



Water and Waste Environmental Engineering

WWEE LAB R&D&I ACTIVITIES BOOKLET 2016-2024

Water and Waste Environmental Engineering Lab

WWEE Lab • UNIVPM

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EU FUNDED PROJECTS



The **WWEELab Research Group**, coordinated by Prof. Fatone, manages several research projects funded by the main EU research programmes: HORIZON 2020, PRIMA Initiative, WATER JPI, LIFE, ENI CBC MED, Climate-KIC COSME, HORIZON EU, TWINNING e INTERREG.



H2020 SMART-Plant
Coordinated by UNIVPM
H2020 ENERWATER
H2020 INTCATCH
(as UNIVR Third Party)

H2020 HYDROUSA

H2020 ULTIMATE
EIT CLIMATE KIC
PROSUMER
COSME CenTOUR
H2020 AQUASPICE

MICROALGAE 4.0
SURE NEXUS
BIORECER
SMART4ENV
WATERUN
TWINNING
INTERREG
HORIZON EU
H2020

CSSBOOST
SEACURE
ONE EARTH
AIMPRESS

2016

2017

2018

2019

2020

2021

2022

2023

2024

2025

H2020 DWC
PRIMA FIT4REUSE
LIFE BLUE LAKES
WATER JPI BLOOWATER
ENI CBC MED DECOST

H2020 SEA2LAND
H2020-BBI
JU CIRCULAR
BIOCARBON
PROMISCES

TWINNING
INTERREG
HORIZON EU
PRIMA FIT4REUSE
H2020
LIFE TURBINES
CARDIMED
VALZEO
FOLLOU
AMOCEAB

To be Continued

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EU FUNDED PROJECTS



ONE EARTH Earth-to-marine-to-earth virtuous cycle: Harnessing residual biomass of animal origin for terrestrial-marine integrated circular economy

<https://www.oneearth-project.eu/> →

Grant agreement ID: 101135559

Status: Ongoing project

Start date: June 2024

End date: June 2028

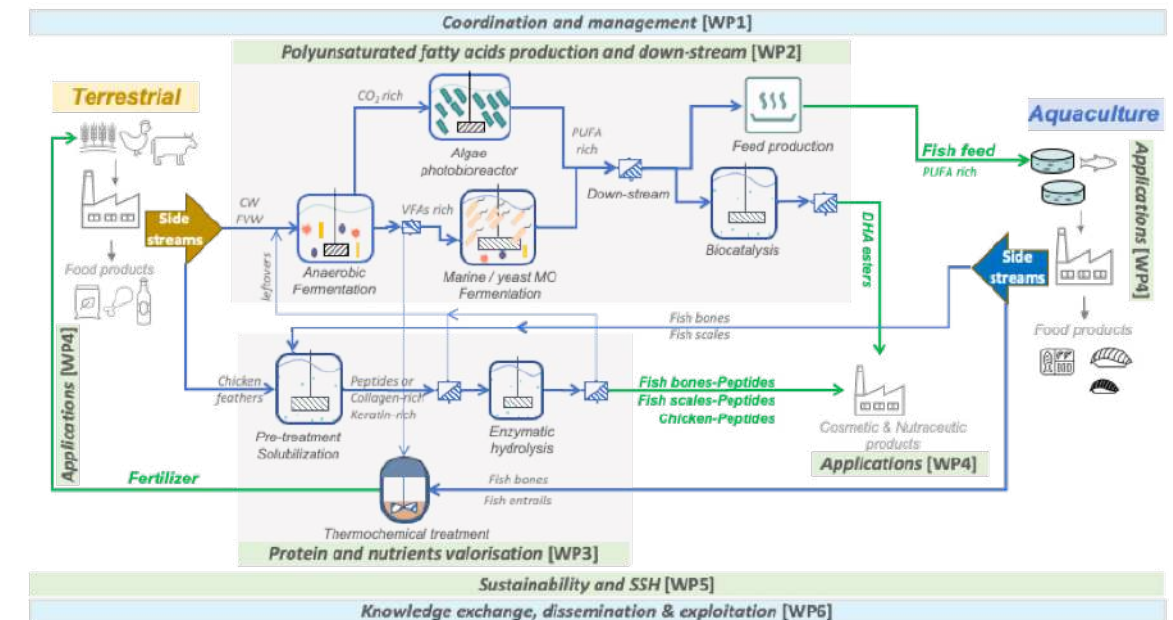
Funded under: HORIZON-CL6-2023-CircBio-02-3-two-stage

Overall budget: € 3.999.971,25

EU contribution: € 3.999.970,75

EU contribution UNIVPM: € 475.000,00

Coordinator: Alma Mater Studiorum Università di Bologna



General concept

ONE EARTH aims to develop and assess innovative bio-based solutions for the production of nutraceutical/cosmetic, bioadhesive, agriculture (fertilizers), and aquaculture (fish feed) products by exploiting residual biomass of animal origin. The overall purpose of ONE EARTH is to develop integrated circular value chains by valorising marine biomass for terrestrial products and using terrestrial biomass for aquaculture product production thus promoting a sustainable and “self-reinforcing” carbon cycle.

The role of UNIVPM in ONE EARTH

Lab-scale tests (TRL 3) will be carried out to set the appropriate process for maximizing VFA production and accumulation. This optimized process will be scaled up to TRL 5 by operating an ad-hoc pilot system consisting of pre-treatment step and a separation unit to concentrate the produced VFAs that will be used for PUFAs production in the downstream process on-line VFA meters (already tested in previous works of UNIVPM), as well as othersensors and meters needed to optimize the process will be installed and validated in the system for best data reliability and probe operation and maintenance. The final products will be tested also for Fish farming application.

Expected impacts

ONE EARTH will clearly contribute to develop the circular economy and bioeconomy sectors by the assessment of an innovative integrated multi-purpose biorefinery fed with underexploited organic residues, whose Carbon content will be converted into final bio-based products for several industrial sectors. ONE EARTH project aims at the formulation of sustainable and healthy fish feed for the aquaculture sector, without the inclusion of PUFAs obtained by intensive fishing, impoverishing natural sea resources. ONE EARTH feedstock is represented by residual organic matter, which would undergo waste management processes if not exploited as a secondary source. Although target residues should not directly contribute to environmental pollution, their transportation and biodegradation lead to the production of impactful GHG emissions (CO₂, CH₄). ONE EARTH project outcomes will contribute enabling a more sustainable local development model by the set-up of new industrial initiatives concerning target residues value chains.

SEACURE

Innovative solutions to prevent, reduce and remediate nutrient pollution along the land-river-sea system in the Mediterranean basin

<https://www.seacure-project.eu/> →

Grant agreement ID: 101157327

Status: Ongoing project

Start date: May 2024

End date: May 2028

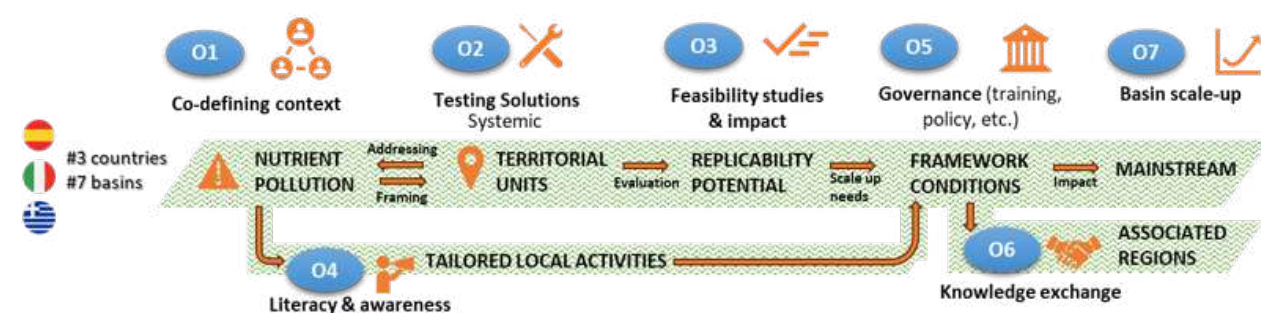
Funded under: HORIZON

Overall budget: € 7.937.485,13

EU contribution: € 8.513.317,50

EU contribution UNIVPM: € 699.125,00

Coordinator: Fundacio Universitaria Balmes UVIC-UCC



General concept

The project SEACURE will aim at demonstrating, scaling up and replicating effective innovations for the systemic prevention and reduction of nutrient pollution in the Mediterranean Sea basin, in line with the innovation ecosystem framework provided by the ongoing Mediterranean Lighthouse projects (as BlueMissionMed) and in close cooperation with related activities implemented by regional soil health living labs in the area.

The project is dedicating resources for the regional upscale and replication of successful nutrient management strategies devoted to: reduce soil pollution and enhance its restoration; reduce fertilizers use and nutrient losses; and prevent, minimize and remediate nutrients pollution in freshwater and marine ecosystems, in six territorial units (Mar Menor and Central Catalunya in Spain, Po delta and Esino river in Italy, and Axios river delta and Thessaly Plain in Greece)

The role of UNIVPM

The **Italian River Esino** and its groundwaters suffer from a bad chemical and ecological status due to sewer overflows and agricultural runoff. UNIVPM will cooperate with VIVA SERVIZI, public organisation in charge of the basin urban water cycle management, to test a portfolio of solutions at the **WWTP** level that allow the region to optimise the removal of pollutants and maximise water reuse for irrigation and fertigation, in close cooperation with the regional public-private alliance which has recently committed to tackle the issue. WWF as NGO will cooperate as manager of the natural area of Oasi Ripabianca to test the reuse of wastewater in crops and for recharging natural lagoons.

Expected impacts

Project results are expected to contribute to all of the following expected outcomes:

- accelerated uptake of integrated innovative and reproducible approaches to prevent, minimise and remediate soil and water pollution from excess nutrients (especially nitrogen and phosphorus) in the landscape-river catchment-sea system and transition waters in the Mediterranean Sea basin;
- accelerated uptake of integrated innovative and reproducible approaches to reduce the use of fertilisers and to prevent, minimise and remediate nutrient pollution and reduce ocean and inland water eutrophication;
- foundations for future demonstration and upscaling activities on integrated innovative approaches to prevent, minimise and remediate soil and water pollution from excess nutrients, and to reduce the use of fertilisers, in 'associated regions';
- empowerment of citizens to take action against pollution of soils, waters and the ocean.

CARDIMED

Climate Adaptation and Resilience Demonstrated In the MEDiterranean region

www.cardimed-project.eu →

Grant agreement ID: 101112731

Status: Ongoing project

Start date: September 2023

End date: February 2028

Funded under: HORIZON-MISS-2022-CLIMA-01

Overall budget: € 20.806.271,44

EU contribution: € 19.307.911,25

EU contribution UNIVPM: € 1.001.875,00

Coordinator: ETHNICON METSOVION POLYTECHNION (NTUA)

General concept

CARDIMED will introduce a framework to build Climate Resilience in the Mediterranean biogeographical region, efficiently unifying individual efforts of regions and communities across different countries and continents. This will be achieved by deploying the digital infrastructure to harmonise the data collection and evaluation processes, providing open data to all the actors involved in the Nature-based Solutions (NBS) value chain and integrating crucial functions for Climate Resilience. Among these functions, smart digital tools for citizen participation and capacity building will supplement an ambitious multi-stakeholder engagement strategy, focused on knowledge translation and impact pathways. Furthermore, holistic modelling tools introducing the Water-Energy-Food-Ecosystems (WEFE) Nexus approach will provide comprehensive knowledge on the complex NBS interfaces, that will decisively contribute to addressing socio-ecological challenges, along with issues of valuation and low-investment rate in NBS. These actions will be implemented across 9 demonstration sites, composed of 10 regions, 20 locations and 28 communities and comprising 47 NBS that directly relate to 83 interventions and supporting units that tackle climate change and circularity challenges. The consolidation of the demonstrating regions and communities will establish the CARDIMED Resilience Alliance, that will function as the vehicle for expanding the network via upscaling the existing sites and adding new ones. The project includes 5 transferability cases, as well as an additional 10 that will be defined during the implementation. Through these actions, the CARDIMED Resilience Alliance will achieve at least 28 regions and 70 communities by 2030, will create 8000 jobs especially in the NBS sector, and will leverage over 450 M€ in climate investment.

The role of UNIVPM in CARDIMED

UNIVPM will bring major expertise in the field of NBS for sustainable and resilient agricultural practice, advanced municipal wastewater treatment and safe reuse, sustainable aquaculture. UNIVPM will lead the DEMO 3 which scope is decarbonization of agricultural practices and combating agricultural pollution in Sardinia, Italy. NBS will be employed to decarbonize the agricultural cultivation and livestock sector and decontaminate the agricultural runoffs, combined with renewable energy systems (RES), achieve efficient water distribution of reclaimed water and efficient irrigation in community of Alghero and Calich lagoon catchment.

Expected impacts

- Knowledge translation and impact pathways methodology, OS/OI/CS and CoP supporting actions that form the Multi-Stakeholder Engagement Strategy, aimed at striking at the root of the problem and establishing ambitious engagement with citizens and communities;
- The Dissemination Exploitation and Communication strategy and capacity building will ensure that Regional, national, municipal authorities and organisations together with local communities and citizen associations will obtain both the knowledge and means to act;
- Through targeted actions for effective planning and governance for mainstreaming NBS, replication actions, policy interaction and financing liaison, CARDIMED will contribute decisively to making NBS more widespread and easier to fund.

AIMPRESS Adriatic-Ionian Maritime oPeRational Efficiency and Sustainable Scheme

aimpress.interreg-ipa-adrion.eu →

Project id: IPA-ADRION00527

Project title:

Adriatic-Ionian Maritime oPeRational Efficiency and Sustainable Scheme

Acronim: AIMPRESS

Start date: September 2024

End date: August 2027

Programme:

Interreg IPA Adrion Programme
(Co-funded by the European Union)

Name of the lead partner in English:

Technical University of Crete

Name of the lead partner in original language:

ΠΟΛΥΤΕΧΝΕΙΟ ΚΡΗΤΗΣ

UNIVPM total eligible budget: 290.343,75 €

Di cui (per UNIVPM):

Interreg Funds: 246.792,18 € (85% del tot);

Partner contribution: 43.551,57 € (15% del tot)

Total approved Project Budget: 1.586.864,40 €

Maximum Interreg amount of funding awarded:

1.348.834,72 € (85% del tot)

Total Partners' co-financing:

238.029,68 € (15% del tot)

Overview

AIMPRESS aims to modernize Adriatic-Ionian ports by integrating AI-driven systems and renewable energy, reducing emissions and enhancing energy efficiency. The project supports EU decarbonization goals by transforming port infrastructure into smart, low-impact, and economically viable hubs.

The role of UNIVPM

- Environmental Assessments: Leads activities on decarbonization strategies and environmental impact analysis.
- Sustainable Port Solutions: Supports the design and evaluation of clean energy solutions, including Cold-Ironing and renewable energy integration.
- Capacity Building: Trains stakeholders on sustainable port operations and circular approaches.

Key Technologies

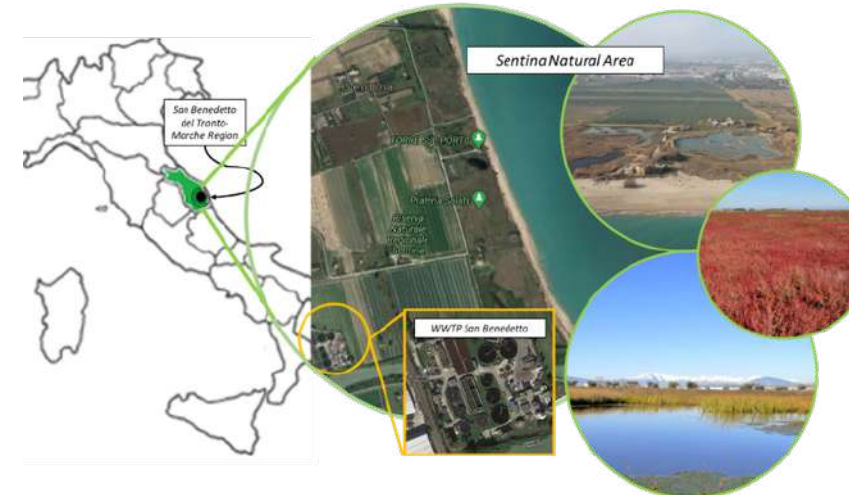
- AI-based Energy Management Systems: Optimize energy use through real-time monitoring.
- Cold-Ironing: Cuts fuel consumption and emissions of docked vessels.
- Digital Shadow Technology: Simulates port operations for optimization and planning.
- Renewables Integration: Promotes use of solar power and battery storage.

Expected Impacts

- Reduced GHG emissions and improved air quality.
- Increased energy efficiency and operational cost savings.
- Scalable smart port models for regional replication.
- Strong alignment with EU Green Deal and EUSAIR goals.

CSSBOOST Boosting circular systemic solutions through virtual circular economy spaces

cssboost-project.eu →



Grant agreement ID: 101135275

Status: Ongoing project

Start date: June 2024

End date: December 2027

Funded under: HORIZON-CL6-2023-

CircBio-02-1-two-stage

Overall budget: € 9.799.443,75

EU contribution: € 9.190.318,75

EU contribution UNIVPM: € 621.875,00

Coordinator: Polytechneo Kritis (Tuc)

General concept

CSSBoost aims to overcome technological and non-technological CE barriers, minimise CSS application and operational risks and decisively stimulate and maximise the Circular Economy and Bioeconomy Transition in any EU city/region or group of regions.

The role of UNIVPM in CSSBOOST

Referent and scientific coordinator for Pilot 2: Water Reuse and Nutrients Recovery CSS

Description: this case enables and promotes water reuse and nutrient recovery in the region of Marche, integrated with agricultural, industrial and natural environment components. A composite CSS will establish, promote and support two value chains for water reuse and nutrient recovery.

Scale: The peri-urban area of the Municipality of San Benedetto del Tronto with a natural reserve and multiple agricultural and agro-industrial land uses (25.4 km² area, population of 47,000, 610,000 tourists in summer).

Sectors involved are 7: Water, food, agriculture, industry, urban/rural, nature eco-services, energy.

Expected impacts

The CSS to be established and the value chains demonstrated will benefit the farmer community, as well as the industrial agro-food sector in various ways. The farmers will be able to dispose of waste while earning extra income and helping their lands and plants become healthier and more productive. The industry, particularly producers of fertilisers and materials for soil improvement, flour producers, bakeries, confectioneries, producers of textile and leather-based products, etc., will receive new products with a competitive advantage and potentially new export markets. Furthermore, the region will be empowered to sustain a more environmentally friendly economy, which can directly affect tourism. At a later stage, the value chains will be expanded, upscaled and improved by the addition of laboratories and enterprises so that their products can be specialised and optimised towards particular needs, and new products can be developed. Potential new actors are producers of fertilisers, materials for soil improvement, flour, textiles, leather-based items, as well as bakeries, confectionaries, etc.



LIFE TURBINES

Empowering smart renewable cities through hydropower technology in urban drinking water supply systems

<https://turbineslifeproject.eu/> →

Grant agreement ID: 101113749
Status: Ongoing project
Start date: September 2023
End date: March 2027

Funded under: LIFE-2022-SAP-CLIMA
Overall budget: € 1.510.799,00
EU contribution: € 2.518.001,04
EU contribution UNIVPM: € 109.782,00
Coordinator: Aguas de Valencia

General concept

LIFE TURBINES aims to boost the development of Smart Cities and promote decarbonisation of drinking water supply in order to achieve the European Union's 2050 target, the Green Deal and the new REPowerEU Plan. The project focuses on the generation of hydroelectric power by taking advantage of the excess of pressures that occur in the drinking water supply network of cities in order to generate electricity from a renewable resource such as water.

The role of UNIVPM in LIFE TURBINES

UNIVPM is engaged in different Work Packages (WP) and tasks together with the partners. Specially in WP 4 - Impact monitoring and evaluation of indicators, UNIVPM will collaborate in the evaluation and estimation of the territorial impacts, in terms of hydraulic, energy and carbon footprint efficiency of the LIFE TURBINES solutions, in three utilities. UNIVPM participates in the definition of the monitoring and evaluation methodology requirements; The impact assessment methodology from a technical, economic, social, and environmental perspective, and, the development of the Exploitation Strategy and Business Plan.

Expected impacts

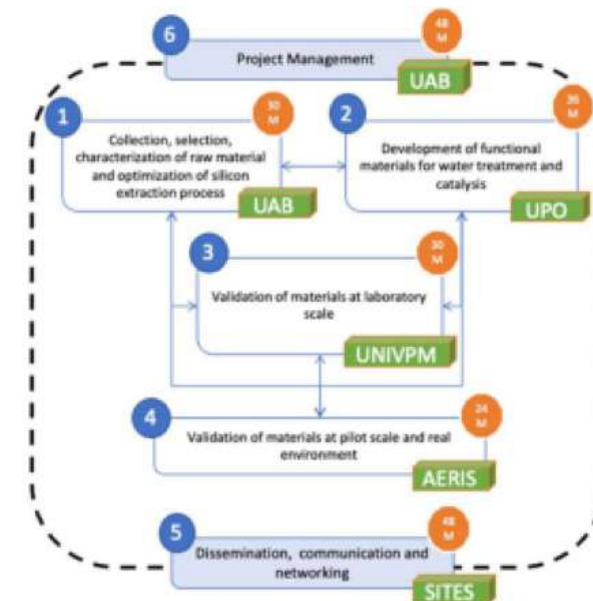
Life Turbines project aims to contribute to climate-neutral cities while lightening the load on the electricity system as well as the energy dependence. Moreover, positive impacts are related to promote renewable energy production in drinking water supply networks, consolidating it as a sustainable, autonomous and decentralised technology that responds to the energy consumption needs of European population. This will be achieved through the developing of a methodology to establish an energy balance that ensures, always, the delivery of the greatest amount of energy available without compromising the necessary flow and pressure conditions in the distribution network, between points with variable demands; quantifying the social, economic and environmental viability of the project; Implementing an impact monitoring strategy, including project performance, socio-economic and environmental impacts, with the participation of citizens and stakeholders; Measuring the territorial (at water utility level) energy and carbon footprint of the water and energy services before and after the implementation of LIFE TURBINES solutions; and, complying with the Do Not Significant Harm (DNSH) principles applying the life cycle considerations and demonstrate the best available levels of environmental performances in the water and energy domains.



VALZEO

Valorisation of agro-industrial waste to obtain zeolite-based composite materials and their use in environmental remediation and biofuel production

valzeo.eu →



Grant agreement ID: 101086354
Status: Ongoing project
Start date: January 2023
End date: December 2026
Funded under: HORIZON-MSCA-2021-SE-01
Overall budget: € 883.200,00
EU contribution: € 883.200,00
EU contribution UNIVPM: € 105.800,00
Coordinator: Universidad Autonoma de Barcelona (UAB) (Spain)

General concept

In EU, an average of 3.1 million tons of paddy rice is produced (ca. 450.000 ha). Around 80% of the EU rice production takes place in Italy and Spain, with a further 12% in Greece and Portugal. Globally, 750 million tons of rice husk (RH) are yearly produced, and it is estimated a continuous increase of 1.1% each year. Each ton of rice can produce 20% of RH, that must be eliminated since it accumulates in the environment due to its low degradability. RH generates 18-20% of RHA through a combustion process. The inadequate deposition of RHA pollutes the environment and deteriorates the respiratory system of humans and animals. During RH incineration, the burnt ash can spread into a large area facilitated by air, causing environmental pollution. According to these figures, large volumes of RHAs with low density are becoming a major challenge to the surroundings of dumping environment and dump fill areas.

The role of UNIVPM

UNIVPM leads the WP3 for Validation of materials at laboratory scale to evaluate the performance of developed materials for water treatment / biodiesel production and to determine the lifecycle of developed materials.

Expected impacts

VALZEO intends to employ RHAs as raw supplies to produce composite materials based on hierarchical zeolites modified by metal oxide nanoparticles (MON) and metal-organic framework (MOF) materials with a double purpose, the removal of pharmaceuticals, pesticides, dyes and microorganisms in water, and the catalytic production of biodiesel. To address such challenge, VALZEO will promote the exchange of researchers from participating institutions to enhance the exchange of knowledge, best practices, know-how, innovative ideas, experience, cooperation, and culture of work. VALZEO will foster, improve and develop permanent international and inter-sector collaboration between academic research centers, and private sector, enhancing the exchange of knowledge, best practices, know-how, innovations, experience, mutual cooperation and culture of work at different regions and countries (ES, IT, UK and CU) through a series of scheduled secondments.



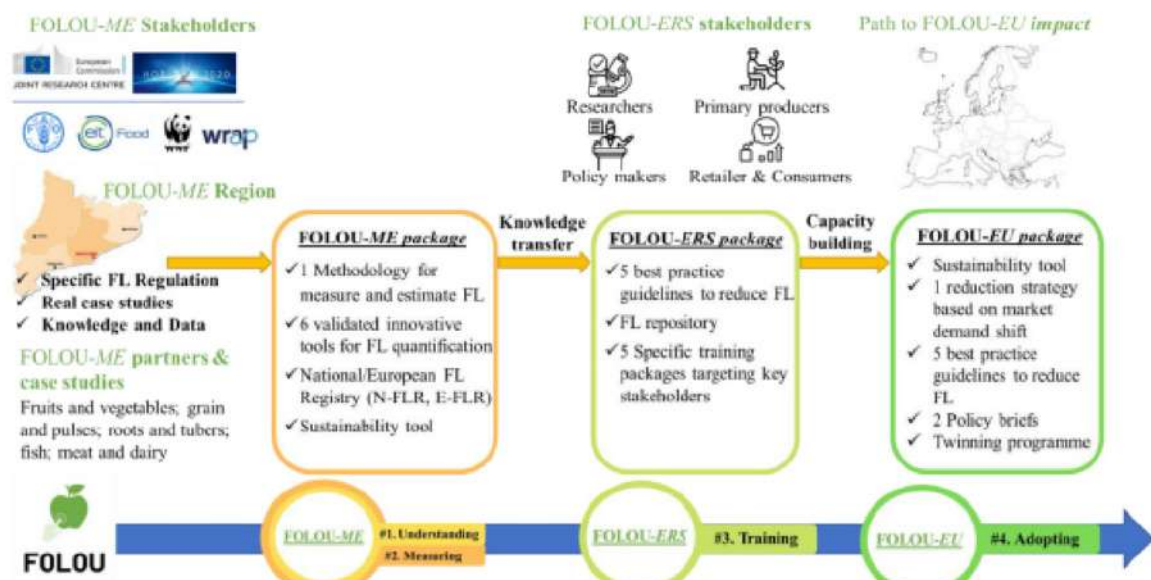
FOLOU

Bringing knowledge and consensus to prevent and reduce Food Loss at the primary production stage. Understanding, measuring, training and adopting

folou.eu →

Grant agreement ID: 101084106
Status: Ongoing project
Start date: January 2023
End date: December 2026

Funded under: HORIZON-CL6-2022-FARM2FORK-01
Overall budget: € 6.523.903,00
EU contribution: € 6.523.903,00
EU contribution UNIVPM: € 771.875,00
Coordinator: FUNDACIO UNIVERSITARIA BALMES (UVIC-UCC), SPAIN



General concept

Each year, a substantial amount of food loss (FL) is generated at the primary production stage; FL have negative impacts on the society, contributing to food insecurity, depleting the environment, generating avoidable GHG emissions and creating pressure on land and water. Currently, key challenges hampering the reduction of FL are: regulatory challenges (e.g., exclusion of FL in the EU Commission Decision 2019/1597), technical challenges (e.g., lack of common measurement methodology, lack of cost-effective measurement tools), scientific challenges (e.g., lack of understanding of drivers) and social challenges (e.g., lack of skills of the different stakeholders involved).

The role of UNIVPM

UNIVPM leads the WP1 about Creation of a robust and consolidated registry and repository on Food Losses at the primary production sector. The objective of this WP is twofold. On one side, it aims to develop the IT framework of the future "National Food Losses Registry (N-FLR)" and of the future European Food Losses Registry (E-FLR). On the other hand, this WP will collect, analyse and cure all available EU food loss data to develop a comprehensive secondary source of information (food losses repository) to be used by partners and to be made available for public consultation.

Expected impacts

FOLOU is willing to contribute in overcoming these challenges, being the main objective of the project to set up the necessary mechanisms to: (i) measure and estimate (robust and harmonized methodology), (ii) monitor and report (national and EU FL registries), and (iii) assess the magnitude and impact of FL. Additionally, FOLOU will also work to assure the appropriate knowledge transfer and adoption of the project outcomes by the key targeted stakeholders: primary producers, retailers, consumers, policy makers and researchers. FOLOU will structure its activities in a comprehensive action plan revolving around four levers of change: 1#Understanding by working on collecting and curing FL available data, by working on understanding the drivers behind food losses and by assessing the impact of these losses; 2#Measuring by developing new cost-effective tools for the measurement/estimation of FL and a robust and harmonized methodology; 3#Training by providing tailored trainings to different stakeholders; 4#Adopting by preparing recommendations and creating a twinning programme. With a duration of 4 years, FOLOU gathers 16 multidisciplinary partners from 10 countries joining forces around a common challenge: Preventing and reducing the amount of food intended for human consumption that is eventually lost.



WATERUN

Innovative methodology to prevent and mitigate diffuse pollution from urban water runoff

<https://www.waterun.eu/> →



Grant agreement ID: 101060922
Status: Ongoing project
Start date: June 2022
End date: May 2026
Funded under: HORIZON-CL6-2021-ZEROPOLLUTION-01
Overall budget: € 3.974.187,50
EU contribution: € 3.974.187,50
EU contribution UNIVPM: € 281.875,00
Coordinator: AIMEN

General concept

WATERUN aims to develop an innovative methodology to contribute to the implementation of urban water runoff (UWR) management plans in cities based on the Water-Sensitive Urban Design (WSUD) concept. This methodology will provide preventive and mitigation solutions and best management practices adopting a holistic perspective (from source identification to decision making) for diffuse water pollution control in urban catchments.

The target is to transform the UWR management by the development of identification, planning and risk-based tools and new working procedures (guidance) with the early involvement of the main urban water management and governance actors (co-creation process), ensuring a wider and faster adoption.

The role of UNIVPM

In WATERUN, 3 modelling tools will be developed and validated to improve the UWR management in cities: 1 - Identification tool for critical sources of urban diffuse pollution based on a connectivity assessment. 2 - Planning tool for SW management based on a decentralised approach at city block level (WP3). 3 - Risk-based DSS for UWR management and reuse based on environmental and health-risk assessment. The identification tool will provide global and qualitative information about the critical sources of pollution, pathways, severity ranking and locations for GI. Once the GI locations are identified, UNIVPM will lead the risk-based DSS (WP5) giving quantitative info about UWR quality (QMRA and QCRA) from a health-risk perspective, delivering the EWS providing indication on restrictions of the water use and allowing to assess the suitability of GI for different reuse scenarios (risk-based tool). All modelling tools will be connectable, and they will work as an integral methodology for UWR management.

Expected impacts

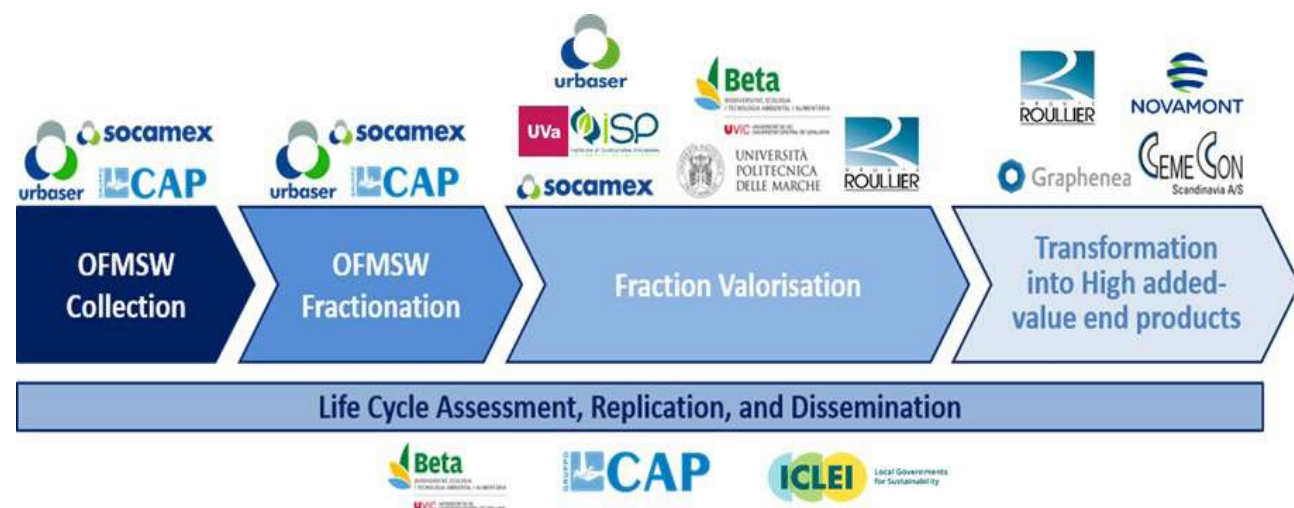
The main expected impacts of WATERUN are: Co-creation process for preventing and managing diffuse pollution from UWR in cities; Development of advanced monitoring for diffuse pollution in UWR; Development of modelling tools for diffuse pollution identification, SW management and risk, and UWR quality management plans and Implementation and validation of Green Infrastructure for diffuse pollution mitigation from UWR.



CIRCULAR BIOCARBON

Turning carbon of complex organic urban waste streams into value-added products (H2020–BBI–JU)

circularbiocarbon.eu →



Grant agreement ID: 01023280

Status: Approved

Start date: June 2021

End date: May 2026

Funded under: H2020-BBI-JTI-2020 / BBI-2020-SO1-F

Overall budget: € 22.952.297,50

EU contribution: € 14.999.999,75

EU contribution UNIVPM: € 356.562,50

Coordinator: URBASER S.A. (Spain)

General concept

CIRCULAR BIOCARBON is a first-of-its-kind flagship biorefinery conceived to valorise organic fraction of municipal solid waste (OFMSW) into value-added products: diamond-like-carbon coatings, green graphene, tailor-made bio-based fertilisers, or bio-plastic, as well as a variety of intermediate products. To maximise replicability and boost potential penetration in the market, the biorefinery will be operated for three years in Spain and Italy, and consistent business and exploitation strategies will be put in place. The CIRCULAR BIOCARBON biorefinery, organised through a pool of cascading technologies, start from anaerobic process steps (after proper pre-treatment) of mixed urban waste streams, of which OFMSW is the main one, in order to treat all the biowaste produced by a medium-size city (at the end of the project, a commercial scale biorefinery will be fully operative). The fundamental objective of the CIRCULAR BIOCARBON project is to open up new business frameworks based on a new circular vision of waste treatment in a city towards a sustainable bioeconomy, to which actors leading the territorial waste management schemes and policies will be brought to maximize impact on the market, on policy makers and on society.

The role of UNIVPM in CIRCULAR BIOCARBON

The project will demonstrate the industrial viability of the SCHEPPAR system (background IPR of Prof. Fatone- UNIVPM) in a wider concept of OFMSW and sewage sludge biorefinery. SCEPPHAR system will be fully scaled-up (500 m3 of fermenter) to integrate the existing Sesto San Giovanni AD section, managed by the water utility CAP Holding. UNIVPM will work together with the UNIVR team (third party) for the process design and start-up of the system. UNIVPM experience in pilot scale co-fermentation in real environment and demo and full-scale process design in previous H2020 (e.g. SMART-Plant) will be valorised both in technical and replication activities.

Expected impacts

Circular Biocarbon will promote a new concept, treating bio-waste as a raw material, not as a disposable product, obtaining different products of high added value for the market. The main expected impact of the project will be to realize the first commercially viable biorefinery, converting OFMSW to valuable building blocks and materials at commercial levels, including nexus with the primary sector. The project advances valorising options of existing biogas facilities and demonstrates transformation of other industries utilising carbon as their building block.



SMART4ENV

Enhancing the scientific capacity of tubitak mam in the field of smart environmental technologies for climate change challenges

smart4env.com →

Grant agreement ID: 101079251

Status: Ongoing project

Start date: November 2022

End date: October 2025

Funded under: HORIZON-WIDERA-2021-ACCESS-03

Overall budget: € 1.499.420,00

EU contribution: € 1.499.420,00

EU contribution UNIVPM: € 251.750,00

Coordinator: TUBITAK (Turkey)

General concept

SMART4ENV aims to improve TUBITAK Marmara Research Center (TUBITAK MAM) R&I capacities to strengthen its scientific reputation, attractiveness and networking channels while stimulating scientific excellence in the field of Smart Environmental Solutions (SES) for climate change adaptation and mitigation of key applications for the Turkish economy within water, agriculture, and public health sectors. It will reinforce R&I and knowledge transfer capacity of TUBITAK MAM.

The role of UNIVPM

UNIVPM will lead the Innovation mobilities for excellence to better integrate TUBITAK MAM in the research landscape, as well as, to establish mechanisms to better collaborate and compete for EU and/or international research funding through a mobility programme; to ensure required knowledge transfer to contribute to sustainability of TUBITAK MAM through specific designed mobility and specialized training; to maximize the impact of research, enabling the value of results to be potentially wider than original focus and enlarge the network of expert ESRs in SES.

Expected impacts

The project will develop capacity building of permanent scientists, Early-Stage Researchers (ESR) training, enlarge cooperation between academia, industry, and stakeholders in Turkey with a general sustainable framework for research, international networking, mobility, and integration in the European Research Area (ERA). Strengthening the experience of the research staff of TUBITAK MAM, including a new generation of young scientists, will be developed through the cooperation with EU partners of established scientific excellence in the topics and demonstrated experience in economic impact and awareness raising and integration into national policies. At scientific level, it is expected to enlarge the community of competitive prestigious researchers at TUBITAK MAM in SES, stronger and better-connected to a core of international and relevant R&I systems, supported by skilled R&I managers with their international networks. At social level, it is expected an improvement in environmental quality, public health, improved customer experience and communication, a better mitigation and adaptation to climate change because of new SES for intelligent, connected, and responsive environmental services and a sustainable use of water and resilient treatment systems with stable effluents quality. At an economic level, the project will contribute to the development of an innovative SES industry and the profitability of regional companies through new product development, process improvements, innovation support, and job creation.



BIORECER Biological Resources Certifications Schemes

biorecer.eu →

Grant agreement ID: 101060684
Status: Ongoing project
Start date: September 2022
End date: August 2025

Funded under: HORIZON-CL6-2021-ZEROPOLLUTION-01
Overall budget: € 5.713.200,00
EU contribution: € 4.999.061,25
EU contribution UNIVPM: € 292.187,50
Coordinator: CETAQUA (Spain)

General concept

BIORECER aims to ensure the environmental performance and traceability of the biological feedstock used by the biobased industries, deploying guidelines to strengthen the current certification schemes. Within this approach, the added value, the use, as well as social acceptance of bioproducts will be increased. To fulfill this goal, BIORECER is structured in three main technological pillars: 1) to develop a multidimensional assessment framework for an aggregated analysis on the biological feedstocks and their associated supply chains; 2) to create a BIORECER Innovation ecosystem livinglab with a multi-agent approach, testing the framework in 4 bio-based systems supply chain cases of study, and 3) to use all this knowledge to complement current certification schemes including new criteria for certifying biological resources' sustainability, origin, and traceability, and ensure applicability at EU and global scale. The transition to a biobased economy is expected to deliver substantial environmental and economic benefits. Specifically, BIORECER will assess the impact of current and adapted certification schemes on consumers and bio-based industries stakeholders' WTP along with industries and consumers' acceptance of new bio-value chains from biological feedstocks, including residual feedstock and waste.

The role of UNIVPM

UNIVPM will lead the Italian case study in Milan. BIORECER products will be validated in the Lombardian region, which will include wastes treated in biorefineries managed by CAP HOLDING SPA (water and waste utility) i.e., sewage sludge, OFMSW, agro-waste and non-hazardous organic liquid waste. SPRING will integrate endusers' feedback, and also other relevant actors in bio-based sectors into the validation process, translating the case study necessities to the product owner requirements.

Expected impacts

The project proposes first to design and develop a multidimensional framework to analyze and define the assessment of the environmental performance of biological resources and traceability that will be subsequently validated in 4 full bio-based systems and applicable to a wide range of bio-based value chains. This approach will be unfolded by the joint creation of two levels of interaction: a physical one through the creation of a BioResources Stakeholders Platform (BRSP) and a "digital" one through a BIORECER ICT tool (BIT) to amplify the "scope" of the project.



PROMISCES Preventing Recalcitrant Organic Mobile Industrial chemicalS for Circular Economy in the Soil-sediment-water system

promisces.eu →



Grant agreement ID: 101036449
Status: approved
Start date: November 2021
End date: April 2025
Funded under: H2020-LC-GD-2020
Overall budget: € 11.995.413,75
EU contribution: € 11.995.413,75
EU contribution UNIVPM: € 605.125,00
Coordinator: Bureau de Recherches Geologiques et Minieres (France)

General concept

PROMISCES will identify how industrial pollution prevents the deployment of the circular economy (CE) in the EU and which strategies help overcome key bottlenecks to deliver the ambitions of the European Green Deal and Circular Economy Action Plan. PROMISCES considers specific CE routes including (i) semi-closed water cycles for drinking water supply at urban and catchment scale; (ii) wastewater reuse for irrigation in agriculture; (iii) nutrient recovery from sewage sludge; (iv) material recovery from dredged sediment and (v) land remediation for safe reuse in urban areas.

PROMISCES will develop new analytical methods and tools to provide data on persistent and mobile (PM) substances, to explore sources, pathways and impacts of persistent and mobile (PM) substances released from soil, sediment, landfills, wastewater treatment plants and urban runoff into relevant environmental compartments (soil, sediment, surface water, groundwater). The project will propose measures for assessment and management of human health risks and develop and demonstrate cost-efficient and sustainable technologies for the removal of PM substances from different media.

The role of UNIVPM in PROMISCES

UNIVPM will be involved with two case studies in Marche Region in two Circular Economy routes: (i) Nutrient and energy recovery from sewage sludge and its valorisation as soil amendment in agriculture and (ii) Materials recovery from dredged sediments and their valorisation for eco-materials or civil engineering.

The first case study will focus on landfill leachate treatment to unlock safe resource recovery potential and near zero pollution discharge, in a wastewater treatment plant located in the province of Ancona (Italy). The second case study, concerning removal of PFAS from dredged sediments for material recycling, will involve the Port of Ancona and ECOSEDRA project for studying solutions for the valorisation of seaport sediments.

Expected impacts

PROMISCES will develop and demonstrate cost-efficient and sustainable technologies for the removal of PM substances from different media and translate PROMISCES results into guidance for efficient and feasible management of PM substances and recommendations for the implementation of relevant EU policy strategies and directives.

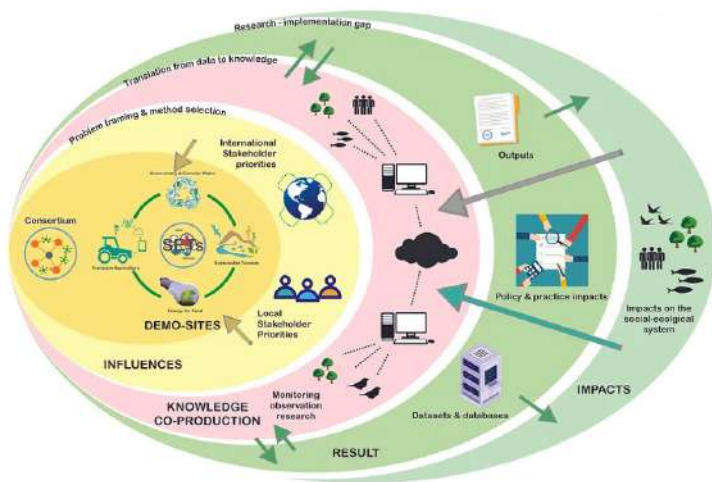
The results will be integrated into a decision support framework, which considers resource recovery and water reuse and supports chemical management decisions with regards to i) stakeholders and societal demands; ii) PM chemical properties iii) technical solutions to prevent, mitigate and remediate industrial pollution and iv) the whole life cycle of current and future chemicals.



surenexus.eu →

SURE NEXUS

Ensure fair NEXUS transition for climate change adaptation and sustainable development implementation based on coupled nature-based systems and bioeconomy



Grant agreement ID: 2142
Status: Ongoing project
Start date: April 2022
End date: March 2025
Funded under: Prima [SURE_NEXUS] [Call 2021 Section 1 Nexus IA]
Overall budget: € 2,123,235.12
EU contribution: € 2,123,235.12
EU contribution UNIVPM: € 280.000,00
Coordinator: Universitat Politècnica de Catalunya (Spain)

General concept

The SureNexus project will support informed and evidence-based decision-making for a fair transition to climate change adaptation and mitigation as well as sustainable development, thereby enhancing the implementation of the WEFE NEXUS. The approach of NEXUS is to produce healthy and sufficient food with fewer resources (water, soil, energy and nutrients) through regenerative and precision agriculture including permaculture practises and with minimal impact on the environment. However, local/regional sustainable development should be coupled with biodiversity conservation and mitigation of land degradation. SureNexus will translate conceptual NEXUS into practical solutions and develop a set of alternative socio-ecological and technical systems (SETs) adapted to NEXUS conflicts in different key sectors for the Mediterranean region.

SETs will use nature-based solutions and bioeconomy as the main integrative tools for NEXUS implementation, to improve the cycles of water, energy, food and ecosystem resources. The project will establish small-scale demonstration sites for promising innovative transformation solutions and evaluate their productivity and value for the local community, driving technology uptake and mentality change. Integrated tools will be tested on four innovative Living Labs in Spain, Greece, Morocco and Israel. At the same time, SureNexus will bridge the barrier and resistance to change through the development of interconnected networks (network of networks) of grassroots community projects and foster Mediterranean knowledge transfer and best practices, coupled with intersectoral cooperation.

The role of UNIVPM

UNIVPM will lead the WP6 about Living Lab with the main focus to validate the selected NbS and bioeconomy practices in specific environments of the Mediterranean area. It will be achieved through specific objectives to analyse local specificities to be addressed when implementing Nature-Based Solutions, Bioeconomy Practices or other international and regional WEFE-related decisions; to test, validate and quantify the performance of NEXUS implementation and framework across SETs, focused on 4 main activities: wine production, sustainable tourism, fruit production and renewable energy; to validate support systems, digital tools, data mining and machine learning in the 4 Living Labs; to implement cross-fertilization for NEXUS optimization in SETs and to assess the transferability and replication of SETs in the MED area.

Expected impacts

The novelty of SureNexus is the “bottom-up meets top-down” approach to the implementation of NEXUS through the development of interconnected networks of co-designed SETs adapted to NEXUS conflicts in different key sectors and increasing resilience in the Mediterranean areas. Innovative solutions that go beyond the state of the art will be demonstrated for different sectors and contexts, including: 1) Water treatment and conservation for water security, to prevent agricultural runoff pollution and negative impacts on ecosystems in agriculture, ecotourism and winery sector, 2) Precision agriculture for food security, 3) Renewable energies for food/energy, 4) Off-grid water-energy-food systems for sustainable tourism, housing and food production, 5) Bioeconomy solutions for resource and waste recovery and reuse, and water treatment and value chain enhancement for the area MED area, 6) Machine learning and data mining to improve allocation of different resources considering technical and policy constraints and for NEXUS modelling.



www.sea2landproject.eu →

SEA2LAND

Producing advanced bio-based fertilisers from fisheries wastes (H2020)

Grant agreement ID: 101000402
Status: Ongoing project
Start date: January 2021
End date: December 2024
Funded under: H2020-EU.3.2.1.1.
Overall budget: € 8,853,401,54
EU contribution: € 7 748 383,50
EU contribution UNIVPM: € 373.375,00
Coordinator: NEIKER (Spain)

General concept

SEA2LAND focuses on producing advanced bio-based fertilizers from fisheries waste, bringing together 26 multidisciplinary actors from 10 European countries. The project aims to implement and optimize near-market technologies (TRL7) for nutrient recovery from the by-products of the aquaculture and fishing industries. Key technologies include advanced composting, biodrying, pyrolysis, enzymatic hydrolysis, chitin extraction, and membrane technology, which will generate at least 12 bio-based fertilizers. The project bridges the gap between nutrient waste in fisheries and the need for sustainable agricultural solutions by engaging waste producers, agricultural researchers, technological centers, and fertilizer companies.

UNIVPM's Role

UNIVPM is leading the development of a “shell biorefinery” concept using seafood processing waste from CO.PE.MO in Ancona, Italy, which generates 1-3 tons of seafood by-products daily. The research focuses on two innovative recovery routes:

1. Chitin and Protein Hydrolysates – Extracted from seafood waste at the lab scale to produce a slow-release nitrogen fertilizer.
2. Biochar-Compost Composite Fertilizer – Developed at pilot scale by pyrolyzing mussel shells and co-composting the organic fraction with other aquaculture and forestry wastes. Process optimization ensures high-quality, ready-to-use biofertilizers.

Expected Impacts

SEA2LAND will enhance the supply of renewable nutrients to European agriculture, recovering an estimated 5.2 million tons of waste and 620,000 tons of nutrients (N and P), covering over 20% of Europe's annual nutrient imports. This could benefit around 6.8 million hectares of agricultural land, reducing Europe's dependence on external nutrient sources, lowering greenhouse gas emissions, and fostering the local economy through sustainable resource recovery.



cordis.europa.eu →

MICROALGAE 4.0

Microalgae cultivation in a WRRF scheme to improve circularity and risk-based assurance in wastewater treatment using digital tools

Grant agreement ID: 101067621
Status: Ongoing project
Start date: September 2022
End date: August 2024
Funded under: HORIZON-MSCA-2021-PF-01
Overall budget: € 172.750,08
EU contribution: € 172.750,08
EU contribution UNIVPM: € 172.750,08
Coordinator: UNIVPM (Italy)

General concept

MICROALGAE 4.0 enhances circularity in wastewater treatment by integrating microalgae cultivation into a Water Resource Recovery Facility (WRRF). The project, led by UNIVPM under Prof. Francesco Fatone, focuses on digitalization, Circular Economy, and the Water-Energy-Food-Ecosystems (WEFE) Nexus.

UNIVPM's Role

Experimental Activities: Design, operation, and automation of a microalgae-based pilot plant, data analysis, techno-economic assessment, and dissemination of results.
Scientific Training: Project management, LCA/LCC analysis, machine learning, automation, networking, and policy evaluation.

Expected Impacts

Improve microalgae-based wastewater treatment reliability.
Maximize resource recovery (water, nutrients, energy).
Develop digital tools for process monitoring and optimization.
Provide real-environment data for safe water reuse and biomass valorization.

ULTIMATE Industry water-utility symbiosis for a smarter water society (H2020)

Grant agreement ID: 869318
Status: Ongoing project
Start date: June 2020
End date: May 2024
Funded under: H2020-EU.3.5.4., H2020-EU.3.5.2.2.
Overall budget: € 16,614,813.75
EU contribution: € 13 527 116.27
EU contribution UNIVPM: € 417,500,00
Coordinator: KWR (The Netherlands)



Download the flyer
https://ultimatewater.eu/wp-content/uploads/2020/10/ultimate-postcard_04web.pdf

www.ultimatewater.eu →

Overview

ULTIMATE develops and demonstrates Water Smart Industrial Symbiosis (WSIS) models in 9 cases across Europe and Israel. The project integrates innovative technologies, business models, and governance strategies to optimize water, energy, and material reuse, enhancing sustainability and economic viability.

UNIVPM's Role

Innovation Management: Leads symbiotic cluster strategies in Rosignano (Italy) with ARETUSA.
Real-Time Monitoring & Control: Develops an ICT tool for monitoring seawater intrusion, flow equalization, and salinity management in wastewater treatment.
Water Reuse Platform: Implements a data-driven matchmaking system to optimize industrial and agricultural water reuse.

Expected Impacts

Reduces industrial freshwater demand through water reuse and resource recovery.
Lowers process energy needs by 15% and mitigates CO₂ emissions.
Facilitates €270M in Circular Economy investments within three years post-project.
Prepares industries and utilities for climate change challenges like water scarcity.



AquaSPICE - Advancing sustainability of process industries through digital and circular water use innovations (H2020)

Grant agreement ID: 958396
Status: Ongoing project
Start date: December 2020
End date: May 2024
Funded under: H2020-EU.2.1.5.3.
Overall budget: € 12,847,491,81
EU contribution: € 11,055,247,94
Coordinator: RWTH Aachen University (Germany)

www.aquaspice.eu →

General concept

AquaSPICE promotes efficient and circular water use in European Process Industries through innovative treatment and reuse technologies, closed-loop systems, and real-time monitoring. The project involves six case studies across Europe and aims to reduce freshwater consumption, implement near-zero discharge systems, and improve water efficiency by 30%.

The role of UNIVPM in AquaSPICE

UNIVPM focuses on optimizing water cycles at Rosignano Solvay (Italy), treating industrial wastewater for reuse in cooling processes. A pilot system will be validated for compliance with discharge standards and integrated into the production site.

Expected impacts

AquaSPICE supports the EU's EIP Water initiative, targeting water reuse, treatment, and governance. Key outcomes include reduced water usage, increased resource recovery, and enhanced process efficiency.



Programme for the
Competitiveness
of Enterprises
and SMEs (COSME)
2014-2020

CENTOUR Circular economy in tourism (COSME)

Grant agreement ID: 951076
Status: Ongoing project
Start date: September 2020
End date: August 2023
Funded under: COSME -call COSTOURCOOP-2019-3-01
Overall budget: € 1,329,358.42
EU contribution: € 997,018.84
EU contribution UNIVPM: € 111.482,00
Coordinator: CCIAAM (Italy)

www.circulartourism.eu →

General concept

CENTOUR promotes sustainable tourism by fostering innovative solutions and circular business models through transnational cooperation and knowledge transfer. The project focuses on enhancing the competitiveness of tourism SMEs, particularly those in local supply chains, by addressing challenges like food waste reduction, plastic-free operations, and collaborative consumption. CENTOUR aligns with the EU's COSME program to boost economic growth, jobs, and sustainability in the tourism sector.

The role of UNIVPM in CENTOUR

UNIVPM designs innovation strategies for circular supply chains, emphasizing:
Food waste reduction, including reusing spent oil from tourism.
Plastic-free practices and packaging redesign across supply chains.
Collaborative consumption models to enhance community-driven tourism.
UNIVPM also develops marketing strategies tailored to circular tourism for implementation in two focus regions.

Expected impacts

The project will empower SMEs with the skills, knowledge, and resources to adopt circular economy practices, rethink their business models, and implement innovative solutions. It will establish communities of practice, foster cross-sector collaboration, and create a network of institutions to support circular tourism initiatives. The results and frameworks will be shared across the EU to replicate and scale the support scheme for SMEs in the tourism sector.



AMOCEAB Joint Master Degree on Circular Economy

<https://amoceab.adrioninterreg.eu/> →

Grant agreement ID: 1313
Status: Ongoing project
Start date: January 2023
End date: August 2023

Funded under: ADRIAN Programme – third call for proposals
CHANGE LOG FILE Priority Axis: 2
Overall budget: € 1.009.347,57
EU contribution: € 1.009.347,57
EU contribution UNIVPM: € 294.210,61
Project Coordinator: UNIVPM (Italy)

General concept

The main purpose of this project is to contribute to an acceleration towards the circular economy transition in the ADRIAN areas through the development of new and existing capacity and professionals. This will be possible through the achievement of the following three specific objectives. Specific Objective1: to enhance the capacity of universities, research and business centres to manage solutions and technologies focused on Circular Economy. Specific Objective2: to develop a joint academic path that aims at the training and introduction on the market of new experts in Circular Economy. Specific Objective3: to promote and disseminate the new academic path to considerably increase the capacity of research centres and companies to use professional figures in Circular Economy solutions.

The role of UNIVPM

Coordination of Consortium for creation of a transnational network in the ADRIAN area and organization of a mutual learning path between partners and support for the implementation of action plan for the master degree in Circular Economy and Bioeconomy (MDCEB).

Expected impacts

Enhance the capacity in transnationally tackling environmental vulnerability, fragmentation and the safeguarding of ecosystem services in the Adriatic-Ionian area with the possibility of networking and implementation of Education and training program concept and the definition of a joint master degree on the thematic domain selected.



HYDROUSA - Demonstration of water loops with innovative regenerative business models for the Mediterranean region (H2020)

www.hydrousa.org →



Watch the video
<https://youtu.be/yDXS7X7Z-Po>



Download the flyer
https://drive.google.com/file/d/19iTXqPnEfpKuF0Pc7S_QlspbiBISIBn/view

Grant agreement ID: 776643

Status: Ongoing project

Start date: July 2018

End date: December 2022

Funded under: H2020-EU.3.5.2.3.,
H2020-EU.3.5.4., H2020-EU.3.5.2.2.

Overall budget: € 12,015,448

EU contribution: € 9,958,706,88

EU contribution UNIVPM: € 713.500,00

Coordinator: National Technical University of Athens (Greece)

General concept

HYDROUSA focuses on implementing nature-based solutions for managing various water sources, such as rainwater, sewage, ground-water, and seawater, to create valuable resources. These solutions will enhance agricultural productivity and economic activities in Mediterranean areas, starting with demonstrations on the Greek islands of Mykonos and Tinos, followed by transferability assessments in 10 other water-stressed regions.

The role of UNIVPM in HYDROUSA

UNIVPM evaluates the transferability and replication of HYDROUSA solutions worldwide by conducting legislative and institutional analyses. It identifies policy gaps that may hinder the adoption of these solutions in different local contexts. Additionally, UNIVPM develops a guidance methodology for assessing replicability and conducts feasibility studies for replication sites.

Expected impacts

HYDROUSA will benefit the entire water value chain, creating new services and business models, including decentralized urban farming with wastewater, organic farming standards, biogas equipment leasing, and community-supported agriculture. The project aims to revolutionize water management by transforming challenges into solutions and promoting sustainable practices globally.



DWC - Digital Water.City Leading urban water management to its digital future (H2020)

www.digital-water.city →

Grant agreement ID: 820954

Status: Ongoing project

Start date: June 2019

End date: November 2022

Funded under: H2020-EU.3.5.4.,
H2020-EU.3.5.2.2.

Overall budget: € 5,878,014,84

EU contribution: € 4,997,161,66

Coordinator: KWB (Germany)

General concept

The **DWC (Digital Water City)** project connects digital innovations with water management by deploying 18 advanced solutions in five major European cities (Berlin, Milan, Copenhagen, Paris, Sofia), impacting 30 million people. These solutions address water challenges like wastewater management, health protection, and digitization, demonstrating scalability to smaller cities and opening markets for European technologies.

The role of UNIVPM in DWC

UNIVPM develops innovative water quality monitoring systems, early warning tools for water reuse, and digital solutions like matchmaking tools for supply-demand alignment and awareness-raising serious games. It also leads training on wastewater sustainability and supports project coordination and risk management.

Expected impacts

The project improves decision-making, reduces water management costs, enhances infrastructure performance, increases public awareness, and fosters resilient, sustainable water systems while reducing environmental impact and supporting climate adaptation.



BLUELAKES No microplastics, just waves. (LIFE)

www.lifebluelakes.eu →



IT - Guarda il video
https://youtu.be/bV6_tAq-N4o

Grant agreement ID: LIFE18 GIE/IT/000813

Status: Ongoing project

Start date: November 2019

End date: November 2022

Funded under: EU LIFE 2014-2020 Program

Overall budget: € 2,530,927

EU contribution: € 1,391,990

EU contribution UNIVPM: € 193.500,00

Coordinator: LEGAMBIENTE (Italy)

General concept

LIFE Blue Lakes aims to prevent and reduce microplastic pollution in Italian and German lakes by improving decision-making processes across local, regional, and national levels. The project engages stakeholders—such as local administrations, environmental agencies, companies, and citizens—through participatory processes to develop the Lakes Papers, a voluntary framework offering tailored recommendations for reducing microplastic disposal in lakes. Awareness campaigns for citizens and training for water and wastewater treatment operators are also key components.

The role of UNIVPM in BLUELAKES

UNIVPM investigates the presence of microplastics in drinking water, wastewater, and sewer overflows, evaluating the efficiency of treatment processes. The findings will inform operative manuals, training programs, and strategies to optimize treatment systems, reduce microplastic impacts, and guide public authorities and utilities in addressing this emerging issue.

Expected impacts

The project aims to influence European and national policies on plastic and microplastic litter, encouraging sustainable production and consumption. Companies will be motivated to replace microplastics in their products, and citizens will be made aware of their environmental impacts, promoting behavior changes and the demand for sustainable alternatives.



DECOST

DECOST Decentralised composting in small towns (ENI-CBC-MED)

www.enicbmed.eu/projects/decost →

Grant agreement ID: A_B.4.2_0095

Status: Ongoing project

Start date: September 2019

End date: September 2022

Funded under: ENI CBC MED

Overall budget: € 3.011.231,44

EU contribution: € 2.710.108,29

Coordinator: University of VIC (Spain)

General concept

DECOST aims to establish a closed-loop waste management system by integrating decentralized home and community composting with urban agriculture. The project focuses on reducing food waste, valorizing organic waste, and using compost in urban farming. Implemented in four municipalities, DECOST targets the treatment of 1,500–2,000 tons of organic waste annually, empowering communities and enhancing institutional capacities.

The role of UNIVPM in DECOST

In Basilicata, Italy, UNIVPM implements two composting approaches:

Centralized composting in Atella, managing organic and agricultural waste.

Decentralized composting in Potenza, combining community and home systems using electromechanical composting machines in urban areas like Macchia Romana.

The compost produced will support personal gardens, local farms, and urban agriculture projects, fostering social and educational benefits.

Expected impacts

DECOST will divert significant organic waste from landfills, enhancing food security through urban agriculture. Key outcomes include:

4 new Integrated Waste Management Plans.

4 composting plants with a capacity of 1,500–2,000 tons/year.

A smartphone app for citizens to track recycling efforts.

Training for 40 municipal staff and a business plan to ensure long-term sustainability.

This initiative promotes sustainable behaviors, engages communities, and builds resilience in waste management systems.



FIT4REUSE - Safe and sustainable solutions for the integrated use of non-conventional water resources in the Mediterranean agricultural sector (PRIMA)

Grant agreement ID: [1823]
[FIT4REUSE] [Call 2018
Section 1 Water]
Status: Ongoing project
Start date: June 2019
End date: June 2022

Funded under: EU PRIMA
Overall budget: € 2.020.000,00
EU contribution: € 2.020.000,00
EU contribution UNIVPM: € 220.000,00
Coordinator: University of Bologna (Italy)

General concept

FIT4REUSE focuses on innovative wastewater treatment, the use of non-conventional water resources, and regulatory frameworks, with an emphasis on the Mediterranean region. The project aims to optimize the water-energy-carbon-food nexus through advanced technologies, including nature-based solutions and anaerobic treatment processes. It also develops models for efficient irrigation, fertigation, and aquifer recharge with reclaimed water.

The role of UNIVPM in FIT4REUSE

UNIVPM operates a pilot-scale UASB combined with AnMBR at Falconara Marittima WWTP in Italy for high-rate wastewater treatment. It tests molecularly imprinted polymer columns to enhance pharmaceutical removal and develops systems for integrating desalinated water into agriculture. Additionally, UNIVPM works on water reuse safety plans and investigates energy-efficient desalination and brine disposal solutions.

Expected impacts

FIT4REUSE aims to improve water reuse for agriculture, increase system efficiency, reduce treatment costs, and enhance water safety in the Mediterranean. The project provides new insights into brine disposal and influences policy on wastewater reuse, contributing to sustainable water management practices in the region.



BLOOWATER - Supporting tools for the integrated management of drinking water reservoirs contaminated by Cyanobacteria and cyanotoxins (WATER JPI)

Status: Ongoing project
Start date: April 2019
End date: April 2022
Funded under: Water JPI 2018 JOINT CALL WaterWorks RID, Ministero dell'Istruzione dell'Università e della Ricerca (Italy), FORMAS (Sweden), Research Council of Norway (Norway)
Overall budget: € 996.882,00
EU contribution: € 834.423,00
Coordinator: ENEA (Italy)

www.bloowater.eu →

General Concept

The BLOOWATER project aims to support public water systems and agencies in managing the risks of cyanotoxins in drinking water. It integrates advanced monitoring techniques and water treatment solutions through a multi-barrier approach. The project develops a low-cost multisensor platform, predictive models, and early warning systems to enable timely interventions, improving water quality and resource management efficiency.

The role of UNIVPM in BLOOWATER

UNIVPM focuses on designing and validating innovative PEUF (polymer-enhanced ultrafiltration) processes for cyanobacteria and cyanotoxin removal. Laboratory-scale research will progress to pilot-scale validation at Lake Castreccioni (Italy), treating 0.2–0.5 m³/day. The goal is to ensure compliance with drinking water standards and develop a decision support system (DSS) to aid authorities in managing algal blooms.

Expected impacts

BLOOWATER will provide strategies for addressing cyanotoxins in raw and treated water, highlighting how public and private utilities can mitigate this risk. It aims to improve local regulations and foster national and international coordination on pollution and cyanotoxin risk management in the Mediterranean region.



PROSUMER Techno-economic and environmental feasibility study of Phosphorus recovery and reuse in fertilizers (EIT CLIMATE-KIC)

Task ID: EIT_2.2.2_200103_P456_1A
Status: Ongoing project
Start date: January 2020
End date: December 2021

Funded under: EIT CLIMATE-KIC
Overall budget: € 93.803,00
EU contribution: € 73.172,00
EU contribution UNIVPM: € 185.723,34
Coordinator: University of Bologna (Italy)

General concept

Prosumer aims to explore the potential of P loop closing in Italian food industry. A techno-economic feasibility study will be conducted to: (i) identify the main barriers and the necessary concrete interventions to implement drivers of change in this field; (ii) estimate the economic impact for a single Company and for EU economy reducing P imports; (iii) the environmental impact in terms of CO₂ emissions comparing the actual and the potential scenarios; (iv) identify requirements for successful activities, tested during following practical applications. Italian food industries and fertilizer producers, which own and use P, will be engaged to provide data for the feasibility study.

The role of UNIVPM in PROSUMER

UNIVPM is responsible for the analysis of the regulatory framework and of the available technological solutions for P recovery as struvite (and other forms of P). The regulatory framework at several levels (Regional, National and European) will be deeply analyzed to identify the boundaries in which the technological solutions should be implemented. UNIVPM will also conduct techno-economic and environmental feasibility study of P recovery in Italian agro-food industry 'waste' streams and reuse of struvite (and other forms of P) for P fertilizer production.

Expected impacts

The main expected impact is the awareness that new valuable opportunities exist rethinking what now is considered waste, generalizing an effective circular economy. In addition, other expected impacts and/or results include (i) increase awareness about phosphorus and disseminate information; (ii) evaluate business risks and opportunities (iii) deliver decision support tools for financial instruments and regulatory framework.



SMART-Plant Scale-up of low-carbon footprint material recovery techniques in existing wastewater treatment plants (H2020)

www.smart-plant.eu →

Grant agreement ID: 958396
Status: Closed project
Start date: June 2016
End date: May 2020

Funded under: H2020-EU.3.5.4.
Overall budget: € 9,768,806,09
EU contribution: € 7,536,300,02
Coordinator: Università Politecnica delle Marche (Italy)



EN - Watch the video
<https://youtu.be/8sSTxh6p--0>

IT - Guarda il video
<https://youtu.be/xmvvwvLBjqQc>

General concept

SMART-Plant focused on scaling-up eco-innovative, energy-efficient solutions for wastewater treatment plants (WWTPs) to close the circular value chain. By applying low-carbon techniques, the project aimed to recover valuable materials such as biopolymers, cellulose, and fertilizers from wastewater. The project optimized seven pilot systems across five municipal WWTPs, proving the feasibility of circular wastewater management and environmental sustainability through Life Cycle Assessment and Costing. Dynamic modeling and decision support frameworks were also developed to identify optimal system integration options for resource recovery. New public-private partnership models were explored, offering opportunities for funding across sectors such as chemicals, construction, and agriculture.

The role of UNIVPM in SMART-Plant

UNIVPM coordinated the SMART-Plant project, overseeing scientific, financial, and administrative aspects. It supervised the engineering design and optimization of two SMARTechs installed at a WWTP near Treviso, Italy, and organized stakeholder workshops, including the 3rd IWA Resource Recovery Conference. UNIVPM also provided support to policy makers at local, national, and EU levels, helping to integrate SMART-Plant solutions into existing infrastructures.

Impacts and Results

The project validated nine SMARTechs that reduced WWTP operational costs, achieving energy savings up to 68%, greenhouse gas emission reductions of 70%, and sludge reduction by 30%. It demonstrated the potential for energy, nutrient, and material recovery, leading to the development of SMART-Products for sectors such as agriculture, chemicals, and construction. Additionally, digital tools for real-time monitoring and decision support were created to enhance WWTP operations. SMART-Plant results were published in high-impact scientific journals.



INTCATCH - Development and application of Novel, Integrated Tools for monitoring and managing Catchments (H2020) (UNIVPM as third party)

Grant agreement ID: 689341

Status: Closed project

Start date: June 2016

End date: January 2020

Funded under: H2020-EU.3.5.4.

Overall budget: € 8,770,935

EU contribution: € 7,570,335

EU contribution UNIVPM: € 118.339,00

Coordinator: Brunel University London (UK)

www.intcatch.eu →

General concept

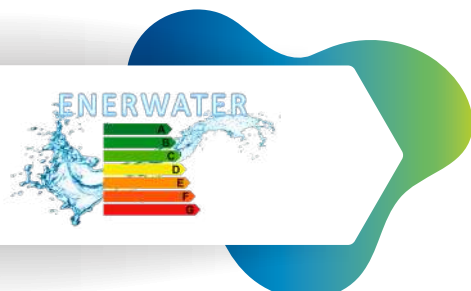
INTCATCH instigated a paradigm shift in the monitoring and management of surface water quality that is fit for global waters in the period 2020-2050. INTCATCH did this by developing efficient, user-friendly water monitoring strategies and systems based on innovative technologies that provided real time data for important parameters, moving towards SMART Rivers.

The role of UNIVPM in INTCATCH

UNIVPM acted as Third Party of University of Verona for the senior engineering supervision of: (i) the operation and validation of the sensors on the CSO treatment; (ii) the monitoring of the impact of stormwater and CSO management on the surface water quality; (iii) design, operation, validation of the CSO treatment; (iv) effectiveness of the decision support tool for the best CSO and stormwater management (v) technical, economic and environmental assessment.

Impacts and Results

The INTCATCH project used demonstration activities to showcase eco-innovative autonomous and radio-controlled boats, sensors, DNA test kits and run-off treatment technologies. INTCATCH incentivised stakeholder innovation in monitoring and facilitated new financing for innovation through its innovative franchise business model and empowerment of community groups and NGOs.



ENERWATER - Standard method and online tool for assessing and improving the energy efficiency of wastewater treatment plants (H2020)

Grant agreement ID: 649819

Status: Closed project

Start date: March 2015

End date: October 2018

Funded under: H2020-EU.3.3.7.

Overall budget: € 1,731,087

EU contribution: € 1,731,087

Coordinator: Universidad De Santiago De Compostela (Spain)

www.enerwater.eu →



EN - Watch the video

<https://youtu.be/d2GDeg8qa-E>

General concept

ENERWATER aimed to develop and validate a standard methodology for assessing, labeling, and improving the energy performance of wastewater treatment plants (WWTPs). The project focused on fostering collaboration among research groups, SMEs, utilities, and authorities, with the goal of creating EU legislation to achieve energy reductions and ensure effluent water quality.

The role of UNIVPM in ENERWATER

UNIVPM led energy monitoring activities in 15 Italian WWTPs, establishing a public benchmark database. It contributed to developing the energy index methodology, conducted energy audits, and engaged Italian stakeholders through workshops. UNIVPM also provided recommendations to the EU on future WWTP energy performance regulations.

Impacts and Results

ENERWATER resulted in a methodology that reduced energy use by up to 30% in 65 WWTPs, along with an automated tool and an online benchmarking database. It promoted dialogue on energy efficiency in water treatment and contributed to European standardization and future EU directives on WWTP energy performance.



UNIVERSITÀ
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DELLE MARCHE



SCIENTIFIC AND TECHNICAL CONSULTING



The **WWEELab manages** several EU-funded R&D&I projects and technical consulting activities commissioned by waste and wastewater utilities and public authorities;

The research fields can be divided into the following **5 macro-areas**:



Resource recovery technologies in the urban water cycle



Stormwater treatment and management



Advanced water and wastewater treatment



Organic waste treatment and valorisation



Digital solutions for carbon footprinting and environmental/economic assessment

CAP HOLDING Master Plan
ATS Sludge valorization

2016

2017

CAP HOLDING
Energy Efficiency

ATS C-FOOTPRINT
ATS UPGRADING WWTP
HERA STRUVITE

2018

2019

HERA C-FOOTPRINT
CIIP ENVIRONMENTAL
AUTHORIZATION
CIIP CSO
SYSTEM GROUP
COMPOSTING TOILET
ENEA PHOSPHORUS RECOVERY

2020

HERA /A2A/ SMAT /
IREN / VFAs
ACEGAS
C-FOOTPRINT

2021

VIVASERVIZI / IREN
c-FOOTPRINT
CIIP / ACEA WATER REUSE
IATT NO-DIG TECHNOLOGIES

2022

MARCHE MULTISERVIZI
I.N.R.C.A
EN ENERGON
BIOREAL
CIIP

2023

BECCACECI
TECHNOLOGIES FOR WATER
SERVICES SPA
ADRIATICA OIL
TENAGLIA
ASFALTI TOTARO
COLANZI
DI PERSIO
CIIP SANTA MARIA GORETTI
CIIP
SUEZ PRESIDIANA
CIIP BRODOLINI

2024

Società del Gres S.p.A.
ATS
SMAT
CIIP
Confindustria Ancona
AcegasApsAmga
Fermo A.S.I.T.E. Etra S.p.A.
Municipality of Terre Roveresche
Acquevenete S.p.A.
Viveracqua S.c.a.r.l.
Hera S.p.A. – AcegasApsAmga S.p.A.
Extraordinary Commissioner
for Wastewater Treatment
REF Ricerche S.r.l.
TWS S.p.A.

2025

To be Continued



Società del Gres S.p.A. (2024) - Technical-scientific consulting for the critical analysis of environmental impact assessment results related to stoneware pipe systems.

Società del Gres S.p.A. (2024) – Consulenza tecnico-scientifica finalizzata all'analisi critica dei risultati della valutazione di impatto ambientale dei sistemi di tubazioni in grès.



ATS (2024) - Consultancy for carbon footprint assessment of wastewater treatment plants in the municipalities of Paese, Carbonera, Treviso, Giavera, Sernaglia, Valdobbiadene, Padova, Gaetano, Mussolente, and Salvatronda.

ATS (2024) Consulenza per la valutazione della carbon footprint degli impianti di trattamento delle acque reflue nei comuni di Paese, Carbonera, Treviso, Giavera, Sernaglia, Valdobbiadene, Padova, Gaetano, Mussolente e Salvatronda.

SOCIETÀ METROPOLITANA ACQUE TORINO



SMAT (2024) - Technical-scientific consulting within the project: "Biological Removal of Phosphorus in the Oxidative Stage of the Wastewater Treatment Process."

SMAT (2024) – Consulenza tecnico-scientifica nell'ambito del progetto: "Rimozione biologica del fosforo nella fase ossidativa del processo di trattamento delle acque reflue".



CIIP (San Benedetto - Brodolini Plant) (2024) - Support for drafting the Risk Management Plan (RMP) for sanitary and environmental aspects related to the reuse of treated wastewater from the Brodolini treatment plant in San Benedetto del Tronto.

CIIP (Impianto Brodolini – San Benedetto) (2024) – Supporto alla redazione del Piano di Gestione del Rischio (RMP) per gli aspetti igienico-sanitari e ambientali legati al riuso delle acque reflue trattate dall'impianto di depurazione Brodolini di San Benedetto del Tronto.



Confindustria Ancona (2024) - Technical-scientific "desktop due diligence" consulting for a multifunctional platform project for hazardous waste treatment and recovery, including "end-of-waste" production, located in Jesi.

Confindustria Ancona (2024) – Consulenza tecnico-scientifica di "desktop due diligence" per un progetto di piattaforma multifunzionale per il trattamento e il recupero dei rifiuti pericolosi, inclusa la produzione di materiali "end-of-waste", localizzata a Jesi.



AcegasApsAmga (2024) - Professional monitoring services and testing for the environmental sustainability analysis of the expansion project of the Cà Nordio wastewater treatment plant in Padua – Phase II.

AcegasApsAmga (2024) – Servizi professionali di monitoraggio e sperimentazione per l'analisi della sostenibilità ambientale del progetto di ampliamento dell'impianto di depurazione di Cà Nordio a Padova – Fase II.



Fermo A.S.I.T.E. (2024) - Specialized technical-scientific consulting for a "desktop due diligence" of the integrated treatment project for landfill leachate and digestate effluent from the wet anaerobic treatment of OFMSW.

Fermo A.S.I.T.E. (2024) – Consulenza tecnico-scientifica specializzata per una "desktop due diligence" del progetto integrato di trattamento del percolato da discarica e degli effluenti da digestato derivanti dal trattamento anaerobico umido dei rifiuti organici da raccolta differenziata (OFMSW).



Etra S.p.A. (2024) - Proposal for the calculation of the carbon footprint indicator for the municipal solid waste management service – year 2023.

Etra S.p.A. (2024) – Proposta per il calcolo dell'indicatore di carbon footprint del servizio di gestione dei rifiuti solidi urbani – anno 2023.



Municipality of Terre Roveresche (2024) - Technical- scientific consulting for the characterization and identification of the optimal treatment configuration for landfill leachate at the Barchi site.

Comune di Terre Roveresche (2024) – Consulenza tecnico-scientifica per la caratterizzazione e l'individuazione della configurazione ottimale di trattamento del percolato da discarica nel sito di Barchi.



Acquevenete S.p.A. (2024) - Preliminary environmental sustainability assessment and DNSH (Do No Significant Harm) compliance analysis for: Ospedaletto Euganeo WWTP , Maserà-Casalserugo WWTPs , Porto Viro WWTP.

Acquevenete S.p.A. (2024) – Valutazione preliminare della sostenibilità ambientale e analisi di conformità DNSH (Do No Significant Harm) per gli impianti di depurazione di Ospedaletto Euganeo, Maserà-Casalserugo e Porto Viro.



Acquevenete S.p.A. (2024) - Environmental sustainability analysis of the project “Water Distribution Network Loss Reduction,” including digitalization and monitoring of water networks in the Polesine area.

Acquevenete S.p.A. (2024) – Analisi della sostenibilità ambientale del progetto “Riduzione delle perdite nella rete di distribuzione idrica”, comprensiva di digitalizzazione e monitoraggio delle reti idriche nell’area del Polesine.



Viveracqua S.c.a.r.l. (2024) - Agreement for the calculation of the “carbon footprint indicator of the wastewater treatment service” and related activities for the Viveracqua utility group.

Viveracqua S.c.a.r.l. (2024) – Accordo per il calcolo dell’“indicatore di carbon footprint del servizio di trattamento delle acque reflue” e delle attività correlate per il gruppo di aziende del servizio idrico Viveracqua.



Hera S.p.A. – AcegasApsAmga S.p.A. (2024) - Drafting of technical requirements framework, project alternatives analysis, environmental sustainability assessments, technical-economic feasibility support, recalculation of annual carbon footprint for wastewater treatment, simplified parametric calculation of the carbon footprint for water supply and sewerage services, and development of a territorial decarbonization plan.

Hera S.p.A. – AcegasApsAmga S.p.A. (2024) – Redazione del quadro dei requisiti tecnici, analisi delle alternative progettuali, valutazioni di sostenibilità ambientale, supporto alla fattibilità tecnico-economica, ricalcolo della carbon footprint annuale per il trattamento delle acque reflue, calcolo parametrico semplificato della carbon footprint per i servizi di approvvigionamento idrico e fognatura, e sviluppo di un piano territoriale di decarbonizzazione.



Extraordinary Commissioner for Wastewater Treatment (2024) - Technical-scientific support for the activities of the National Commissioner for Wastewater Treatment in relation to the design and execution of projects subject to EU infringement procedures against Italy.

Commissario Straordinario per il Trattamento delle Acque Reflue (2024) – Supporto tecnico-scientifico alle attività del Commissario Nazionale per il Trattamento delle Acque Reflue in relazione alla progettazione e realizzazione di interventi soggetti a procedure di infrazione dell’UE nei confronti dell’Italia.



**REF Ricerche S.r.l. (2024)
Support in drafting the Water Safety Plan for ACEA ATO 5.**

REF Ricerche S.r.l. (2024) – Supporto alla redazione del Piano di Sicurezza dell’Acqua (Water Safety Plan) per ACEA ATO 5.



REF Ricerche S.r.l. (2024) - Support in drafting guidelines for efficient water use in the third sector.

REF Ricerche S.r.l. (2024) – Supporto alla redazione di linee guida per l'uso efficiente dell'acqua nel Terzo Settore.



Technologies for Water Services spa (2023) - technical- scientific consultancy for supporting the technical- economic feasibility of the design of the san giovanni di grosseto plant - acquedotto del fiora.

Technologies for Water Services S.p.A. (2023) – Consulenza tecnico-scientifica a supporto della fattibilità tecnico-economica della progettazione dell'impianto di San Giovanni di Grosseto – Acquedotto del Fiora.



TWS S.p.A. (2024) - Consulting for the design of upgrading interventions for the San Giovanni wastewater treatment plant (Grosseto) and similar facilities within the service areas of Acea ATO 2, ATO 5, Acquedotto del Fiora, and Acea Molise.

TWS S.p.A. (2024) – Consulenza per la progettazione di interventi di potenziamento dell'impianto di depurazione di San Giovanni (Grosseto) e di impianti analoghi nelle aree di servizio di Acea ATO 2, ATO 5, Acquedotto del Fiora e Acea Molise.



Adriatica Oli srl (2023) - technical-scientific consultancy aimed at assessing the technical- functional, energy, and environmental impacts of different oil management scenarios.

Adriatica Oli S.r.l. (2023) – Consulenza tecnico-scientifica finalizzata alla valutazione degli impatti tecnico-funzionali, energetici e ambientali di diversi scenari di gestione degli oli.



Beccaceci Costruzioni srl (2023) - executive design and implementation of works for the enhancement of the mortaiolo collesalveti drinking water plant.

Beccaceci Costruzioni S.r.l. (2023) – Progettazione esecutiva e realizzazione dei lavori per il potenziamento dell'impianto idrico potabile di Mortaiolo Collesalveti.



Tenaglia srl (2023) - sustainability report for the enhancement of the green water supply system.

Tenaglia S.r.l. (2023) – Redazione del rapporto di sostenibilità per il potenziamento del sistema di approvvigionamento idrico "verde".



Asfalti Totaro (2023) - sustainability report for the enhancement of the green water supply system - increase in water resources and interconnection.

Asfalti Totaro (2023) – Redazione del rapporto di sostenibilità per il potenziamento del sistema di approvvigionamento idrico “verde” – incremento delle risorse idriche e interconnessione.



CIIP spa - (2023) Technical-scientific proposal for the drafting of the sustainability report for the intervention “extraordinary maintenance of the san benedetto del tronto wastewater treatment plant to comply with the n.T.A. Of the water protection plan - 2nd phase”.

CIIP S.p.A. (2023) – Proposta tecnico-scientifica per la redazione del rapporto di sostenibilità relativo all'intervento “manutenzione straordinaria dell'impianto di depurazione di San Benedetto del Tronto per l'adeguamento alle N.T.A. del piano di tutela delle acque – Fase 2”.



Colanzi srl (2023) - sustainability report for the enhancement of the green water supply system - increase in water resources and interconnection.

Colanzi S.r.l. (2023) – Redazione del rapporto di sostenibilità per il potenziamento del sistema di approvvigionamento idrico “verde” – incremento delle risorse idriche e interconnessione.



SUEZ PRESIDIANA - (2023) drafting of carbon footprint calculations and related reports for participation in tenders for the lato and presidiana drinking water plants.

SUEZ PRESIDIANA (2023) – Redazione dei calcoli della carbon footprint e dei relativi report per la partecipazione a gare d'appalto per gli impianti idrici di Lato e Presidiana.



Di Persio Costruzioni (2023) - technical-scientific proposal for the drafting of sustainability reports for the enhancement of the green water supply system.

Di Persio Costruzioni (2023) – Proposta tecnico-scientifica per la redazione di rapporti di sostenibilità finalizzati al potenziamento del sistema di approvvigionamento idrico “verde”.



CIIP spa Brodolini - (2023) technical-scientific consultancy Brodolini wastewater treatment plant San Benedetto del Tronto.

CIIP S.p.A. Brodolini (2023) – Consulenza tecnico-scientifica per l'impianto di depurazione Brodolini di San Benedetto del Tronto.



CIIP spa Santa Maria Goretti - (2023) technical-scientific proposal for the drafting of the sustainability report for the intervention “expansion of the santa maria goretti wastewater treatment plant”.

CIIP S.p.A. Santa Maria Goretti (2023) – Proposta tecnico-scientifica per la redazione del rapporto di sostenibilità relativo all'intervento “ampliamento dell'impianto di depurazione Santa Maria Goretti”.



(2022) consultancy for calculating the “carbon footprint of the treatment service” in accordance with uni en 14061-1 standard.

(2022) – Consulenza per il calcolo della “carbon footprint del servizio di trattamento” in conformità alla norma UNI EN 14061-1.



I.N.R.C.A (2022) - technical-scientific consultancy for functional analysis, identification of critical issues, and technical solutions for improving the quality of wastewater discharged into the public sewer system of inrca.

I.N.R.C.A. (2022) – Consulenza tecnico-scientifica per l'analisi funzionale, l'individuazione delle criticità e la definizione di soluzioni tecniche per il miglioramento della qualità delle acque reflue immesse nella rete fognaria pubblica dell'INRCA.



COOP Edile Appennino (pfizer) (2021) - technical-scientific consultancy for functional analysis and critical issues to support sizing, optimal configuration, and design of the pharmaceutical wastewater treatment plant for pfizer.

COOP Edile Appennino (Pfizer) (2021) – Consulenza tecnico-scientifica per l'analisi funzionale e delle criticità a supporto della dimensionamento, configurazione ottimale e progettazione dell'impianto di trattamento delle acque reflue farmaceutiche per Pfizer.



En Energy (2022) - biomethanation tests and characterization analyses aimed at producing biogas/ biomethane through anaerobic digestion process.

En Energy (2022) – Test di biomethanation e analisi di caratterizzazione finalizzati alla produzione di biogas/biometano mediante processo di digestione anaerobica.



Asac (2021) - consultancy for comparative and functional analysis of the anaerobic management plant for the production of biomethane and chemical co2 sequestration.

Asac (2021) – Consulenza per l'analisi comparativa e funzionale dell'impianto di gestione anaerobica per la produzione di biometano e il sequestro chimico di CO₂.



Bioreal (2022) - technical-scientific consultancy for the calculation of the "carbon footprint of the treatment service" indicator.

Bioreal (2022) – Consulenza tecnico-scientifica per il calcolo dell'indicatore "carbon footprint del servizio di trattamento".



ATS (2021) Calculation of the indicator called "Carbon Footprint of the Wastewater Treatment Service", in accordance with UNI EN ISO 14064-1.

ATS (2021) – Calcolo dell'indicatore denominato "Carbon Footprint del Servizio di Trattamento delle Acque Reflue", in conformità alla norma UNI EN ISO 14064-1.



Technical and scientific support to the procedure for impact assessment environmental of the Santa Maria Goretti Parere Region of Marche (Prot. 14977 del 7/07/22).

Supporto tecnico-scientifico alla procedura di valutazione di impatto ambientale del Parere Santa Maria Goretti – Regione Marche (Prot. 14977 del 07/07/2022).



ETC (2021) - Critical analysis of the possible effects related to the presence of hydrocarbons in the MBR plant in Novi Ligure.

ETC (2021) – Analisi critica dei possibili effetti legati alla presenza di idrocarburi nell'impianto MBR di Novi Ligure.



MARCHE MULTISERVIZI / CENTRALTUBI (2021) - Technical-scientific consultancy - critical and experimental analysis of aging and wear phenomena of materials and infrastructures to support the design, construction and management of new distribution and drinking water systems.

Marche Multiservizi / CentralTubi (2021) – Consulenza tecnico-scientifica: analisi critica e sperimentale dei fenomeni di invecchiamento e degrado dei materiali e delle infrastrutture a supporto della progettazione, costruzione e gestione di nuovi sistemi di distribuzione e approvvigionamento idrico potabile.



Ireti (2021) - technical and economic assessments on the application of technologies for the production of volatile fatty acids and biopolymers in urban wastewater treatment plants managed by Iren.

Ireti (2021) – Valutazioni tecnico-economiche sull'applicazione di tecnologie per la produzione di acidi grassi volatili e biopolimeri negli impianti di trattamento delle acque reflue urbane gestiti da Iren.



IREN (2021) Technical consulting - Innovative processes for materials and nutrients recovery from sewage sludge.

IREN (2021) – Consulenza tecnica: processi innovativi per il recupero di materiali e nutrienti dai fanghi di depurazione.



Calculation of the carbon footprint of the integrated water service Year 2021, evaluated in accordance with UNI EN ISO 14064-1.

CALCOLO DELL'IMPRONTA DI CARBONIO DEL SERVIZIO IDRICO INTEGRATO Anno 2021, valutato in accordo alla norma UNI EN ISO 14064-1.



SO.GE.IN - ECOSEDRA project (2021) Scientific consulting aimed at the validation in a demonstrative scale of an innovative technological solution for the eco-sustainable management of sediments coming from dredging operations in ports - ECOSEDRA project.

SO.GE.IN – Progetto ECOSEDRA (2021) – Consulenza scientifica finalizzata alla validazione, su scala dimostrativa, di una soluzione tecnologica innovativa per la gestione ecosostenibile dei sedimenti derivanti dalle operazioni di dragaggio nei porti – progetto ECOSEDRA.



CIIP (2019-2020)

Criticalities, impacts and technical solutions to support the unique environmental authorization of the wastewater treatment plants managed by water utility CIIP: Santa Maria Goretti in Offida, San Leonardo in Grottammare, Cupramarittima, San Benedetto del Tronto, Ascoli Piceno, Campolungo and Montefiore (Marche Region).

Criticità, impatti e soluzioni tecniche a supporto dell'autorizzazione ambientale unica degli impianti Santa Maria Goretti a Offida, San Leonardo a Grottammare, Cupramarittima, Montefiore.



Technical and economic assessments on revamping of wastewater treatment plants operated by HERA; IREN; SMAT AND A2A water cycle, for advanced biological removal of phosphorus from wastewater and anaerobic supernatants (in BNR schemes), including topics from the new circular economy action plan (com(2020) 98 final).

Valutazioni tecniche ed economiche sul revamping di impianti di depurazione esistenti, gestiti da HERA; IREN; SMAT E A2A ciclo idrico, finalizzati alla rimozione biologica avanzata del fosforo da acque reflue e surnatanti anaerobici (in schemi BNR), includendo aspetti previsti dal nuovo piano di azione economia circolare (com(2020) 98 final).



HERA (2019) - Calculation of the indicator called "Carbon footprint of the wastewater treatment service", in accordance with UNI EN ISO 14064-1 (Updated Version - April 2019) for the Italian water utility HERA.

Calcolo dell'indicatore di impronta di carbonio del servizio di trattamento delle acque reflue, in accordo alla UNI EN ISO 14064-1 (Versione Aggiornata - Aprile 2019).



HERA/SMAT/A2A (2020) - Technical and economic evaluations on the application of technologies for the production of volatile fatty acids and biopolymers (Polyhydroxalkanoates) in urban wastewater treatment plants managed by Italian water utilities HERA, SMAT and A2A - Scientific and technical consulting.

Valutazione tecnico-economica sull'applicazione di tecnologie per la produzione di acidi grassi volatili e biopolimeri (Polyhydroxalkanoates) negli impianti di trattamento delle acque reflue urbane gestiti da HERA, SMAT e A2A.



ENEA (2019) - Analysis of the best available (or under development) technologies for phosphorus recovery from non-conventional sources and analysis of good practices at national and international level.

Analisi delle migliori tecnologie disponibili (o in fase di sviluppo) per il recupero di fosforo da fonti non convenzionali e analisi di buone pratiche a livello nazionale e internazionale.



**ACEGAS (2020)
Calculation of the indicator called "Carbon footprint of the wastewater treatment service", in accordance with UNI EN ISO 14064-1 (Updated Version - April 2019) for the ITALIAN WATER UTILITY ACEGAS.**

Calcolo dell'indicatore di impronta di carbonio del servizio di trattamento delle acque reflue, in accordo alla UNI EN ISO 14064-1 (Versione Aggiornata - Aprile 2019).



**SYSTEMGROUP (2019)
Support to the project for a Composting Toilet prototype.**

Supporto al progetto del prototipo Composting Toilet.



CIIP (2019) - Plants and measures for mitigation of the impact of sewer overflows in Santa Petronilla and Rio Valloscura basin (Porto San Giorgio - Marche Region) - Experimental analysis and technical-economic feasibility study.

Impianti e misure per la mitigazione dell'impatto degli scaricatori di piena nel bacino di Santa Petronilla e Rio Valloscura (Porto San Giorgio) - analisi sperimentale e studio di fattibilità tecnico-economica.



ALTO TREVIGIANO SERVIZI



ATS (2018)

Calculation of the indicator called "Carbon footprint of the wastewater treatment service", in accordance with UNI EN ISO 14064-1.

Calcolo dell'indicatore di impronta di carbonio del servizio di trattamento delle acque reflue, in accordo alla uni en iso 14064-1.



Piave Servizi
S.p.A.



Calculation of the indicator called "Carbon footprint of the wastewater treatment service", in accordance with UNI EN ISO 14064-1 (Updated Version - April 2019) for the Italian water utility Piaveservizi.

Calcolo dell'indicatore "Impronta di carbonio del servizio di trattamento delle acque reflue", in conformità alla norma UNI EN ISO 14064-1 (versione aggiornata - aprile 2019) per il gestore idrico italiano Piaveservizi.



ALTO TREVIGIANO SERVIZI



ATS (2018) - Process engineering of the definitive project of upgrading / expansion of the wastewater treatment plant of Castelfranco-Salvatronda (TV) managed by the Italian water utility ATS - Technical and scientific support.

Supporto tecnico-scientifico per l'ingegneria di processo relativa al progetto definitivo di upgrading/ampliamento dell'impianto di depurazione di Castelfranco Veneto loc. Salvatronda.



Calculation of the indicator called "Carbon footprint of the wastewater treatment service", in accordance with UNI EN ISO 14064-1 (Updated Version - April 2019) for the Italian water utility Marche Multiservizi.

Calcolo dell'indicatore "Impronta di carbonio del servizio di trattamento delle acque reflue", in conformità alla norma UNI EN ISO 14064-1 (versione aggiornata - aprile 2019) per l'azienda idrica italiana Marche Multiservizi.



HERA (2018)

Technical and economic evaluations on the application of technologies for the production of struvite in urban wastewater treatment plants managed by HERA.

Valutazioni tecniche ed economiche sull'applicazione di tecnologie per la produzione di struvite in impianti di depurazione delle acque reflue urbane gestiti da HERA.



CAP HOLDING (2017)

Preliminary assessment of the energy efficiency of the main wastewater treatment plants of the water utility CAP Group, using the current Enerwater diagnosis method.

Valutazione preliminare dell'efficientamento energetico dei principali depuratori del Gruppo CAP utilizzando l'attuale metodo di diagnosi Enerwater.



Sustainability estimates for integrated water service optimization.

Stime di sostenibilità di interventi di ottimizzazione del servizio idrico integrato.



CAP HOLDING (2016)

Scientific consultancy activities for the preliminary master plan and energy efficiency activities at the group's plants.

Attività di consulenza scientifica relative alla redazione di master plan preliminare e attività di efficientamento energetico presso gli impianti del gruppo.



Environmental calculation and analysis and circularity devices of sewer infrastructures in the water cycle.

Calcolo ed analisi critica di impronta ambientale e indicatori di circolarità delle infrastrutture fognarie nel ciclo idrico integrato.



ATS (2016) - Technical, economic and environmental compatibility for the transfer and valorisation of dried sludge from urban wastewater to a cement production plant.

Compatibilità tecnico, economica ed ambientale al conferimento e valorizzazione in cementificio di fanghi essiccati provenienti da acque reflue urbane.



Intervention program and action plan, according to the nZpLD (near-Zero polluted Liquid Discharge) approach with special reference to the industrial treatment line.

Programma di intervento e piano di azione, secondo l'approccio nZpLD (near-Zero polluted Liquid Discharge) con particolare riferimento alla linea industriale di trattamento.



Analysis of territorial scenarios and feasibility study for wastewater treatment and reuse in WWTPs Marino and Brodolini (Ascoli Piceno Province, Italy), managed by water utility CIIP SpA.

Analisi di scenari territoriali di trattamento e riutilizzo e studio di fattibilità tecnico, economica ed ambientale nell'impianto di depurazione di Brodolini di San Benedetto del Tronto e Marino (ascoli piceno) – ciip – consulenza tecnico scientifica.



Calculation of the indicator called "Carbon Footprint of the Wastewater Treatment Service", in accordance with UNI EN ISO 14064-1.

(2023) Offerta tecnico-scientifica per la redazione delle relazioni di sostenibilità dell'intervento "Manutenzione straordinaria dell'impianto di depurazione di San Benedetto del Tronto per adeguamento alle N.T.A. del piano di tutela delle acque - 2 stralcio".



Construction of a sludge drying center at the Basso Tenna plant.

Redazione della Relazione di Sostenibilità dell'Opera - Realizzazione di un polo centralizzato per l'essiccamento dei fanghi presso l'impianto di Basso Tenna.



Study on the use of no dig technologies in the water sector.

(2023) Redazione dei calcoli dell'impronta di carbonio e relative relazioni nell'ambito della partecipazione alle gare d'appalto per gli impianti di potabilizzazione di Lato e Presidiana.



Sustainability Report of the Work.

Relazione di Sostenibilità dell'Opera -bio-essiccamento.



Calculation of the indicator called "Carbon Footprint of the Wastewater Treatment Service", in accordance with UNI EN ISO 14064-1.

Calcolo dell'indicatore di impronta di carbonio del servizio di trattamento delle acque reflue, in accordo alla UNI EN ISO 14064-1.



Risk management plan for the reuse of wastewater in ACEA ATO 2 (Roma e provincia).

Redazione piano per la gestione del rischio per il riuso di acque reflue acea ato 2 (rome).



Action plan against drought and water scarcity.

AAto Pesaro Urbino - piano di azione contro siccità e scarsità idrica.

Study on the use of no dig technologies in the water sector.

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INFRASTRUCTURES

The WWEElab Research Group, coordinated by Prof. Fatone, can count on a 200 m2-large pilot/demo hall located in the municipal wastewater treatment plant of Falconara Marittima (Ancona), where advanced treatment and reuse/valorization technologies for wastewater, wastes and sludge are validated in real environment.

The Pilot and Demo hall is associated with the Research Laboratory of Water and Waste Environmental Engineering, located in UNIVPM, for analytical and experimental support in urban and industrial wastewater and liquid and solid wastes, with particular reference to organic matrices.

Recently, the group has consolidated new fields of expertise, such as life-cycle assessment, Life Cycle Costing and Cost-benefit analyses, decision support systems, digital water solutions, supported by the use of new softwares such as PYTHON, MATLAB, LABVIEW, R Studio, UMBERTO, WEST.

Research Laboratory of Water and Waste Environmental Engineering

Analytical determination of the main organic and inorganic contaminants

The research of the SIMAU Department group conducts experimental and analytical activities from different thematic areas of research in the context of wastewater and wastes, such as Chemical-physical characterization of wastewater and liquid wastes.

In this context, laboratory tests have contributed to the design and validation of various traditional and innovative biological wastewater treatment processes regarding the removal of organic matter and main macro-pollutants. For this purpose, a well-equipped laboratory is provided to carry out physical-chemical characterization of the matrices for the measurement of:

- Analytical and parametric measurement of pH, alkalinity and electrical conductivity, dissolved oxygen, ammonium or nitrate ion (dedicated ISE sensors) and temperature
- Analytical determination of anions, cations and volatile fatty acids (VFA) carried out by ion chromatography
- Analysis of nitrogen and phosphate macronutrients
- Analysis of the organic substances such as proteins, carbohydrates and organic carbon (COD, BOD)
- Analysis of solid fractions and sub-fractions (TVS / TS)



INFRASTRUCTURES

PILOT AND DEMO HALL

Experimental activity of innovative biological and / or chemical-physical processes at bench-scale

The research centre allows not only to operate and validate eco-innovative solutions in real conditions, but also to carry out research and development activities at the highest level of pre-industrial experimentation and application. The experimental hall is equipped with pilot and demonstrative-scale systems for the advanced treatment of wastewater and / or non-hazardous liquid wastes. It represents a validation center for local, national and international projects in which the research team is involved. The research topics are studied on a pilot and demonstration scale and validated in a real environment.



The pilot hall hosts demonstrative pilots for:

- Anaerobic valorization of urban wastewater and production of water for reuse
- Landfill leachate treatment
- Treatment and valorization of seawater
- Monitoring and measurement of green house gases
- Monitoring of emerging compounds and microplastics in collaboration with Ecotoxicology group of UNIVPM



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“Partendo da una ispirazione, ogni risultato raggiunto è consapevolmente frutto di un obiettivo comune e di un lavoro collettivo. La ricerca continua oltre queste pagine. Ci vediamo nel 2028”

