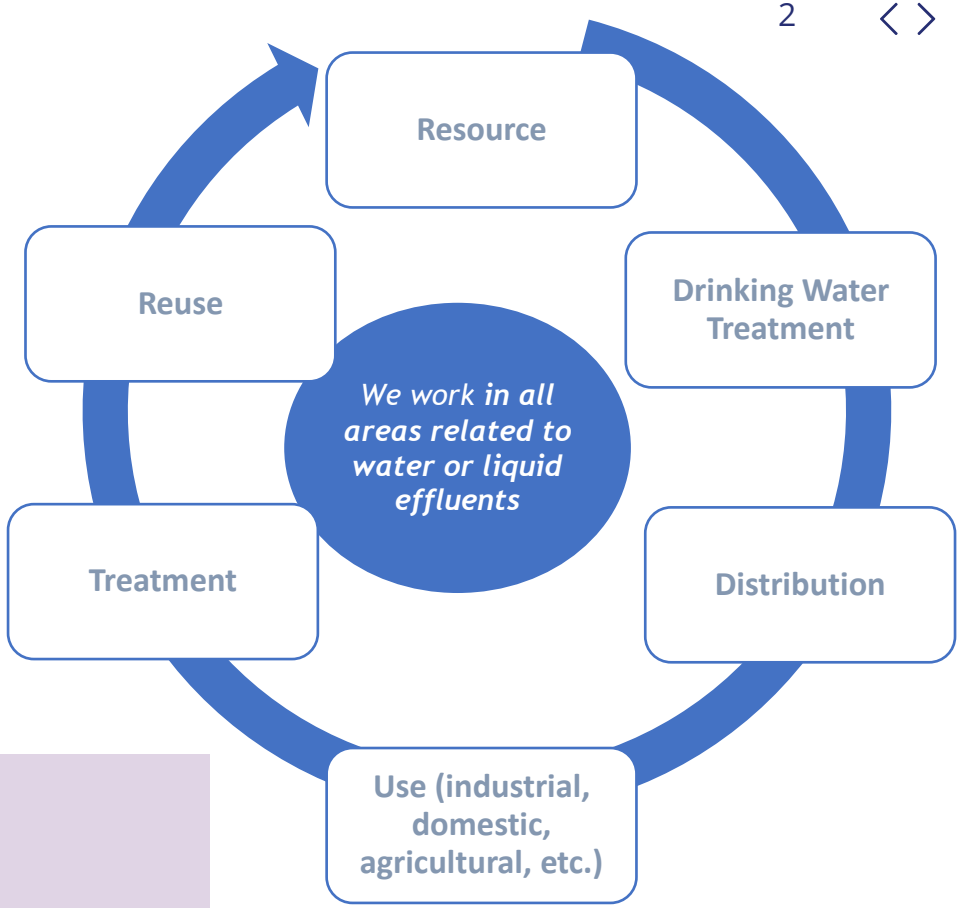

eurecat
WATER RESEARCH LINE

Water research line

We aim to develop, evaluate and optimize **treatment and monitoring** technology to improve the sustainability of the water cycle within the context of climate change



Mission of the research line:

- Generate knowledge and solutions to increase the sustainability and efficiency of the water cycle to adapt and mitigate climate change impacts
- Promote, evaluate and demonstrate cost-efficient technologies and schemes to ensure water quality and quantity for wellbeing and sustainable economic growth
- Support transition to circular economy. Develop, evaluate and optimize technology to enable circular economy, recover resources from water and liquid streams

What we do?

- Development, validation and optimization of **cost-efficient and sustainable technologies for the treatment and monitoring of water resources**
- Design, validation and optimization of **innovative processes for the implementation of circular economy schemes and recovery of resources** (water, energy and / or materials)
- Research on **technologies for production, reuse or discharge of water**: advanced separation processes, biological treatment, nature-based solutions, advanced oxidation and disinfection
- **Modeling of treatment processes and fluid dynamic systems**
- **Health and environmental risk assessment** of treated liquid water or effluent

Working axes

	Name	Description
A1	**Circular economy**	Design, evaluation and demonstration of schemes and/or technologies for resource recovery from wastewater and liquid wastes. Recovery of water, energy (e.g.H2, biogas), salts and other materials (e.g. fertilizers, bioplastics) from wastewater or liquid waste
A2	**Fit-for-purpose treatment schemes**	Design, demonstration and/or optimization of industrial and urban treatment schemes to improve quality and water yield and reduce waste. Modelization and simulation of current schemes to optimize the system and increase cost-efficiency.
A3	**Asset management**	Hydraulic and chemical modelling of networks. Control of losses and selection of sensor locations. Optimization of processes and infrastructure management. Flood and drought events.
A4	**Harsh effluents and brine**	Evaluation and demonstration of technologies for brine or harsh efluent treatment and minimization (nZLD schemes for landfill leachates, concentrated brines, etc).
A5	**Water quality monitoring and risk assesment**	Evaluation of novel monitoring sensors/equipment/methodologies for specific target compounds. Evaluation of risk to human health and environment. Protection of natural media.
A6	**Social engagement and governance**	Bringing technology close to society (dissemination, comunication, engagement, etc). Social engagement in the water policy and governance

Technological expertise

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Advanced separation processes

- Membranes (MF,UF,NF,RO,MD,FO, EDR, EDBM,…)
- Ion exchange
- Adsorption
- Absorption
- Precipitation
- Crystallization and Eutetic Freeze Crystallization
- Evaporation

Advanced Oxidation Technologies

- Ozone-based:
- UV-based (UV, UV-LED)
- Electrochemical(EC, EF, EPC, EO)
- Chemical-AOPs
- Chlorine derivatives:
- Physical processes: Ultrasound, microwaves, plasma

Bioprocesses

- Conventional treatments
- Anaerobic processes
- Granular/attached biomass: aerobic, anaerobic, annamox.
- Non-bacterial treatments
- In-situ groundwater bio/mico-remediation
- Hybridization with other technologies

Nature Based Solutions

- Wetlands
- Biofilters

Risk assessment

- Human health
- Ecosystems
- Nicrobiolgical

Modelling , simulation and optimization

- Electrolyte chemistry:
- Computational Fluid Dynamics
- Data analysis and mathematical simulation
- Distribution networks
- Bioprocceses
- Risk assessment
- GIS

Sectors of application

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We have developed projects with the most water consuming sectors of the EU

Water utilities

Pharmaceutical

Food and beverage

Chemical and petrochemical

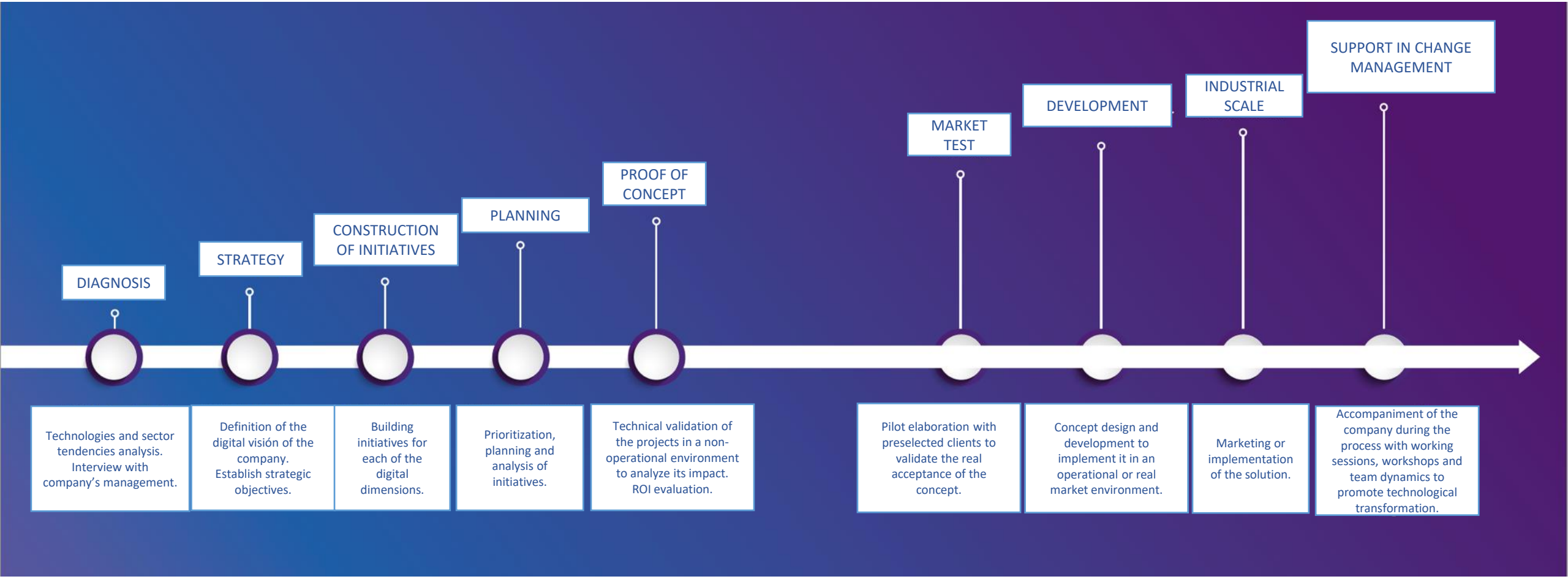
Agroindustry

Metal industry

Mining industry

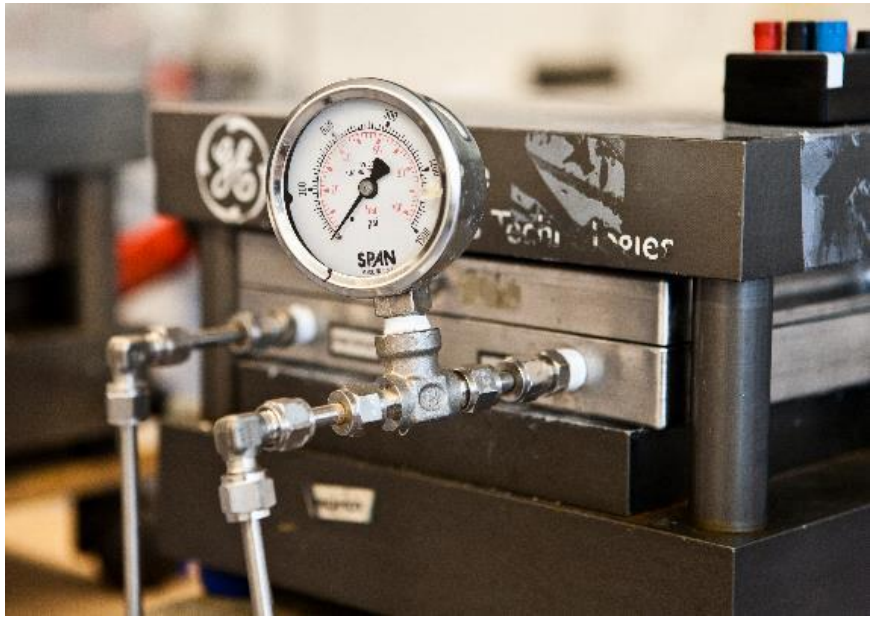
Eurecat and the WATER sector

From the idea to the management of change
WE ACCOMPANY COMPANIES IN THE INNOVATION PROCESS

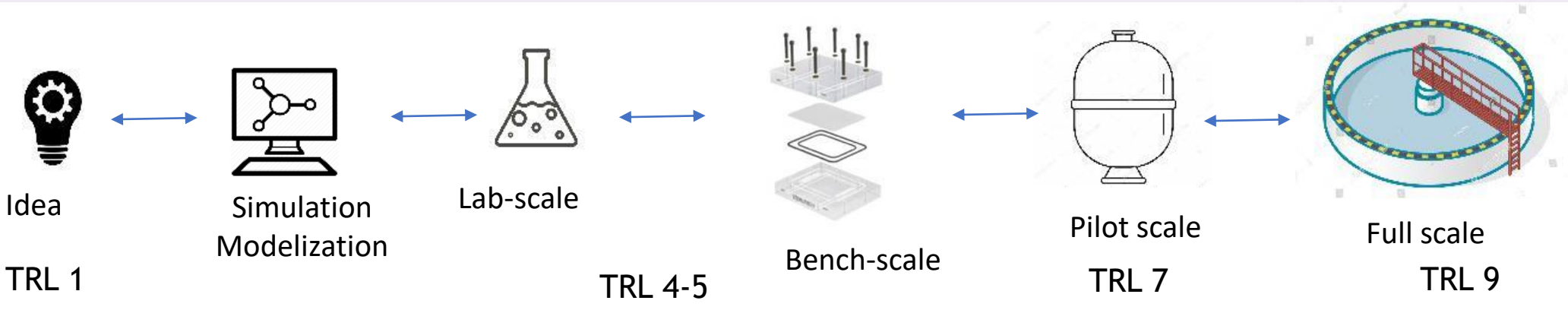


Infrastructures

- Extensive bench-scale testing facilities with most technologies used in the water cycle.
- Mobile pilot plants for in-situ testing.
- Commercial and own software for modelling and simulation.
- Large analytical capabilities.



We count on the necessary infrastructure to promote growth from the idea to full-scale



Team

We count with 17 researchers (PhD, engineers, technicians) with vast experience in R&D and the water cycle technologies

Technical strenghtness of the team

Membrane separation processes (UF, NF, RO, ED, EDM, FO, MD…)
Regeneration of end-of-life membranes for new uses
AOPs for emerging pollutants and harsh waters
Anaerobic treatments, biogas production
Media filtration
Chemical and fluid modelling
Risk assessment

Areas of expertise

Water reclamation
Challenging industrial wastewater treatment
Disinfection
Supply network
Decentralized treatments

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Relevant background experience and on-going projects

Highlighted projects

Consorci d'Aigües de Tarragona

Water quality monitoring

ASSESSMENT AND CHARACTERIZATION OF MICROPLASTICS IN DRINKING WATER

Contamination by microplastics has become a global problem so their global presence in the environment has been determined, which classifies them as new emerging pollutants. Their impact on the environment and human health is still little known.

The proposed study allows, on the one hand, to evaluate and quantify the presence of microplastics in the Ebre River and to determine the elimination performance at the water treatment plant of l'Ampolla as well as in the water distribution network.

Initial date:
Ending date:
Type of project /Budget : Private /
Website: N/A

Highlighted projects

KEIKEN

Fit-for-purpose

KMU · KOOKMIN UNIVERSITY SINCE 1946 · 국민대학교

Pure Envitech

KICT

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SIMPLE

Use of energy efficient treatment schemes for seawater desalination based on membrane distillation.

To study the water transport mechanisms, the quality of the distilled water produced, and the energy requirements of a new desalination system based on a new membrane distillation (MD) technique optimized with an innovative artificial intelligence tool.

WP1. Study on the mass transport phenomena and internal heat recovery of new membrane materials, aiming at increasing the permeability and energy efficiency

WP2. Study on the effects of influent seawater quality and module design on the performance of the new membrane, under controlled conditions

WP3. Holistic study of the long-term operations of MD process, assessing fouling effects, permeate quality and energy efficiency, under real operating conditions

WP4. Operational strategies results study for desalination process energy needs reduction

WP5. Design, evaluation and development of an artificial intelligence instrument for membrane distillation process optimization for sea water desalination with special focus on energy consumption optimization

Pressupost total del projecte: 1.5 M€

Fins a 31/12/2019

tecnio catalonia

ACCIÓ Generalitat

Highlighted projects

nextGen

Circular Economy

NEXTGEN – Towards a new generation of water systems and services for the circular economy.

The NextGen project aims to accelerate, transfer and improve circular economy practices worldwide by sharing our collective experiences and perceptions on citizen and stakeholder engagement, business models and services. Effective solutions will be marketed through market needs and targeted development of spin-off activities.

The project includes a strong partnership of water companies, industry, specialized businesses, applied research centers, technology platforms and municipal and regional authorities. For each of them, NextGen develops an excellent portfolio of research and innovation projects and promotes multiple European and global networks to achieve a real impact.**Initial date: 01/07/2018**

Initial date: 01/07/2018
Ending date: 30/11/2022
Type of project /Budget : H2020/ 11,3 M€
Website: https://nextgenwater.eu/

European Commission
Horizon 2020
European Union funding
for Research & Innovation

Highlighted projects

Drinking water monitoring and modeling

SafeCREW – Management of drinking water supply systems.

The SafeCREW project aims to support the new EU Drinking Water Directive (DWD) by generating advanced knowledge and developing tools and guidelines for drinking water supply systems. It includes improved comprehensive water quality characterization, new treatment solutions to actively respond to identified threats, and management of distribution networks to prevent deterioration of water quality (based on disinfection by-products) to consumers.

SafeCREW will increase the preparedness of the EU water sector for the challenges of climate change and support the EU's leading position in developing science-based policies for consumer protection.

Initial date: 01/11/2022
Ending date: 30/04/2026
Type of project /Budget : Horizon Europe / 3,8 M€
Website: https://safecrew.org/

Horizon Europe

Highlighted projects

water mining

Circular Economy

WATER-MINING

It is a research and innovation project that develops energy efficient technologies for the treatment of urban and industrial wastewater and seawater treatment for desalination, while promoting the extraction of valuable products from the waste generated during the process.

The project aims to recover nutrients (N and P) for application in agriculture. On the other hand, it also aims to recover salt and obtain energy from the treatment of wastewater.

Initial date: September 2020
Ending date: August 2024
Type of project /Budget : H2020 / 19 M€
Website: https://watermining.eu/

European Commission
Horizon 2020
European Union funding
for Research & Innovation

Highlighted projects

IMPETUS

Climate Change

IMPETUS – Dynamic information management for the implementation of climate resilient adaptation strategies in European regions.

The IMPETUS project aims to develop and validate a cross-sectoral framework for adaptation to climate change in order to accelerate the transition to a neutral and sustainable economy.

Some of its tasks focus on the preservation of the natural environment and the aquatic ecosystem in the face of climate change scenarios by minimizing shoreline reduction, flooding and the risk to human health, and improving resilience in the water cycle.

Initial date: 01/10/2021
Ending date: 30/09/2025
Type of project /Budget : Green Deal / 14,8 M€
Website: https://climate-impetus.eu/

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Highlighted projects

AquaSPICE

Circular Economy

AQUASPICE

The project aims to develop innovative technologies for the treatment of wastewater from petrochemical industry processes for its reuse, promoting the recovery of this resource and minimizing the discharge of waste effluents.

The project is working on the development of new technologies for the treatment of complex water, with toxic and recalcitrant compounds, with the combination of new biological processes and improved membrane systems.

Initial date: December 2020
Ending date: November 2024
Type of project /Budget : H2020 / 11 M€
Website: https://aquaspice.eu/

European Commission
Horizon 2020
European Union funding
for Research & Innovation

Highlighted projects

Circular Economy

SEA4VALUE

The project aims to develop innovative technologies for the concentration and recovery of metals and minerals of high added value from the de-salting brine.

The project is working on the development of high value metal recovery systems using selective membranes and ionic liquid extraction, as well as on the modeling of the brine treatment processes.

Initial date: June 2020
Ending date: May 2024
Type of project /Budget : H2020 / 6,9M€
Website: https://sea4value.eu/

European Commission | Horizon 2020 European Union funding for Research & Innovation

Highlighted projects

ULTIMATE

Sustainability & Desalination

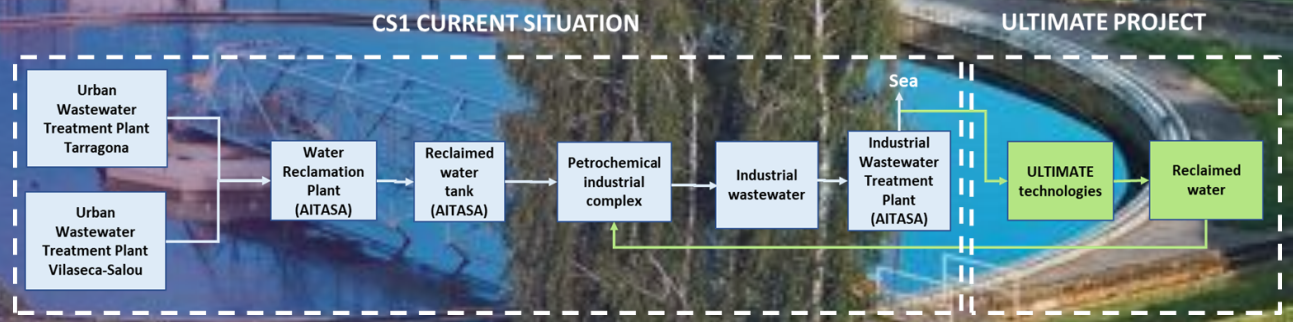
ULTIMATE

The project aims to recover resources (water, energy and materials) from industrial water.

Eurecat is working with Aguas Industriales de Tarragona (AITASA) to improve the efficiency of the regenerated water production process and increase its availability by 20% for industrial uses (cooling water) at the Tarragona petrochemical complex.

Currently, new membrane technologies are being studied to obtain reclaimed water and to minimize the volume of brine. On the other hand, the project aims to influence aspects of social governance and legislation for water reuse.

Initial date: June 2020
Ending date: May 2024
Type of project /Budget : H2020 / 13,5 M€
Website: https://ultimatewater.eu/



European Commission | Horizon 2020 European Union funding for Research & Innovation

Highlighted projects

ZERO BRINE

Sustainability & Desalination

ZEROBRINE // ZEROSILIBRINE

The project aims to recover water and materials from industrial wastewater.

New technologies for the minimization of brine volume and salt recovery: case study in the chemical industry.

Valorization of the produced salt.

http://zerobrine.eu/

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Highlighted projects

iBathwater

Bathing Water

ADASA

Barcelona Cicle de l'Aigua SA

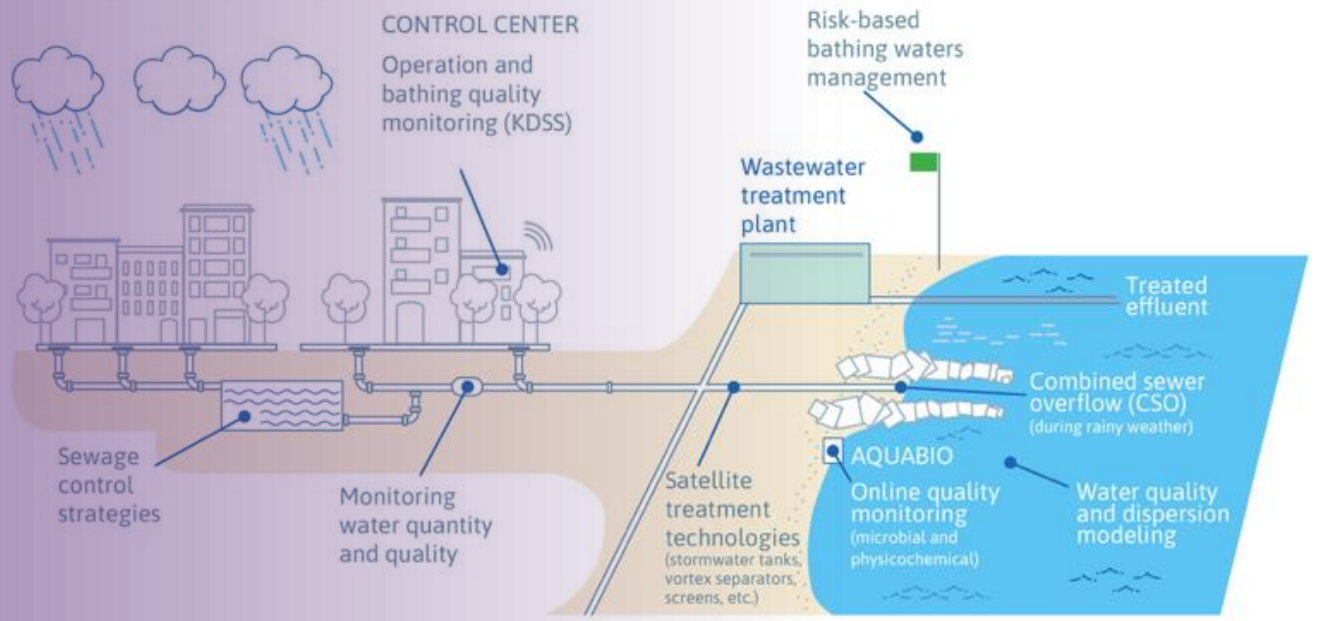
Ajuntament de Barcelona

KOMPETENZZENTRUM WasserBerlin

IBATHWATER

Full-scale demonstration project for a new integrated urban sewer network management system. Its application is expected to reduce the impact of combined sewer overflow events (CSO) on the natural environment, thus improving the quality of bathing water during and after heavy rainfall events.

Technologies:
KEYWATER MANAGEMENT STRATEGIES
TREATMENT TECHNOLOGIES
CONTINUOUS AND REAL TIME MICROBIAL DATA
MODELING OF WATER QUALITY AND POLLUTANT DISPERSION
STANDARDIZED INTEROPERABILITY PROCEDURES
DECISION SUPPORT TOOLS
RISK MANAGEMENT ASSESSMENT



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Highlighted projects

iBathwater

Bathing water (Microbiological risk determination)

ADASA

Barcelona Cicle de l'Aigua SA

Ajuntament de Barcelona

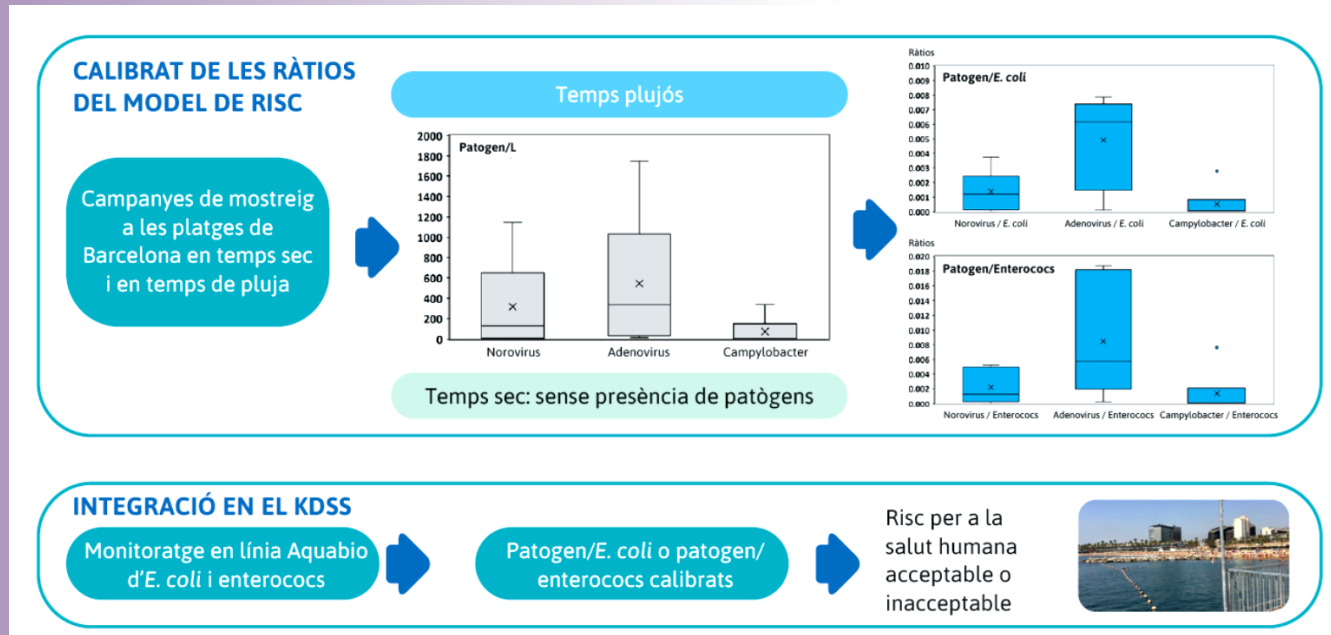
KOMPETENZZENTRUM WasserBerlin

IBATHWATER- Quantitative determination of microbiological risk

The project developed a health risk assessment model for a more optimal management of recreational water quality in Barcelona.

The model is based on the determinations of pathogenic microorganisms in Barcelona's beaches carried out during sampling campaigns and on the measurements of *E. coli* and enterococci provided by AquaBio equipment throughout the project.

To calculate the risk, reference microorganisms known to cause gastroenteritis or respiratory diseases (*Campylobacter, Cryptosporidium, norovirus and adenovirus*) were selected.



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THANKS!

"innovando con las empresas"