proliferation of cyanobacteria in real time. – A model of the reservoir under study including its hydrodynamics, ecology and toxicology. – A digital information management solution based on geographic information systems with an integrated decision support system trained with machine learning techniques with the project's data. | | | |
| NEEDS DETECTED TO EVOLVE | | | |
| Optimize control of drinking water treatment at source | | | |
| ECONOMIC FIGURES | | | |
| Project financed by the MICINN in the call for public-private collaboration projects 2021-NGEU. File: CPP2021-008579 | | | |

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|  | | R&D+I Group | |
| R&D&I PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 | |
| PROJECT NAME | Development of a methodology to prevent the wear of the axial bearing in submersible pumps (DeCoB) | | |
| ORGANIZATION | FACSA | | |
| WEB | https://www.facsa.com/idi-2/decob/ | | |
| PARTNERS IN THE PROJECT | | | |
| Facsa (Coordinator), Universidad Politécnica de Valencia (UPV) and Universidad de Valladolid (UVa). | | | |
| Start date of the Project | 2022 | End date of the Project | 2025 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>The general objective of the proposal is presented: discover the cause of water contamination and detect when it starts to avoid bearing wear and secondary damage. Then, a work hypothesis is presented, explaining a possible origin of the water contamination: the wear of the end-ring. Afterwards, types of rotors and their related failures are reviewed, while the end-ring wear is described as a unique failure typical of submersible motor pumps. Then, it is explained that this wear of the end-ring is an uninvestigated failure, clarifying that in the state of the art, the closest research related is the analysis of more standard asymmetry problems, as double bar breakages. Finally, once the strategy to solve the problem has been presented, general and specific objectives of the proposal are synthesized, whose novelty is clearly exposed by the previous analysis, finishing with the need for interdisciplinary research to come up with a real and affordable solution.</p> | | | |
| IMAGE OF THE PROJECT | | | |
|  | |  | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| YES | NO | NO | YES |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>The general objective is to discover if the internal contamination of the water of the submersible motors is the cause of the wear. For this, an algorithm will be developed to detect the moment when water contamination begins, to avoid bearing wear and its secondary damage, such as stator rewinding, and finally build and implement this algorithm in a cost-effective solution.</p> | | | |
| NEEDS DETECTED TO EVOLVE | | | |
| <p>In surface pumps, wear is usually controlled by a proximity sensor between the fixed and moving elements of the bearing. However, proximity sensors cannot be used in submersible motor pumps, which work completely submerged in their fluid. Also, vibration measurement is not feasible. It is difficult to do in deep well submersible motors, since it requires placing the sensors in the body of the machine, which in this case is inside an aquifer up to 500 m deep. The long data transmission cable makes measurements difficult as it introduces capacitances into the sensor circuit distorting the vibration signal. Furthermore, it is difficult to find a sensor robust enough to cope with such a harsh environment: underwater operation with dirt, mud, etc. Therefore, at these depths, water distribution system operators use only Pt-100 temperature sensors, with motors specially designed to place the sensor inside the sealed motor. In conclusion, the solution applied by the industry today is the monitoring of the motor's working temperature, but this depends on other factors, such as seasonality, in addition to not having enough sensitivity regarding the state of the bearing; therefore, it is not a reliable indicator. The consortium proposes to develop strategies to detect (not prevent) the degradation of thrust bearings through electrical magnitudes: supply voltages and currents absorbed by the induction motor.</p> | | | |
| ECONOMIC FIGURES | | | |
| Project financed by MICINN in the call for Public-Private Collaboration Projects 2021. File number: CPP2021-008621. Total budget: 739,311.38€ | | | |

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|  | | R&D+I Group | |
| R&D&I PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 | |
| PROJECT NAME | Agricultural digitization for Fertigation and management of Water Regeneration Stations (DIFERA) | | |
| ORGANIZATION | FACSA | | |
| WEB | https://www.facsa.com/idi-2/difera/ | | |
| PARTNERS IN THE PROJECT | | | |
| FACSA | | | |
| Start date of the Project | 2022 | End date of the Project | 2024 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>The objective of the project is to develop a new comprehensive management model with digital support for reclaimed water, promoting its reuse in agriculture and fertigation. The project seeks to develop a treatment for the recovery of high-quality water for irrigation and fertigation that improves its agronomic quality and optimizes the management of reclaimed water. The information digitization processes in combination with the agronomic analyzes will allow the development of innovative protocols for efficient fertigation, improving the optimal use of water and minimizing the risks on the crop.</p> | | | |
| IMAGE OF THE PROJECT | | | |
| Conceptual deployment for IoT network in citrus crops | | | |
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| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| YES | YES | NO | YES |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <ul style="list-style-type: none"> · Develop a pilot-scale system to regenerate wastewater (agricultural tertiary) and reuse it in agriculture through a fertigation strategy. · Implement an automated reclaimed water distribution system for use in fertigation techniques. · Evaluate the efficiency of filter media from agricultural waste management to improve the quality of reclaimed water. · Design an innovative system to incorporate the water from the WWTP into agricultural irrigation. · Design and implement a digital platform to support decisions to improve the health of crops and optimize the use of reclaimed water and the fertigation system. · Enable IoT in the experimental plot for remote and real-time monitoring. · Evaluate the response of citrus crops irrigated with reclaimed water through the new prototype for the tertiary agronomic treatment of treated water. · Identify the costs of use and management of the installation, as well as determine their distribution and be able to recommend an efficient organization in order to manage it. | | | |
| NEEDS DETECTED TO EVOLVE | | | |
| <p>The province of Castellón has a citrus cultivation occupation of more than 34,000 ha, of which the majority are mandarins (27,000 ha) and sweet orange (6,500 ha). The distribution of citrus farms is mainly centered on the coastal area, and mostly in the southern area. Citrus cultivation is considered irrigated and an average consumption of about 5.000 m3/ha is estimated for mandarins and about 6,000 m3/ha for orange trees. This causes that the annual allocation for the cultivation of the farms is quite high.</p> | | | |
| ECONOMIC FIGURES | | | |
| Project financed by the Valencian Agency for Innovation 2022 (Project No. INNEST/2022/331). Total budget: 859.515,18 € | | | |

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|  | | R&D+I Group | |
| R&D&I PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 | |
| PROJECT NAME | Online control by means of a Hybrid Digital Twin to improve energy efficiency in WWTPs (DTCONEDAR) | | |
| ORGANIZATION | FACSA | | |
| WEB | https://www.facsa.com/idi-2/dtconedar/ | | |
| PARTNERS IN THE PROJECT | | | |
| FACSA, ZINNAE, CLEANAR, DIAMA, ELECTRO INGENIUM, NABLADOT | | | |
| Start date of the Project | 2022 | End date of the Project | 2024 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>The main objective of the DTCONEDAR project focuses on the development of a Hybrid Digital Twin to carry out more efficient control of the main water treatment processes in WWTP, tertiary treatment (during phase 1) and secondary treatment (phase 2), focused on energy efficiency and improving contaminant removal performance. DTCONEDAR is proposed as an industrial research project, with a multitude of innovative aspects, necessary to advance the digital transformation of the water industry 4.0, to respond to a current need in the water purification sector such as the implementation of twins. digital, which in addition to using data from sensor measurements, use data calculated from simulators, which has already been successfully implemented in other industrial sectors.</p> | | | |
| IMAGE OF THE PROJECT | | | |
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| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| NO | YES | YES | YES |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>The incorporation of models through simulators will allow the behavior of the processes to be reproduced in detail, understand their dynamics and propose new control and automation strategies in the plants. Two of the main aspects to highlight of the digital twin of the DTCONEDAR project are (i) the level of detail of the models to be implemented, since they will contemplate the hydraulic behavior and the specific reactions of the processes; (ii) the development of rapid response models, which will allow calculation in real time, and which will allow a digital twin with a simulator to be connected to a SCADA supervision system, providing online information to be used in plant control. This will be a great advance for process models in WWTPs, since they currently have high computing times and only provide offline simulations.</p> | | | |
| NEEDS DETECTED TO EVOLVE | | | |
| <p>The situation of water stress and desertification is worsening, especially in southern Europe, which is forcing us to resort to water reuse as a key component for the integrated management of water resources. Additionally, the new quality criteria defined by European legislation, both for water treated in WWTPs that is discharged into a receiving environment, and for water regenerated in tertiary treatment for reuse, are becoming increasingly restrictive. For all this, it is necessary to maintain the pace of improving the efficiency of processes in the WWTP, based on its knowledge and through the application of new digital tools that allow us to delve deeper into them.</p> <p>The main challenge that the integral water cycle sector must address at the national level, especially in wastewater treatment, is its digital transformation. This will allow us to be more effective in removing contaminants and reduce energy consumption in the processes.</p> | | | |
| ECONOMIC FIGURES | | | |
| <p>This project is subsidized thanks to the aid to support Innovative Business Groups (AEI) from the Ministry of Industry, Commerce and Tourism (MINCOTUR) within the Recovery, Transformation and Resilience Plan (PRTR) financed by the Next Generation EU funds (NGEU).), with File No.: AEI-010500-2022b-196.</p> | | | |



R&D+i Group

R&D&I PROJECTS - PORTFOLIO

PERIOD: 2021-2023

PROJECT NAME Improving the energy efficiency and sustainability of treatment plants through the recovery of sewage sludge (ENEDAR)

ORGANIZATION FACSA

WEB <https://www.facsa.com/idi-2/enedar/>

PARTNERS IN THE PROJECT

Facsa (Coordinador), SMALLLOPS S.L, GENESAL ENERGY Ib, S.A., SYMBORG S.L.U, Asociación de Investigación Metalúrgica del Noroeste (AIMEN) and Instituto de Procesos Sostenibles de la Universidad de Valladolid (UVA)

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|---------------------------|------|-------------------------|------|
| Start date of the Project | 2022 | End date of the Project | 2025 |
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DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE

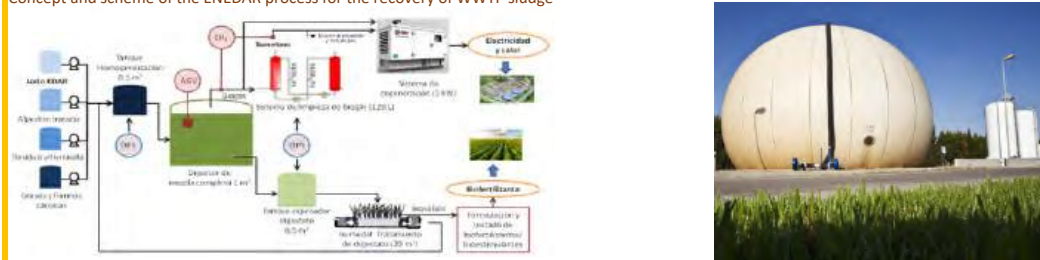
The main objective of the ENEDAR project is to improve the energy efficiency and sustainability of WWTPs through the efficient production and use of biogas, biomethane and biofertilizers using innovative and sustainable processes. To do this, a sludge recovery process will be developed of WWTP, applying innovations to AD to biogas cleaning, the use of biogas and sludge treatment wetlands, capable of producing value-added products (energy and biofertilizers), reducing the destabilization of the process and GHG emissions, and increasing the recovery and resilience of the WWTP.

To do this, a pilot system will be validated for the recovery of WWTP sludge based on:

- 1) An anaerobic digester operated with OPS obtained in the recovery of alperujo and alpechín (residue from olive processing) and a VFA and CH4 photoacoustic sensor to control possible inhibitions due to VFA accumulation and CH4 reduction in biogas in real time. In addition, various co-substrates (eg treated vegetable water, agro-industrial residues such as fats and meat meal and wine residues) will be tested to carry out co-DA.
- 2) A cost-efficient physicochemical biogas cleaning process (with a minimum contribution of chemicals) for the simultaneous elimination of CO2 and H2S with the obtaining of a biomethane with a composition of CH4>95% and CO2<2% (BOE-A-2018- 14557) and elemental sulfur as a by-product. The process is based on a washing system at atmospheric pressure in an absorption-stripping configuration with a self-regenerating absorbent liquid with high alkalinity and buffer capacity supplemented with Fe3+-AEDT (which means savings in energy consumption and investment costs).
- 3) A nature-based solution for the stabilization (mineralization of volatile matter and dehydration) of DA digestate consisting of an HTD to obtain a 50% mineralized and dehydrated biosolid.
- 4) A cost-efficient system for the energy use of biogas and biomethane (yield of 85%) that contributes to improving the resilience and energy efficiency of the WWTP, reducing the normalized cost of electricity and heat production, compensating for obtaining biomethane.

IMAGE OF THE PROJECT

Concept and scheme of the ENEDAR process for the recovery of WWTP sludge



PROJECT APPROACH WITHIN THE WATER CYCLE

| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
|-------------------------|------------|------------------|-------------|
| NO | YES | YES | YES |

RESULTS ACHIEVED OR EXPECTED

- Energy self-sufficiency of the WWTPs it manages, and sale of surplus energy and value-added material for the formulation of biofertilizers.
- License the technology (new product) to biogas producing companies (FACSA) or engineering companies that implement AD plants. New sustainable product for WWTP plants or agro-industrial plants producing biogas and debiomethane.
- License the technology to manufacturers of sensors/industrial control equipment, allowing them to be a supplier of a new product for biogas producing companies




NEEDS DETECTED TO EVOLVE

The ENEDAR project arises from the need to transform wastewater treatment plants (WWTP) into energy efficient and resilient infrastructures through the development of technologies that allow maximizing the performance of anaerobic digestion (AD) of WWTP sludge, and obtaining products from added value (energy and biofertilizers) in a profitable way, ensuring the sustainability of the water sector in a context of economic crisis and climate emergency.


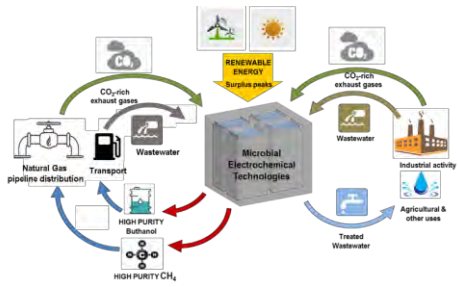

ECONOMIC FIGURES

Project financed by the MICINN in the call for public-private collaboration projects 2021. File No.: CPP2021-008427. Total budget 1,104,928.73€

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|  | | R&D+I Group | |
| R&D&I PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 | |
| PROJECT NAME | Closing cycles towards local sustainability in agriculture: production of nutrient-enriched biofertilisers and organic amendments with biopesticidal and biostimulant properties (FERTILAB) | | |
| ORGANIZATION | FACSA | | |
| WEB | https://www.facsa.com/idi-2/fertilab/ | | |
| PARTNERS IN THE PROJECT | | | |
| Universitat Autònoma de Barcelona, Universidad Miguel Hernández, Universitat Politècnica de Catalunya, Institut de Recerca i Tecnologia Agroalimentàries, Basque Centre for Climate Change, FACSA and Castellón City Council. | | | |
| Start date of the Project | 2022 | End date of the Project | 2024 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>FertiLab aims to give a second life to digested wastewater and other sludge by converting it into three main families of products with a critical interest in sustainable agriculture: Mineral fertilizers, biopesticides and biostimulants.</p> <p>From a technical point of view, two most important aspects must be highlighted: on the one hand, digested sludge is inherently produced locally, so the solutions proposed in FertiLab can also be implemented locally, with the clear benefits that this entails. On the other hand, the proposal includes important technical efforts to evaluate the possible use and application of the bioproduct obtained, thus promoting the successful commercialization and market acceptance of the new biologically based agricultural ingredients developed. In addition to that, the creation of a new Living Lab for Sustainable Fertilization will act as a catalyst towards the implementation of an open platform available where all new and existing agricultural proposals can be studied technically, environmentally and economically.</p> <p>In summary, FertiLab is designed to develop specific lines of research to promote local, sustainable and low-impact agriculture, with a wide variety of parallel benefits in related and unrelated sectors.</p> | | | |
| IMAGE OF THE PROJECT | | | |
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| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| NO | NO | YES | YES |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <ul style="list-style-type: none"> – Mineral fertilizers enriched with nutrients present in the sludge: especially struvite and, secondarily, vivianite. – Biopesticides through solid state fermentation, a technology in which sludge is inoculated with specific strains to produce a stabilized organic amendment with pesticide properties against a predefined pest. – Biostimulants through solid state fermentation, where sludge is inoculated with specific strains that produce a large number of defined bioproducts that improve specific properties of the stabilized organic amendment. These properties may include better plant growth, higher production, better qualities, etc. | | | |
| NEEDS DETECTED TO EVOLVE | | | |
| FertiLab is a multidisciplinary proposal where digested sludge, a waste available practically throughout Spain, changes its paradigm from waste to resource to produce value-added products. It is well known that this waste will become waste that is increasingly difficult to manage in accordance with the new regulations. | | | |
| ECONOMIC FIGURES | | | |
| Project PLEC2022-009252 funded by MCIN/AEI /10.13039/501100011033 and by the European Union NextGenerationEU/ PRTR. | | | |

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|  | | R&D+I Group | |
| R&D&I PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 | |
| PROJECT NAME | Development of a predictive tool for flood impact assessment (FLOODS) | | |
| ORGANIZATION | FACSA | | |
| WEB | https://www.facsa.com/idi-2/flood/ | | |
| PARTNERS IN THE PROJECT | | | |
| FACSA | | | |
| Start date of the Project | 2023 | End date of the Project | 2024 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>The main objective of the FLOODS project is to develop a predictive tool that allows quantifying the impact caused by a flood and proposing improvements in a risk area.</p> <p>For this hydraulic modeling, both natural and artificial drainage will be taken into account, on which modifications can be proposed to improve the behavior of runoff and reduce the resulting draft. The main novelty lies in the development of a comprehensive system, that is, a simulation model that considers the process variables that govern the surface conditions, together with the stormwater and sewage networks.</p> | | | |
| IMAGE OF THE PROJECT | | | |
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| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| NO | NO | NO | YES |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>As a result, a predictive tool will be obtained that allows support for decision-making to improve infrastructure, based on flood risk. This will be calculated for different precipitation scenarios and will take into account the interaction between the depth obtained at the surface and the potential for stormwater evacuation.</p> | | | |
| NEEDS DETECTED TO EVOLVE | | | |
| <p>Due to Climate Change, the rain events that occur are increasingly more intense, concentrating these in a short moment of time, causing serious flooding. Thus, it is necessary to study this important problem, determining what the impact of a flood may be in the given area and what solutions can be proposed to mitigate its effect.</p> | | | |
| ECONOMIC FIGURES | | | |
| <p>Co-financed by the Valencian Innovation Agency (AVI) and by the European Union through the Program to Promote Innovative Public Procurement (CPI), Line 1: Promotion of R&D&I projects aimed at CPI tenders with Number of File INNCP1/2023/1. Action financed by the European Union through the European Regional Development Fund (ERDF) Program of the Valencian Community 2021-2027.</p> | | | |

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|  | | R&D+I Group | |
| | | R&D&I PROJECTS - PORTFOLIO | |
| | | PERIOD: 2021-2023 | |
| PROJECT NAME | An integrated platform of novel cost and energy-efficient conversion technologies producing liquid and gaseous bioFUELS from sustainable biogenic residues validated for direct use in fuel cells (FUELS-C) | | |
| ORGANIZATION | FACSA | | |
| WEB | NOT YET AVAILABLE | | |
| PARTNERS IN THE PROJECT | | | |
| FACSA, LEITAT, VLAAMSE INSTELLING VOOR TECH ONDERZO, COMMISSARIAT A L ENERGIE ATOMIQUE ET AUX ENERGIE, BLUENERGY REVOLUTION, UNIV GIRONA, UNIV BURGOS, GOODFUELS, CONSIGLIO NAZIONALE DELLE RICERCHE, MAGELLAN CIRCLE | | | |
| Start date of the Project | 2024 | End date of the Project | 2027 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>Fuels-C aims to develop an integrated platform of innovative energy-efficient conversion technologies validated in TRL5, including bioelectrochemically assisted CH₄ production, bioelectrochemical NH₃ production, gasification, microbial electrosynthesis and electroreduction. Various biogenic waste (biodegradable and non-biodegradable) will be converted under mild conditions into CH₄, NH₃, formic acid and ethanol, through two main production routes, using renewable energy, thus allowing efficient storage of surplus energy in the form of chemicals.</p> <p>All four biofuels can be used out of the box, but Fuels-C will also test them in FCs for electricity production: gaseous NH₃ and CH₄ in SOFC, liquid ethanol and formic acid in DLFC. The power density, energy efficiency and stability of each process will be validated. The technologies will be modeled at the process level, for the description of interfacial phenomena, and at the system level, giving rise to integrated Digital Twin processes. This second model, together with a raw materials mapping tool, will provide relevant data for circularity assessment, costing, benchmarking and replication in other relevant use cases.</p> | | | |
| IMAGE OF THE PROJECT | | | |
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| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| NO | NO | YES | YES |
| RESULTS ACHIEVED OR EXPECTED ² | | | |
| The development of an integrated platform of innovative energy-efficient conversion technologies validated in TRL5 is expected. This is expected to create new trade opportunities and strengthen the EU's leadership in science and technology and the biofuels market. | | | |
| NEEDS DETECTED TO EVOLVE | | | |
| Advanced biofuels represent an important piece of the puzzle in the EU's pursuit of climate neutrality, helping to decarbonise transport sectors and reduce the EU's dependence on fossil fuels. Fuels-C aims to contribute to this search by increasing the availability of two liquid and two gaseous advanced biofuels for maritime and road transport, produced from biogenic organic waste and CO ₂ . | | | |
| ECONOMIC FIGURES | | | |
| Project funded by the call HORIZON-CL5-2023-D3-02-07 with a total project budget of €3,999,386.25 | | | |

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|  | | R&D+I Group | |
| PROJECT NAME | | R&D&I PROJECTS - PORTFOLIO | |
| ORGANIZATION | | PERIOD: 2021-2023 | |
| WEB | | Bioelectroconversion of orGAnic waste streams and CO2 into sustalnAble fuels (GAIA) | |
| PARTNERS IN THE PROJECT | | FACSA | |
| LEITAT as project leader, FACSA and University of Girona | | | |
| Start date of the Project | 2021 | End date of the Project | 2022 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>GAIA project aims developing novel, energy-efficient solutions for obtaining both liquid (butanol) and gas (methane) biofuels, based on microbial electrochemical technologies (MET). MET use electroactive microorganisms to catalyse the electrochemical process of CO2 conversion to fuels, they operate under mild conditions and without need of externally produced H2, thereby decreasing the energy requirement of the process.</p> <p>GAIA will achieve these goals through improvement of electrode materials and reactor geometries by additive manufacturing, enhancement of electrode-microorganism interaction and bioprocess engineering approaches. The technology will be validated at laboratory-scale and a complete techno-economical, replicability and societal assessment will pave the ground for benchmarking and commercialization of the technology in the future.</p> | | | |
| IMAGE OF THE PROJECT | | | |
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| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| NO | NO | YES | YES |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>The first stage has focused on improving the electrode materials and the geometry of the reactor through additive manufacturing, with the aim of improving the biology of the process. With this, a novel reactor has been designed and built and is currently being validated on a laboratory scale. Thanks to this, techno-economic analysis will be carried out, an evaluation of its replicability and its social impact that will allow the analysis and identification of the key aspects for its subsequent industrial commercialization. The results of the project, together with an exploitation plan, will establish the roadmap for the implementation of the technology in the market in the short and medium term.</p> | | | |
| NEEDS DETECTED TO EVOLVE | | | |
| <p>Arise as a need with renewable feedstocks, such as wastewater and CO2, for its bioconversion into sustainable fuels. Paving the way for an alternative to achieve a future decarbonized economy, boosting the development of Carbon Capture and Utilisation Technologies (CCUs) and opening new opportunities for the biobased processes.</p> | | | |
| ECONOMIC FIGURES | | | |
| <p>GAIA project was funded under the frame of the call "Proyectos de I+D+I en Líneas estratégicas 2021" funded by the Spanish Ministry of Science and Innovation. For three years, the consortium formed by Leitai Technological Center (as coordinator), Universitat de Girona (LEQUIA and gEMM research groups) and Sociedad Fomento Agrícola Castellonense (FACSA)</p> | | | |




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|  | | R&D+I Group | |
| R&D&I PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 | |
| PROJECT NAME | Development of a Hydrodynamic Digital Twin for the control of WWTPs (GEODA) | | |
| ORGANIZATION | FACSA | | |
| WEB | https://www.facsa.com/idi-2/geoda/ | | |
| PARTNERS IN THE PROJECT | | | |
| FACSA | | | |
| Start date of the Project | 2022 | End date of the Project | 2024 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>The main objective of the project is the development of a digital twin in WWTP biological reactors based on Computational Fluid Dynamics (CFD) and that allows its control in real time in a precise and efficient way. The DG will be a control tool that will make use of an artificial neural network (ANN) trained through CFD simulation to determine the distribution of hydrodynamic parameters inside the reactors, thus solving the problem of computing time and computational resources of the simulations. CFD, but retaining the precision in the distribution necessary for the new control.</p> <p>Specifically, the neural network will be trained to learn the hydraulic behavior inside the biological reactor, allowing the distribution of the hydrodynamic variables to be resolved in a very short time from results generated through CFD simulations of the reactor for different operating scenarios of this reactor. treatment stage. Through this tool based on the prediction of the ANN through CFD simulation, a new paradigm is proposed in the control of WWTP.</p> | | | |
| IMAGE OF THE PROJECT | | | |
|  | |  | |
| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| NO | YES | NO | YES |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>The results of the CFD simulation will be transferred to the neural network, providing a high level of detail for learning and verification. The Hybrid Digital Twin will therefore calculate the biochemistry on the hydrodynamic solution, allowing this double distribution (hydrodynamic and biochemical variables) to be available throughout the reactor and in real time. This enormous amount of information calculated inside the digital twin of the WWTP reactor and validated by field probes, will open new ways to control and operate the reactors, in a more reliable and efficient way, and even in a predictive way.</p> | | | |
| NEEDS DETECTED TO EVOLVE | | | |
| <p>Any conventional purification system entails a very significant energy consumption that is difficult for the beneficiary to assume. Smaller WWTPs are much less energy efficient than large capacity ones and entail greater specific electrical consumption due to the lack of automatic regulation and energy optimization systems, generating notable technical problems (faulty operation and suboptimal quality of the treated water) and economic problems (excessive cost overruns) in its management and exploitation, making it unviable in many cases.</p> <p>The attempt to save on these types of plants frequently results in poor functioning of the infrastructure, and even its abandonment. This makes it essential to innovate in this field with the purpose of guaranteeing the technological, economic and environmental sustainability of these key infrastructures, overcoming the current problems of operation, maintenance and economic support that hinder or prevent their operation in many cases, and also converting them into producers. net of renewable energies and resources.</p> | | | |
| ECONOMIC FIGURES | | | |
| Co-financed by the Valencian Innovation Agency (AVI) through the Promotion Line for R&D&I projects intended for Public Innovation Procurement tenders, with reference INNCP1/2022/1, and has a total budget of 100,973.58 euros. | | | |


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|  | | R&D+I Group | |
| R&D&I PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 | |
| PROJECT NAME | From the material to the hydrogen generation electrolyser. Advanced electrodes based exclusively on cheap and abundant metals (H2VAL) | | |
| ORGANIZATION | FACSA | | |
| WEB | https://www.facsa.com/idi-2/h2val/ | | |
| PARTNERS IN THE PROJECT | | | |
| FACSA, PRIMALCHIT SOLUTIONS,, ITQ-UPV, ELECTROTECNIA MONRABAL, ADYPAU INGENIEROS | | | |
| Start date of the Project | 2022 | End date of the Project | 2025 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>The H2VAL ELECTROLYZER project aims to develop a 10kW electrolyser for the production of hydrogen, combining the knowledge and capabilities of technological centers and companies and where innovation is pursued in the composition and nature of the electrodes that allows avoiding the use of critical materials and elements, not very abundant and expensive in the electrolyzer, looking for alternatives based on the use of abundant metals and renewable materials in order to reduce the costs of the equipment from the current values, approximately around €1,000,000/kW to values around €600,000/kW. FACSA will be in charge of the design, construction and operation of the water treatment equipment to obtain water with the appropriate qualities for use in the electrolyzer.</p> | | | |
| IMAGE OF THE PROJECT | | | |
|  | | | |
| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| NO | NO | YES | NO |
| RESULTS ACHIEVED OR EXPECTED | | | |
| Preparation of materials and electrocatalysts, design of the electrolyzer and development of the membrane/electrode assembly. | | | |
| NEEDS DETECTED TO EVOLVE | | | |
| <p>To achieve the decarbonization objectives set by the European Union, it is necessary to look for alternatives. The search for sustainable solutions to the impending energy crisis, both on a small and large scale, has become one of the most urgent challenges on the path to reducing our dependence on conventional energy sources based on fossil fuels. In this framework, electrochemistry plays an essential role, since it allows transformations between electrical and chemical energy and vice versa, thus allowing the storage of energy in the form of chemical bonds. In particular, when supply from renewable sources exceeds demand, excess electrical energy can be used to carry out non-spontaneous electrochemical reactions (in electrolysis cells) and stored in the most convenient form of chemical energy.</p> | | | |
| ECONOMIC FIGURES | | | |
| <p>The project has been financed by the "Incentive program for the innovative value chain and knowledge of renewable hydrogen, incentive program 4: Basic-fundamental research challenges, innovative pilots and training in key enabling technologies", within the framework of the Recovery, Transformation and Resilience Plan of the IDAE and financed by the European Union through NextGenerationEU Funds. PERTE-ERHA PR-H2VAL4-C1-2022-0090</p> | | | |




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|  | | R&D+I Group | |
| R&D&I PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 | |
| PROJECT NAME | Solar hydrogen generation from wastewaters in inexpensive and scalable photocatalytic panels (HACDOS) | | |
| ORGANIZATION | FACSA | | |
| WEB | https://www.facsas.com/idi-2/hacdos/ | | |
| PARTNERS IN THE PROJECT | | | |
| Facsas (Coordinator), EneGás, Universitat Rovira i Virgili and Fundació Eurecat. | | | |
| Start date of the Project | 2022 | End date of the Project | 2025 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>The HACDOS project aims at designing, producing and validating inexpensive solar photocatalytic panels for hydrogen production from wastewaters. This innovative technology has already been successfully tested at laboratory scale and protected by European Patent Applications. The endeavour of the project will focus on pilot scale validation using real wastewaters as feedstocks and under natural sunlight, ensuring an early market uptake. The process entails degradation of aqueous pollutants, mostly organic, by solar photocatalytic reforming (photoreforming) under anaerobic conditions with concomitant hydrogen production.</p> <ol style="list-style-type: none"> 1) Knowledge build upon the process and optimization. Determination of the optimum photocatalytic system and reaction conditions to maximise both pollutant removal and hydrogen production depending on the different composition of wastewaters, and postulation of the relationship between efficiency and physico-chemical features of the wastewaters. 2) Wide scope of applicability. Define diverse wastewater types and origin, and possible industrial, agricultural and/or domestic treatment plants where the novel photocatalytic panels might be most suited for hydrogen production under solar irradiation, combined with convenient pollutant degradation. 3) Consolidate affordable solar photocatalysis for wastewater valorisation. Design and construction of replicable and robust panels and their modular assembly into pilot plants for solar photocatalytic wastewater treatment and hydrogen production to be tested under natural sunlight, keeping the costs of fabrication as low as possible. 4) Maximise hydrogen yields and decontamination. Determination of the most effective pilot plant setup and reaction conditions for each kind of wastewater regarding fastest hydrogen evolution rate and purity and pollutant degradation. 5) Establish a rapid market uptake strategy. Identify target scenarios for industrial scale implementation and develop a business plan for both the technology and produced hydrogen exploitation to ensure a rapid market uptake and transcendental water-energy economy transformation. | | | |
| IMAGE OF THE PROJECT | | | |
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| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| NO | YES | NO | YES |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>Pollutant degradation in wastewaters Hydrogen production via waste valorisation Novel inexpensive solar panel reactors New economic framework for water-energy binomial</p> | | | |
| NEEDS DETECTED TO EVOLVE | | | |
| <p>The sustainability of future energy schemes will largely depend on a successful transition from the current overexploitation of fossil fuels to the efficient and judicious use of renewable energy sources. Moreover, efficient use and reuse of key resources such as water is of paramount importance to protect aquatic ecosystems and help our adaptation to climate change. This proposal encompasses an integrated strategy combining both clean energy and water treatment.</p> | | | |
| ECONOMIC FIGURES | | | |
| Project financed by the MICINN in the call for public-private collaboration projects 2021. Total budget 555.116,72 € | | | |

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|  | | R&D+I Group | |
| R&D&I PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 | |
| PROJECT NAME | Intelligent Management of Industrial Discharges in Rivers (IVERGEST) | | |
| ORGANIZATION | FACSA | | |
| WEB | https://www.facsa.com/idi-2/ivergest/ | | |
| PARTNERS IN THE PROJECT | | | |
| ZINNAE, Ideya, Facsa y Arateck | | | |
| Start date of the Project | 2021 | End date of the Project | 2022 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>IVERGEST intends to develop a decision support system that allows predicting the behavior of an industrial discharge in the receiving channel. The system will provide the industry with information with a sufficient time margin to avoid significant effects on river ecosystems or other users. , the digitization of the dumping process of a collaborating industry is proposed through the use of a hydrodynamic mathematical model and the development of forecasting algorithms, as well as available public data such as those provided by SAIH Ebro.</p> <p>The purpose is for the industry to be able to modify its dumping operations for a time, reducing the negative effects. These actions depend on each particular situation and may include the temporary stoppage of the discharge, alteration of its frequency, modification of its flow, selection of another discharge point, or other strategies.</p> | | | |
| IMAGE OF THE PROJECT | | | |
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| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| YES | NO | NO | YES |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>Thanks to IVERGEST, the user will have a tool that will allow them to monitor the effect of the spill in real time (scope and intensity of the polluting plume), which will allow them to take different actions to minimize the impact of the spill if necessary.</p> <p>In this way, the industry will avoid the environmental and economic risks associated with the spill and which are regulated by Law 26/2007 of 23 October. In addition, it opens up the possibility for basin organizations to incorporate this system into the best available technologies for activities subject to European and national regulations on integrated pollution prevention and control (R.D.L. 1/2016).</p> | | | |
| NEEDS DETECTED TO EVOLVE | | | |
| <p>Currently, there is no advance control system on the market for the effects of an industrial spill; however, the environmental and economic risks associated with these spills are enormous.</p> | | | |
| ECONOMIC FIGURES | | | |
| <p>This project has been supported by the Ministry of Industry, Energy and Tourism, receiving aid in the form of a subsidy regulated by the support program for Innovative Business Groups (AEIs). Project budget: €73,287.00</p> | | | |


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|  | | R&D+I Group | |
| R&D&I PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 | |
| PROJECT NAME | Reuse of wastewater for agricultural irrigation and recharge (LIFE AMIA) | | |
| ORGANIZATION | FACSA | | |
| WEB | https://www.facsa.com/idi-2/amia/ | | |
| PARTNERS IN THE PROJECT | | | |
| FACSA as project leader, ARVIA, CSIC, IPROMA, ESAMUR and Atlantis | | | |
| Start date of the Project | 2019 | End date of the Project | 2022 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>LIFE AMIA aims to reuse treated wastewater in agricultural irrigation and aquifer recharge, in order to protect the aquatic environment against contamination caused by pathogens and micro-pollutants not eliminated by conventional activated sludge treatments.</p> <p>The project aims to demonstrate a novel process that guarantees the foreseeable quality requirements in the new European water reuse regulations and promote the reuse of wastewater. To do this, a combination of technologies with low energy consumption will be used. The new process consists of a compact anaerobic-aerobic treatment, which produces biogas and removes organic matter, a treatment with microalgae to recover nutrients and, finally, a combination of adsorption and advanced oxidation process powered by renewable energy, which will eliminate micro-pollutants.</p> | | | |
| IMAGE OF THE PROJECT | | | |
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| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| YES | YES | YES | YES |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>A complete characterization of the organic compounds presents in a Wastewater Treatment Plant (WWTP) was performed under two different approaches, a qualitative screening and a quantitative multicomponent analysis.</p> <p>On the one hand we have carried out a screening analysis to search all possible theoretical organic compounds using several analytical techniques: dynamic headspace and stir bar sorption extraction coupled GC-MS, according to the NIST library, and solid phase extraction with HPLC-QTOF according to the High-Resolution Accurate-Mass Spectral Libraries. The most relevant organic micropollutants were identified by these techniques.</p> <p>On the other hand, we have carried out a quantitative multicomponent analysis by a variety of chromatographic techniques, depending on the chemical properties of the compounds. The organic micropollutants reaching the WWTP in two different seasonal periods were determined by means of these techniques.</p> | | | |
| NEEDS DETECTED TO EVOLVE | | | |
| The European Union is progressively restricting the presence of emerging organic compounds in both reuse and continental waters. Based on the results of this study, alternative options to conventional biological treatments for the removal of emerging organic compounds in WWTPs can be evaluated. | | | |
| ECONOMIC FIGURES | | | |
| The LIFE AMIA project (LIFE18 ENV / ES / 000170) is co-financed by the LIFE Program of the European Commission LIFE 2018 and has a total budget of € 1,945,914. | | | |




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|  | R&D+I Group | | |
| | R&D&I PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 |
| PROJECT NAME | New model for the application and use of reclaimed water in industrial environments in the ceramics sector (LIFE REWAINCER) | | |
| ORGANIZATION | FACSA | | |
| WEB | https://www.facsa.com/idi-2/rewaincer/ | | |
| PARTNERS IN THE PROJECT | | | |
| FACSA, ASOCIACION DE INVESTIGACION DE LAS INDUSTRIAS CERAMICAS (AICE), S.A. MINERA CATALANO-ARAGONESA | | | |
| Start date of the Project | 2023 | End date of the Project | 2027 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>LIFE REWAINCER is a demonstration project that aims to reduce the extraction of fresh water from aquifers, validating water regeneration technologies that allow the direct use of regenerated water in industrial processes that require quality water in the ceramic sector, helping to guarantee the economic development of the region, and increasing the amount of available water sources. The LIFE REWAINCER consortium is made up of a multidisciplinary group of industrial and academic actors who will validate the demonstration plant.</p> <p>The proposed model can be replicated in other sectors and regions, generating more than €0.8M in five years of replication. From the industrial side, FACSA (coordinator) has experience in the construction and management of wastewater treatment plants, while SAMCA is a multinational ceramic company that will be responsible for the application of regenerated water in its industrial processes. The ITC-AICE research institute will contribute its experience and knowledge in the ceramic sector and in environmental analysis techniques. In addition, some regional public sector entities have shown interest in the project and will contribute to the Advisory Board.</p> | | | |
| IMAGE OF THE PROJECT | | | |
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| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| NO | YES | NO | YES |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>The project will have very relevant impacts at different levels, not only during the execution of the project, but also after its execution, thanks to the planned replication and exploitation actions. It is expected that the results obtained in LIFE REWAINCER will promote the adoption of the proposed solutions, not only in the ceramic sector, but also in other industrial sectors that are highly demanding of quality water, such as the textile sector.</p> | | | |
| NEEDS DETECTED TO EVOLVE | | | |
| <p>Recent studies show that by 2050 there will be river basins with severe water stress affecting more than 130 million inhabitants in southern Europe. Additionally, climate change is expected to exacerbate the availability of fresh water for irrigation.</p> | | | |
| ECONOMIC FIGURES | | | |
| Project 101113759 — LIFE22-ENV-ES-LIFE REWAINCER is co-financed by the European Commission's LIFE Program LIFE 2022 and has a total budget of €1,327,027.91. | | | |





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|  | | R&D+I Group | |
| R&D&I PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 | |
| PROJECT NAME | Green solutions for treating groundwater pollution to meet drinking water Directive standard | | |
| ORGANIZATION | FACSA | | |
| WEB | https://www.facsas.com/idi-2/lifespot/ | | |
| PARTNERS IN THE PROJECT | | | |
| The consortium is made up of 6 partners, 5 Spanish and a French partner. FACSA, IRTA, CSIC, EURECAT, NENUPHAR and PROTECMED. | | | |
| Start date of the Project | 2019 | End date of the Project | 2023 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>The fundamental objective of the environmental project is to demonstrate the technical and economic viability of the sustainable treatment of groundwater through the SPOT process. The proposed solution is based on a natural process (NBS), through a treatment with microalgae and low consumption of resources. This treatment will provide water resources in areas vulnerable to nitrates, useful in isolated rural areas, both in the livestock sector as well as in the rural and tourist sectors. The project will address this environmental problem through a climate change adaptation approach.</p> <p>The aim of SPOT is to provide an integrated management of nutrients and organic pollutants caused by agriculture in rural areas of Europe, promoting sustainability and resilience through nature-based solutions and the valorization of algal biomass.</p> <p>To achieve this objective, it is proposed to build two pilot microalgae treatment plants in order to treat groundwater in different locations. The microalgae will subsequently be separated by a DAF process and post-filtration with a cork filter, treating 10 m³ / day and 1 m³ / day, respectively. The advantage of this treatment is that the addition of a compound with a high organic load is not required because atmospheric CO₂ is used as a carbon source.</p> | | | |
| IMAGE OF THE PROJECT | | | |
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| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| YES | YES | NO | YES |
| RESULTS ACHIEVED OR EXPECTED | | | |
| The project, whose completion is scheduled for June 2024, has shown to have quite promising results, achieving a nitrate removal of 47.6 - 97.8% in the microalgae bioreactor and an almost 100% nitrate removal in the biofilter, as well as an elimination of up to 98% of emerging contaminants, allowing compliance with water quality according to the new drinking water directive. | | | |
| NEEDS DETECTED TO EVOLVE | | | |
| The high content of nitrates and micropollutants such as pesticides, antibiotics and ARGs in the groundwater in rural areas affected by on-going intensive agriculture and/or organic fertigation, imply to further optimize the PBR and cork-wood pellet filter to treat water reaching proper water quality standards | | | |
| ECONOMIC FIGURES | | | |
| The project (ref. LIFE18 / ENV / ES / 000199), is co-financed by the LIFE program of the European Commission, LIFE 2018, in the thematic area "LIFE Environment and Resource Efficiency project application" and has a total budget of 2,179,363 €. | | | |



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|  | R&D+I Group | | |
| | R&D&I PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 |
| PROJECT NAME | Advanced technologies for sludge reduction in sewage treatment plants (LOWDOS) | | |
| ORGANIZATION | FACSA | | |
| WEB | https://www.facsa.com/idi-2/lowdos/ | | |
| PARTNERS IN THE PROJECT | | | |
| FACSA, ZINNAE, CENTRO TECNOLÓGICO AGROPECUARIO CINCO VILLAS S.L., INGENIERÍA DE OBRAS DE ZARAGOZA, S.L., ARATECK ELECTRONICS S.L., CLUSTER DE LA MAQUINARIA AGRICOLA DE ARAGON, | | | |
| Start date of the Project | 2023 | End date of the Project | 2024 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>The main objective of the project is to minimize the generation of sludge produced during wastewater purification processes. To this end, the project focuses on the development of an anoxic biological treatment technology, which reduces said production, in turn eliminating the organic load from the treatment plants in an effective way, by consuming COD during biological activity. The validation of the technology will also require the monitoring of key parameters for process control and the development of the IoT server for data processing and visualization.</p> <p>Taking into account that sludge production can be drastically reduced but not separated from the purification process, LOWDOS is proposed as a two-phase project in which the sludge generated will also be monitored with the aim of analyzing alternatives for its use and adapt bioprocesses to improve their characteristics.</p> | | | |
| IMAGE OF THE PROJECT | | | |
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| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| NO | YES | YES | YES |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>The main result of LOWDOS is the technological validation and the definition of the working ranges of the main variables that govern the two processes that make up LOWDOS: the anoxic process and the aerobic process. For this and in this first phase, the expected results are:</p> <ul style="list-style-type: none"> – Design, construction and start-up of a prototype that will be used in technological validation. – Design and implementation of the monitoring and control system for water quality sensors. – Technological validation and optimization of the working parameters of the anoxic process and the aerobic process. – Characterization of the sludge generated in both processes. | | | |
| NEEDS DETECTED TO EVOLVE | | | |
| <p>Since the recent publication of RD 1051/2022, of December 27, which establishes standards for sustainable nutrition in agricultural soils, concern has grown about the final use that can be given to sewage sludge, due to the limitations established by said RD. Addressing this problem effectively consists of developing new wastewater treatment processes that minimize the generation of sludge. Since, in this way, not only the difficulties associated with sludge management are reduced, but also the operating costs linked to the energy consumption necessary for its treatment.</p> | | | |
| ECONOMIC FIGURES | | | |
| Project funded by the Ministry of Industry, Commerce and Tourism of the Government of Spain and the European Union – Next Generation EU. Call for subsidies to support Innovative Business Groups, corresponding to the year 2023, within the framework of the Recovery, Transformation and Resilience Plan. AEI 2023 CALL, AEI-010500-2023-303 | | | |




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|  | | R&D+I Group | |
| R&D&I PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 | |
| PROJECT NAME | Quantification of micro-nanoplastics in reclaimed waters and agricultural ecosystems. Environmental risk assessment. (MICRONANOCARE) | | |
| ORGANIZATION | FACSA | | |
| WEB | https://www.facsa.com/idi-2/micronanocare/ | | |
| PARTNERS IN THE PROJECT | | | |
| Eurofins IPROMA, IMDEA Water and FACSA | | | |
| Start date of the Project | 2020 | End date of the Project | 2023 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>The μNanoCare project proposes the development and validation of a novel analytical method that allows quantifying the presence of micronanoplastics in different environmental matrices. Thanks to this method, the amount of micronanoplastics present in wastewater, the effectiveness of the different purification processes, will be assessed. for the elimination of micronanoplastics in the WWTP environment, their concentration in reclaimed water and sewage sludge, and their environmental fate in agricultural ecosystems. In addition, the ecotoxicological effect of said micronanoplastics with aquatic and terrestrial organisms will be assessed. , and the presence of these in groundwater will be evaluated in order to make a first assessment of human exposure through water consumption. Finally, the μNanoCare project will propose improvements in current wastewater treatment systems, making an assessment of the environmental and cost impact of alter processes proposed natives.</p> <p>The objectives of the project are:</p> <ul style="list-style-type: none"> Development of an analytical, sensitive and selective method that identifies and quantifies these micro-nanoplastics in different matrices Development of an efficient sampling method that allows the collection of micro-nanoplastics in a reliable and affordable way. Evaluate and optimize the treatment capacity of the technologies currently implemented in WWTP in terms of micro-nanoplastics. Determine the fate and environmental load of micronanoplastics in agricultural ecosystems where sludge is applied and reclaimed water is used. Evaluate the exposure and the potential risk associated with these particles on aquatic, terrestrial, and human health organisms. | | | |
| IMAGE OF THE PROJECT | | | |
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| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| NO | NO | YES | YES |
| RESULTS ACHIEVED OR EXPECTED | | | |
| The studies carried out to date can conclude that both techniques applied for the quantification of micro and nanoplastics are complementary and allow working in different test matrices with satisfactory results. | | | |
| NEEDS DETECTED TO EVOLVE | | | |
| Pollution by plastic material is a reality in our days, as reflected by its agglomeration in seas, rivers and road ditches. This is a great environmental problem, but its possible health effects are unknown when these plastics are degraded in small sizes and are capable of being assimilated by the human body. For this reason, in addition to other reasons, it is necessary to undertake the task of determining its presence in water, in consumption systems and in waste generated in agricultural ecosystems. | | | |
| ECONOMIC FIGURES | | | |
| The project has been funded by the Ministry of Science and Innovation and the State Research Agency (RTC2019-007261-5). | | | |

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|  | | R&D+I Group | |
| | | R&D&I PROJECTS - PORTFOLIO | |
| | | PERIOD: 2021-2023 | |
| PROJECT NAME | Next advanced biofuels from AlGae biomAss and oRganic biogenic wAstes for electricity generation through fuel cells application (NIAGARA) | | |
| ORGANIZATION | FACSA | | |
| WEB | NOT YET AVAILABLE | | |
| PARTNERS IN THE PROJECT | | | |
| FACSA, COMMISSARIAT A L ENERGIE ATOMIQUE ET AUX ENERGIE, POLITECNICO DI TORINO, UNIVERSIDAD DE ALMERIA, GAZOTECH, RISE RESEARCH INSTITUTES OF SWEDEN AB, LOMARTOV SL, LULEA TEKNISKA UNIVERSITET, SOLYDERA SPA, ECOLE POLYTECHNIQUE FEDERALE DE LAUSANNE | | | |
| Start date of the Project | 2024 | End date of the Project | 2028 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>NIAGARA's project intends to make a significant contribution to the development of a sustainable process chain, involving the shaping and procurement of openly available EU biogenic wastes (wastewaters, digestate, sewage sludge etc.), a production of carbohydrate-rich microalgae, an innovative continuous and flexible HTC process to convert the mix of biogenic wastes and microalgae into a solid fraction (hydrochar1) and an aqueous phase that will in turn be converted into an advanced biofuel (a biogenic syngas rich in hydrogen) via gasification and aqueous phase reforming. Subsequent syngas cleaning processes are envisaged to ensure a full compatibility of the syngas to the solid oxide fuel cells for an optimized production of electricity. NIAGARA's value chain will feature a very low carbon balance with a strong potential to become carbon negative overtime after further rounds of optimization as the technology will mature.</p> <p>NIAGARA will dramatically improve advanced biofuel production by combining complementary scientific and industrial know-how while fostering various promising market applications (e.g., fuel cells). the NIAGARA methodology, which derives from the ambitious idea of producing advanced biofuels from EU-widely available biomasses and wastes on a fully circular basis, making this value chain ultimately sustainable. The main market application that is sought in the NIAGARA project is the generation of electricity using highly efficient SOFC. This implies (ii) individually developing key innovative and carbon-efficient processes, (ii) assessing their performances (carbon footprints, energy balance and production yields), and (iii) demonstrating their integration and global compatibility to achieve the objective of negative carbon emission on the biofuel production chain up to the generation of electricity.</p> | | | |
| IMAGE OF THE PROJECT | | | |
| NOT YET AVAILABLE | | | |
| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| NO | YES | YES | YES |
| RESULTS ACHIEVED OR EXPECTED | | | |
| Ultimately, NIAGARA will contribute towards lowering the technological, economic, and social barriers faced by the development and maturation of the contemplated processes at TRL5. The outcome of this work will contribute directly and significantly to EU's overall renewal energy targets. | | | |
| NEEDS DETECTED TO EVOLVE | | | |
| <p>Current trends in fossil fuel-based energy supply and use are unsustainable. Without decisive action, energy-related greenhouse gas (GHG) emissions will more than double by 2050 and rising oil demand will raise concerns about security of supply. The critical importance of dependence on fossil fuels and oil is mainly in transport (94% of energy use in transport represented 64.5% of oil consumption in 2014, i.e. 2 425 Mtoe) . If the world wants to reach net zero emissions by 2050, fossil fuel use in transport will have to fall from 90% to less than 10%, while biofuels will have to rise to 15%3</p> <p>Unlike their fossil counterparts, biofuels are produced from organic matter found in biomass. Microalgae capture large amounts of CO2 and store energy in the form of biomolecules such as lipids, proteins and sugars. Hydrothermal processes are particularly adapted for wet resources, avoiding drying steps and costs. Furthermore, the conversion (either liquefaction, HTL or carbonization, HTC) is very efficient. These properties give third-generation biofuels greater GHG reduction potential than their counterparts (thus paving the way toward carbon neutrality).</p> | | | |
| ECONOMIC FIGURES | | | |
| Project funded by the call HORIZON-CL5-2023-D3-02-07 with a total project budget of €3,965,334.75 | | | |

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|  | | R&D+I Group | |
| R&D&I PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 | |
| PROJECT NAME | Industry 4.0 technologies that allow determining the impact of spills and applying solutions to reduce their impact on the environment. (PIVER) | | |
| ORGANIZATION | FACSA | | |
| WEB | https://www.facsa.com/idi-2/piver/ | | |
| PARTNERS IN THE PROJECT | | | |
| FACSA, ZINNAE, IDEYA and CONTROL7 | | | |
| Start date of the Project | 2020 | End date of the Project | 2021 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>The PIVER project is an industrial research project whose main objective is to develop an economically viable technology that makes it possible to assess the impact of a spillway based on its characteristics. Thanks to this, it will be possible to propose, in a safe and precise way, the corrective measures that allow to improve the diffusion of said discharges in the receiving channel and minimize their impact on the environment. The project will require intra-company management applications and will integrate digital enablers from Industry 4.0, such as sensors, embedded systems and drones equipped with thermal imaging cameras. The combination of these systems with a two-dimensional hydraulic calculation and computational fluid dynamics (CFD) software will allow obtaining validated and accurate models that help in decision-making tasks focused on reducing the impact produced by spills.</p> <p>The development of PIVER will have a very positive impact on the value chain of customers and suppliers. On the one hand, it will make it possible to establish a new work methodology, creating new lines of work to increase the productive activity of the project partners as a direct consequence of the application of these tools. On the other hand, the environmental risk and economic costs associated with the damage caused to the physical environment and ecosystems will be reduced by providing financial guarantees to the companies that produce the spill and that are regulated within the framework of Law 26/2007 of 23 October, on Environmental Responsibility. Likewise, it will allow the Basin organizations to establish the tasks of inspection of discharges, define the points of sampling and, in short, control and regulate in a more appropriate way the activities subject to the European and national regulations of prevention and integrated control of pollution (R.D.L 1/2016)</p> | | | |
| IMAGE OF THE PROJECT | | | |
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| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| NO | YES | NO | YES |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>Thanks to the PIVER project, it has been possible to assess the impact of two discharges in the Aragón and Gállego rivers. In both cases, it has been possible to verify that the discharges suffered a dilution of more than 90% 200 meters downstream from the discharge point and the trajectory of the polluting compounds along the river's discourse has been accurately calculated. The plumes obtained through computer simulation have been satisfactorily contrasted and validated with laboratory analyses and measurements using an aerial thermal imaging camera, which has provided robustness and reliability to the model to be used in other situations with different spills and rivers.</p> | | | |
| NEEDS DETECTED TO EVOLVE | | | |
| <p>Constant population and industry growth have necessitated improvements in the distribution and treatment of wastewater, industrial and drinking water. This has promoted the strengthening of this sector, which has been driven by the implementation of new technologies based on digital transformation, which facilitate the management of this resource.</p> | | | |
| ECONOMIC FIGURES | | | |
| <p>This project has been supported by the Ministry of Industry, Energy and Tourism, receiving aid in the form of a subsidy regulated by the support program for Innovative Business Groups (AEIs). This support program for strengthening "innovation clusters" is inserted in the European strategy to improve competitiveness for innovation. The groups that can benefit from the program's aid are those entities whose innovative potential and critical mass have earned them the recognition of the Ministry of Industry, Trade and Tourism through its registration in the Register of Innovative Business Groups.</p> | | | |

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|  | | R&D+i Group | |
| R&D&I PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 | |
| PROJECT NAME | Environmental management platform applied to air pollution control in ports based on AI and computational fluid simulation (PORTMOD) | | |
| ORGANIZATION | FACSA | | |
| WEB | https://www.facsa.com/idi-2/portmod/ | | |
| PARTNERS IN THE PROJECT | | | |
| FACSA and Potsur | | | |
| Start date of the Project | 2021 | End date of the Project | 2023 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>The PORTMOD project consists of the development of an environmental impact management platform in port environments based on rapid response software on an urban scale to manage in an adaptive, systematized and evaluable way the problems caused by the impact of particulate and gaseous pollutants in areas ports, combining the application of CFD simulation techniques and artificial intelligence. In addition, the system will allow the validation of “ad-hoc” engineering solutions that mitigate the environmental impact, allowing not only the monitoring and modeling of the environmental problem, but also the decision-making regarding the solutions to be implemented to mitigate the problem.</p> | | | |
| IMAGE OF THE PROJECT | | | |
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| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| NO | NO | NO | NO |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>On the one hand, developments have been made in quality sensors to measure certain chemical species and suspended particles. On the other hand, the CFD simulation has made it possible to study in a precise way the aerodynamic effect that the different obstacles of the terrain (docks, houses, sea, walls, etc.) cause on the dispersion of pollutants. Finally, specific engineering solutions have been proposed through the use of CFD tools, such as the implementation of strategically located windbreaks, specific systems to precipitate the entrained particles, such as sprinklers and humidifiers, bulk protection, etc., and their effectiveness has been evaluated on a real scale using a digital urban model. From this project, differential developments will be obtained with which to reduce the environmental impact.</p> | | | |
| NEEDS DETECTED TO EVOLVE | | | |
| <p>Currently, seaports represent one of the most relevant strategic logistics assets for any country. According to figures from the World Trade Organization (WTO), more than 80% of the goods traded in the world move by sea, and Some data indicate that the volume of international transport will increase up to four times by 2050. In recent years, concern for the environment in the port environment and the surrounding urban area has increased notably, mainly due to the deterioration in air quality. This has caused the development of the activity and growth of the ports not only to focus from the economic point of view, but also from the environmental point of view.</p> <p>At times, environmental policies are complex to implement since in certain cases they limit the range of action of port activity. That is why it is necessary to provide new proposals applied to provide solutions in environmental matters and that not only do not hinder activity in ports, but also enhance it.</p> | | | |
| ECONOMIC FIGURES | | | |
| Project co-financed by the European Union through the Operational Program of the European Regional Development Fund (ERDF) of Comunidad Valenciana 2014-2020, with reference INNCAD / 2021/27, and has a total budget of 346,758.40 euros. | | | |




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|  | R&D+i Group | | |
| | R&D&I PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 |
| PROJECT NAME | New model for predictive maintenance of WWTPs based on artificial intelligence (PREDICTEDAR) | | |
| ORGANIZATION | FACSA | | |
| WEB | https://www.facsa.com/idi-2/predictedar/ | | |
| PARTNERS IN THE PROJECT | | | |
| FACSA, GRUPO SANDO | | | |
| Start date of the Project | 2023 | End date of the Project | 2024 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>The PREDICTEDAR project seeks to make a substantial leap in WWTP management, moving from the traditional vision based on experience and preventive-corrective maintenance to intelligent and predictive management of its life cycle that allows predicting the degradation of its critical components. , as well as anticipating the operation and maintenance activities necessary to achieve certain optimization objectives: availability, energy consumption, cost, etc.</p> | | | |
| IMAGE OF THE PROJECT | | | |
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| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| NO | NO | NO | YES |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>It is expected to obtain an intelligent system capable of updating itself in real time based on the availability of new data to provide the WWTP with evolutionary intelligence that allows it to learn from its own experience and better anticipate failures, avoiding them. In this way, the reliability and availability of the plant will significantly increase while reducing costs, thanks precisely to the anticipatory capacity that the new system will provide.</p> | | | |
| NEEDS DETECTED TO EVOLVE | | | |
| <p>PREDICTEDAR is aligned with FACSA's R&D&i strategy of "Fostering innovation in the organization to increase its competitiveness in the Comprehensive Water Cycle sector through the improvement of products, processes and services, aligning with the R&D vision D+i of the company" and in particular with the strategic lines of DIGITALIZATION OF PROCESSES, Modeling, IoT and decision-making support tools, and WASTE TREATMENT AND VALUATION, Innovation in treatment, management and recovery.</p> | | | |
| ECONOMIC FIGURES | | | |
| <p>The project has received financial support from the Industrial Technological Development Center (CDTI) and the Andalusian Technological Corporation (CTA). Regarding the support of CDTI, this project has been co-financed by the European Regional Development Fund (ERDF), with the objective to promote technological development, innovation and quality research, under project reference IDI-20230322. Budget. Likewise, it has private financing from the Andalusian Technology Corporation (CTA), CTA File No.: 23/1111.</p> | | | |

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|  | | R&D+i Group | |
| R&D&I PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 | |
| PROJECT NAME | Digitized for quality control of Regenerated Water (SADAR) | | |
| ORGANIZATION | FACSA | | |
| WEB | https://www.facsa.com/idi-2/sadar/ | | |
| PARTNERS IN THE PROJECT | | | |
| The project consortium is formed by FACSA (coordinator), BIOTICA and EUROFINs IPROMA | | | |
| Start date of the Project | 2021 | End date of the Project | 2023 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>The project entitled " Advanced Digitized System for quality control of Regenerated Waters (SADAR) "seeks the development of an innovative platform for the management of the quality of reclaimed waters, taking into account microbiological parameters.</p> <p>The objective is to digitize the information generation process from water regeneration facilities, traditionally known as wastewater treatment plants (WWTP). The conversion of data generated to digital signals in an innovative device that allows the detection of multiple pathogens that are in turn indicators of the quality of reclaimed water is one of the novelties of this project. The SADAR platform will also allow the management of wastewater regeneration treatments remotely and will have a Decision Support System (DSS). The combination of IOT and GIS technologies in the development of this platform and its associated device (PathLab) are key aspects that allow optimizing water purification processes thanks to the inclusion of new technologies and innovative developments in the generation of biosensors.</p> <p>Specific and technical objectives.</p> <ul style="list-style-type: none"> Increased efficiency and digitization of the current system for the detection of microbiological parameters in WWTPs. Improve the effectiveness of the risk plan system for the correct management of reclaimed water. Design of a digital device for the rapid and effective measurement of the microbiological parameters required by the regulations. Reduction of the time necessary for the information of the state of the reclaimed waters in microbiological terms. Facilitate access to information by the management bodies of the WWTP. Development of a rapid detection system with a low detection limit to adapt the PathLab device to current regulations. It is intended to define the feasibility of new virus preconcentration studies and their incorporation into the PathLab device. | | | |
| IMAGE OF THE PROJECT | | | |
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| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| YES | YES | NO | YES |
| RESULTS ACHIEVED OR EXPECTED | | | |
| The implementation of this project will result in the development of an innovative platform for the management of the quality of reclaimed water according to microbiological parameters. | | | |
| NEEDS DETECTED TO EVOLVE | | | |
| The efficiency of water treatment in WWTP requires a detailed control of the processes and stages that take place in these facilities. At present, part of this control is carried out automatically but digitization and automation is still necessary in the control of other parameters, such as microbiological parameters. The measurement and monitoring of these microbiological parameters in an automated way is currently a challenge that is intended to be solved in this project to guarantee the good management of reclaimed water. | | | |
| ECONOMIC FIGURES | | | |
| INNCAD / 2021/95 Total project budget for FACSA: 266,579.00 euros. Project co-financed by the European Union through the Operational Program of the European Regional Development Fund (ERDF) of the Valencian Community 2014-2020 | | | |




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|  | | R&D+i Group | |
| R&D&I PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 | |
| PROJECT NAME | Optimization of tertiary WWTP treatments through the use of CFD simulation techniques and experimental obtaining of pollutant degradation kinetics by means of UV radiation (SIMUV) | | |
| ORGANIZATION | FACSA | | |
| WEB | https://www.facsca.com/idi-2/simuv/ | | |
| PARTNERS IN THE PROJECT | | | |
| FACSA | | | |
| Start date of the Project | 2021 | End date of the Project | 2022 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>SIMUV seeks to improve the performance and efficiency of tertiary WWTP treatments, from the physical-chemical pretreatment stage to its subsequent disinfection using UV radiation. The improvement is intended to be carried out through the development of CFD models of physical systems -chemicals and UV reactors, which allow simulating hydraulic improvements in their operation and, as a result, optimizing the disinfection of treated water.</p> <p>The physicochemical equipment available at WWTPs, consisting of tanks and agitators, can be a valuable tool to improve the quality of the effluent and align it with compliance with the new European Regulation. Ultraviolet light effectively destroys pathogenic microorganisms, but the energy consumption of UV lamps is quite high, so it is especially interesting to optimize the hydraulic behavior to make the most of energy consumption. In this sense, CFD simulation tools have shown improvements with respect to laboratory tests, as a result of the hydraulic ignorance of these process units, so that, by means of CFD simulation, it is sought to optimize the mixture, the dosage of reagents or the grade full-scale disinfection.</p> | | | |
| IMAGE OF THE PROJECT | | | |
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| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| YES | YES | NO | YES |
| RESULTS ACHIEVED OR EXPECTED | | | |
| A CFD simulation of physicochemical systems and UV reactors will be obtained that will allow the simulation of hydraulic improvements in their operation and, as a result, the disinfection of treated water will be optimized. | | | |
| NEEDS DETECTED TO EVOLVE | | | |
| From different public sanitation entities, the need arises to advance towards an integral management of water resources, a water management model that takes into account the expected effects of climate change on hydrometeorological patterns, incorporating the circular economy in the management of the integral cycle of the water. The general objective that is proposed is to increase the level of application of the principles of the circular economy in the integral water cycle with special emphasis on wastewater treatment infrastructures, both at the level of specific processes and technologies as well as integral management. plants and sanitation systems. | | | |
| ECONOMIC FIGURES | | | |
| Co-financed by the Agència Valenciana de la Innovació (AVI) through the Line of Promotion of R & D & I projects aimed at the public Procurement of Innovation, with reference INNCP1 / 2021/4, and has a total budget of 74,709.39 euros. | | | |

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|  | | R&D+i Group | |
| | | R&D&I PROJECTS - PORTFOLIO | |
| | | PERIOD: 2021-2023 | |
| PROJECT NAME | Simulation Methodology for Sanitation Relief Discharges (SIMVA) | | |
| ORGANIZATION | FACSA | | |
| WEB | https://www.facsa.com/idi-2/simva/ | | |
| PARTNERS IN THE PROJECT | | | |
| FACSA | | | |
| Start date of the Project | 2021 | End date of the Project | 2022 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>SIMVA aims to develop advanced mathematical models that allow calculations to be made in a very precise way and considering the hydraulic characteristics of the river, as well as its geometry in a faithful and detailed way. To this end, FACSA is using the latest techniques in two-dimensional hydrodynamic simulation and computational fluid dynamics (CFD) in order to obtain models that accurately determine the hydrodynamic behavior of the river and the spillway discharge.</p> <p>In addition to developing the model, it is calibrated and validated through the quantification of different physicochemical parameters, measured by multiparameter probes or other equipment already installed in the spillway or receiving channel, to ensure the correct reproduction of the hydraulic behavior and scope of the spill. These validated models will help FACSA to find alternative protocols and solutions to reduce the impact of sanitation relief on water bodies that occur mainly after heavy periods of rainfall.</p> <p>Therefore, the main objective of the SIMVA project is the development of a methodology that allows modelling sanitation reliefs for the quantification and minimisation of negative impacts on receiving river water bodies using simulation and monitoring tools.</p> | | | |
| IMAGE OF THE PROJECT | | | |
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| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| YES | YES | NO | YES |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>The results of the models developed made it possible to propose a series of corrective measures that could be used to minimise the impact of the various reliefs defined. The proposed corrective measures include from the construction from new storm tanks to the design and implementation of Sustainable Urban Drainage Systems (SUDS).</p> | | | |
| NEEDS DETECTED TO EVOLVE | | | |
| <p>The sanitation spillways constitute a fundamental point in the large sanitation networks in periods of rainfall, since they allow the evacuation of the flow in the treatment plants in periods of DANAs or extreme rainfall where the limit calculated for the operation of the WWTP is exceeded. The rainwater evacuated by the spillways and collected in the sanitation networks presents a high contamination from both the homes of the users and the solid urban waste, generating technical and environmental problems. The solids in the receiving environment constitute a serious environmental problem of contamination of water bodies.</p> <p>In this sense, from an informed and environmentally aware society, there is an urgent need to design and implement a new system that reduces the impact of sanitation relief on the bodies of water that receive them, to ensure the elimination of all agents pollutant of these bodies of water.</p> | | | |
| ECONOMIC FIGURES | | | |
| <p>Co-financed by the Agència Valenciana de la Innovació (AVI) through the Line of Promotion of R & D & i projects aimed at the public Procurement of Innovation, with reference INNCP1 / 2021/3, and has a total budget of 88,136.86 euros.</p> | | | |

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|  | R&D+i Group | | |
| R&D&I PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 | |
| PROJECT NAME | Industrial Urban symbiosis and its social, economic and environmental impact on different European regions (SYMSITES) | | |
| ORGANIZATION | FACSA | | |
| WEB | https://www.facsa.com/idi-2/symsites/ | | |
| PARTNERS IN THE PROJECT | | | |
| <p>FACSA, AITEX, CSIC, ITG, Bar Ilan University, UPC, Katholieke Universiteit Leuven, Universitaet Fuer Bodenkultur, NTUA, Fovasa Greene, OSM-DAN LTD, Project Sas Di Massimo Perucca, Agra Consulting LTD, Germaine de Capuccini S.A.U., Francisco Jover S.A., Fleischwaren Berger Gesellschaft MBH & Co. KG, AAT Abwasser – UND Abfalltechnik GMBH, Bornholms Spildevand A/S, Gardejer Finn Harild, Svaneke Bryghus A/S, S.C. Davo Star, Impex SRL, Spitzer Gesmbh, Klink SRL, Sirmet S.A., ELAIOURGIKES EPIXEIRISEIS PATRON, ICLEI EUROPEAN Secretariat GMBH, Bornholms Regionskommune, Gemeindeabwasserverband Suedoestliches Tullnerfeld, Dimos Ditikis Achaïas</p> | | | |
| Start date of the Project | 2022 | End date of the Project | 2026 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>SYMSITES's main objective is to implement regional industrial urban symbiosis in four European regions different in social economic, and environment aspects, from the north Denmark, through the mid Austria to the south Spain and Greece. The four EcoSites will use the same technologies for wastewater and waste treatment and energy production and cycling, enabling a clean comparison of the EcoSite impacts. The four EcoSites will generate virtuous circles of energy, treated waste and wastewater streams between urban and industrial entities. The enabling technologies to be developed for waste and wastewater (WW) co-treatment, are: a newly developed IT Regional Management platform (ITRMP) including novel IIoTs and Social Decision support System (SDSS) to manage efficiently the I-U symbiosis; an anaerobic bioreactor(AnMBR) with advanced membrane coupled with a tertiary treatment, to be installed at the four EcoSites for a clean comparison of all impacts not directly influenced by different technologies.</p> <p>The aim is A) to achieve near-zero GHG emissions or CO2 negative footprint; B) use of bio-waste and non-recyclable wastes (NRW) to produce energy and reusable water as well as high-value new resources (HVNR), thus reducing the waste generation by ~50%; LCA and LCC studies and the quantity prevented from transportation (Ton-Kilometer units) and from landfilling (Ton/m3 units) will evaluate the costs and environmental impact.</p> <p>Dedicated tools will be developed to spread the I-US concept within Europe. These include: virtual demonstration of replication potential in other regions by setting up a network amongst waste associations' facilitation services for implementing symbiotic processes; actions to facilitate relations and to involve the local community actors and establishment of a social innovation non profit spin-off involving tools and business models for streams exchange in a dynamic production.</p> | | | |
| IMAGE OF THE PROJECT | | | |
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| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| YES | YES | YES | YES |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>The project will make it possible to define the viability of the industrial reuse model, especially in the textile and cosmetic sector, which is important in the study area in order to promote sustainable regional development.</p> | | | |
| NEEDS DETECTED TO EVOLVE | | | |
| <p>Need to recover water, energy and value-added products such as fertilizers and platform molecules to obtain biofuels or bioplastics.</p> | | | |
| ECONOMIC FIGURES | | | |
| <p>Project financed by the HORIZON-CL4-2021-TWIN-TRANSITION-01 call with a total project budget of 12.404.455€</p> | | | |

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|  | R&D+I Group | | |
| | R&D&I PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 |
| PROJECT NAME | Thermal hydrolysis and thermophilic digestion (THERM2) | | |
| ORGANIZATION | FACSA | | |
| WEB | https://www.facsas.com/idi-2/therm2/ | | |
| PARTNERS IN THE PROJECT | | | |
| EMASESA (Coordinator), Facsa (Hydrens), Universidad de Valladolid (UVA), TECH4+ and la Universidad de Sevilla. | | | |
| Start date of the Project | 2022 | End date of the Project | 2025 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>The Therm2 project aims to achieve greater efficiency in the energy recovery of WWTP sludge and other organic waste, obtaining sanitised and agronomically recoverable digestate, as well as greater robustness and flexibility in the advanced management operation of the WWTP sludge line. To this end, an innovative process will be developed that includes Thermal Hydrolysis (HT), integrated after an initial mesophilic anaerobic digestion, with thermophilic anaerobic digestion (TAD). Applying thermodynamic energy integration tools, the high temperature of the hydrolyzed substrates is used to implement an energy-efficient thermophilic anaerobic digestion process, by adapting conventional anaerobic digesters (mesophilic) to reduce their CAPEX.</p> | | | |
| IMAGE OF THE PROJECT | | | |
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| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| NO | YES | YES | YES |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>The expected result of the project is an innovative configuration of an advanced DA plant, which, with its lower CAPEX, greater efficiency and lower OPEX, will enable a more intense and faster implementation of biogas generation and sludge sanitation plants.</p> | | | |
| NEEDS DETECTED TO EVOLVE | | | |
| <p>The greater production of biogas, a renewable energy that contributes to the mitigation of Climate Change and the decarbonization of the water sector, allows the energy self-sufficiency of the process and contributes to that of the WWTP, providing valuable products in the agricultural sector with lower OPEX, in line with the circular economy. The need to evolve on the already executed MITLOP project (CPI-2019-34-1-MIT-04) is detected through the innovative combination of HT with DAT.</p> | | | |
| ECONOMIC FIGURES | | | |
| Project financed by the MICINN in the call for public-private collaboration projects 2021. Nº File: CPP2021-008678. Total budget: 1.254.730,39 € | | | |


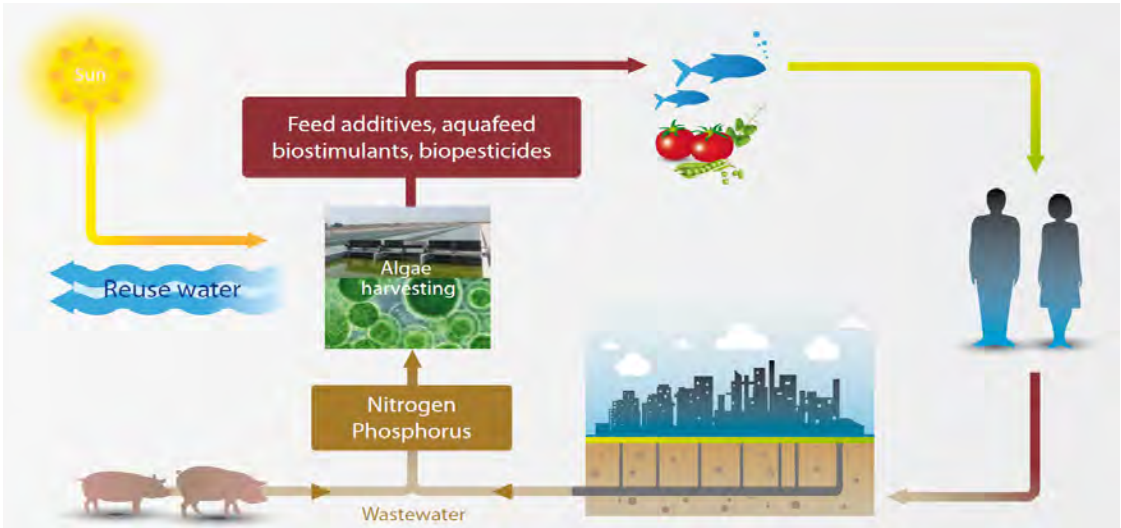
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|  | R&D+I Group | | |
| R&D&I PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 | |
| PROJECT NAME | Development of a digital twin in the DWTP and supply network to control the chlorination process and Trihalomethanes generation (THMOD) | | |
| ORGANIZATION | FACSA | | |
| WEB | https://www.facsa.com/idi-2/thmod/ | | |
| PARTNERS IN THE PROJECT | | | |
| FACSA | | | |
| Start date of the Project | 2023 | End date of the Project | 2024 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>The main objective of the THMod project is to develop a modeling tool for DWTP and the supply network, which reproduces the dynamics of the chlorination process focused on calculating the generation of Trihalomethanes. This will be carried out using computational fluid simulation (CFD) tools. On the other hand, the monitoring of water quality inside the tanks will be further explored through experimental measurements with an underwater vehicle.</p> | | | |
| IMAGE OF THE PROJECT | | | |
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| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| YES | NO | NO | YES |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>Based on modeling using computational fluid simulation (CFD) techniques, the aim is to customize the tool so that it is capable of reproducing not only the degree of mixing inside the tanks, but also the distribution of chlorine inside, its consumption and the generation of THM.</p> | | | |
| NEEDS DETECTED TO EVOLVE | | | |
| <p>The supply of quality drinking water requires a series of prior physicochemical treatments that are carried out in the DWTPs. One of the most widespread methods for disinfection is chlorination, which allows the products contained in the source water to be oxidized, as well as to maintain minimum levels of free residual chlorine that prevent microbial recontamination during supply. However, the chlorination process can also produce byproducts that, in excess, can reduce the quality of drinking water, mainly in the treatment of surface water, due to their higher organic matter content. This is one of the phenomena that has caught the spotlight in recent years.</p> <p>The new legislative framework on the supply of drinking water in force (Royal Decree 3/2023) expands the current scope of application and raises the level of demand through more restrictive requirements in terms of the number of species and their more rigorous control. On the other hand, one of the challenges faced by water purification is the use of new, more sustainable disinfection technologies, as well as achieving the maximum benefits of the use of chlorine with the aim of having a minimum environmental impact and toxicity in the disinfection byproducts.</p> <p>To carry out the optimization of these processes, it is of interest to analyze in more detail the mixing, the distribution of chlorine and disinfection reactions that occur inside the purification tanks, focusing on disinfection byproducts of increasing interest. such as trihalomethanes (THM).</p> | | | |
| ECONOMIC FIGURES | | | |
| <p>Co-financed by the Valencian Innovation Agency (AVI) and by the European Union through the Program to Promote Innovative Public Procurement (CPI), Line 1: Promotion of R&D&I projects aimed at CPI tenders with Number of File INNCP1/2023/2. Action financed by the European Union through the European Regional Development Fund (ERDF) Program of the Valencian Community 2021-2027.</p> | | | |

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|  | | R&D+i Group | |
| R&D&I PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 | |
| PROJECT NAME | Geospatial predictive platform for environmental monitoring of SARS-CoV-2 and its variants. (TRACKER) | | |
| ORGANIZATION | FACSA | | |
| WEB | https://www.facsa.com/idi-2/tracker/ | | |
| PARTNERS IN THE PROJECT | | | |
| FACSA | | | |
| Start date of the Project | 2021 | End date of the Project | 2022 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>TRACKER is the set of SARS-CoV-2 clinical monitoring indicators, based on indirect wastewater, epidemiology indicators and predictive tools based on mobility, socioeconomic and meteorological data to facilitate the management of the pandemic for public health authorities.</p> <p>The prediction of possible COVID-19 cases in a given area is possible by combining epidemiology, information, and SARS-CoV-2 levels in wastewater, as demonstrated during the COVID WATER project developed by FACSA. This system is already integrated into the GIS-based platform that has been commercialized in more than 50 municipalities during 2020 (COVIDWATER platform). The implementation of the predictive blocks in TRACKER will improve the first version of the platform thanks to the artificial intelligence analysis of the data collected on mobility, socio-economics and meteorology in the study areas. The integration of these three modules in TRACKER will result in an innovative system in the fight against COVID-19. In addition, the platform will be adapted for other variants and pathogens of interest that can be traced through wastewater, contributing to the prevention and management of future pandemics. For all these reasons, it is worth highlighting the role of TRACKER in 2021 to monitor vaccination programs and their effectiveness.</p> | | | |
| IMAGE OF THE PROJECT | | | |
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| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| NO | NO | NO | YES |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>Tracker will develop an intelligent geospatial platform that integrates the blocks of information necessary to understand, from a multidisciplinary point of view, the changes in the spread of the virus in a study area and its evolution and impact on the population. In addition to this, develop a predictive model aimed at anticipating changes in trend in the number of infections, symptomatic or asymptomatic, present in an area, also considering the influence of mobility. The project has made it possible to detect new variants of SARS-CoV-2 present from wastewater that differ from those detected only from a clinical point of view, including the observation of the B.1.617 variant in advance of the first cases detected en masse in the study areas.</p> | | | |
| NEEDS DETECTED TO EVOLVE | | | |
| <p>After the development of the COVID WATER project carried out by FACSA, where the comprehensive research project on SARS-CoV-2 was carried out, capable of detecting and quantifying the genetic material of the virus in the sewers and Wastewater Treatment Plants (WWTP).), which has become a very useful tool to support decision-making by administrations, an innovative environmental monitoring platform emerges for the fight against Covid-19 that incorporates novel algorithms to improve the predictive capacity of the tool (Tracker)</p> | | | |
| ECONOMIC FIGURES | | | |
| Project financed by the European Commission through the Horizon 2020 program (Framework Program for Research and Innovation 2014-2020, EU Grant Agreement 101016203) | | | |

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|  | | R&D+i Group | |
| R&D&I PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 | |
| PROJECT NAME | Innovative anaerobic purification technology adapted to the needs of the petrochemical sector (TRAP) | | |
| ORGANIZATION | FACSA | | |
| WEB | https://www.facsa.com/idi-2/trap/ | | |
| PARTNERS IN THE PROJECT | | | |
| FACSA | | | |
| Start date of the Project | 2019 | End date of the Project | 2022 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>The technological development proposed in the TRAP project consists of a new anaerobic wastewater treatment system, adapted to the characteristics of the petrochemical industry, which allows adaptation to the needs and operational variations of the different types of WWTP in the petrochemical sector. The new anaerobic treatment system to be developed will allow the reactor volume to be minimized and will protect it from the biological purification system against possible spills. In addition, thanks to the use of anaerobic technology, the process will allow the production of biogas from the treated wastewater and the drastic reduction of the energy consumption of the treatment.</p> <p>The general objectives of the project are listed below:</p> <ul style="list-style-type: none"> Develop a new anaerobic technology that allows to degrade and revalue pollutants from the petrochemical industry. Reduce energy costs through the use of a new biological treatment system. Reduce the generation of sludge corresponding to the biological process of wastewater treatment. Revalue the wastewater streams generated for the recovery of value-added products and reusable treated water, for example, for cooling systems. Guarantee the stability of the new system and maintain its functionality against the anticipation of toxics at the entrance. Achieve total denitrification of wastewater from plants in the petrochemical sector, completing the biological elimination of nitrogen. Address the individualized treatment of streams of a petrochemical industrial plant, allowing to increase the efficiency and sustainability of internal processes to adapt to future hardening of environmental hardening. | | | |
| IMAGE OF THE PROJECT | | | |
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| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| YES | YES | NO | YES |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>An EGSB anaerobic digestion system has been operated for almost two years by treating really complex industrial wastewater to study long-term acclimatization and treatment efficiency potential. The COD, pH and conductivity removal results have been taken and evaluated, obtaining COD removal yields of around 50%. In addition, a toxicity test has been carried out that determines the inhibition of methanogenic activity by this wastewater, reaching inhibitions of around 45%.</p> | | | |
| NEEDS DETECTED TO EVOLVE | | | |
| <p>Wastewater effluents from the petrochemical industry are usually characterized by having a high organic load and temperature, which makes them especially attractive for applying anaerobic purification technologies that allow degrading, and even revaluing, the compounds present in these waters, and also with a lower energy cost and a minimum generation of sludge. However, the water from these industries is complex and it is typical to generate punctual discharges that can affect the biological system of wastewater treatment plants (WWTP) and destabilize the purification process.</p> | | | |
| ECONOMIC FIGURES | | | |
| Co-financed by the Center for Industrial Technological Development (CDTi) under the project reference IDI- 20191344, and has a total budget of 572,974.00 euros. | | | |

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|  | | R&D+I Group | |
| R&D&I PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 | |
| PROJECT NAME | Development of the Virtual Reactor in WWTP: the use of artificial intelligence and CFD modeling for the development of a new online management and control paradigm. (VIRAL) | | |
| ORGANIZATION | FACSA | | |
| WEB | https://www.facsa.com/idi-2/viral/ | | |
| PARTNERS IN THE PROJECT | | | |
| FACSA | | | |
| Start date of the Project | 2020 | End date of the Project | 2022 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>The VIRAL project aims to combine advanced simulation with artificial intelligence in biological reactors, so that the purification processes can be optimized to save on energy consumption associated with it, improve the quality of the discharge and provide the system with a certain prediction in the face of future events.</p> <p>The main objective of the project consists of the design and implementation of a digital twin in biological reactors (VIRTUAL REACTOR) that allows its control in real time in a precise and efficient way. Its design is based on the training of a neural network (machine learning), which learns the hydrodynamic behavior of the flow inside the reactors thanks to a high number of CFD simulations, capable of transferring a high level of detail to the network to their learning and verification. The results of the VIRTUAL REACTOR model will be validated with online probes that will feed the control system of the real reactor.</p> <p>This model based on the prediction of the neural network through CFD simulation opens up new possibilities for control in WWTP.</p> | | | |
| IMAGE OF THE PROJECT | | | |
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| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| NO | YES | NO | YES |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>The general conclusion of the VIRAL project is that it has been possible to apply computational fluid simulation tools for the control of WWTPs using AI. A methodology has been developed to develop digital twins in biological reactors using AI that can not only be replicated for other biological reactors, but is also valid for other process units in the integral water cycle such as chlorination tanks or control of discharges and discharges into waterways. Specifically, the application of ANN through the developed methodology allows a highly accurate response to be obtained in 10-3 seconds, technically similar in degree of detail to that which would result from a CFD simulation but with a computational cost of 104 seconds. This 7 orders of magnitude reduction in computation time makes this system an essential tool for the study of long flows in tanks. Thanks to this reduction in calculation time and without losing precision, it will be possible to expand the capabilities of these advanced simulation tools (CFD), which had the limitation of being applied only in the design and optimization of the facilities. With this advance, it will be possible to apply control techniques to improve the operation based on CFD (high precision) results with the help of ANN (very low computational cost).</p> <p>VIRAL presents the first results (there are still no references of this application in the water treatment sector) in which AI techniques have been applied using computational fluid simulation (CFD).</p> | | | |
| NEEDS DETECTED TO EVOLVE | | | |
| <p>Most of the automatic control and operation strategies currently implemented in WWTP biological reactors are based on sensors or analyzers that provide information on the status of the process at specific sampling points. This specific information has an unquestionable value to contrast if the overall yields have been the required ones, but it does not allow to know with precision the state of the process inside each zone. The control system is developed without taking into account the tank hydraulics, it is adjusted with biased information to reproduce global phenomena. For control systems to contemplate the reality of more complex hydrodynamics, it is necessary to include new technologies and more sophisticated tools.</p> | | | |
| ECONOMIC FIGURES | | | |
| Co-financed by the Center for Industrial Technological Development (CDTi) under the project reference IDI-20200294, and has a total budget of 461,244.00 euros. | | | |

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|  | | R&D-I Group | |
| R&D&I PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 | |
| PROJECT NAME | Re-designing the value and supply chain of water and minerals: a circular economy approach for the recovery of resources from saline impaired effluent (brine) generated by process industries (ZERO BRINE) | | |
| ORGANIZATION | FACSA | | |
| WEB | https://www.facsa.com/idi-2/zero-brine/ | | |
| PARTNERS IN THE PROJECT | | | |
| <p>The consortium, coordinated by the University of TU Delft, is made up of 22 partners from different fields: companies from the mining and service sectors (EUROPIREN, WITTEVEEN + BOS, TYPISA, FACSA), end users (HUNTSMAN, EVIDES, IQE), universities (TU DELFT, NTUA, UNIPA, POLSL, ABDN), research institutes (CTM, TUBITAK, DLR, IVL), SMEs (SEALEAU, LENNTECH, ARVIA), public entities (ROTTERDAM PORT) and European technology platforms (WSSTP, ISPT).</p> | | | |
| Start date of the Project | 2017 | End date of the Project | 2021 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>The objective of the project is to seek a combination of technologies to achieve the discharge of "ZERO BRINE" can be combined to take advantage of most of the resources of this residue.</p> <p>ZERO BRINE basically seeks to minimize the impact on the environment, having as main objectives:</p> <ul style="list-style-type: none"> water recovery: 95% The recovery of 90% of minerals such as magnesium, carbonates, potassium salts, etc. Energy recovery through waste heat Minimize the amount of by-products and discharges into the environment | | | |
| IMAGE OF THE PROJECT | | | |
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| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| NO | YES | YES | YES |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>The technologies used in Zero Brine have made it possible to recover and generate high-value resources. Thus, on the one hand, what they intend is to concentrate the salts and, on the other, to eliminate organic matter through advanced oxidation technologies and, in turn, Once, crystallize those recovered minerals The Castellón-based company is already applying these innovative systems and is studying the feasibility of implementing these systems in its water treatment plants.</p> | | | |
| NEEDS DETECTED TO EVOLVE | | | |
| <p>Every industrial process produces negative effects on the environment, such as wastewater for example. Faced with this problem, the ZERO BRINE project aims to develop new technologies with the aim of minimizing these damages, recovering the resources generated in the industrial activity of saline effluents and later using them in other industrial sectors such as the chemical, textile or even food industries.</p> | | | |
| ECONOMIC FIGURES | | | |
| <p>The project was funded by the Horizon 2020 program of the European Union (GA 7303390) with a total budget: € 11,081,972.78, with a grant of € 9,992.209.11.</p> | | | |

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|  | R&D+I Group | | |
| R&D&I PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 | |
| PROJECT NAME | H2020 SABANA | | |
| ORGANIZATION | AQUALIA | | |
| WEB | http://www.eu-sabana.eu/ | | |
| PARTNERS IN THE PROJECT | | | |
| UNIVERSIDAD DE ALMERÍA GEA WESTFALIA SEPARATOR GROUP GMBH KARLSRUHER INSTITUT FUER TECHNOLOGIE BIORIZON BIOTECH SL MIKROBIOLOGICKY USTAV AV CR V.V.I UNIVERSITA DEGLI STUDI DI MILANO A.I.A. AGRICOLA ITALIANA ALIMENTARE S.P.A. UNIVERSIDAD DE LAS PALMAS DE GRAN CANARIA SZECHENYI ISTVAN UNIVERSITY CIB-CONSORZIO ITALIANO BIOGAS E GASSIFICAZIONE | | | |
| Start date of the Project | 01/12/2016 | End date of the Project | 30/11/2021 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>SABANA aims at developing a largescale integrated microalgae-based biorefinery for the production of biostimulants, biopesticides and feed additives, in addition to biofertilizers and aquafeed, using marine water and nutrients from wastewaters (sewage, centrate and pig manure). The objective is to achieve a zerowaste process at a demonstration scale of up to 5 ha, sustainable both environmentally and economically.</p> | | | |
| IMAGE OF THE PROJECT | | | |
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| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| NO | YES | YES | NO |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>The key advantages of SABANA are:</p> <ul style="list-style-type: none"> • the sustainability of the process, • recovering nutrients from wastewaters while minimizing the energy consumption, • and the socioeconomic benefits, due to the relevance of the target bioproducts for two major pillars in food production as agriculture and aquaculture. <p>Bioproducts capable of increasing the yield of crops and fish production are in high demand, whereas recovery of nutrients is a priority issue in the EU. Instead of considering wastewater as an inevitably useless and problematic residue of our society, SABANA acknowledges its potential as an opportunity for economically relevant sectors.</p> | | | |
| NEEDS DETECTED TO EVOLVE | | | |
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| ECONOMIC FIGURES | | | |
| TOTAL BUDGET: 10.646.705 € TOTAL FUNDING RECEIVED: 8.848.523 € | | | |



R&D+I Group

R&D&I PROJECTS - PORTFOLIO

PERIOD: 2021-2023

PROJECT NAME: H2020 RUN4LIFE

ORGANIZATION: AQUALIA

WEB: <http://run4life-project.eu/>

PARTNERS IN THE PROJECT

Aqualia (Leader, Spain); DESAH (Netherlands); SLU, Sveriges Lantbruksuniversitet (Sweden); LEAF (Netherlands); LEITAT (Spain); NSVA, Nordvastra Skanes Vatten Och Avlopp (Sweden); USC, Universidad de Santiago de Compostela (Spain); - WE&B, Water Environment & Business Development (Spain); Wageningen University (Netherlands); ZFV, Consorcio de la Zona Franca de Vigo (Spain); JETS, ECOMOTIVE (Norway); Isle Utilities (United Kingdom); CEIP, Clean Energy Innovative Projects (Belgium); Forfarmers Corporate Services (Netherlands) y ASB Grünland Helmut Aurenz (Germany)

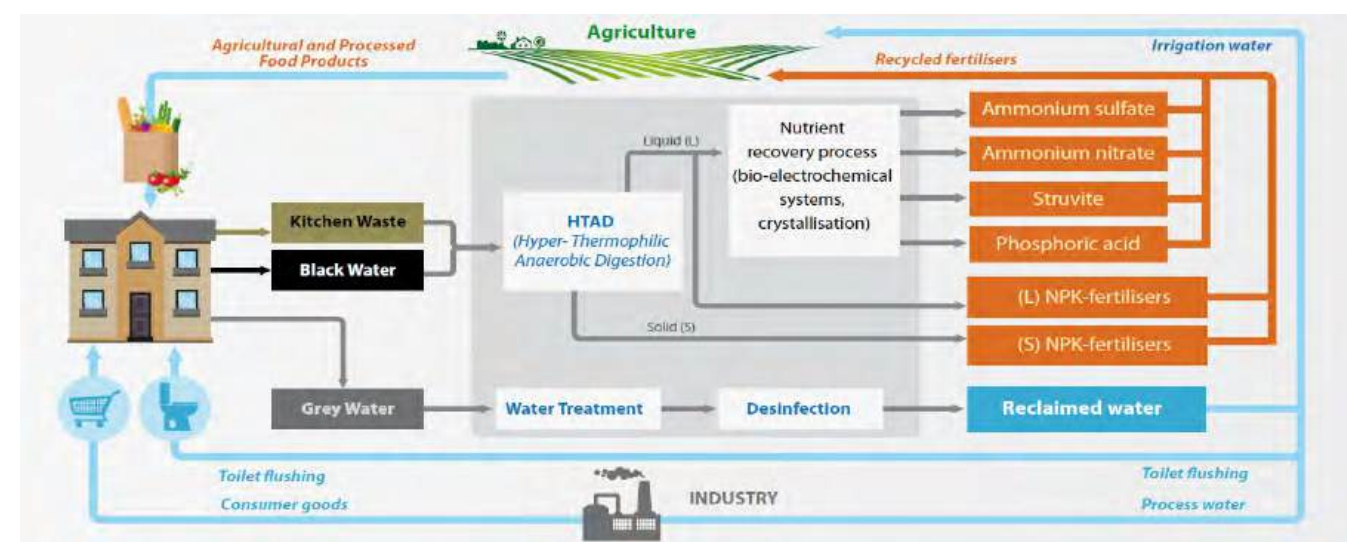
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| Start date of the Project | 01/06/2017 | End date of the Project | 30/11/2021 |
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DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE

Run4Life proposes a radical change to efficiently recover nutrients from wastewater (ww) within a circular economy approach:

- Decentralized recovery at the source,
- Segregating concentrated waste streams such as black water (toilet ww), grey water (other domestic ww) and organic kitchen waste,
- Innovative nutrient recovery technologies are integrated with complementary fertiliser concepts to reduce environmental and health risks.

IMAGE OF THE PROJECT



PROJECT APPROACH WITHIN THE WATER CYCLE

| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
|-------------------------|------------|------------------|-------------|
| | | | |

RESULTS ACHIEVED OR EXPECTED

It is foreseen up to 100% nutrient (NPK) recovery (2 and >15 times current P and N recovery rates, respectively) and >90% water reuse. In collaboration with fertilizer producers, the resulting products will be characterized and possibilities for their agricultural and further applications will be explored, thanks to the participation of prospective end-users in the consortium and the development of a new business model based on a cooperative financial scheme. Run4Life will be large scale demonstration at 4 living sites in Belgium, Spain, Netherlands and Sweden, adapting the concept to different scenarios (market, society, legislation...). The information obtained in the 4 demo-sites will be used for process simulation to conceive a unified Run4Life model which will be applied in a fifth demo-site, allowing new business opportunities and providing data for critical raw material policies. The process will be optimized by online monitoring of key performance indicators (nutrient concentration, pathogens, micropollutants). Monitoring of data and modelling of the process will be included in a Run4Life Platform allowing the optimization of the process and nutrient recovery while facilitating a decentralized management. Run4Life opens a new paradigm in society. Therefore active measures such as knowledge brokerage activities will be developed as engagement strategy to advocate the institutional, legal and social acceptance of Run4Life nutrient recovery technologies.



NEEDS DETECTED TO EVOLVE

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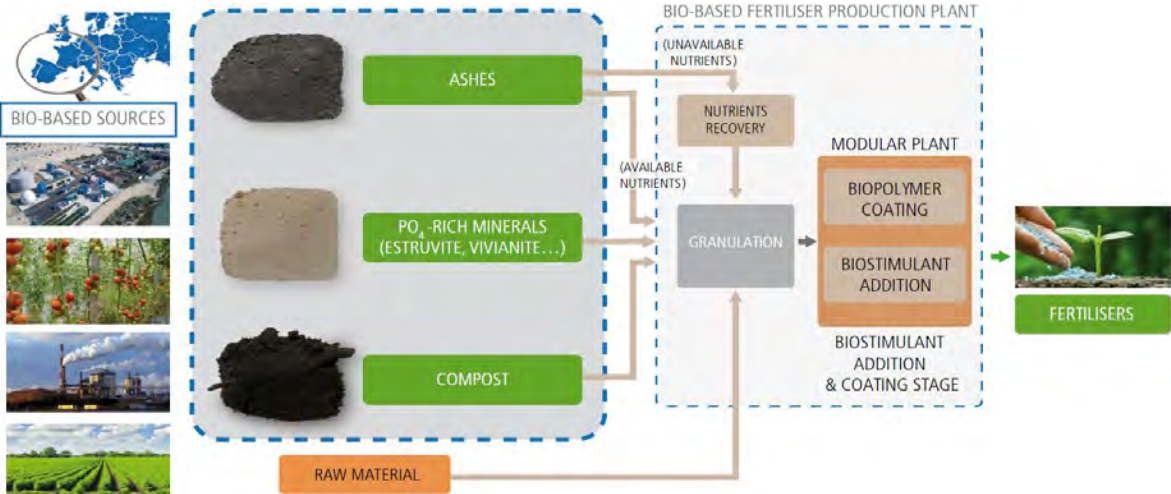
ECONOMIC FIGURES


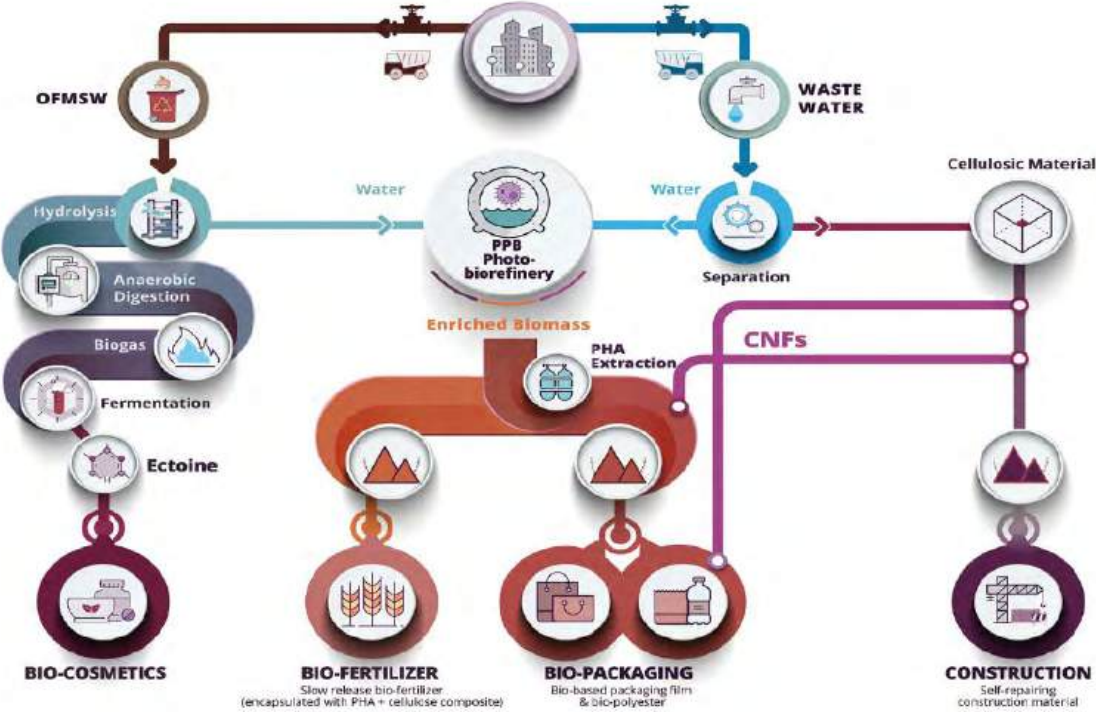
TOTAL BUDGET: 7.720.900,61 €
 TOTAL FUNDING RECEIVED: 6.239.340,65 €


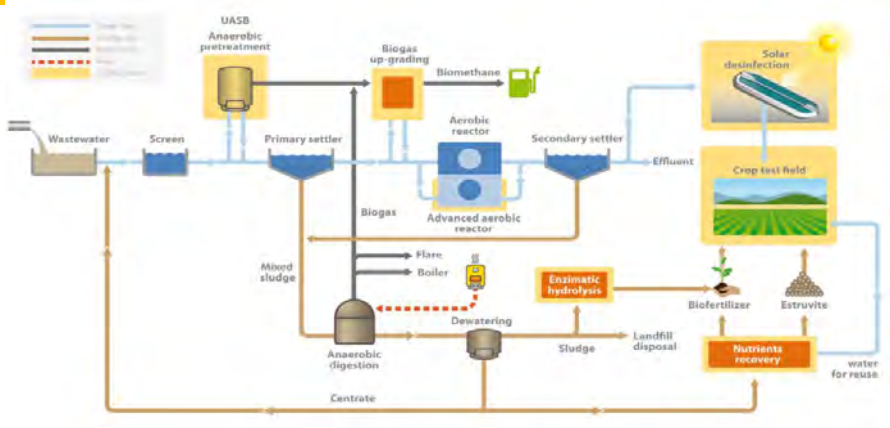
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|  | R&D+i Group | | |
| R&D&I PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 | |
| PROJECT NAME | H2020 SCALIBUR | | |
| ORGANIZATION | AQUALIA | | |
| WEB | http://www.scalibur.eu/ | | |
| PARTNERS IN THE PROJECT | | | |
| <p>ITENE (Spain) - Líder; AERIS (Spain); ASA Spezialenzyme (Germany); CENER (Spain); CLUBE, Bioenergy & Environment Cluster (Greece); CSCP Collaborating Centre on Sustainable Consumption and Production (Germany); Exergy (United Kingdom); FCC Medio Ambiente (Spain); Greenovate (Belgium); Kour Energy (Italy); ANCI Lazio (Italy); Ciudad de Lund (Sweden); Ayuntamiento de Madrid (Spain); Novamont (Italy); Nutrition Sciences (Netherlands); Aqualia (Spain); Universidad de Módena y Reggio Emilia (Italy); IRIS (Sweden); Wetsus (Netherlands); Brabantse Delta (Netherlands) y Zetadec (Netherlands)</p> | | | |
| Start date of the Project | 01/11/2018 | End date of the Project | 30/10/2022 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>SCALIBUR project presents an innovative concept to valorize three important biowaste streams: organic fraction of municipal solid waste (OFMSW), Hotel, Restaurant and Catering wastes (HORECA) and urban sewage sludge (USS) produced in waste water treatment plants (WWTP). Within the H2020 SCALIBUR project, AQUALIA leads the Work Package that aims to a circular valorization process to obtain “ready-touse” products operating highinnovative technologies, based on advanced anaerobic digesters and bioelectrochemical processes in Spain (SP) and Czech Republic (CZ).</p> | | | |
| IMAGE OF THE PROJECT | | | |
|  | | | |
| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| NO | YES | YES | NO |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>The SCALIBUR project will optimize the use of dual anaerobic digested (two-phased temperature) in continuous operation to improve hygienization, obtaining high quality biosolids since the pathogen content is reduced in line with the new European regulations. Methane production and dewatering of the sludge will be also improved leading to energy-rich biogas production, and sludge volume reduction. A low-cost digestion system will enable a sustainable sludge treatment for medium and small WWTP, achieving a reduction of sludge volume and ensuring an enhanced biosolids quality for land application. In addition, a biogas upgrading system, ABAD Bioenergy® developed by AQUALIA, will be installed in CZ to obtain vehicular biofuel, and the undesired CO2 stream will be treated by bioelectrochemical reactors for the production of added-value organic products, mainly alcohols and acids. This system will also be tested in a waste valorization plant in SP.</p> | | | |
| NEEDS DETECTED TO EVOLVE | | | |
| | | | |
| ECONOMIC FIGURES | | | |
| TOTAL BUDGET: 12.005.992,00 € | | | |
| TOTAL FUNDING RECEIVED: 9.999.391,39 € | | | |


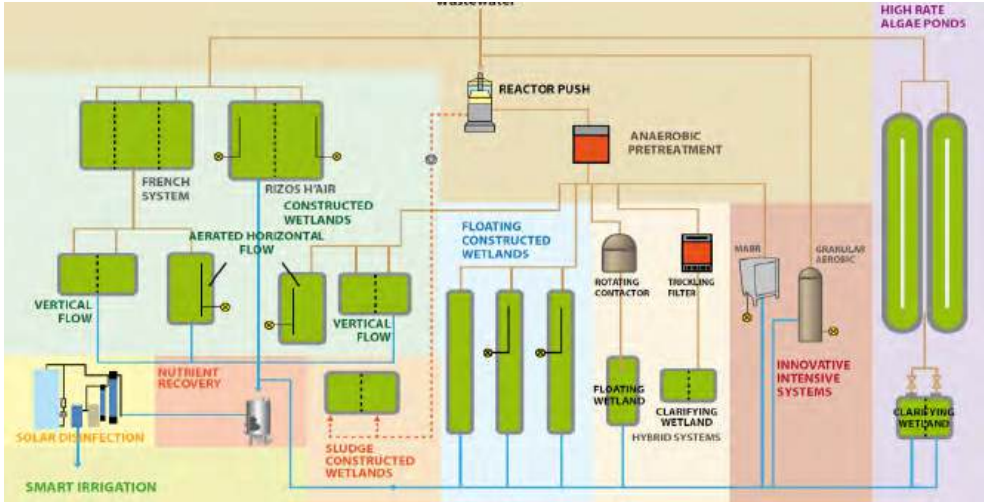
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|  | | R&D+I Group | |
| PROJECT NAME | | INTERCONECTA ADVISOR | |
| ORGANIZATION | | AQUALIA | |
| WEB | | N/A | |
| PARTNERS IN THE PROJECT | | | |
| FCC Aqualia, S.A. (leader) Bionet Servicios Técnicos, S.L. (Bionet) TE Consulting House 4 Plus S.L. (teCH4+) Matadero de Guijuelo, S.A. (MAGUISA) | | | |
| Start date of the Project | 01/10/2018 | End date of the Project | 31/03/2021 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>The meat industry wastes management is an important challenge that carries a high cost in certain regions. It is proposed alternatively the development of solutions environmentally and economically sustainable with the valorisation of waste. The proposal promoted by Aqualia, with the support of the City Council of Guijuelo, supposes an innovative solution to get a beneficial use of these wastes. The technology to be implemented in the municipal wastewater treatment plant (WWTP) will allow to reach more ambitious objectives than current (wastewater treatment to return water to the environment in good conditions), adding the integral valorization of animal by-products not intended for human consumption and the production of biofuel and bioplastics. The treatment of these fatty wastes by co-digestion in the facilities available in the wastewater treatment plant has several advantages.</p> | | | |
| IMAGE OF THE PROJECT | | | |
|  | | | |
| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| NO | YES | YES | NO |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>The AD-VISor project will optimize the use of the existing anaerobic digesters in the plant. For this purpose, it will be validated a thermal pre-treatment and novel control systems that will increase the treatment capacity and guarantee the efficiency of the process to obtain valuable products. In addition, new solutions will be developed to maximize the value of treated waste, such as a bioelectrogenic reactor and the biogas upgrading system ABAD Bioenergy®, developed by Aqualia, to obtain vehicular biofuel, boosting the city towards a sustainable mobility. The utilization of the fatty waste will be carried out through its transformation into bioplastics of high added value. The proposed solution will be validated using substrates from the local meat industry.</p> | | | |
| NEEDS DETECTED TO EVOLVE | | | |
| ECONOMIC FIGURES | | | |
| TOTAL BUDGET: 1.379.151,00 € | | | |
| TOTAL FUNDING RECEIVED: 215.184,40 € | | | |


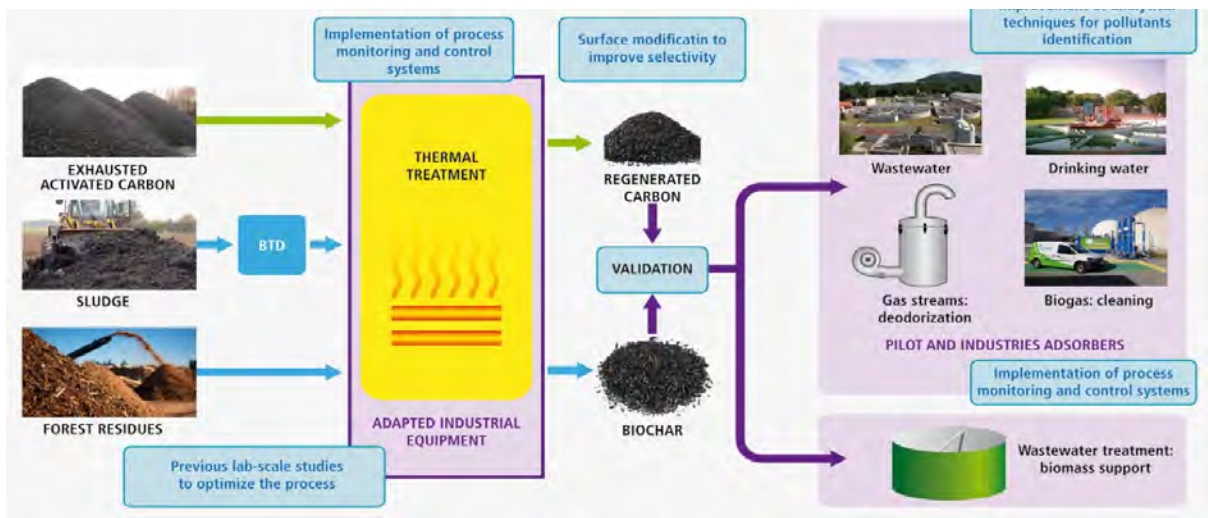
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|  | R&D+I Group | | |
| | R&D&I PROJECTS - PORTFOLIO | | PERIOD: 2021-2022 |
| PROJECT NAME | WATERWORKS MARADENTRO | | |
| ORGANIZATION | AQUALIA | | |
| WEB | https://www.idaea.csic.es/project/maradentro/ | | |
| PARTNERS IN THE PROJECT | | | |
| HydroSciences Montpellier Center, SLU, AQUALIA, IRSA CNR, UPC, IDEA | | | |
| Start date of the Project | 01/04/2019 | End date of the Project | 31/12/2021 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>Today, the serious shortage of good quality water reserves is a problem that affects not only arid and semi-arid countries. As the world population increases, this problem will worsen. Replenishment of depleted aquifers and restoration of river ecological services can be achieved through Managed Artificial Recharge (MAR). However, the risks associated with the appearance of pathogens and emerging organic contaminants in groundwater have led to questioning the reuse of reclaimed water for artificial recharge. MarAdentro seeks to minimize these risks and increase the benefits of MAR for the adequate protection of health and the environment by developing advanced, affordable and effective tools, specifically based on reactive layers that incorporate biological and abiotic systems. The developed MAR system will be scaled from laboratory to pilot for verification under ambient operating conditions. The modeling of contaminant transport, the evaluation of potential risks and their minimization, the economic balance and the provision of guidelines to the interested parties, will guarantee the correct implementation of the MAR system developed. The transfer of the knowledge gathered in MarAdentro to the authorities and policy makers will help the EU regulation on the analysis of emerging pollutants and MAR</p> | | | |
| IMAGE OF THE PROJECT | | | |
|  | | | |
| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| NO | YES | NO | NO |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>Studies of the reactive layer have been carried out regarding the growth of biofilm and its reactivity. It has been seen that with retention times of 5-6 h, treating synthetic wastewater, most of the pollutants evaluated as chemical oxygen demand are removed, as well as many of the emerging pollutants studied, their performance in drug removal is yet to be evaluated. Results in Palamós: it is verified that ammonium is drastically reduced, but it is largely transformed into nitrates, nitrification increases in the reactive layers with a higher proportion of compost. There is a good denitrification, but finally some residual nitrates remain. AOB organisms and also actinobacteria have been identified. In recent months, samples of the reactive layers of the Palamós prototype have been taken and, among other evaluations, the microorganisms present in the biofilm and their involvement in the results are being identified. Laboratory tests include analysis of PPCPs as well as micro and nano plastics retained in the reactive barrier. It has been detected that the more MO there is in the barrier, the more CEC's adsorption occurs."</p> | | | |
| NEEDS DETECTED TO EVOLVE | | | |
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| ECONOMIC FIGURES | | | |
| TOTAL BUDGET: 1.657.698 € | | | |
| AQUALIA BUDGET: 175.635 € AQUALIA FUNDING: 70.254 € | | | |


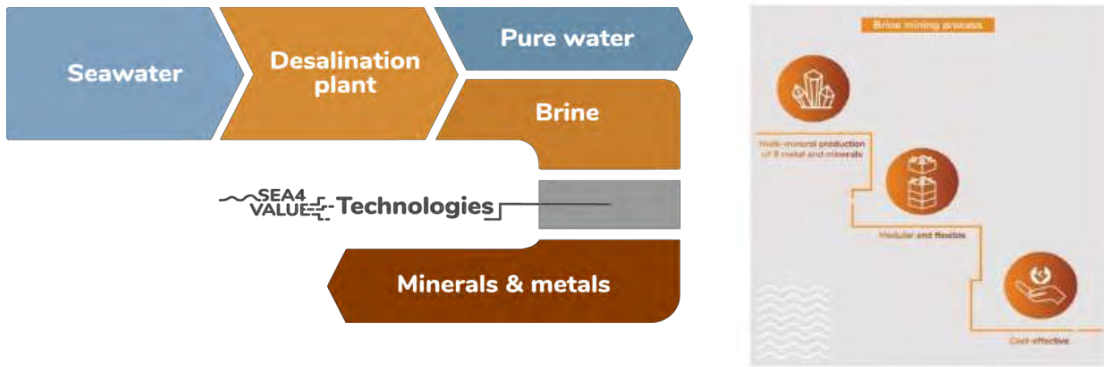
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|  | | R&D+I Group | |
| | | R&D&I PROJECTS - PORTFOLIO | |
| | | PERIOD: 2021-2023 | |
| PROJECT NAME | H2020 BBI B-FERST | | |
| ORGANIZATION | AQUALIA | | |
| WEB | https://bferst.eu/ | | |
| PARTNERS IN THE PROJECT | | | |
| FERTIBERIA (LÍDER), UNIVERSIDAD DE LEÓN, NOVAMONT, AQUALIA, FKUR, AGRISAT, VITO, AGFUTURA, ARCADIA INTERNATIONAL, ICONS, IUNG | | | |
| Start date of the Project | 01/05/2019 | End date of the Project | 30/04/2024 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>B-FERST aims to create and promote new ways of bio-waste valorisation by creating new circular and bio-based value chains. The main objective for Aqualia is to demonstrate viable valorisation strategies of resulting coproducts from wastewater treatment plants to achieve the following points:</p> <ol style="list-style-type: none"> 1. Produce new sustainable and competitive fertilisers, based on nutrients recycle. 2. Implement the pseudo-industrial production of large amounts of biofertilisers (up to 600 t / year) from secondary raw materials (approximately 115 t / year). 3. Substitute 15-40% raw materials utilization by bio-wastes. 4. Decentralise the fertiliser production and recycling networks through the supply of co-products, at local and European level, using innovative logistics. 5. Reduce the environmental impact of the fertiliser value chain, optimising processes to reduce water and energy consumption, and the carbon footprint by 10%. 6. Elaborate guidelines and propose specifications for certification and quality standards for the new value chains in the EU. | | | |
| IMAGE OF THE PROJECT | | | |
|  | | | |
| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| NO | NO | YES | NO |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>Aqualia will evaluate the use of biological wastes at pseudo-industrial scale, with special attention on struvite and vivianite production, ashes and compost from sewage sludge. The long-term study of the continuous supply of these materials will be a key point to minimize costs at national and European level. Challenges and opportunities will also be identified to promote the replicability of the B-Ferst solution.</p> <p>The composition of these resources and their adaptation to logistical requirements (sorting, transportation and storage) will be defined. These and other factors will be integrated in the decision-making tool that will promote eco-efficient initiatives.</p> <p>The activities to be carried out at the wastewater treatment plant (WWTP) will allow the evaluation and testing of nutrient recovery technologies, such as struvite and vivianite recovery. Biological hygienisation and drying technology of sludge will be implemented to guarantee a safe use in environmental applications, mainly in agricultural purposes.</p> <p>The concept of sustainable WWTP requires the development of innovative strategies for a beneficial use of co-products. The recovery and use of nutrients is a strategic option to guarantee the supply of biofertilisers. The technology for the reduction, drying and biological hygienisation of sewage sludge proposed in B-FERST represents an important advance to guarantee a safe and viable use of biosolids in circular economy initiatives.</p> | | | |
| NEEDS DETECTED TO EVOLVE | | | |
| ECONOMIC FIGURES | | | |
| TOTAL BUDGET: 10.016.296 € | | | |
| TOTAL FUNDING RECEIVED: 6.787.076 € | | | |

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|--|--|-------------------------|-------------------------|
|  | | R&D+i Group | |
| PROJECT NAME | | H2020 BBI DEEP PURPLE | |
| ORGANIZATION | | AQUALIA | |
| WEB | | https://deep-purple.eu/ | |
| PARTNERS IN THE PROJECT | | | |
| AQUALIA; ACTIVATEC; RNB; FCC Medio Ambiente; ITENE; UNIV. VALLADOLID; UNE; ROULLIER GROUP; NATUREPLAST; UNIV. BRUNEL; NOVAMONT; ALCHEMIA NOVA; GATE2GROWTH y UNIV. REY JUAN CARLOS | | | |
| Start date of the Project | | 01/05/2019 | End date of the Project |
| | | | 30/04/2023 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>The DEEP PURPLE project proposes a synergistic and integrated treatment for three types of bio-waste: the organic fraction of municipal solid waste (OFMSW), sewage sludge and domestic wastewater by means of a multiplatform photobiorefinery based on Phototrophic Purple Bacteria (PPB). This new concept will allow for the generation of five new bio-products with commercial application in the cosmetics, plastics, construction and fertilizers sectors. AQUALIA is the project coordinator and responsible for the up-scaling of the Advansist technology at demonstrative scale for the treatment of domestic wastewater. Advansist technology is based on the use of PPB in anaerobic raceways with a double purpose: wastewater treatment and use of an enriched biomass as feedstock for novel bioproducts. AQUALIA currently operates the largest PPB photobioreactors in the world, located at the wastewater treatment plant (WWTP) Estiviel (Toledo). The DEEP PURPLE project envisages the construction and operation of two photobiorefineries at the WWTP Estiviel (Toledo) and in Czech Republic in 2021. The DEEP PURPLE project also comprises cellulose recovery for its use in bio-fertilizers coatings and additives for construction materials, as well as biogas as feedstock for the recovery and use of ectoine in cosmetics.</p> | | | |
| IMAGE OF THE PROJECT | | | |
|  | | | |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>Valorise the organic fraction of the municipal solid waste (OFMSW), wastewater (WW) and sewage sludge (SS) into a sustainable biomass for marketable bio-based products Create biomass feedstock for the bio-based industry Bio-cosmetics, fertilizers, bio-packaging, self-repairing construction materials Implementation of multiplatform concept (biomass, cellulose and biogas) Innovative combination of optimized recovery technologies & novel solutions First PPB Photobiorefinery in the EU, the biggest worldwide Implemented in 2 demo sites (Spain and Czech Republic) Reduction of 60% of landfilled OFMSW Recovery of 71% WWTP solids Bio-products for commercialization (440 t/y) Reduction of 20% of GHG emissions (420 t CO²-eq per year)</p> | | | |
| NEEDS DETECTED TO EVOLVE | | | |
| ECONOMIC FIGURES | | | |
| TOTAL BUDGET: 9.527.581,25 € | | | |
| TOTAL FUNDING RECEIVED: 6.983.049,99 € | | | |



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|--|------------|---|-------------------------|
|  | | R&D+i Group | |
| | | R&D&I PROJECTS - PORTFOLIO | |
| PROJECT NAME | | LIFE ULISES | |
| ORGANIZATION | | AQUALIA | |
| WEB | | https://life-ulises.eu/ | |
| PARTNERS IN THE PROJECT | | | |
| AQUALIA (líder) CETIM CIESOL-UAL ENERGYLAB | | | |
| Start date of the Project | | 01/07/2019 | End date of the Project |
| | | | 30/06/2022 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>The main goal of LIFE Ulises Project is to upgrade conventional wastewater treatment plants (WWTP) by different innovative technologies that produce useful resources from wastewater, such as automotive biofuel, biofertilizers and water for reuse. The project aims to reduce energy consumption and carbon footprint of WWTPs, increasing their efficiency by the integration of different technologies in each of their lines (water, gas, sludge). During the project, the next low cost technologies will be implemented in El Bobar WWTP (Almería):</p> <ul style="list-style-type: none"> • Biogas up-grading with ABAD Bioenergy® system to produce a renewable biofuel (Aqualia, Energylab) • Combined PUSH anaerobic pretreatment with advanced aeration control system to half energy demand of wastewater treatment process (Aqualia) • Solar tertiary treatment based on photo-phenon to produce disinfected water for irrigation (Ciesol – UAL) • Biofertilizer production from sludge by enzymatic hydrolysis treatment (CETIM, aqualia) • Struvite recovery system from centrate by direct osmosis technology (CETIM) <p>All these innovative technologies will let reduce the electric consumption of El Bobar WWTP and then, minimize its environmental impact and carbon footprint.</p> | | | |
| IMAGE OF THE PROJECT | | | |
|  | | | |
| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| NO | YES | YES | NO |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>The main goal of LIFE ULISES Project is to upgrade conventional wastewater treatment plants (WWTP) by different innovative technologies that produce useful resources from wastewater, such as automotive biofuel, biofertilizers and water for reuse.</p> <p>Specific objectives:</p> <ol style="list-style-type: none"> 1. Energy self-sufficiency in WWTP: <ol style="list-style-type: none"> a) Producing bioenergy from sludge in the form of biomethane (GAS LINE) b) Reducing energy consumption at biological process by: (WATER LINE) <ol style="list-style-type: none"> b.1 UASB anaerobic pretreatment b.2 Reduce in 1/3 the energy demand of the aeration system by an advance control system 2. A "full recycling" concept in WWTP to improve resource efficiency: <ol style="list-style-type: none"> a) Reuse of water by solar-based tertiary treatment (WATER LINE) b) Obtain added value fertilizer products from sludge: (SLUDGE LINE) <ol style="list-style-type: none"> b.1 Biofertilizer with phytostimulant properties produced by enzymatic hydrolysis of sludge b.2 Recover P & N from centrate in form of struvite and a concentrate fertilizer 3. Reduction of carbon footprint of WWT process, performing a holistic analysis based on LCA. | | | |
| NEEDS DETECTED TO EVOLVE | | | |
| ECONOMIC FIGURES | | | |
| TOTAL BUDGET 1.902.784 € | | | |
| TOTAL FUNDING RECEIVED: 1.041.810 € | | | |

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|---|----------------------------|----------------------------|-------------------|
|  | | R&D+i Group | |
| | | R&D&I PROJECTS - PORTFOLIO | PERIOD: 2021-2023 |
| PROJECT NAME | LIFE INTEXT | | |
| ORGANIZATION | AQUALIA | | |
| WEB | https://www.life-intext.eu | | |
| PARTNERS IN THE PROJECT | | | |
| <p>AQUALIA (leader); Asociación de Investigación Metalúrgica del Noroeste (AIMEN); Aarhus University; Autarcon GmbH; Fundación Centro de las Nuevas Tecnologías del Agua (CENTA); Future Intelligence (FINT); Comercial Projar; SYNTEA; SYNTEA Tratamientos de Depuración</p> | | | |
| Start date of the Project | 01/07/2019 | End date of the Project | 30/06/2023 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>The Project will create a technological platform located in Talavera de la Reina wastewater treatment plant (WWTP), where innovative hybrid technologies for wastewater treatment and resource recovery in small communities will be developed, with the next objectives:</p> <ul style="list-style-type: none"> -Wastewater treatment system robustness against environmental (wintersummer) and pollutants/industrial loads variations -Reduction of investment and maintenance costs -Reduction of the required area < 1 m2/PE -Quantification and assessment of greenhouse gases emissions reduction -Assessment of emergent pollutants removal -Disinfection and water reuse -Decision Support System (DSS) based on Life Cycle Analysis. -Validation of technologies broadly used in the north and centre of Europe. | | | |
| IMAGE OF THE PROJECT | | | |
|  | | | |
| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| NO | YES | YES | NO |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>16 different technologies will be implemented in Talavera de la Reina WWTP. These will be sized to treat 125 population equivalent (PE) and could be classified in the next different groups according to their technology and companies involved:</p> <ul style="list-style-type: none"> • Anaerobic and biofilm pretreatments (Aqualia) • Constructed wetlands: vertical, horizontal, aerated (Syntea) • Floating constructed wetlands (Projar) • High rate algae ponds (Aqualia) • Nutrients recovery by innovative adsorption materials (Aarhus University) • Solar anodic oxidation for water disinfection (Autarcon) • Smart irrigation system (FINT) • Greenhouse gases emissions (Aarhus University) • Sludge constructed wetlands, emergent pollutants and toxicity (AIMEN) <p>In parallel, the Centro de Nuevas Tecnologías del Agua (CENTA) facilities in Carrión de los Céspedes (Sevilla) will be used for the implementation of INTEXT technologies and the evaluation of their potential to improve the existing treatment plants.</p> | | | |
| NEEDS DETECTED TO EVOLVE | | | |
| ECONOMIC FIGURES | | | |
| TOTAL BUDGET: 2.926.547 € | | | |
| TOTAL FUNDING RECEIVED: 1.596.470 € | | | |


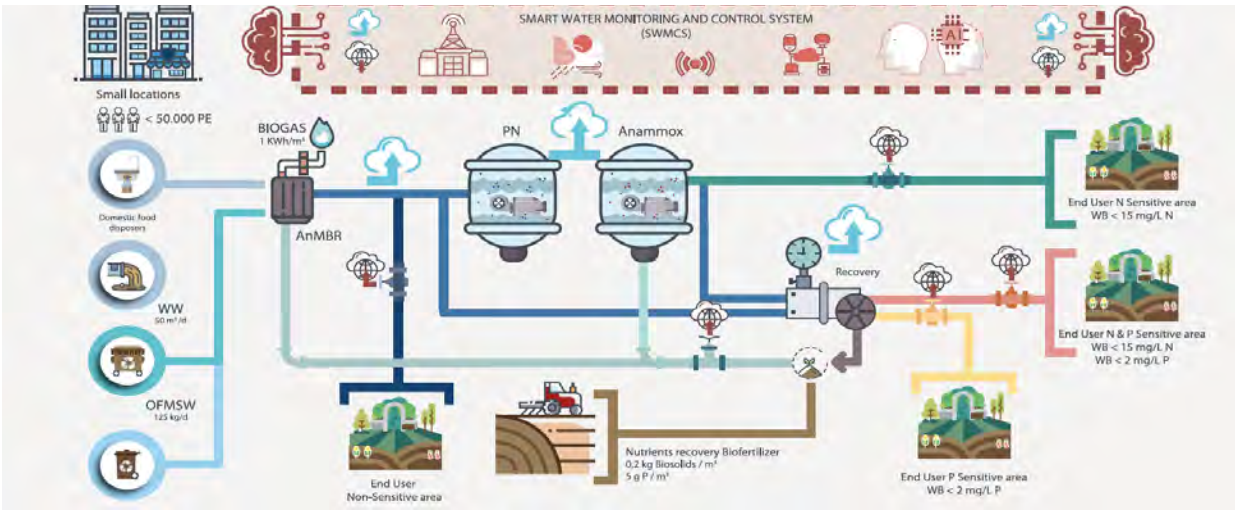
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|  | | R&D+I Group | |
| | | R&D&I PROJECTS - PORTFOLIO | |
| | | PERIOD: 2021-2023 | |
| PROJECT NAME | RE-CARBÓN | | |
| ORGANIZATION | AQUALIA | | |
| WEB | N/A | | |
| PARTNERS IN THE PROJECT | | | |
| INGEMAS (Grupo TSK) AQUALIA BIESCA INGENIERÍA ITC SISTEMAS | | | |
| Start date of the Project | 15/07/2019 | End date of the Project | 30/06/2022 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>RE-CARBON project aims to demonstrate the technical feasibility and viability of innovative methods for the regeneration of exhausted activated carbon and the production of biochar from sewage sludge. The resulting products will be evaluated in water (drinking and wastewater) and gas streams purification. Carbon regeneration will minimize waste generation and raw materials consumption, allowing the recovery of exhausted activated carbon. Energy consumption will also be reduced as the regeneration process consumes less energy than the activation process for new materials. Sewage sludge from wastewater treatment plants (WWTP) and forest residues are used in RE-CARBON to obtain biochar, promoting new circular economy models around the water cycle. Regenerated activated carbon and biochar will be used as adsorbents to remove undesirable compounds present in wastewater and drinking water. The project will evaluate the capacity of the adsorbent materials to remove pharmaceuticals and plastic-derived micro pollutants from wastewater. In drinking water, the adsorption of pesticides, disinfection by-products, geosmin, organic matter and radioactive will be validated. Additionally, new analytical methodologies will be developed for the detection of these contaminants in drinking water.</p> | | | |
| IMAGE OF THE PROJECT | | | |
|  | | | |
| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| NO | SI | SI | NO |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>In gas streams, the operation will validate the removal of odourcausing compounds from WWTP and biogas cleaning produced by sewage sludge anaerobic digestion in WWTP to obtain high quality biomethane. The adsorbent materials will be also tested as biomass carrier in a new generation of biofilm membrane bioreactors for wastewater treatment and water reuse. Activated carbon regeneration and biochar production will be performed in a pyrolysis demonstration plant placed in Tineo (Asturias, North Spain). As for the materials validation, the project includes laboratory, pilot and industrial scale tests in different WWTPs and drinking water treatment plants managed by Aqualia.</p> | | | |
| NEEDS DETECTED TO EVOLVE | | | |
| ECONOMIC FIGURES | | | |
| TOTAL BUDGET: 551.170,53 € | | | |
| TOTAL FUNDING RECEIVED: 358.936,89 € | | | |

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|  | | R&D+I Group | |
| R&D&I PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 | |
| PROJECT NAME | H2020 SEA4VALUE | | |
| ORGANIZATION | AQUALIA | | |
| WEB | https://sea4value.eu/ | | |
| PARTNERS IN THE PROJECT | | | |
| EURECAT, AQUALIA, OMYA INTERNATIONAL AG, UNIVERSITAT POLITECNICA DE CATALUNYA, UNIVERSITÀ DELLA CALABRIA, KATHOLIEKE UNIVERSITEIT LEUVEN, DNIPROVSKIJ DERGAVNIJ TECHNICHNIJ UNIVERSITET, SEALEAU BV, UNIVERSITAET BREMEN, TECNICAS REUNIDAS SA, LUT UNIVERSITY, DECHEMA, CATALAN WATER PARTNERSHIP, EUROPEAN DESALINATION SOCIETY, EUROPEAN SCIENCE COMMUNICATION INSTITUTE (ESCI), WATER ENERGY INTELLIGENCE, BASF | | | |
| Start date of the Project | 01/06/2020 | End date of the Project | 31/05/2024 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>Sea4Value will design and implement technologies to recover minerals and metals from seawater desalination brines. The goal is to make desalination plants the third largest source of valuable raw materials in the European Union.</p> <p>More specifically, a modular, multi-mineral process will be developed, which will be the first industrially viable brine extraction method.</p> <p>Most of the projects and technologies dealing with the recovery of metals and minerals from brines focus on individual elements, which makes the process economically unfeasible. Sea4Value goes one step further: it is based on a combination of advanced separation technologies and seeks to design a technically and economically viable process for the recovery of multiple elements.</p> | | | |
| IMAGE OF THE PROJECT | | | |
|  | | | |
| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| YES | NO | YES | NO |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>Catalog of the composition of brines taking into account their origin and contributing to the construction of the knowledge base of the European Union on the sources of raw materials.</p> <p>Make seawater desalination plants the third source of valuable raw materials.</p> <p>Develop next generation technologies to recover minerals and metals from seawater brines in desalination plants.</p> <p>Increase knowledge about the mechanisms involved in established advanced separation processes dealing with high ionic strength solutions, thus enabling the development of radical innovations.</p> <p>Validate the viability of innovative processes capable of producing raw materials in a sustainable way: profitable and with a low environmental impact through the optimal tailor-made combination of innovative technologies.</p> <p>Increase the number of professionals and engineers trained in the recovery of raw materials.</p> | | | |
| NEEDS DETECTED TO EVOLVE | | | |
| ECONOMIC FIGURES | | | |
| TOTAL BUDGET: 6.995.736,25 € | | | |
| TOTAL FUNDING RE: 6.995.736,25 € | | | |


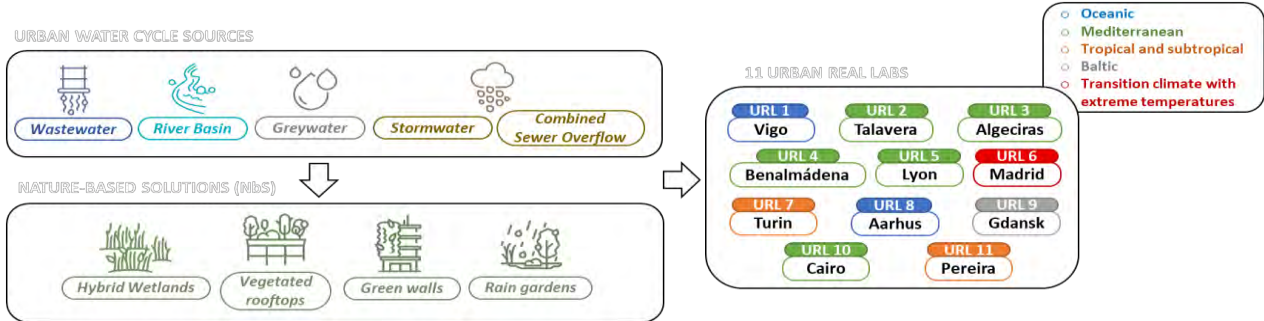
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|  | | R&D+I Group | |
| R&D&I PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 | |
| PROJECT NAME | H2020 ULTIMATE | | |
| ORGANIZATION | AQUALIA | | |
| WEB | https://ultimatewater.eu/ | | |
| PARTNERS IN THE PROJECT | | | |
| KWR, EURECAT, KOMPETENZ ZENTRUM WASSER BERLIN, UNIVERSITÀ POLITECNICA DELLE MARCHE, WATER EUROPE, UNIVERSITY OF EXETER, NATIONAL TECHNICAL UNIVERSITY OF ATHENS, CRANFIELD UNIVERSITY, AQUALIA, SUEZ, STRANE INNOVATION, EUROPEAN SCIENCE COMMUNICATION INSTITUTE (ESCI), THE GALILEE SOCIETY, MEKOROT, GREENER THAN GREEN TECHNOLOGIES, AQUABIO, AITASA, ARETUSA, AGROBICS, WEST SYSTEMS, ALBERTA, NORWEGIAN UNIVERSITY OF SCIENCE AND TECHNOLOGY, KALUNDBORG SYMBIOSIS, NOVOZYMES, PENTAIR X-FLOW, CPTM | | | |
| Start date of the Project | 01/06/2020 | End date of the Project | 31/05/2024 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>ULTIMATE aims to create economic value and increase sustainability by valuing resources within the water cycle. Wastewater is not only a reusable resource, but also a carrier of energy and components that can be extracted, treated, stored and reused. Based on the “Water Smart Industrial Symbiosis” (WSIS), wastewater recycling is promoted in various industrial settings. Nine large-scale demonstration cases have been selected from the four most important industrial sectors in Europe: AGRICULTURE, FOOD PROCESSING, HEAVY CHEMICAL/PETROCHEMICAL INDUSTRY, BEVERAGE AND BIOTECHNICAL INDUSTRY</p> <p>By turning wastewater into a resource, it is recovered, conditioned and reused; energy is extracted and harnessed; and the materials they contain are extracted and used. ULTIMATE fosters partnerships between companies, water utilities, regulators, and policymakers. It mobilizes a strong association of industrial complexes and symbiosis clusters, leading water companies and water service providers, specialized SMEs, research institutes and water industry networks. Our team draws on an impressive portfolio of past and ongoing research and innovation, leveraging multiple European and global networks to ensure real impact.</p> | | | |
| IMAGE OF THE PROJECT | | | |
|  | | | |
| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| YES | YES | YES | NO |
| RESULTS ACHIEVED OR EXPECTED? | | | |
| | | | |
| NEEDS DETECTED TO EVOLVE | | | |
| | | | |
| ECONOMIC FIGURES | | | |
| TOTAL BUDGET: 16.614.813,75 € | | | |
| TOTAL FUNDING RECEIVED: 13.527.116,27 € | | | |


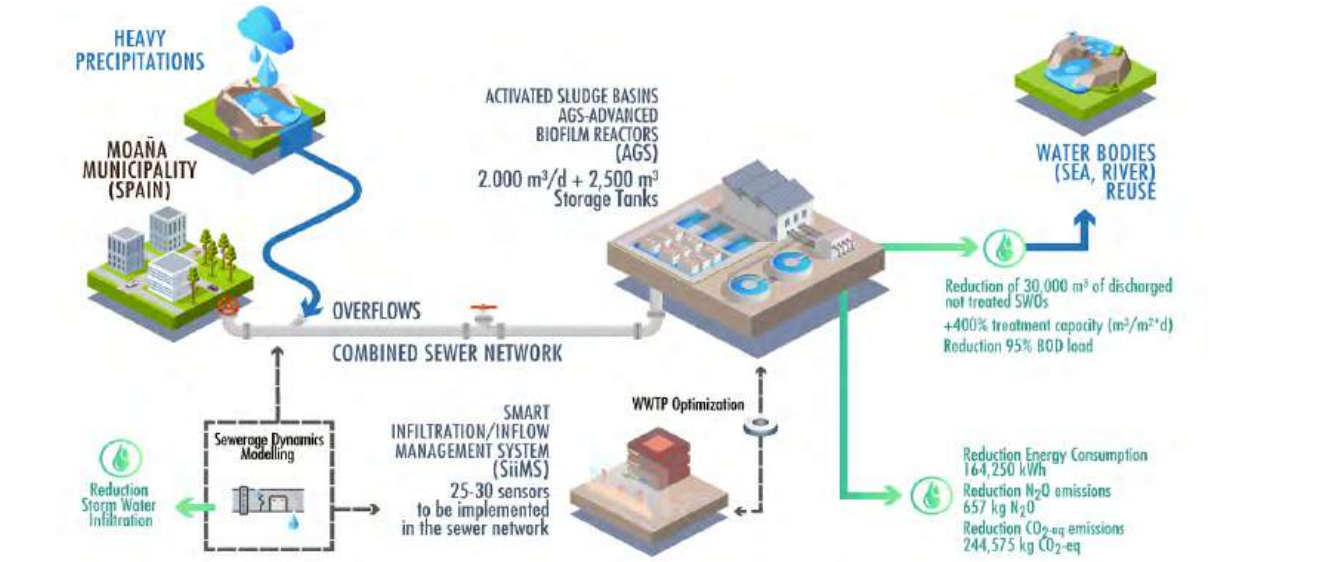
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|  | | R&D+I Group | |
| | | R&D&I PROJECTS - PORTFOLIO | |
| PROJECT NAME | | H2020 REWAISE | |
| ORGANIZATION | | AQUALIA | |
| WEB | | http://reweise.eu/ | |
| PARTNERS IN THE PROJECT | | | |
| <p>AQUALIA, SEVERN TRENT, VASYD, AQUANET, EUROPEAN NETWORK OF LIVING LABS, HIDROTEC, CITY OF MALMO, POLYMEM, ResourSEAs, BLUETECH RESEARCH, AQUAPORIN, WATER ENVIRONMENT AND BUSINESS FOR DEVELOPMENT, ENVIRONMENTAL MONITORING SOLUTIONS, SOLAR WATER, IETU, UNIVERSITAT DE VALENCIA, TECHNICAL UNIVERSITY OF OSTRAVA, ZAGREB UNIVERSITY FACULTY OF ELECTRICAL ENGINEERING AND COMPUTING, CETIM, COVENTRY UNIVERSITY, LUND UNIVERSITY, POZNAN UNIVERSITY OF TECHNOLOGY, PKF ATTEST INNCOME, UNIVERSITÀ DEGLI STUDI DI PALERMO</p> | | | |
| Start date of the Project | | 01/09/2020 | End date of the Project |
| | | | 31/08/2025 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>The aim of REWAISE is to create a new “smart water ecosystem”, to result in a carbon free, sustainable hydrological cycle, in line with the concept of a resilient circular economy, recovering energy, nutrients and materials from water. REWAISE will reveal the full Value of Water, considering three key technical, economic and societal factors to generate:</p> <ul style="list-style-type: none"> -the value in water, by extracting and putting to beneficial use dissolved substances such as nutrients, minerals, chemicals and metals, as well as organic matter and energy, embedded in raw and used water streams. Examples of this are the minerals that will be extracted from the seawater brines in Tenerife and the bioplastics that will be produced from sewage sludge in Salamanca. -the value from water, that expresses the importance of water for economic activities and related businesses of the water sector, particularly SMEs that will provide new membrane systems that will be demonstrated in Denia and Vigo for the reuse and desalination of water. -the value through water, considering the societal, health and well-being functions of water, as it enables almost all our economic activities, and most products have a significant water footprint. It is also a source of energy and a means of transport. The new software tools will improve water quality for citizens and companies, allowing a real-time response to demand. This implies cost optimization that will be evident in pilot facilities in Badajoz and the Canary Islands. | | | |
| IMAGE OF THE PROJECT | | | |
|  | | | |
| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| YES | YES | YES | YES |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>REWAISE will demonstrate technological innovations and new water governance models in real environments. They will reduce water consumption by more than 30% and develop an energy self-sufficient cycle. The new value chains in the production of minerals and fertilizers from water will generate employment and new commercial activities. Throughout this path, it will be necessary to promote social commitment to eliminate institutional obstacles and legal barriers.</p> | | | |
| NEEDS DETECTED TO EVOLVE | | | |
| <p>ECONOMIC FIGURES</p> <p>TOTAL BUDGER: 18.816.721,93 €</p> <p>TOTAL FUNDING RECEIVED: 14.984.656,81</p> | | | |

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|---|------------|---------------------|-------------------------|
|  | | R&D+I Group | |
| PROJECT NAME | | LIFE PHOENIX | |
| ORGANIZATION | | AQUALIA | |
| WEB | | www.life-phoenix.eu | |
| PARTNERS IN THE PROJECT | | | |
| Aqualia (leader); Águas de Portugal (AdP); CETIM; Confederación Hidrográfica del Guadalquivir; Diputación Provincial de Almería; Newland; CIESOL-UAL; microLAN BV | | | |
| Start date of the Project | | 01/09/2020 | End date of the Project |
| | | | 29/09/2024 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>The LIFE PHOENIX project's main objective is to obtain reclaimed water from the secondary effluent of a treatment plant, while eliminating microplastics (MPs) and contaminants of emerging concern (CECs). The project anticipates the new European Directive 2020/741 aiming to meet the new requirements that it establishes, which are more severe than the current national regulations. The general objectives of the project are the following:</p> <ul style="list-style-type: none"> • Obtain reclaimed water that meets the strictest requirements of the new European regulations. • Minimize the possible environmental and health effects of the use of reclaimed water by reducing toxics, emerging pollutants, antibiotic-resistant bacteria and MPs. • Develop a decision support system to ensure the adaptability of tertiary treatment to each specific case. • Ensure water quality through online monitoring of certain parameters as pathogens. • Recover more than 90% of the nutrients from the wastewater. • Test reclaimed water and nutrients in field studies. • Reduce the costs of tertiary treatment to € 0.10-0.15 / m3. • Study compliance with the new European Directive in existing tertiary plants, and, if necessary, propose upgrading solutions. • Promote the replication, transferability and market launch of technologies. • Assessment of environmental, social and economic impacts. • Dissemination of results. <p>To achieve the proposed objectives, two flexible pilot plants (FPPs) will be created with the PLUG & PLAY concept, suitable for direct transport and operation. Each of the FPPs includes technologies adapted to the needs of medium-large and small populations, respectively, and will be tested in different locations. In this way, the viability of the PHOENIX concept will be studied for all types of scenarios.</p> | | | |
| IMAGE OF THE PROJECT | | | |
|  | | | |
| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| NO | SI | SI | NO |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>More than 10 different technologies will be tested throughout the life of the project, with advanced disinfection and oxidation processes as well as pretreatments. The performance of the different possible combinations will be evaluated, to optimize tertiary treatments. Technologies can be classified according to the stage of tertiary treatment and the population size for which they have been designed: - Ballasted lamella decantation - High Rate Oxygen/ozone flotation - Continuous sand filtration - Disk filters - Biological Activated Carbon - Ultrafiltration - High rate algae pond + dissolved air flotation - Constructed wetlands - Solar & LED Photo-Fenton - Ozone/UV disinfection - UV AOP</p> | | | |
| NEEDS DETECTED TO EVOLVE | | | |
| ECONOMIC FIGURES | | | |
| TOTAL BUDGET: 3.390.078 € | | | |
| TOTAL FUNDING RECEIVED: 1.855.113 € | | | |


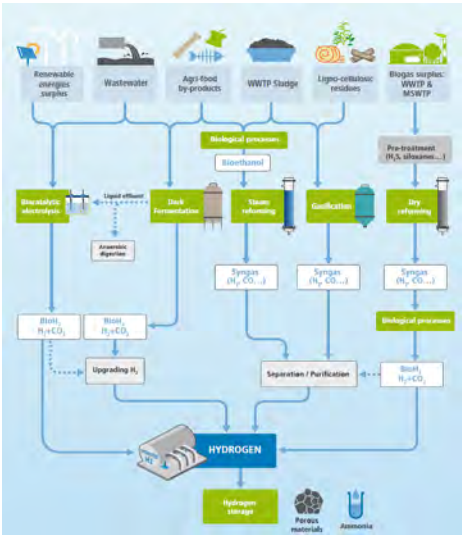
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|--|---|-------------------------|-------------------|
|  | R&D+i Group | | |
| | R&D&I PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 |
| PROJECT NAME | LIFE ZERO WASTE WATER | | |
| ORGANIZATION | AQUALIA | | |
| WEB | http://www.lifezerowastewater.com/ | | |
| PARTNERS IN THE PROJECT | | | |
| Aqualia (Coordinator, Spain); Canal de Isabel II (Spain); Simbiente – Engenharia e Gestão Ambiental (Portugal); Universidade de Santiago de Compostela (Spain); Universitat de València (Spain); VWMS Vienna Water Monitoring Solutions (Austria) | | | |
| Start date of the Project | 01/09/2020 | End date of the Project | 31/08/2024 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>The main objective of the project is to revolutionize the conventional water treatment processes in wastewater treatment plants (WWTP). ZWW will study the feasibility of a joint treatment system for wastewater (WW) and the organic fraction of urban solid waste (OFMSW) as an innovative solution, with positive energy balance and economically profitable in populations of less than 50,000 inhab-eq.</p> <p>For this, a waste collection and management strategy will be established at the municipal level, which will include awareness campaigns and the adoption of commitments with the neighbourhood and waste producers of the Valdebebas residential area (Madrid, Spain). The existing regulatory barriers for the collection of the OFMSW will be considered as well as onsite treatment (i.e. grinding) and disposal into the sewer system for the transport of the mixed waste stream (OFMSW + WW).</p> <p>The solution of the ZWW project will consist of a treatment train composed of three modules that will jointly treat the organic fraction of urban solid waste and urban wastewater that reaches the Valdebebas WWTP:</p> <ul style="list-style-type: none"> • Anaerobic Membrane Bioreactor (AnMBR) • AQU-ELAN® Partial Denitritation- Anammox System (PN/AMX) • Nutrient Extraction & Recovery Unit (from P and surplus biosolids) <p>All three systems will be integrated in a compact solution with synergic results and minimal requirements in terms of energy and surface.</p> | | | |
| IMAGE OF THE PROJECT | | | |
|  | | | |
| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| NO | YES | YES | NO |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>The project will also be equipped with a smart water monitoring and control system (SWMC) which will allow obtaining different types of water quality depending on the legal requirement and the needs of the end user.</p> <p>The implementation of new bioprocesses in the Valdebebas WWTP facilities represents a step forward in the paradigm shift of the purification concept:</p> <ul style="list-style-type: none"> - Collection of 125 kg/day of OFMSW – 45 tons during the project - Treatment capacity of 50 m³/day - 50% reduction in biosolid, up to 0.2 Kg SS/Kg COD removed. - 95% recovery of “pathogen free” water to be used for fertigation or environmental purposes. - Recovery of 5 g P/m³. Obtaining 0.2 Kg of soil fertilizer/m³ - Production of 0.3 Nm³CH₄ (biomethane)/m³ in AnMBR – 3kWh/m³ - Positive energy balance 1.0 kWh/m³ between the produced energy in the AnMBR and the consumed energy in the operation of the WWTP. - N₂O Emissions: 7,2 g N₂O/Kg N removed. | | | |
| NEEDS DETECTED TO EVOLVE | | | |
| ECONOMIC FIGURES | | | |
| Total Budget: 2.454.512 € | | | |
| Aqualia Budget: 1.099.639 € | | | |

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|--|------------|---|-------------|
|  | | R&D+i Group | |
| PROJECT NAME | | LIFE INFUSION | |
| ORGANIZATION | | AQUALIA | |
| WEB | | https://lifeinfusion.eu/es/ | |
| PARTNERS IN THE PROJECT | | | |
| Fundació EURECAT; Àrea Metropolitana de Barcelona; AMIU Genova Spa; AQUALIA; COGERSA; Detricon bvba; EBESA; Institute of Agrifood Research and Tecnology | | | |
| Start date of the Project | 01/09/2020 | End date of the Project | 31/08/2024 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>The main objective of LIFE INFUSION is to demonstrate, with a circular economy vision, an innovative resource recovery scheme (biogas, biofertilizers and reclaimed water (RW)) from effluents in municipal management through an almost zero discharge process. These effluents are landfill leachate and liquid digestate of organic fraction of municipal solid waste (OFMSW). INFUSION will build on the combination of existing highly efficient biological and separation technologies to reduce the environmental impact of MSW management and recovery of valuable products. The ultimate goal is to change the current MSW management paradigm by converting current MSW facilities into resource recovery and production factories.</p> | | | |
| IMAGE OF THE PROJECT | | | |
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| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| NO | YES | YES | NO |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>INFUSION aims to demonstrate and validate on a pilot scale a water purification treatment for landfill leachate and OFMSW liquid digestate based on the perspective of the circular economy, in order to recover resources (biogas, bio-fertilizers, and regenerated water). This system will be based on a treatment that combines various technologies of biological treatment and filtration and will be validated at pilot scale in two waste management centres: Ecoparc 2 in Montcada i Reixac, Barcelona, and COGERSA in Gijón, Asturias.</p> | | | |
| NEEDS DETECTED TO EVOLVE | | | |
| ECONOMIC FIGURES | | | |
| TOTA BUDGET: 3.119.601 | | | |
| TOTAL FUNDING RECEIVED: 1.712.587 | | | |


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|  | | R&D+i Group | |
| PROJECT NAME | | H2020 NICE | |
| ORGANIZATION | | AQUALIA | |
| WEB | | nice-nbs.eu | |
| PARTNERS IN THE PROJECT | | | |
| Aqualia (leader), CETIM, ICLE, G2G, ECOBIRD, Aarhus University, DRC, UNITO, Lisode, GUT, Aguas de Pereira, IRIDRA, SLU, INRAE research center, Agua Pereira | | | |
| Start date of the Project | 01/06/2021 | End date of the Project | 31/05/2025 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>The main goal of NICE project is to demonstrate the feasibility of using nature-based solutions (NBS) in European cities by integrating them into the Integral Water Cycle. These goals are aligned with SDG 6 (Clean Water and Sanitation) and SDG 11 (Sustainable Cities and Communities) within the 2030 Agenda on Sustainable Development. The NICE project will provide key knowledge and tools for the design and implementation of innovative NBS. In this context, NICE solutions will provide reusable water for different purposes, as well as mitigating pollution and water run-off and being an attractive and integral part of the urban landscape. NICE's strategy will be based on the exhaustive study of existing NBS and their optimization through research and the implementation of innovative pilots covering the entire urban water cycle: wastewater treatment plants (WWTP) effluents, greywater, polluted river basins, stormwater and combined sewer overflow. It will explore nature-based solutions such as green walls, vegetable rooftops, rain gardens and hybrid subsurface wetlands, which will be further enhanced with tailored strategies such as: bioaugmentation, reactive materials and other innovative filling media, vegetation selection and novel design. The project will implement 11 demonstration pilots (Urban Real Labs - URL) in 7 different countries: Spain, France, Italy, Poland, Poland, Denmark, Colombia and Egypt.</p> | | | |
| IMAGE OF THE PROJECT | | | |
|  | | | |
| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| NO | YES | YES | NO |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>The project will integrate research, private sector, citizens, policies and economy to:</p> <ul style="list-style-type: none"> - Enable the scaling up and revision of existing NBS across Europe through development of standards, guidelines and methodologies, supported and justified by research results and the development of innovative nature-based solutions at lab and URL scales. - Create new business and investment models for cost-effective solutions that benefit the economy, environment and society. - Identify obstacles, barriers and opportunities in current regulatory frameworks. - Raise awareness among the general public, by involving local stakeholders in co-creation in Urban Real Labs. <p>AQUALIA collaborates in the design and is responsible for the construction and validation of five of the URLs that will be built and validated in Spain:</p> <p>URL 1: Vigo - Located in the H building of the Vigo Free Trade Zone, the URL will collect rainwater and it will be treated in a 30 m2 green filter. The treated water will be stored to irrigate a section (25-50 m2) of green wall. Greywater will also be collected from nearby offices for treatment and reuse.</p> <p>URL 2: Talavera - Located in the Talavera de la Reina WWTP. Three constructed wetlands with innovative aspects such as low-energy forced aeration and recirculation will treat wastewater for comparison with the variety of nature-based solutions and technologies on the INTEXT platform.</p> <p>URL 3: Algeciras - Located on the promenade of the bay of Algeciras. The application of a 70 m2 vertical flow constructed wetland will be studied to prevent pollution caused in the Bay by the overflow of the sewage system in rainy episodes. In addition, gray water from the nearby Torrealmirante High School will be captured and treated to maintain humid conditions during the summer drought.</p> <p>URL 4: Benalmádena - A green wall will be installed for the treatment of grey water that will allow its effectiveness to be compared with other grey water treatment systems integrated into the residential urban environment.</p> <p>URL 6: Madrid - Located in the Aqualia headquarters. The collection of grey water for its treatment will be studied in two types of NBS: a 200 m2 green roof and a 112 m2 rain garden. This URL will be representative of the future replication of Nbs technologies to close the water cycle in the urban center of large cities in the EU.</p> | | | |
| NEEDS DETECTED TO EVOLVE | | | |
| ECONOMIC FIGURES | | | |
| Total budget: 4.996.342 € | | | |
| Aqualia budget: 1.073.125 € | | | |


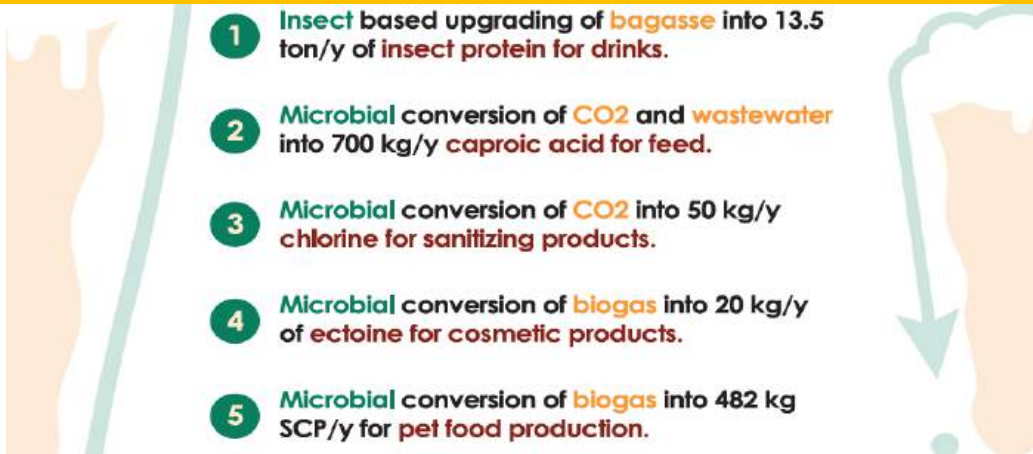
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|  | | R&D+I Group | |
| | | R&D&I PROJECTS - PORTFOLIO | |
| PROJECT NAME | | LIFE RESEAU | |
| ORGANIZATION | | AQUALIA | |
| WEB | | https://life-reseau.eu/ | |
| PARTNERS IN THE PROJECT | | | |
| AQUALIA, FUNDACIÓN INSTITUTO TECNOLÓGICO DE GALICIA, VANDCENTER SYD AS | | | |
| Start date of the Project | | 01/09/2021 | End date of the Project |
| | | | 28/02/2025 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>LIFE RESEAU seeks to reduce by up to 100% the discharge of untreated stormwater overflows (SWOs) in heavy precipitation areas. To do this, it will develop and validate a novel solution for retrofitting and upgrading conventional activated sludge (CAS) Wastewater Treatment Plants (WWTP) and combined sewer networks (CSN). The novel solution is based on:</p> <p>ABR - A highly efficient and flexible system of Advanced Biofilm Reactor (ABR) that will be designed to be integrated into the existing activated sludge basins currently used in CAS systems, increasing the WWTP capacity (m³/h) by up to 600%, without additional land requirements, using the existing area and infrastructures (reactors intensification), while reducing the energy consumption and related CO₂ and N₂O emissions up to 66% and 85%.</p> <p>SWTM - A Storm Water Treatment Module (SWTM) based on mechanical filtration to be designed and integrated in the WWTP. The influents will be diverted to the reactors, storage tanks or the SWTM and distributed among them depending on their volumes and composition.</p> <p>SiiMS - A Smart Infiltration/Inflow Management System (SiiMS) for monitoring and controlling the combined sewer networks by assessing the presence of infiltration/inflow in CSN, optimizing the operation and maintenance tasks and evaluating the influence of climate change scenarios over the WWTP and CSN.</p> | | | |
| IMAGE OF THE PROJECT | | | |
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| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| NO | YES | YES | NO |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>Reduction of up to 100% of untreated storm water overflows discharged by WWTP amounting to 36.000 m³ (30.000 m³ in Spain and 6.000 m³ in Denmark)</p> <p>Increase of up to 600% of the WWTP treatment capacity (m³/(m²·d))</p> <p>Reduction of up to 95% of Biochemical Oxygen Demand (BOD) load.</p> <p>Reduction of up to 75% of the suspended solids, N, P and microplastic content in the SWTM.</p> <p>Reduction in energy consumption of up to 66% amounting to 243.090 kWh (164.250 in Spain and 78.840 in Denmark).</p> <p>Reduction of up to 85% of N₂O emissions amounting to 894 kg of N₂O (657 in Spain and 237 in Denmark).</p> <p>Reduction of up to 80% in CO₂-eq emissions to 337.737 kg of CO₂-eq.</p> | | | |
| NEEDS DETECTED TO EVOLVE | | | |
| ECONOMIC FIGURES | | | |
| Total Budget: 2,891,589 € | | | |
| Aqualia budget: 1,349,698 € | | | |



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|  | R&D+i Group | | |
| R&D&I PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 | |
| PROJECT NAME | MISIONES ECLOSION | | |
| ORGANIZATION | AQUALIA | | |
| WEB | https://www.aqualia.com/i-d/proyectos-misiones/misiones-eclosion | | |
| PARTNERS IN THE PROJECT | | | |
| <p>ARIEMA, AQUALIA, FCC MEDIO AMBIENTE, GHENOVA, H2B2, IDECAL, CADE, MINDCAPS, UNIVERSIDAD AUTÓNOMA DE MADRID, UNIVERSIDAD DE EXTREMADURA, ISP-UVA, UNIVERSIDAD DE CASTILLA-LA MANCHA, UNIVERSITAT DE GIRONA, AICIA, CIEMAT, INSTITUTO DE CIENCIA DE MATERIALES DE SEVILLA, CARTIF, IMDEA ENERGÍA</p> | | | |
| Start date of the Project | 01/11/2021 | End date of the Project | 31/12/2024 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>The main objective of the ECLOSION project is to create new materials, technologies, and processes for the generation, storage, and transport of renewable and local hydrogen and biomethane.</p> <p>This generation of energy vectors will be made from urban waste, agri-food products, wastewater, and sewage sludge. The objective is to provide new technological tools that optimize the profitability of the renewable energy sector, encouraging economic activity and the creation of qualified employment.</p> <p>The project also proposes the development of energy optimization tools, which implies designing from source to point of consumption energy systems that are eco-efficient, flexible, and intelligent.</p> | | | |
| IMAGE OF THE PROJECT | | | |
|  | | | |
| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| NO | NO | YES | NO |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>In Activity 1 it is proposed to take advantage of the energy content of wastewater for the generation of energy vectors (biohydrogen and biomethane) through bioelectrochemical processes. The residual water will be conveniently regenerated for use in electrolyzers and obtain high-quality hydrogen at reasonable costs. On the other hand, new more efficient biological processes will be investigated for the generation and purification of biohydrogen and biomethane from the organic fraction of solid waste (FORSU), agri-food waste and sewage sludge.</p> <p>In Activity 2, the catalyzed supercritical water gasification of biowaste, sewage sludge and digestates with a high content of organic matter for the generation of a synthesis gas rich in hydrogen is proposed as a thermochemical treatment. Likewise, it is proposed to investigate a high-pressure storage system to take advantage of the process conditions.</p> <p>Activity 3 is focused on the study of new processes and materials for the separation of gas mixtures produced with hydrogen, methane and/or carbon dioxide in their composition, in order to generate high quality pure gases. In addition, options for the capture and comprehensive valorization of carbon dioxide generated in all processes will be investigated.</p> <p>Activity 4 will focus on the storage, transport, and transformation of the energy vectors (hydrogen and methane) generated in the rest of the processes. However, the investigated technological options (AEM and SOFC electrolyzers, fuel cells, hybrid supercapacitors, or hydrogen compression by metal hydrides) will be universally applicable to these vectors regardless of their generation process.</p> <p>Finally, Activity 5 will address aspects of process integration in a transversal way, through simulation with digital twins and also experimentally.</p> | | | |
| NEEDS DETECTED TO EVOLVE | | | |
| ECONOMIC FIGURES | | | |
| <p>Total budget: 6.602.498 € Total grant: 4.451.374,85 € Aqualia budget: 1.258.077 € Grant Aqualia 777.425,30</p> | | | |



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|  | R&D+I Group | | |
| | R&D&I PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 |
| PROJECT NAME | MISIONES ZEPPELIN | | |
| ORGANIZATION | AQUALIA | | |
| WEB | https://www.aqualia.com/i-d/proyectos-misiones/misiones-zeppelin | | |
| PARTNERS IN THE PROJECT | | | |
| AQUALIA, NATURGY, NORVENTO ENERXIA, PERSEO, REPSOL, REDEXIS, REGANOSA, TECNICAS REUNIDAS, CETIM, CIDAUT, CIEMAT, ENERGYLAB, FUNGE UVA, IMDEA ENERGIA, ITMATI, INSTITUTO DE TECNOLOGÍA QUÍMICA | | | |
| Start date of the Project | 01/11/2021 | End date of the Project | 31/12/2024 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>Hydrogen (H2) as an energy vector has been postulated as one of the most promising ways to mitigate and adapt to climate change, since it can produce electrical, mechanical and thermal energy without generating direct CO2 emissions. Currently, 96% of the H2 in market is produced on an industrial scale from the reforming of fossil fuels, a process that is associated with a high environmental impact (11.5 kgCO2/kg H2) and makes it unfeasible as a means of producing H2 in a decarbonizing environment. Likewise, it is essential that the energy transition is based on the principle of the circular economy, with waste management as one of the key elements to mitigate and curb the climate and economic impact of its generation. Industrial symbiosis must be promoted in order to allow converting byproducts or waste from one industry into raw materials for another one. The ZEPPELIN project arises in response to this challenge, with the general objective of investigating a flexible set of green hydrogen production and storage technologies based on the use of waste and by-products, seeking to significantly improve the production costs and efficiency of this energy vector. In this way, the project will address the different technological challenges linked to biogas and bioethanol reforming, dark fermentation (DF), microbial electrolysis (ME), gasification and H2 storage, establishing new models for obtaining green H2 complementary to electrolysis with renewable energies, integrated into a decarbonized energy model under the principles of the circular economy and digitization, in a scenario of water stress aggravated by phenomena derived from climate change.</p> | | | |
| IMAGE OF THE PROJECT | | | |
|  | | | |
| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| NO | NO | YES | NO |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <ul style="list-style-type: none"> To establish new alternative and complementary green H2 production pathways to electrolysis associated with the use of by-products and waste from different sectors, integrating green H2 production and circular economy. To study the complementarity of the technologies developed through research in proofs of concept under real operating conditions. To investigate new ways of seasonal storage of H2 by modeling systems based on NH3 and studies on new porous materials, to reduce costs on a small scale, tripling the energy density of compressed H2 storage. To demonstrate the technical feasibility of a flexible model for obtaining H2 complementary to electrolysis, decoupling its production from the use of renewable energy and water. To obtain a digital modeling and decision-making tool that allows evaluating the potential for H2 production based on the waste and the technology used. To establish a delocalized model of green H2 production applicable to different environments. To reduce the cost of green H2 production by 30% compared to production with electrolysis (€4.6/ kgH2), achieving a 70% reduction in associated CO2 emissions. To establish a model for the use of waste with the potential to generate more than 133,800 t/year of green hydrogen at national level, covering nearly 30% of the national demand for H2 and optimizing it. | | | |
| NEEDS DETECTED TO EVOLVE | | | |
| ECONOMIC FIGURES | | | |
| Total budget: 7.108.584 € Total funding: 4.226.161,42 € Aqualia budget: 1.211.393 € Aqualia funding: 697.152,16 | | | |



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|  | | R&D+I Group | |
| | | R&D&I PROJECTS - PORTFOLIO | |
| | | PERIOD: 2021-2023 | |
| PROJECT NAME | RIS3 EFLUENT-EX | | |
| ORGANIZATION | AQUALIA | | |
| WEB | https://www.aqualia.com/en/web/aqualia-en/r-d/mission-projects/ris3-e-fluent-ex | | |
| PARTNERS IN THE PROJECT | | | |
| DISAIM INGENIERÍA, SENERGY, EXTREMADURA VERDE, PHI4 | | | |
| Start date of the Project | 25/02/2022 | End date of the Project | 24/08/2023 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>The E-fluent-EX project proposes to investigate the integration of different technologies that make it possible to take advantage of these existing and unused infrastructures in the WWTP, turning them into biofactories that allow a beneficial use of agro-industrial and forestry bio-waste from the region together with the sewage sludge to obtain positive synergistic effects in the generation of bioenergy, biofuels and other valuable bioproducts.</p> | | | |
| IMAGE OF THE PROJECT | | | |
|  | | | |
| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| NO | NO | YES | NO |
| RESULTS ACHIEVED OR EXPECTED? | | | |
| <p>The general objective of the project is to investigate the concept of eco-efficient bio-factories, such as production centres for new bioproducts, renewable energy sources and their storage with disruptive systems, in addition to promoting sustainable mobility with green biofuels, taking advantage of the biowaste generated in Extremadura. Thus, the main objectives of the E-fluent-EX project are:</p> <ul style="list-style-type: none"> Promoting the circular economy, transforming waste into resources with high added value. Increasing the competitiveness of the participating companies and their sectors. Generating and storing renewable energy in a distributed way. Promoting energy efficiency and the consumption of renewable energy. Reducing greenhouse gas emissions associated with current waste management and with the use of fossil fuels as energy source. | | | |
| NEEDS DETECTED TO EVOLVE | | | |
| ECONOMIC FIGURES | | | |
| <p>Total budget: 753,057.97 € Total funding: 548,017.71 € Aqualia budget: 314,076.85 € Aqualia funding: 202,489.20 €</p> | | | |

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|  | R&D+i Group | | |
| | R&D&I PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 |
| PROJECT NAME | HORIZON EUROPE D4RUNOFF | | |
| ORGANIZATION | AQUALIA | | |
| WEB | https://d4runoff.eu/ | | |
| PARTNERS IN THE PROJECT | | | |
| VANDCENTER SYD AS (Denmark), AQUALIA (Spain), FUNDACIÓN INSTITUTO TECNOLÓGICO DE GALICIA (Spain), LABORATORIO IBERICO INTERNACIONAL DE NANOTECNOLOGIA (Spain), Geological Survey of Denmark and Greenland (Denmark), KOBENHAVNS UNIVERSITET (Denmark), UNIVERSIDAD DE CANTABRIA (Spain), THREE O'CLOCK (France), INGEGNERIE TOSCANE SRL (Italy), MITIGA SOLUTIONS SL (Spain), KLINK SRL (Italy) | | | |
| Start date of the Project | 01/09/2022 | End date of the Project | 31/08/2024 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>Urban runoff, comprising stormwater and snowmelt, is a major transport vector of pollutants released in the urban environment. It contributes significantly to the deterioration of urban receiving waters quality, making it a threat to public health and damaging ecosystems. In addition to heavy metals and other pollutants, contaminants of emerging concern (CECs), such as endocrine-disrupting compounds, pharmaceuticals and microplastics, are detected in urban runoff.</p> <p>Current combined sewer networks (CSN) are designed to process only a portion of major storms overflow, and untreated sewage is discharged into water bodies. This problem is worsening with climate change effects and varying rainfall patterns. The alternative, separated sewer networks (SSN), collect wastewater and stormwater separately and discharge the later directly into receiving waters, with no purification, which is a serious threat to the ecosystem.</p> <p>Nature Based Solutions (NBS) can contribute effectively to stormwater management of the sewer networks by reducing the volume and flow rate of stormwater runoff. Latest research suggests that the implementation of hybrid green-blue-grey infrastructures can bring important synergies in the integral management of urban water. However, currently it is difficult to make informed decisions for the implementation of effective hybrid measures. The European D4RUNOFF project aims to tackle this challenge by developing a knowledge driven approach. More specifically, the project will develop:</p> <ul style="list-style-type: none"> *. Novel detection methods for runoff pollutants characterisation *. Novel sensors for identifying and monitoring of CECs. <p>The knowledge gained in this field will serve to build:</p> <ol style="list-style-type: none"> 1. a multi-criteria methodology for the design of cost-effective mitigation hybrid solutions combining new and existing NBS and water infrastructures (i.e blue-green-grey solutions) 2. an AI-assisted management platform to support water management in the planning, operation and risk monitoring of the urban infrastructures for the design of effective strategies to cope and mitigate urban runoff events. | | | |
| IMAGE OF THE PROJECT | | | |
|  | | | |
| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| NO | YES | YES | NO |
| RESULTS ACHIEVED OR EXPECTED ² | | | |
| <p>D4RUNOFF will create a novel framework for preventing and managing diffuse pollution from urban water runoff through the data driven design of hybrid Nature Based Solutions (NBS) adapted to the current and future risk scenarios solutions. This innovative approach will support water utilities, urban planners and policy makers in defining urban runoff and storm water management plans to enhance the quality of the water discharged to water bodies, considering the Climate Change.</p> <p>D4RUNOFF expected results include:</p> <ul style="list-style-type: none"> - Increase the knowledge regarding urban runoff pollution sources and the impacts through the development of novel high-resolution suspect and screening & non target screening NTS methods for CECs detection and identification of the major CECs and relevant pollutants present in storm water source and assessing their fate in NBS. - Development of cost effective advanced online sensors for targeted CECs, metals and microplastics for improving the monitoring of the water pollution derived from urban runoff. - Enhancing the implementation of advanced preventive and mitigation strategies to reduce diffuse pollution through the development of and innovative multiple-criteria decision analysis (MCDA) methodology integrated in Geographical Information Systems (GIS) for hybrid NBS design. - Development of a risk assessment and mapping methodology to identify diffuse pollution hotspots for specific sites & considering climate change effects. - Development of an AI based platform to facilitate the development of effective urban runoff and storm water management plans based on informed decisions. - Implementation and validation of D4RUNOFF approach in 3 case studies and 5 replication sites - Knowledge transfer and engagement with stakeholders, including civil society | | | |
| NEEDS DETECTED TO EVOLVE | | | |
| ECONOMIC FIGURES | | | |
| Total Budget: 3.332.948,75 € | | | |
| Aqualia Budget: 402,00 € | | | |

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|  | | R&D+I Group | |
| R&D&I PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 | |
| PROJECT NAME | HORIZON EUROPE CHEERS | | |
| ORGANIZATION | AQUALIA | | |
| WEB | https://cheers-project.eu/ | | |
| PARTNERS IN THE PROJECT | | | |
| MAHOU, S.A. (Coordinator)Q, FCC AQUALIA, S.A., UNIVERSIDAD DE VALLADOLID, PROTEINSECTA SOCIEDAD LIMITADA, EURIZON, S.L., SYMRISE, A.G., GENIA BIOENERGY, S.L., SYSPRO AUTOMATION, S.L., AINIA, THUNDER FOODS LDA) | | | |
| Start date of the Project | 01/09/2022 | End date of the Project | 31/08/2024 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>CHEERS is a new biorefinery concept, inspired on nature biodiversity (insect and microbial platforms), to sustainably and efficiently upgrade underused or waste sidestreams such as bagasse, wastewater, CO₂ and CH₄ from bio-based industries into innovative bio-based products. CHEERS will help biobased industries to improve their feedstock use efficiency and overall sustainability and competitiveness via upcycling and cascading use of biomass produced from their side-streams. CHEERS is developed as a modular solution where bio-based industries can configure their optimal combination by selecting among 5 novel biotechnological routes which generate 5 bio-based products for industrial applications, with attractive market opportunities: insect protein, disinfectant, microbial protein, ectoine and caproic acid. All value chains are based on new bioprocesses and/or innovative biofermentors combined with sustainable downstream processes, which will be validated at demoscate at an industrial brewery.</p> <p>A min. 45% carbon footprint reduction will be achieved in each value chain. The evaluation of CHEERS impacts will consider go beyond the classic LCA and will cover broader impacts such as biodiversity and land use.</p> <p>CHEERS will contribute to a “zero waste” biorefinery approach, fully aligned with the EU Green Deal, Circular Economy Action Plan and Bioeconomy Strategy, and foster the understanding of biotechnology-based value chains through the engagement of relevant actors, from small bio-based industries to consumer</p> | | | |
| IMAGE OF THE PROJECT | | | |
|  | | | |
| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| NO | NO | YES | NO |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>An integral solution for the valorisation of all by-products and side-streams via 2 novel bio-based production platforms (insect and microbial) and 5 bio-based products: Upgrading of bagasse into 13.5 ton/y of insect protein drinks. Conversion of CO₂ and wastewater into 700 kg/y caproic acid for feed. Conversion of CO₂ into 50kg/y chlorine for sanitizing products. Conversion of biogas into 20kg/y of ectoine for cosmetic products. Conversion of biogas into 482 kg SCP/y for pet food production.</p> | | | |
| NEEDS DETECTED TO EVOLVE | | | |
| ECONOMIC FIGURES | | | |
| Total Budget: 7.355.347 € | | | |
| Aqualia Budget: 1.576.750 € | | | |

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|  | | R&D+I Group | |
| | | R&D&I PROJECTS - PORTFOLIO | |
| | | PERIOD: 2021-2023 | |
| PROJECT NAME | UNIDAD MIXTA DE INVESTIGACIÓN AQUATIM | | |
| ORGANIZATION | AQUALIA | | |
| WEB | https://www.aqualia.com/i-d/proyectos-misiones/umi-aquatim | | |
| PARTNERS IN THE PROJECT | | | |
| AQUALIA, TRAINASA, CETIM | | | |
| Start date of the Project | 01/07/2022 | End date of the Project | 30/06/2025 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>The AQUATIM Joint Research Unit (JRU) has the general objective of responding to the current challenges of society, through the study and implementation of new technologies throughout the entire water cycle. Innovation, development of new circular economy models and digitalization are key factor to obtain new sources of green energy (H2 and biogas), new natural resources and efficient use of them (nutrients, metals, and water). Likewise, it includes the protection of ecosystems and biodiversity through nature-based solutions (NbS), the development of new digital technologies (sensors, traceability, models, and predictive systems) and the introduction of improvement actions to ensure quality. of the bodies of water</p> | | | |
| IMAGE OF THE PROJECT | | | |
|  | | | |
| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| NO | NO | YES | YES |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>Lines of research</p> <ul style="list-style-type: none"> Green hydrogen from water as a key element towards decarbonization NBS and Sustainable Urban Drainage Systems (SUDs) for the efficient management of the water cycle and adaptation to climate change Circular economy of water for a sustainable efficiency of resources Quality of water masses to guarantee their safe use and the protection of ecosystems Digitization of the integral water cycle Integration and validation of technologies | | | |
| NEEDS DETECTED TO EVOLVE | | | |
| ECONOMIC FIGURES | | | |
| <p>Total Budget: 2.002.016,51 € Total funding: 800.806,61 € Aqualia Budget: 851.661,97 € Aqualia funding: 566.666,67 €</p> | | | |

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|  | | R&D+I Group | |
| | | R&D&I PROJECTS - PORTFOLIO | |
| | | PERIOD: 2021-2023 | |
| PROJECT NAME | HORIZON EUROPE NINFA | | |
| ORGANIZATION | AQUALIA | | |
| WEB | https://ninfa-project.eu/ | | |
| PARTNERS IN THE PROJECT | | | |
| LEITAT (Spain), CENTER FOR TECHNOLOGY RESEARCH AND INNOVATION (Cyprus), INSTITUT MINES-TELECOM (France), WETSUS (Netherlands), WINGS ICT SOLUTIONS (Greece), DELTARES (Netherlands), SAPIENZA UNIVERSITÀ DE ROMA (Italia), AQUALIA (Spain), MUNICIPALITY OF LOS ALCAZARES (Spain) | | | |
| Start date of the Project | 01/11/2022 | End date of the Project | 30/04/2026 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>Ninfa aims to develop groundwater monitoring strategies through innovative technology to prevent groundwater pollution. These novel strategies will ensure effective management, control, governance and protection of groundwater resources thus securing water quality and quantity for future use. Groundwater quality is affected by different sources of pollution: pesticides and nutrients from agriculture and farming, wastewater treatment plant effluent and urban runoff infiltration. In addition, the exploitation of aquifers for water consumption results in increased pressure on groundwater resources, which may be exacerbated by climate change (lack of natural recharge to aquifers).</p> <p>NINFA will provide a novel strategy based on an early-warning DSS and knowledge base (the NINFA Platform) and a series of innovative and cost effective monitoring, modelling and treatment solutions, considering diverse pollutants (nutrients, pesticides, salinity, CECs, ARG, and MP) and synergistic effects regarding stressors derived from climate and global changes, with the aim of preventing GW contamination, protecting its quality and enhancing its resilience.</p> | | | |
| IMAGE OF THE PROJECT | | | |
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| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| YES | YES | NO | NO |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>1) Development of hydrogeological and reactive transport models</p> <p>2) Innovative technologies for pollutants removal and resource recovery:</p> <p>2.1 Membrane-based technologies for the metal recovery from urban runoff</p> <p>2.2 Natural base solutions and advanced oxidation processes for hydrocarbons and microplastic removal from urban runoff, obtaining water for indirect auifer recharge or water reuse</p> <p>2.3 Combined advanced oxidation processes and adsorption for the removal of CECs and microplastics from WWTP effluents.</p> <p>2.4 Membrane-based technologies for the manure treatment.</p> <p>2.5 Woodchip bioreactor and electro wetland for nitrates removal from subsurface drainage water.</p> <p>3) Development of in situ continuous high-resolution distributed sensors for groundwater monitoring.</p> | | | |
| NEEDS DETECTED TO EVOLVE | | | |
| ECONOMIC FIGURES | | | |
| Total Budget: 3.996.824,73 € | | | |
| Aqualia Budget: 399.746,38 € | | | |

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|  | | R&D Group | |
| PROJECT | | R&D PROJECT REPOSITORY | |
| | | PERIOD 2021-2023 | |
| PROJECT | | LIFE ECODIGESTION 2.0 - INNOVATIVE TECHNOLOGY SCALE-UP FOR THE CONTROL AND AUTOMATION OF CODIGESTION IN WWTPS TO PRODUCE GREEN ENERGY ON DEMAND | |
| ORGANIZATION | | GLOBAL OMNIUM | |
| WEB | | https://www.lifecodigestion.com/ | |
| ORGANIZATIONS PARTICIPATING IN THE PROJECT | | | |
| Global Omnium Medioambiente, Aguas do Centro Litoral, FINNOVA | | | |
| Project start date | | 01/09/2020 | Project end date |
| | | | 29/02/2024 |
| DETAILED DESCRIPTION. SUMMARY OF OBJECTIVES AND PURPOSE | | | |
| <p>Energy production through co-digestion of waste in WWTPs has significant environmental advantages in terms of energy production, offering an attractive alternative to fossil fuels in the production of power and heat. These advantages are aligned with the commitments reached in the Paris Agreement in terms of CO2 emissions reduction. In addition, it allows the transformation of waste into raw materials, as recommended by Directive 2008/98/EC.</p> <p>The main objective of LIFE-ECODigestion 2.0 is the scaling up of the technology for on-demand biogas production with WWTP sludge, using agri-food waste and slurry as co-substrate. The technology is based on that developed in the previous LIFE ECODigestion project LIFE13 ENV/ES/377, whose main objective was the development, implementation and demonstration at pilot scale of an innovative technology for automatic control of waste dosing in WWTP anaerobic digesters and, consequently, to maximize biogas production and waste treatment capacity.</p> <p>The development of LIFE ECODigestion 2.0 aims to avoid the loss of resources and energy contained in waste and WWTP sludge by developing a control, management and decision making tool to optimize the co-digestion of waste in WWTP digesters. Environmental and economic benefits will be achieved through increased and better controlled biogas production, as well as optimal waste exploitation.</p> | | | |
| PROJECT IMAGE | | | |
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| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation and Purification | Energy and Waste | Transversals |
| NO | YES | YES | YES |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>The main expected results are as follows:</p> <ol style="list-style-type: none"> Scaling up of the tool for automatic co-digestion in WWTP with agri-food waste and slurry, with the aim of energy production, introducing waste into the digesters based on optimal mixtures that will be generated and updated. Adjustment between the target biogas production (selected by the operator) and the simulated one. Adjustment between target biogas and that produced after automated dosing of cosubstrates. Increasing the amount of slurry and agri-food waste that can be treated in each of the WWTPs in the study, resulting in an increase in waste treated during the full-scale demonstration. Obtain more biogas with co-digestion compared to digesting each substrate separately. Improve the stability of the codigestion process under different operating conditions with various cosubstrates, taking the acidity/alkalinity ratio as a stability reference. To valorize agri-food waste and slurry by changing its current destination, which are incineration, agriculture, composting and disposal in landfills, for its co-digestion. This implies: i) Avoidance of greenhouse gas emissions in the full-scale application of co-digestion of agri-food waste and slurry respectively; ii) total annual methane production using agri-food waste with slurry. Consolidation of quality and qualified full-time jobs and job creation during project implementation (specialized technicians). Regarding the impact on the EU, the implementation of the tool in all WWTPs with anaerobic processes (5,477 WWTPs) will mean an energy production of 58,330 GWh/year in the EU-28. In addition to this, an annual reduction of greenhouse gases of 66.2 Mt CO2 and 17.1 t NOx, and of gases that promote acid rain by 23.7 t SO2 will be achieved. | | | |
| IDENTIFIED NEEDS TO EVOLVE | | | |
| <i>Project under development</i> | | | |
| ECONOMIC DATA | | | |
| <p>Total Project Budget: 938,867 €.</p> <p>Total Project Grant: 516,376 € (LIFE Program)</p> | | | |


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|  | | R&D Group | |
| R&D PROJECT REPOSITORY | | PERIOD 2021-2023 | |
| PROJECT | | LIFE RENATURWAT - INTEGRATING CIRCULAR ECONOMY AND BIODIVERSITY IN SUSTAINABLE WASTEWATER TREATMENTS BASED ON CONSTRUCTED WETLANDS | |
| ORGANIZATION | | GLOBAL OMNIUM | |
| WEB | | https://liferenaturwat.com/ | |
| ORGANIZATIONS PARTICIPATING IN THE PROJECT | | | |
| UPVLC (Coordinator), Global Omnium Medioambiente, EMIVASA, Aguas do Portugal, EFE, Fundación Global Nature, UVEG, , Ayuntamiento de Carricola y Sociedad Civil Particular Urbanizacion Valle Residencial Los Monasterios | | | |
| Project start date | | 01/10/2020 | Project end date |
| | | | 31/03/2024 |
| DETAILED DESCRIPTION. SUMMARY OF OBJECTIVES AND PURPOSE | | | |
| <p>The overall objective is to demonstrate that it is possible to obtain reclaimed water from WWTP effluents by combining SbN and industrial wastes, in order to produce a high quality water resource suitable for environmental uses, such as wetland reclamation/conservation.</p> <p>The artificial wetlands will be enhanced with the sludge produced in the settlers during the water purification process, which will function as "absorbent material" for the treatment of urban wastewater. The creation of these artificial wetlands in wastewater treatment plants (WWTP) of small towns is a measure to improve the quality of treated wastewater and help meet the water quality objectives in the receiving environment set out in the Water Framework Directive.</p> | | | |
| PROJECT IMAGE | | | |
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| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation and Purification | Energy and Waste | Transversals |
| YES | YES | YES | NO |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>The main expected results are:</p> <ol style="list-style-type: none"> 1.- Creation of a renaturation treatment system in WWTP. This action implies the creation of wetland habitats in the WWTP facility, thus providing environmental services, such as landscape integration, carbon sequestration and biodiversity enhancement. 2.- Demonstration that the proposed treatment contributes to significantly improve the environmental quality of the WWTP effluent. 3.- Complementarily, it is expected to improve aquatic biodiversity by enhancing the taxonomic richness in aquatic invertebrates and favoring the colonization of the artificial wetland by some species of amphibians, reptiles, fish, birds and terrestrial insects. 4.- Production of a renaturalized water flow equivalent to a population of about 1500 inhabitants. This flow will feed the receiving river, contributing to improve its condition in accordance with the WFD. 5.- Implementation of an economic and environmental method to process and transport the sludge. 6.- Implementation of a design and management tool for the proposed treatment scheme, which will facilitate the implementation of this cost-effective technology in any location and under similar conditions. 7.-Elaboration of a guide for the design, construction, maintenance and operation of WWTP effluent renaturation systems that includes the criteria for environmental uses (RD1620 / 2007), which will help the competent authorities to propose improvements in future tenders for WWTPs. 8.- To get the competent administrations to positively value this type of actions in the tenders for the maintenance and operation of WWTPs. 9.- To carry out training workshops on effluent renaturation in companies specialized in wastewater and competent administrations.Elaboration of a communication and dissemination plan of the results of the project among the different social target groups (schoolchildren, general public, technical profiles), based on talks and visits to the facilities with an eminently practical character where they can consult themselves the environmental benefits of the action. 10.- Elaboration of a communication and dissemination plan of the results of the project among the different social target groups (schoolchildren, general public, technical profiles), based on talks and visits to the facilities with an eminently practical character where they can consult themselves the environmental benefits of the action. | | | |
| IDENTIFIED NEEDS TO EVOLVE | | | |
| Project under development | | | |
| ECONOMIC DATA | | | |
| Total Project Budget: 1.893.955 €. | | | |
| Total Project Grant: 1.041.675 € (LIFE Program) | | | |

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|  | | R&D Group | |
| | | R&D PROJECT REPOSITORY | |
| | | PERIOD 2021-2023 | |
| PROJECT | LIFE SAFE_T_WATER - NEW ECO-INNOVATIVE DRINKING WATER TREATMENT BASED ON 1-STEP CHEMICAL TECHNOLOGY USING A MULTIFUNCTIONAL NATURAL POLYMER | | |
| ORGANIZATION | GLOBAL OMNIUM | | |
| WEB | https://safetwater.eu/ | | |
| ORGANIZATIONS PARTICIPATING IN THE PROJECT | | | |
| SERVYECO (Coordinator), Global Omnium-EMIVASA y Canal de Isabel II | | | |
| Project start date | 01/09/2020 | Project end date | 31/08/2024 |
| DETAILED DESCRIPTION. SUMMARY OF OBJECTIVES AND PURPOSE | | | |
| <p>Drinking water treatment is based on multiple stages, the objective of which is to obtain an effluent of adequate quality and suitable for human consumption. During the coagulation-flocculation stage, a physical-chemical process is carried out to eliminate the colloidal matter in suspension and a large part of the microorganisms associated with the particles responsible for turbidity. This process has a direct influence on the optimization of subsequent stages, sedimentation or filtration among others, and directly affects the final quality of the treated water.</p> <p>Given the restrictions on the use of hazardous substances in the regulations of the member states of the European Union, there is a growing interest in the search, design and development of new natural organic coagulants, which are not toxic to humans and have a lower impact on the environment.</p> <p>The main objective of the project is to validate a new innovative and environmentally friendly technology for the production of drinking water in Drinking Water Treatment Plants (DWTP). The new technology eliminates all corrosive and hazardous chemicals in the different processes of drinking water treatment, such as: coagulation, flocculation and pH adjustment, which will be replaced by an improved organic polymer based on natural extracts.</p> | | | |
| PROJECT IMAGE | | | |
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| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation and Purification | Energy and Waste | Transversals |
| YES | NO | YES | NO |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <ol style="list-style-type: none"> Enhanced efficiency of coagulants in drinking water treatment without incurring additional costs. Reduction in the dosage of chemical products, leading to cost savings. Complete elimination (100%) of toxic, carcinogenic, and corrosive substances in the drinking water treatment process. Decreased waste generation during the treatment process. Prolonged lifespan of treatment plants by using non-toxic and non-corrosive products, which protect metal components. Enhanced safety for workers compared to the currently used products, minimizing risks and the potential for injuries to individuals. | | | |
| IDENTIFIED NEEDS TO EVOLVE | | | |
| <i>Project under development</i> | | | |
| ECONOMIC DATA | | | |
| <p>Total Project Budget: 1.970.735 €.</p> <p>Total Project Grant: 1.083.903 € (LIFE Program)</p> | | | |



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|  | | R&D Group | |
| R&D PROJECT REPOSITORY | | PERIOD 2021-2023 | |
| PROJECT | LIFE WASTE2COAG - BRINE AND METAL WASTES VALORISATION TO PRODUCE COAGULANTS FOR WASTEWATER TREATMENT | | |
| ORGANIZATION | GLOBAL OMNIUM | | |
| WEB | https://lifewaste2coag.com/ | | |
| ORGANIZATIONS PARTICIPATING IN THE PROJECT | | | |
| Global Omnium Medioambiente (coordinator), AIDIMME, Aquafin, Joviar, Isle Utilities | | | |
| Project start date | 01/09/2021 | Project end date | 01/07/2024 |
| DETAILED DESCRIPTION. SUMMARY OF OBJECTIVES AND PURPOSE | | | |
| <p>LIFE Waste2Coag aims to demonstrate an innovative and cost-effective technology based on waste electrolysis to produce coagulants for the removal of contaminants in urban and industrial wastewater, including emerging pollutants and pathogens.</p> <p>LIFE Waste2Coag promotes circular economy in water treatment plants and creates synergies with other sectors, as it valorizes metallic waste from industrial scrap and brines generated in various industries, including wastewater treatment plants (WWTPs) and desalination plants (DPs). The project is aligned with and contributes to the European Circular Economy Action Plan, the Green Deal Communication, the EU Strategy on Climate Change Adaptation, and the Roadmap to a Resource-efficient Europe, among others.</p> <p>Waste2Coag is a project co-financed by the European Union under the LIFE Program, which is the financial instrument that supports environmental and nature conservation projects throughout the European Union.</p> | | | |
| PROJECT IMAGE | | | |
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| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation and Purification | Energy and Waste | Transversals |
| NO | YES | YES | NO |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>1. Technological Development:</p> <ul style="list-style-type: none"> - Design, build, and operate an electrolytic pilot prototype for coagulant production. - Develop coagulants with adjustable metal concentrations. - Demonstrate comparable purification efficiency to commercial products. <p>2. Environmental Impact and Resource Conservation:</p> <ul style="list-style-type: none"> - Reduce CO₂ emissions by 80% through the use of scrap metal as raw material. - Valorize significant volumes of brines from wastewater treatment plants. - Save non-renewable primary resources by recycling steel and aluminum wastes. <p>3. Cost Reduction and Efficiency:</p> <ul style="list-style-type: none"> - Achieve savings in the dosing of chemical coagulants. - Decrease current coagulant treatment costs per unit of treated wastewater. <p>4. Technology Transfer and Application:</p> <ul style="list-style-type: none"> - Propose the developed technology as a reference document for brine valorization. - Demonstrate the applicability of the technology to a wide range of wastewater treatment plants in the EU. - Prepare guidelines for best practices, replicability, and transferability of the demonstrated technology. <p>5. Socio-economic and Health Considerations:</p> <ul style="list-style-type: none"> - Assess the socio-economic and environmental impact through life cycle assessments. - Improve worker safety compared to currently used products. <p>6. Business and Exploitation Strategy:</p> <ul style="list-style-type: none"> - Develop an exploitation and business strategy plan for project results. | | | |
| IDENTIFIED NEEDS TO EVOLVE | | | |
| Project under development | | | |
| ECONOMIC DATA | | | |
| Total Project Budget: 1.564.295 €. | | | |
| Total Project Grant: 860.360 € (LIFE Program). | | | |



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|  | | R&D GROUP | |
| | | R&D PROJECT REPOSITORY | PERIOD 2021-2023 |
| PROJECT | ATALAYA - IDENTIFICATION AND QUANTIFICATION OF EMERGING CONTAMINANTS IN WASTEWATER (VIRUS AND PHARMACEUTICALS) AND POSSIBLE IMPACT ON WATER QUALITY | | |
| ORGANIZATION | GLOBAL OMNIUM | | |
| WEBSITE | https://www.globalomnium.com/Page/1711 | | |
| ORGANIZATIONS INVOLVED IN THE PROJECT | | | |
| GLOBAL OMNIUM | | | |
| Starting Date | 01/03/2021 | Finishing Date | 31/08/2023 |
| DETAILED DESCRIPTION. SUMMARY OF GOALS AND PURPOSE. | | | |
| <p>During the COVID-19 pandemic, wastewater epidemiology has played a key role in the early detection and monitoring of SARS-CoV-2 in the population. From GAMASER (part of the Global Omnium business group), the study of SARS-CoV-2 concentration in wastewater has allowed the creation of the SARS-GOanalytics tool, an early warning system with which has enables the assessment of trends and establishment of correlations between various epidemiological indicators (cases, cumulative incidence, hospitalizations and deaths, among others). Currently, this surveillance system does not contemplate the determination of other pathogens and/or contaminants of special interest, so that nurturing this system will allow the health authorities to establish a more exhaustive control. That the reason that made GAMASER explore new technological solutions to detect, monitor and prevent the spread of emerging contaminants in a faster and more efficient manner.</p> <p>The objective of ATALAYA is the design and development of a tool to monitor the health of the population and the quality of water, based on the evaluation of the presence of emerging contaminants (pathogens and drugs).</p> <p>The achievement of the project will allow Global Omnium, in addition to improving the quality of customer service through the aforementioned lines, to increase the response capacity of society by being more prepared for possible contingencies that may occur in the future, reducing the social, economic and environmental impacts that may result from them. With this strategy, Global Omnium will strengthen its position among the companies in the sector in terms of determination, analysis and detection of pathogens and drugs; all this while incorporating digitalization in all the phases of the processes.</p> | | | |
| PROJECT IMAGE | | | |
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| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Water Supply and Distribution | Waste Water and Sewage Treatment | Energy and Waste | Transversal |
| NO | YES | NO | YES |
| ACHIEVED OR PLANNED RESULTS | | | |
| <p>The main expected results are:</p> <ol style="list-style-type: none"> 1. Development and implementation in the laboratory of the most efficient techniques for the determination of drugs and major pathogens in wastewater. 2. Development of an electrochemical biosensing technology for the detection of contaminants (indicators of fecal contamination) present in wastewater. 3. Evaluation of the evolution of SARS-CoV-2 in wastewater throughout the pandemic by targeted sequencing. 4. Evaluation of the possible effect of increased drug consumption on the quality of water in rivers or seas. Development and implementation of a molecular tool for the characterization of water quality indicators. 5. The consolidation of quality and qualified full-time jobs during the execution of the project and the creation of new jobs (specialized technicians) to execute the new services developed in new and numerous locations where the developed technology is to be implemented. | | | |
| NEEDS DEEMED NECESSARY FOR ITS EVOLUTION | | | |
| <i>Project under development</i> | | | |
| ECONOMIC DATA | | | |
| Total project Budget: 627.904,17 € | | | |
| Total Project Funding: 282.556,90 € (AVI programme) | | | |



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|  | R&D Group | | |
| | R&D PROJECT REPOSITORY | | PERIOD 2021-2023 |
| PROJECT | UP-TO-ME: Unmanned-Power-to-Methanol-production | | |
| ORGANIZATION | GLOBAL OMNIUM MEDIOAMBIENTE, S.L. | | |
| WEB | https://www.globalomnium.com/Page/1861 | | |
| ORGANIZATIONS PARTICIPATING IN THE PROJECT | | | |
| GLOBAL OMNIUM MEDIOAMBIENTE, S.L., Instituto Tecnológico Metalmecánico, Mueble, Madera, Embalaje y Afines, Vielca Ingenieros S.A., Universidad Católica de Valencia, Control de Vertido Industrial, S.L. | | | |
| Project start date | 01/11/2022 | Project end date | 31/10/2025 |
| DETAILED DESCRIPTION. SUMMARY OF OBJECTIVES AND PURPOSE | | | |
| <p>Currently, maritime transportation is one of the major sources of CO₂ emissions. Although methanol, derived from natural gas, can help reduce emissions in the naval industry and is used in limited cases as a marine fuel, the decarbonization of methanol is essential for its sustainability and, therefore, for the long-term viability of methanol as a marine fuel. However, the quality requirements for renewable marine fuel based on methanol are not fully understood, especially considering water content and organic and sulfur impurities from P2X production.</p> <p>In this context, the UP-TO-ME project aims to assess the suitability of the fuel produced in a marine-type engine and establish ranges for fuel specifications and maximum limits for impurities to make it a sustainable marine fuel. The conversion of decentralized CO₂ point sources into renewable fuel production centers poses a significant challenge. These CO₂ sources may be related, for example, to biogas production in anaerobic digestion plants.</p> <p>The potential for renewable methanol production, solely using the CO₂ content of biogas in Europe, is 128 Mt/year. The UP-TO-ME concept is based on a hybrid process that combines CO₂ capture with methanol synthesis in a fully autonomous, unmanned plant. The process involves 3D-printed reactors and columns designed using highly advanced computational fluid dynamics. The control system, fully automated, self-learning, and self-optimized, enables production under fluctuating conditions through the combination of dynamic plant models and Artificial Intelligence.</p> | | | |
| PROJECT IMAGE | | | |
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| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation and Purification | Energy and Waste | Transversals |
| NO | YES | YES | YES |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>The project involves a novel concept centered around intelligent plants and new materials for methanol production, featuring an algorithm for self-optimizing operation based on local weather conditions. The quality of methanol as maritime fuel has been proven. The unmanned, self-optimizing lab scale plant has reached Technology Readiness Level (TRL) 4, producing 100 liters of methanol. The project includes the evaluation of CAPEX and OPEX at different scales, demonstrating improvements in CO₂ emissions mitigation through Techno-Economic Analysis (TEA).</p> <p>The project has resulted in 3 PhDs and 3 innovation disclosures. The team possesses knowledge in 3D printing of reactors and packings, as well as expertise in integrating the UP-TO-ME (Unmanned Plant for Methanol Production) technology in Wastewater Treatment Plants (WWTPs). The project emphasizes networking and knowledge sharing for the ongoing development and implementation of this innovative technology.</p> | | | |
| IDENTIFIED NEEDS TO EVOLVE | | | |
| <i>Project under development</i> | | | |
| ECONOMIC DATA | | | |
| Total Project Budget: €2,997,500 Total Project Funding: €256,128.75 (HORIZON-CL5-2021-D3-03) | | | |

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|  | R&D Group | | |
| | R&D PROJECT REPOSITORY | | PERIOD 2021-2023 |
| PROJECT | POSEIDON: Propulsion Of Ships with E-Methanol In favour of the Decarbonisation Of Naval transport | | |
| ORGANIZATION | Global Omnium Medioambiente S.L | | |
| WEB | | | |
| ORGANIZATIONS PARTICIPATING IN THE PROJECT | | | |
| <p>EIFER EUROPAISCHES INSTITUT FUR ENERGIEFORSCHUNG, ELECTRICITE DE FRANCE, KARLSRUHER INSTITUT FUER TECHNOLOGIE, RINA CONSULTING SPA, FUNDACION DE LA COMUNIDAD VALENCIANA PARA LA INVESTIGACION, PROMOCION Y ESTUDIOS COMERCIALES DE VALENCIAPORT, ARISTOTELIO PANEPISTIMIO THESSALONIKIS, ICODOS GmbH, FINCANTIERI SPA, ISOTTA FRASCHINI MOTORI S.P.A., WINTERTHUR GAS & DIESEL AG, STEINBEIS INNOVATION GGMH, GLOBAL OMNIUM MEDIOAMBIENTE, S.L., ORGANISMOS LIMENOS THESSALONIKIS ANONYMI ETAIRIA, ETHNIKO KENTRO EREVNAS KAI TECHNOLOGIKIS ANAPTYXIS, CONSIGLIO NAZIONALE DELLE RICERCHE, SWEDISH MARITIME ADMINISTRATION, INVENTORS ANONYMI ETAIREIA ANAPTYXIS KAI EKMETALLEFSIS VIOMICHANIKIS TECHNOLOGIAS, CAO HELLAS MAKEDONIKI ASVESTOPOIIA ANONIMI ETAIRIA PARAGOGIS KAI EMPORIAS ASVESTOY KAI LOIPON DOMIKOICHIMIKON ILON, ASOCIACION ESPANOLA DE LA VALORIZACION ENERGETICA DE LA BIOMASA</p> | | | |
| Project start date | 01/09/2023 | Project end date | 31/08/2027 |
| DETAILED DESCRIPTION. SUMMARY OF OBJECTIVES AND PURPOSE | | | |
| <p>The reduction of greenhouse gas (GHG) emissions in maritime transport has become a political priority. Over 99% of the global marine fuels used in 2018 were of petroleum or natural gas origin. The International Maritime Organization (IMO) established a strategy to reduce at least 50% of the total annual GHG emissions from international maritime transport by 2050, compared to 2008. In line with this, the European Commission introduced the FuelEU Maritime proposal in 2021 as part of the Fitfor55 package. This proposal sets GHG intensity thresholds for ships traveling to, from, or within the EU, with incremental reductions of 2% in 2025, 6% in 2030, and so forth, reaching 75% by 2050 compared to the 2020 baseline. The POSEIDON project addresses this challenge and focuses on the implementation of local value chains based on e-methanol as fuel for maritime transport in the ports of Valencia and Thessaloniki.</p> <p>Objectives:</p> <ul style="list-style-type: none"> - Connect Stakeholders and Establish Sustainable Value Chains: Create local communities of practice to strengthen collaborations. Provide information on needs and expectations. Support the construction of sustainable value chains in the ports of Valencia and Thessaloniki. Build and Demonstrate Innovative Solutions for the E-Methanol Value Chain: Develop an efficient power-to-e-methanol demonstration plant. Evaluate its performance with different raw materials. Test the quality of e-methanol in 2T and 4T engines. - Assess Impacts and Demonstrate Value Creation: Conduct detailed assessments of technical, economic, environmental, and social impacts along the value chain. Quantify the economic value created, identify optimizations, and overcome remaining barriers. - Facilitate Future Implementation in the EU: Develop local roadmaps in Valencia and Thessaloniki. Create an EU-level roadmap for the future implementation of e-methanol. Develop preliminary policy recommendations and business models. - Promote the Adoption of E-Methanol through Dissemination and Communication: Build communities of followers. Share progress with various stakeholders. Collaborate with similar projects. Disseminate comprehensive information to foster public acceptance and maximize the project's impact. | | | |
| PROJECT IMAGE | | | |
| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation and Purification | Energy and Waste | Transversals |
| NO | YES | YES | YES |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <ul style="list-style-type: none"> - Development and testing of engines using e-methanol as fuel, providing information on their performance and feasibility. - Creation of a modeling tool to assess the economic, environmental, and social impacts of using e-methanol as an e-fuel. - Development of an implementation roadmap at the European Union level, including specific roadmaps for Valencia and Thessaloniki. - Development of a detailed business model and business plan for the e-methanol value chain. - Implementation of a fully automated power-to-e-methanol solution enabling efficient and competitive e-methanol production. - Creation of a digital twin of the pilot plant to facilitate efficient monitoring and management. - Development of an industrialization plan for the e-methanol solution. - Identification and specification of potential raw materials for e-methanol production. - Establishment of valorization routes for CO2 and H2 sources used in e-methanol production. - Creation of a replication tool for viability assessments. - Development of a new methodology to assess the impacts of implementing the e-methanol value chain. - Obtaining information on limitations and value in individual steps of the e-methanol value chain. - Data collection on fuel and raw material characteristics. - Lessons learned from the pilot plant demonstration and case study evaluations, contributing to new standards and best practices. - Comparative evaluation of e-methanol against other renewable e-fuels such as e-H2 and e-NH3. - Development of a set of policy recommendations to adapt the regulatory framework and leverage funding. - Launch of a communication campaign across the EU on renewable e-fuels and e-methanol, focusing on the potential for emission reduction and job creation, with the aim of reaching 10,000 citizens. | | | |
| IDENTIFIED NEEDS TO EVOLVE | | | |
| Project under development | | | |
| ECONOMIC DATA | | | |
| Total Project Budget: €11,868,392.50. | | | |
| Total Project Funding: €9,663,172.39 (HORIZON-CL5-2022-D3-02) | | | |


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|  | R&D Group | | |
| | R&D PROJECT REPOSITORY | | PERIOD 2021-2023 |
| PROJECT | NIAGARA: Understanding, monitoring, and remediating the spread of chemical, microbiological and plastic pollution in drinking water treatment plants | | |
| ORGANIZATION | EMPRESA MIXTA VALENCIANA DE AGUAS S.A., AGUAS DE VALENCIA S.A., GENERAL DE ANÁLISIS MATERIALES Y SERVICIOS S.L. | | |
| WEB | | | |
| ORGANIZATIONS PARTICIPATING IN THE PROJECT | | | |
| <p>INSTITUTO TECNOLOGICO DEL EMBALAJE, TRANSPORTE Y LOGISTICA, FUNDACIO INSTITUT CATALA DE NANOCIENCIA I NANOTECNOLOGIA, CY.R.I.C CYPRUS RESEARCH AND INNOVATION CENTER LTD, AEGIR SAS, KNEIA S.L., UNITE TECHNIQUE DU SEMIDE GEIE, ZEMEDELSKY VYZKUM SPOL SRO, EMPRESA MIXTA VALENCIANA DE AGUAS S.A., AGUAS DE VALENCIA S.A., GENERAL DE ANÁLISIS MATERIALES Y SERVICIOS S.L., GENERAL DE ANÁLISIS MATERIALES Y SERVICIOS S.L., FAKULTETA ZA TEHNOLOGIJO POLIMEROV.</p> | | | |
| Project start date | 01/11/2023 | Project end date | 01/11/2027 |
| DETAILED DESCRIPTION. SUMMARY OF OBJECTIVES AND PURPOSE | | | |
| <p>The NIAGARA project addresses the growing issue of chemical, microbiological, and plastic pollution in drinking water treatment plants (DWTPs). Pollution is projected to affect over 2.5 billion people by 2050 due to industrialization, urbanization, and increased intensive livestock farming. In the European Union (EU), over 60% of surface waters do not have good ecological status, and 62% do not have good chemical status. DWTPs serve as the last barrier before human exposure to contaminants, but they face threats such as risk underestimation and the presence of nano-/micro-plastics (N/MP).</p> <p>Objectives:</p> <p>Develop multi-analytical biosensors to detect contaminants (BPA, H. pylori, imazalil, ibuprofen/paracetamol) in DWTPs, validating them at the laboratory scale.</p> <p>Design an immobilized enzyme degradation system (IEDS) to eliminate chemical contaminants and pathogens (BPA, H. pylori, imazalil, ibuprofen/paracetamol) in drinking water, validating it at the laboratory scale.</p> <p>Develop and validate at the laboratory scale an IEDS to remove nano-/micro-plastics (N/MPs) from drinking water in DWTPs.</p> <p>Validate at the laboratory scale an efficient and safe disinfection method based on UV/TiO2 photocatalysis, considering byproducts associated with contaminants.</p> <p>Demonstrate the solutions at the pilot level (TRL5) and their combined use in an innovative IEDS-UV/TiO2 tandem to ensure their safety and sustainability.</p> <p>Develop an accurate hydraulic model based on Smooth Particle Hydrodynamics (SPH) to predict the real-time spread of contaminants and (UR)DBPs in the drinking water distribution network (DWDN) in Valencia, incorporating a multi-agent model to elucidate human exposure data.</p> <p>Optimize project dissemination, communication, exploitation, and training</p> | | | |
| PROJECT IMAGE | | | |
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| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation and Purification | Energy and Waste | Transversals |
| YES | NO | NO | YES |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <ul style="list-style-type: none"> - Increase knowledge in the monitoring, management, and treatment of contaminants in drinking water. - Enhance understanding of contamination sources and pathways in the urban water cycle. - Develop and validate technological solutions for the prevention, monitoring, and removal of contaminants in drinking water. - Generate 50 new jobs, including 20 doctoral positions. - Facilitate the future commercialization of the technology through sustainability assessment, market and risk analysis, and the development of an exploitation plan | | | |
| IDENTIFIED NEEDS TO EVOLVE | | | |
| <i>Project under development</i> | | | |
| ECONOMIC DATA | | | |
| <p>Total Project Budget: €3,601,442.5.</p> <p>Total Project Finding: €445.000 (HORIZON-CL6-2022-ZEROPOLLUTION-01).</p> | | | |


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|  | | R&D Group | |
| | | R&D PROJECT REPOSITORY | PERIOD 2021-2023 |
| PROJECT | LIFE ELEKTRA: Circular economy applied to nitrate removal: hydrogen generation and waste recovery in drinking water | | |
| ORGANIZATION | AGUAS DE VALENCIA S.A. | | |
| WEB | | | |
| ORGANIZATIONS PARTICIPATING IN THE PROJECT | | | |
| AGUAS DE VALENCIA S.A., UNIVERSIDAD DE ALICANTE, ASOCIACION INSTITUTO TECNOLOGICO DE LA ENERGIA, UNIVERSITAT DE VALÈNCIA, APRIA SYSTEMS S.L., INSTITUTO TECNOLOGICO DE CANARIAS, S.A., WATER SERVICES CORPORATION - WSC, REDINN - SRL | | | |
| Project start date | 01/10/2023 | Project end date | 31/03/2027 |
| DETAILED DESCRIPTION. SUMMARY OF OBJECTIVES AND PURPOSE | | | |
| <p>LIFE ELEKTRA project aims to demonstrate an industrial-scale technology based on electrochemical denitrification capable of removing nitrate content from reject streams generated in membrane processes. Additionally, the overall process will allow treating the rest of the ionic components present in the water for subsequent valorization, creating a process that will approach zero liquid discharge to the environment. From an energy perspective, the high-purity hydrogen gas obtained in the denitrification process will be used to power a fuel cell, and photovoltaic solar energy will be integrated into the denitrification process as a source of direct current required by the electrochemical reactor. This energy hybridization will minimize the use of fossil energy in the proposed process.</p> <p>Objectives:</p> <ul style="list-style-type: none"> - Validate a tandem prototype of ion exchange/osmosis/electrochemical denitrification applied to the treatment of streams with high nitrate concentrations, transforming nitrates into nitrogen gas without impacting the environment. - Valorize the residues produced during the pre and post-conditioning stages of electrochemical denitrification water, achieving a process that approaches zero liquid discharge into the environment. - Demonstrate the feasibility of a system that allows the hybridization of renewable energies to cover most of the energy needs of the process, reducing greenhouse gas emissions through process decarbonization. - Contribute to European policies to adapt water treatments for high nitrate concentrations to more environmentally friendly processes. - Quantify the social, economic, and environmental viability of the project through Life Cycle Assessments, Life Cycle Cost, and Social Life Cycle Assessment. - Ensure the replicability and long-term sustainability of the proposed technology throughout the EU. - Disseminate and communicate the results to users, clients, territorial agents, and society at large. | | | |
| PROJECT IMAGE | | | |
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| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation and Purification | Energy and Waste | Transversals |
| YES | NO | YES | YES |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>A preliminary exploitation plan has been developed considering the contribution of results to patents, new or existing technologies, services, infrastructures, knowledge bases, and standards to ensure that the project's innovations reach the market. The intention is to pursue all avenues of exploitation for the results:</p> <p>Industrial Use: Focus on the industrial use of project knowledge and technical/technological developments to create new technological options, processes, and consulting services that drive competitiveness and growth.</p> <p>Contribution to Future Projects: Contribute to knowledge and skills for future research and development projects, generating a significant impact to increase the European knowledge base and promote the transition of target industrial sectors toward the green economy.</p> <p>Contribution to Standards and Policies: Project results will contribute to the development of regulations and standards, as well as policy reviews in the project field. Cooperation with regulatory bodies and third-party sales and distribution licensees in the project field will be implemented.</p> <p>The process has already started through conceptual development and pre-project validation work conducted by partners within their existing customer bases. Key Exploitable Results identified, including knowledge, products, technologies, and results with potential for industrial or commercial application in R&D, product or process creation or commercialization, are detailed in the following table.</p> <p>The exploitable knowledge will form the basis for preparing the Exploitation Plan for consortium companies to encourage future investments for bringing the project's results to market. The plan will include various components such as key exploitable results and application areas, analysis of current and target markets, competitive analysis, SWOT analysis, business model with marketing strategy and key customers, and definition of intellectual property (IP).</p> | | | |
| IDENTIFIED NEEDS TO EVOLVE | | | |
| Project under development | | | |
| ECONOMIC DATA | | | |
| Total Project Budget: €2,329,944 | | | |
| Total Project Finding: €1,397,967 (LIFE-2022-SAP-ENV). | | | |

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|  | R&D Group | | |
| | R&D PROJECT REPOSITORY | | PERIOD 2021-2023 |
| PROJECT | LIFE TURBINES: Empowering smart renewable cities through hydropower technology in urban drinking water supply systems | | |
| ORGANIZATION | AGUAS DE VALENCIA S.A., EMPRESA MIXTA VALENCIANA DE AGUAS S.A., EMPRESA MIXTA METROPOLITANA, S.A., EMPRESA MUNICIPAL DE SERVEIS PÚBLICS, S.L. | | |
| WEB | | | |
| ORGANIZATIONS PARTICIPATING IN THE PROJECT | | | |
| AGUAS DE VALENCIA S.A., EMPRESA MIXTA VALENCIANA DE AGUAS S.A., EMPRESA MIXTA METROPOLITANA, S.A., EMPRESA MUNICIPAL DE SERVEIS PÚBLICS, S.L., ASOCIACION INSTITUTO TECNOLÓGICO DE LA ENERGIA, Cooperativa Servicios Energéticos C y C Coop. V., AYUNTAMIENTO DE TORTOSA, REDINN - SRL, Acquadotto del Fiora S.p.A., UNIVERSITA POLITECNICA DELLE MARCHE | | | |
| Project start date | 01/10/2023 | Project end date | 31/03/2027 |
| DETAILED DESCRIPTION. SUMMARY OF OBJECTIVES AND PURPOSE | | | |
| <p>The current society faces one of the greatest challenges: climate change. According to the fifth report of the Intergovernmental Panel on Climate Change (IPCC), the warming of the climate system is unequivocal, with a clear human influence. Mitigating emissions and adapting to their effects require joint cooperation. 80% of the world's energy comes from fossil fuels, with Europe being responsible for 10% of greenhouse gas emissions. The energy consumed in water distribution systems represents 7% of the global total.</p> <p>The impacts of climate change are already evident, with record temperatures, rising sea levels, and extreme weather events. The European Union (EU) has adopted ambitious legislation, such as the European Green Deal, to achieve climate neutrality by 2050.</p> <p>The LIFE TURBINES project addresses the need to increase energy efficiency, focusing on urban water distribution networks. It proposes harnessing the dissipated energy in the network through turbine systems to generate electricity. The project aims to contribute to the decarbonization of water supply and promote climate-neutral cities.</p> <p>Objectives:</p> <ul style="list-style-type: none"> - Design and build a system to produce electricity from the dissipated energy in drinking water supply networks. - Provide a tool to facilitate the implementation of the LIFE TURBINES solution. - Increase the energy efficiency of drinking water supply networks. - Reduce greenhouse gas emissions through the decarbonization of water supply. - Promote clean and sustainable mobility. - Quantify the socio-economic and environmental viability of the project through life cycle and cost assessments. - Ensure universal access to affordable, safe, and sustainable energy. - Catalyze the large-scale implementation of developed policy solutions. - Ensure the replicability and long-term sustainability of the proposed technology in the EU. - Disseminate and communicate results to users, clients, territorial agents, and society at large. | | | |
| PROJECT IMAGE | | | |
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| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation and Purification | Energy and Waste | Transversals |
| YES | NO | YES | YES |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>Renewable Energy Generation:</p> <ul style="list-style-type: none"> - Total generation of 995,486.4 kW/year of renewable energy through the installation of equipment in urban areas. - Specific projection for each case study, reaching 1,425,486.4 kW/year five years after the project. <p>Energy Savings:</p> <ul style="list-style-type: none"> - Utilization of surplus energy for self-consumption in the water distribution network. - Expected savings of 0.972 gW/year at the end of the project, increasing to 1.12 gW/year five years later. <p>Greenhouse Gas Emissions Reduction:</p> <ul style="list-style-type: none"> - Reduction of 257.81 tons/year of CO2eq through the generation of clean energy. - Specific projection for each case study, with a total reduction of 369.18 tons/year five years later. <p>Increase in Efficiency in Drinking Water Supply Networks:</p> <ul style="list-style-type: none"> - Installation of hydraulic machines to generate electricity and control pressure, reducing losses and adjusting energy consumption. <p>Promotion of Clean and Sustainable Mobility:</p> <ul style="list-style-type: none"> - Promotion of sustainable mobility with an electric vehicle charging point. - Estimated sale of 2.5 electric vehicles at the end of the project, doubling five years later. <p>Return on Investment:</p> <ul style="list-style-type: none"> - An accumulated return on investment (CAPEX and OPEX) of €129,000 is projected with an estimated income of €278,425 after 2.5 years of operation. <p>Social Critical Points Index:</p> <ul style="list-style-type: none"> - The index evaluates the risk in categories such as labor rights, human rights, and health and safety. - A value of 0.5 is assigned to indicate a risk below the average level. <p>Communication and Dissemination Strategy:</p> <ul style="list-style-type: none"> - Implementation of a communication strategy with events, presence on social networks, scientific publications, and educational workshops. - Participation in 20 events unrelated to the project, 7,000 website visits, 1,000 social media followers, among others, is anticipated. | | | |
| IDENTIFIED NEEDS TO EVOLVE | | | |
| Project under development | | | |
| ECONOMIC DATA | | | |
| <p>Total Project Budget: €2,518,001</p> <p>Total Project Finding: €1,510,799 (LIFE-2022-SAP-CLIMA).</p> | | | |

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|  | R&D+I Group | | |
| | R&D+I PROJECTS - PORTFOLIO | | PERIOD: 2021-2022 |
| PROJECT NAME | STARDUST | | |
| ORGANIZATION | MCP-SCPSA | | |
| WEB | https://stardustproject.eu/cities/pamplona/?trad=1 | | |
| PARTNERS IN THE PROJECT | | | |
| <p>Stardust has 30 partners (9 cities, public and private companies, technology centres, universities and SMEs) from nine European countries. The "lighthouse" cities are Pamplona, Trento (Italy) and Tampere (Finland).</p> <p>In addition to the city of Pamplona, the participating partners from Navarra are the National Renewable Energy Centre - CENER (project coordinator), the Government of Navarra, Nasuvinsa, Zabala Innovation Consulting, Bee Planet, the Mancomunidad de la Comarca de Pamplona and the UPNA, through the Smart Cities Institute. The Spanish consortium is completed by the telecommunications company SICE.</p> | | | |
| Start date of the Project | 01/10/2017 | End date of the Project | 31/03/2024 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>Stardust is a European project aimed at increasing overall energy efficiency and improving the quality of life in participating cities, as well as stimulating the local economy and the emergence of new business models. The way to achieve this is the integration of the building, energy and electric mobility sectors through the use of the most advanced information and communication technologies, connectivity and the Internet of Things - IoT.</p> <p>This project has received funding from the European Union's Horizon 2020 research and development programme under grant agreement no. 774094. Pamplona, together with the cities of Trento (Italy) and Tampere (Finland), are the "lighthouse" cities of this project. It is coordinated by the National Renewable Energy Centre - CENER.</p> <p>MCP has carried out actions in several areas. Transport (electrification of one of the Regional Urban Transport lines) and Water.</p> <p>In this area, which affects the AEAS group, a hydrothermal installation has been installed to heat the offices and laboratories of one of our water treatment plants (EGUILLOR), which, when hybridised with a photovoltaic generation installation, optimises local energy use. An analysis of the thermal potential of the existing water network in the city has also been carried out to evaluate the possible use of the energy generated there.</p> | | | |
| IMAGE OF THE PROJECT | | | |
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| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| YES | YES | YES | NO |
| RESULTS ACHIEVED OR EXPECTED | | | |
| Report describing the thermal potential in the Shire's water network and installation of Hydrothermal + PV | | | |
| DETECTED NEEDS FOR FURTHER DEVELOPMENT | | | |
| Need to adjust the programming and operation of the hydrothermal system to achieve the efficiency targets. Equipment and technologies to exploit the thermal potential of water | | | |
| ECONOMIC FIGURES | | | |
| Global 21M€ | | | |



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|  | | R&D+I Group | |
| | | R&D+I PROJECTS - PORTFOLIO | |
| | | PERIOD: 2021-2023 | |
| PROJECT NAME | LIFE Nadapta | | |
| ORGANIZATION | Government of Navarre | | |
| WEB | https://lifenadapta.navarra.es/en/ | | |
| PARTNERS IN THE PROJECT | | | |
| GAN-NIK (Environmental management of Navarre); INTIA (Agri-food Technology and Infrastructures); Nasuvinsa (Navarre Land and Housing); NILSA (Navarre Local Infrastructures); UPNa (Public University of Navarre) | | | |
| Start date of the Project | 02/10/2017 | End date of the Project | 31/12/2025 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>The main objective of the LIFE16 IPC/ES/000001 - LIFE-IP NAdapta-CC project is to increase resilience to climate change in Navarre through intersectoriality, long-term sustainability, participation and networking, contributing to the implementation of all the actions included in the HCCN-KLIIna roadmap for the fight against climate change.</p> <p>The project aims to integrate the different sectoral policies, so that the fight against climate change is incorporated into their action programs and development. It is therefore a regional strategy that allows progress to be made in the different sectors in a coordinated manner.</p> | | | |
| IMAGE OF THE PROJECT | | | |
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| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| YES | YES | YES | YES |
| RESULTS ACHIEVED OR EXPECTED | | | |
| The LIFE NAdapta project seeks to anticipate the changes that may occur through the development of adaptation measures that limit the negative effects derived from these changes and, as far as possible, takes advantage of the positive impacts. These early and well-planned adaptation measures will ensure a better future and economic savings. | | | |
| DETECTED NEEDS FOR FURTHER DEVELOPMENT | | | |
| ECONOMIC FIGURES | | | |
| Budget: 15,565,090€; LIFE Funding: 9,339,055€; NILSA: 3M€ | | | |

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|  | R&D+i Group | | |
| | R&D+i PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 |
| PROJECT NAME | MAGNYFOS - USE OF MAGNESIUM BYPRODUCTS FOR PHOSPHORUS RECOVERY AS STRUVITE IN WASTEWATER TREATMENT PLANT | | |
| ORGANIZATION | NILSA | | |
| WEB | https://www.nilsa.com/es/que-hacemos/saneamiento-y-depuracion/proyectos-nacionales/ | | |
| PARTNERS IN THE PROJECT | | | |
| NILSA, Bosch i Gimpera Foundation (University of Barcelona), Ceit, Magna S.A. | | | |
| Start date of the Project | 01/07/2020 | End date of the Project | 31/12/2023 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| The main objective is to design, develop and validate in a real environment a technological solution to recover phosphorous that is present in urban wastewater in an efficient way and try to revalorize at the same time a byproduct with high content in magnesium. | | | |
| IMAGE OF THE PROJECT | | | |
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| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| NO | YES | YES | YES |
| RESULTS ACHIEVED OR EXPECTED | | | |
| The main result expected is to achieve a significant advance in closing the cycle of phosphorous and magnesium. The idea is to obtain an optimized technology to recover phosphorous efficiently from wastewater treatment plants, to expand the market of a byproduct and to design a mathematical model of the process | | | |
| DETECTED NEEDS FOR FURTHER DEVELOPMENT | | | |
| ECONOMIC FIGURES | | | |
| Total budget: 697.899 €. Nilsa: 60.552 €. | | | |

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|  | R&D+i Group | | |
| | R&D+i PROJECTS - PORTFOLIO | | PERIOD: 2021-2022 |
| PROJECT NAME | Evaluación de la mitigación del impacto de la escorrentía urbana con Sistemas Urbanos de Drenaje Sostenible en las Redes de Saneamiento | | |
| ORGANIZATION | NILSA | | |
| WEB | | | |
| PARTNERS IN THE PROJECT | https://www.nilsa.com/es/que-hacemos/saneamiento-y-depuracion/proyectos-nacionales/ | | |
| NILSA, Public University of Navarre | | | |
| Start date of the Project | 15/06/2021 | End date of the Project | 31/03/2023 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>The project addresses the fundamental aspects when designing Urban Sustainable Drainage systems: the characterization of the design rain or storm for an optimal design; the characterization of the physical parameters of the SUDS itself through the instrumentation and modeling of the system; the analysis of the effect of the application of different solutions in different urban units such as car parks, roads, buildings, etc.</p> | | | |
| IMAGE OF THE PROJECT | | | |
| | | | |
| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| NO | YES | NO | NO |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>It is expected that with the results obtained, NILSA will be able to develop design guidelines to advise different Local Entities of Navarre, in order to optimize the management of their urban runoff waters. This would have a significant impact at regional level, being able to extrapolate the results at the national or even international level to other countries with a Mediterranean climate</p> | | | |
| DETECTED NEEDS FOR FURTHER DEVELOPMENT | | | |
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| ECONOMIC FIGURES | | | |
| Total budget: 139.412 €. Nilsa: 78.735,40 €. | | | |

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|  | R&D+i Group | | |
| | R&D+i PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 |
| PROJECT NAME | THERMOGAS - TREATMENT OF SLUDGE BY THERMOPHILIC ANAEROBIC DIGESTION: STUDY AND OPTIMIZATION OF THE TECHNOLOGY FROM MICROBIOLOGY, ENGINEERING AND SIMULATION | | |
| ORGANIZATION | NILSA | | |
| WEB | https://www.nilsa.com/es/que-hacemos/saneamiento-y-depuracion/proyectos-nacionales/ | | |
| PARTNERS IN THE PROJECT | | | |
| NILSA, University of Barcelona, Ceit, University of Zaragoza, GyD Water technology | | | |
| Start date of the Project | 01/09/2022 | End date of the Project | 31/08/2025 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>ThermoGas aims to study, optimize and validate in a real environment the techno-economic feasibility of thermophilic anaerobic digestion to effectively and safely produce renewable biogas energy and a hygienized sludge. The project aims to establish feasible operation conditions, consolidate start-up strategies, evaluate digestion robustness and stability, develop specific technology for thermophilic anaerobic digestion at different solid concentration and develop a prototype of a digital twin. These goals will be achieved by combining the consortium engineering, microbiology and simulation knowledge and expertise.</p> | | | |
| IMAGE OF THE PROJECT | | | |
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| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| NO | YES | YES | YES |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>The project will provide a holistic understanding of the thermophilic anaerobic digestion that will be used to optimize its technical operation and economic feasibility. Results from this project will be a reference point for thermophilic anaerobic digestion implementation in Spain.</p> | | | |
| DETECTED NEEDS FOR FURTHER DEVELOPMENT | | | |
| ECONOMIC FIGURES | | | |
| Total budget: 646.707,22 €. Nilsa: 264.970,81 €. | | | |

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|  | | R&D+i Group | |
| | | R&D&I PROJECTS - PORTFOLIO | PERIOD: 2021-2023 |
| PROJECT NAME | PERTE Agua Digital Navarra (ADNa) | | |
| ORGANIZATION | NILSA | | |
| WEB | https://www.nilsa.com/es/que-hacemos/saneamiento-y-depuracion/proyectos-nacionales/ | | |
| PARTNERS IN THE PROJECT | | | |
| Servicios Montejurra S.A. (SMSA), Servicios de la comarca de Pamplona S.A. (SCP5A) | | | |
| Start date of the Project | 2020 | End date of the Project | 2025 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| To consolidate a unitary, pioneering and digital urban water cycle in Navarre, which promotes the digitalisation actions of the Master Plan for the Integral Urban Water Cycle of Navarre 2019-2030. | | | |
| IMAGE OF THE PROJECT | | | |
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| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| YES | YES | YES | YES |
| RESULTS ACHIEVED OR EXPECTED | | | |
| Digitalisation of the water sector in Navarre: control of spillages, early warning, mathematical modelling, digital twins, control of industrial discharges. | | | |
| NEEDS DETECTED TO EVOLVE | | | |
| | | | |
| ECONOMIC FIGURES | | | |
| Presupuesto total: 11.451.207,38€. Presupuesto NILSA 3.583,166,51€ (80% 2.669.487€) | | | |

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|  | | R&D+i Group | |
| | | R&D&I PROJECTS - PORTFOLIO | PERIOD: 2021-2023 |
| PROJECT NAME | POCTEFA EMERGENCY (POCTEFA OUBIOTICS-2) | | |
| ORGANIZATION | NILSA | | |
| WEB | https://www.nilsa.com/es/que-hacemos/saneamiento-y-depuracion/proyectos-europeos/ | | |
| PARTNERS IN THE PROJECT | | | |
| UNIZAR, CNRS, NMB, UNAV, Ecocène, Eurocob | | | |
| Start date of the Project | 2024 | End date of the Project | 2026 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| Diagnosis, removal and prevention of antibiotics and other emerging pollutants, resistant bacteria and antibiotic resistance genes in the urban water cycle of the POCTEFA territory. | | | |
| IMAGE OF THE PROJECT | | | |
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| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| NO | YES | NO | YES |
| RESULTS ACHIEVED OR EXPECTED | | | |
| Establishment of a sampling network in sewers of 5 localities of the POCTEFA territory. Diagnosis of antibiotics, ARB and ARG in this network. Study of the removal of analytes in different water and sludge treatment lines. Development of a powdered activated carbon product from corn cob residues for use in EC removal treatments. Increased TRL of a patent with photocatalysis treatment for EC removal. Raise public awareness with education campaigns on antibiotic consumption. Advance in limiting some ECs in discharge to sewer (Navarra pilot). | | | |
| NEEDS DETECTED TO EVOLVE | | | |
| Need to coordinate joint solutions in a cross-border territory. Lack of knowledge on the origin and occurrence of antibiotics, ARB and ARG in the POCTEFA territory. | | | |
| ECONOMIC FIGURES | | | |
| Total: 1.999.748,35€. NILSA 472.001€ | | | |

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|  | R&D-I Group | | |
| | R&D&I PROJECTS - PORTFOLIO | | PERIOD: 2021-2022-2023 |
| PROJECT NAME | Project Ô (Demonstration of planning and technology tools for a circular, integrated and symbiotic use of water) | | |
| ORGANIZATION | SOCAMEX | | |
| WEB | http://eu-project-o.eu/ | | |
| PARTNERS IN THE PROJECT | | | |
| | | | |
| Start date of the Project | 01/06/2018 | End date of the Project | 30/11/2022 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>H2020 project which aims to demonstrate technologies for the circular treatment of wastewater, as well as planning tools oriented towards an integrated, symbiotic and circular use of water. The objective is to obtain water with a very high quality starting from diverse, non-traditional sources, reducing the pressure on the source, and adapting the type of treatment to specific needs of specific places. To this end, pilots have been implemented in four demosites, located in Italy, Croatia, Israel and Spain, with the objective of developing highly customizable technologies. Results have been promising.</p> | | | |
| IMAGE OF THE PROJECT | | | |
| <div style="display: flex; align-items: center; justify-content: space-between;"> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> <div style="text-align: center;"> <p>This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 776816</p>  </div> </div> | | | |
| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| NO | YES | NO | NO |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>Modular and affordable technologies for treating water, as well as innovative control systems, which may be easily and flexibly implemented in order to process "difficult" pollutants (e.g. dyes, pharmacological products, pesticides) / Decision-making supporting platforms to allow law makers and consumers to evaluate the suitability of introducing specific water loops, taking into account the territorial and economic perspective / A participative approach to the decision-making process related to water, which is able to integrate the interests of different stakeholders.</p> | | | |
| NEEDS DETECTED TO EVOLVE | | | |
| Legal framework for a circular water economy / Industrial scale-up / Social acceptance of regenerated water | | | |
| ECONOMIC FIGURES | | | |
| Total budget for the action: 10.489.533 €; budget for SOCAMEX in the action: 889.015 € | | | |

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|  | | R&D+I Group | |
| R&D&I PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 | |
| PROJECT NAME | LIFE Green Sewer (Innovative Secondary Wastewater Treatment with Resource Recovery) | | |
| ORGANIZATION | SOCAMEX | | |
| WEB | https://lifegreensewer.com/ | | |
| PARTNERS IN THE PROJECT | | | |
| | | | |
| Start date of the Project | 01/09/2018 | End date of the Project | 29/02/2024 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>European project (LIFE Programme) oriented towards testing an innovative secondary treatment for wastewater, including pre-concentration of the waste stream, as well as biogas production and recovery of liquid fertiliser. The objective is the development of a treatment system for municipal wastewater, which is also suitable for urban-like waters, creating also a system for general monitoring, based on advanced sensors, in order to monitor energy consumption in the plant (optimising energy use). This system will also monitor and avoid water losses and will allow to control discharges, minimising pollution by emerging compounds and pathogens.</p> | | | |
| IMAGE OF THE PROJECT | | | |
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| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| NO | YES | NO | NO |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>Reduction in treatment costs by 30% (thanks to a lower energy consumption and to the recovery of resources) / Reduction by 70% of emerging pollutants and pathogens, improving water quality / Reuse of 80% treated water / Reduction in 70% of energy consumption / Nutrient recovery.</p> | | | |
| NEEDS DETECTED TO EVOLVE | | | |
| <p>Industrial scale-up / Social acceptance of recycled water / Better knowledge of emerging pollutants life cycle.</p> | | | |
| ECONOMIC FIGURES | | | |
| <p>Total budget for the action: 1.752.612 €; budget for SOCAMEX in the action: 290.345,00 €</p> | | | |

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|  | R&D+I Group | | |
| | R&D&I PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 |
| PROJECT NAME | CIRCULAR BIOCARBON (Turning carbon of complex organic urban waste streams into value-added products) | | |
| ORGANIZATION | SOCAMEX | | |
| WEB | https://circularbiocarbon.eu/ | | |
| PARTNERS IN THE PROJECT | | | |
| <div style="border: 1px solid black; height: 40px;"></div> | | | |
| Start date of the Project | 01/06/2021 | End date of the Project | 31/05/2026 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>The CIRCULAR BIOCARBON project aims to set the first-of-a-kind flagship biorefinery, at industrial scale, based on a unique model in which the organic fraction of municipal solid waste and the sewage sludge will be valorised into high added-value end products and a variety of intermediate products. The project will open up business frameworks based on a new circular vision of waste treatment in a city to advance towards a sustainable bioeconomy.</p> | | | |
| IMAGE OF THE PROJECT | | | |
|  <p>The diagram illustrates the 'Circular Biocarbon' process flow. It starts with 'Carbon Biocarbon from Municipality' (municipal solid waste and sewage sludge), moves through 'Biorefinery' (anaerobic digestion, fermentation, distillation, and extraction), and finally to 'Solid value-added products' (biogas, bioethanol, and various biochemicals). Logos for 'Circular Biocarbon', 'Bio-based Industries Consortium', and 'Horizon 2020 European Union Funding for Research & Innovation' are also shown.</p> | | | |
| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| NO | YES | NO | NO |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>In the CIRCULAR BIOCARBON biorefinery, the organic fraction of municipal solid waste and sewage sludge will be processed through a pool of cascading technologies (involving biological, physical, chemical and mechanical steps). Starting from anaerobic digestion processes, high-added value end products will be obtained (moving from energy-related usages), towards new models based on a circular vision of waste treatment in a city in the framework of a sustainable bioeconomy. Multi-location implementation will support the replicability of the concept by testing the model against different waste management schemes, ecosystems and practices in different territories.</p> | | | |
| NEEDS DETECTED TO EVOLVE | | | |
| <p>New regulatory frameworks encouraging and enabling manufacturing of products based on waste; new regulatory frameworks identifying the requirements for end of residue status.</p> | | | |
| ECONOMIC FIGURES | | | |
| <p>Total budget for the action: 22.952.297,50 €; budget for SOCAMEX in the action: 3.400.877,5 €</p> | | | |

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| socamex | R&D+I Group | | |
| | R&D+I PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 |
| PROJECT NAME | iMERMAID (Innovative solutions for Mediterranean Ecosystem Remediation via Monitoring and decontamination from Chemical Pollution) | | |
| ORGANIZATION | SOCAMEX | | |
| WEB | https://imermaid.eu/the-project/ | | |
| PARTNERS IN THE PROJECT | | | |
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| Start date of the Project | 01/06/2023 | End date of the Project | 31/05/2026 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>The Mediterranean Sea and its surrounding regions are characterised by anthropogenic activities (and hence, are vulnerable to chemical pollution). In order to safeguard the Mediterranean basin from emerging pollutants, iMERMAID (HORIZON EUROPE project) integrates and coordinates innovative solutions from preventing, monitoring and remediating pollution. The project will support the creation of new laws and the transformation of social perception, with the aim of reducing emerging pollutants in the environment. Also, new sensors will be developed, which will be implemented together with remediation solutions in order to abate priority substances near the source. iMERMAID brings together SMEs, researchers, regulators and innovation professionals, essential in order to improve knowledge and remediation linked to emerging pollutants.</p> | | | |
| IMAGE OF THE PROJECT | | | |
|  <p>The infographic shows the iMERMAID logo on the left. To the right, under the heading 'The project's outcomes', there are three blue boxes with icons and text: <ul style="list-style-type: none"> 1. Prevent, monitor, and remediate chemical pollution in the Mediterranean Sea (with a magnifying glass icon). 2. Support the EU's mission to restore, protect, and preserve the health of our oceans, seas, and waters (with a hand holding water icon). 3. Realise the goals of the EU Chemicals Strategy for Zero Chemical Pollution (with a chemical flask icon). </p> | | | |
| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| NO | YES | NO | YES |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <p>The project pursues the remediation of chemical pollution (with a special focus on heavy metals and emerging pollutants) in the Mediterranean Basin, treating pollution upstream, near the source. Also, the project aims to widen economic possibilities as well as competitiveness, improve life standard of the EU citizens and prevent chemical pollution accumulation in the Mediterranean.</p> | | | |
| DETECTED NEEDS FOR FURTHER DEVELOPMENT | | | |
| Coordination with legislators, implication and co-creation together with society. | | | |
| ECONOMIC FIGURES | | | |
| Total budget for the action: 9.352.552,50 €; budget for SOCAMEX in the action: 403.750,00 € | | | |

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|  | R&D+I Group | | |
| | R&D+I PROJECTS - PORTFOLIO | | PERIOD: 2021-2023 |
| PROJECT NAME | Therm ² : Thermal Hydrolysis & Thermophilic Digestion | | |
| ORGANIZATION | teCH4+ | | |
| WEB | https://tech4plus.com/ | | |
| PARTNERS IN THE PROJECT | | | |
| Empresa Metropolitana de Abastecimiento y Saneamiento de Aguas de Sevilla, S.A. (EMASESA) FACSA (HYDRENS) Universidad de Valladolid (UVa) Universidad de Sevilla (US) teCH4+ | | | |
|  | | | |
| Start date of the Project | 01/10/2022 | End date of the Project | 30/09/2025 |
| DETAILED DESCRIPTION. SUMMARY OF THE OBJECTIVES AND PURPOSE | | | |
| <p>Main Goal: Identify optimal configuration fo advanced anaerobic digestion based in experimental data of new Mesophilic Anaerobic Digestion+Thermal Hydrolysis+Thermophilic Anaerobic Digestion configurations in order to enhance energetic efficiency and develop circular economy guaranteeing sanitary safety.</p> <p>Expected results: Maximize biogas production Decrease in sewage sludge production Enhance of final sludge dewaterability Decrease in operational costs, particularly in energetic costs. Characterize rehology of anaerobic digestion treated sludge to enhance process efficiency Study of viability of thermal hydrolysis as an emergent containantes destruction method Enhance biosolids agronomic porperties through hygienized sludge Analyse biowastes adition to advances anaerobid digestion</p> | | | |
| IMAGE OF THE PROJECT | | | |
|  | | | |
| PROJECT APPROACH WITHIN THE WATER CYCLE | | | |
| Supply and Distribution | Sanitation | Energy and Waste | Transversal |
| NO | YES | YES | NO |
| RESULTS ACHIEVED OR EXPECTED | | | |
| <ul style="list-style-type: none"> - Enhancement in biogas production - Decrease of sewage sludgedge production - Enhancement in final sewage sludge dewaterability - Optimization of energetic consumption via anaerobic digestion agitation process - OPEX optimization - Ensure final sewage sluge hygienization in order to obtain a biosolid that complies with regulatory requirements. | | | |
| DETECTED NEEDS FOR FURTHER DEVELOPMENT | | | |
| Progress has not reached a point yet where needs for further development can be considered | | | |
| ECONOMIC FIGURES | | | |
| Total Budget: 1.254.730,39€ teCH4+ Budget: 132.000,00€. Partially financed by Science and Innovaton Ministry CPP-2021 Call | | | |

