2022 ANNUAL REPORT

RESEARCH COLLABORATION THINKING FORWARD

CETAQUA
WATER TECHNOLOGY CENTRE

Aigües de Barcelona · UNIVERSITAT POLITÈCNICA DE CATALUNYA BARCELONATECH · CSIC

CONTENTS

01 OPENING REMARKS

CARLOS MONTERO

“Cetaqua offers concrete and sustainable solutions, covering, among others, aspects of treatment, quality assurance, social acceptance, management optimization and availability forecasting”.

GENERAL MANAGER
OF CETAQUA

Developing new solutions on a continuous basis, in an environment of research excellence such as the European programs, is a great challenge. To do it on a resource, water, vital for society and the environment, providing environmental and operational value, is the best motivation to achieve this challenge. Indeed, 2022 has been a particularly outstanding year in Cetaqua’s life.

The achievement of 21 new public funding projects, 5 coordinated by Cetaqua, reinforces the collaborative model that defines us. It boosts and expands, even more, the knowledge and innovation ecosystem from our patrons and academic partners to the operating environment, responding to the challenges derived from the climate emergency.

As the challenge of water scarcity and drought.

Cetaqua, a benchmark in water regeneration and reuse, offers concrete and sustainable solutions, covering, among others, aspects of treatment, quality assurance, social acceptance, management optimization and availability forecasting. Using solutions based on nature and industrial technologies, analytical techniques and artificial intelligence, knowledge in environmental sciences and social behaviour.

And as the challenge of decarbonization.

By applying circular economy principles to transform wastewater treatment plants into biofactories. Contributing to the replacement of fossil gas with renewable gases, multiplying the production of biomethane. We are also promoting new forms of biological generation of green hydrogen.

And we do this with a broad body of knowledge, made up of contributions from our team, the University, other technology centres, water companies, organizations, institutions and startups. Composed by operations personnel, product and market managers. By customers and users. All of them, with our research team, share the desire to make the water cycle more sustainable.

There are many challenges and needs, as well as achievements. We present some of them in the following pages, thanking Aigües de Barcelona, the UPC and the CSIC for the continued support we receive to continue adding value to a challenge we are passionate about.

CIRIL ROZMAN

"We are a benchmark in the sector, providing solutions that allow us to preserve water resources, move towards decarbonisation and clean energy generation, and drive digitisation and the use of AI".

CHAIRMAN OF THE CETAQUA
BOARD OF TRUSTEES

We are at a crucial moment for water management. Meeting the challenges posed by water scarcity and the climate emergency requires a greater boost to technological innovation and digitisation as key factors for efficiently managing this scarce yet essential resource.

Cetaqua, as a pioneering model for public-private partnerships, is a success story in applying and transferring scientific knowledge to water and the environment. We are a benchmark in the sector, providing solutions that allow us to preserve water resources, move towards decarbonisation and clean energy generation, and drive digitisation and the use of AI.

In the present context of drought, solutions involving water reclamation are essential to ensuring the availability and quality of the resource. Reclaimed water is a constant and reliable source that reduces extraction of surface and groundwater resources and which does not depend on rainfall. Adopting a circular model, water is being given a second life for the irrigation of parks and gardens, firefighting, agricultural uses, refilling aquifers, adding to flows and more, so that scarce drinking water can be used for human consumption.

In the field of green energies, Cetaqua is working on projects that will demonstrate new, profitable ways to produce biomethane, thus contributing to the European REPowerEU strategic energy plan, with the aim of advancing towards decarbonisation.

The different initiatives we are driving demonstrate our huge potential for transformation, responding to current and future challenges to make production and environmental processes more effective, efficient and sustainable.

We have also shown our commitment to building alliances between different actors (government authorities, companies, universities and technology centres), with the aim of collaborating and contributing our expertise, knowledge and human potential.

The members of the Board of Trustees (Aigües de Barcelona, CSIC and UPC) reaffirm our commitment to Cetaqua which, for over 15 years, has continually helped drive the ecological and digital transformation in the water sector through research, development and innovation.

ELOISA DEL PINO

“Cetaqua is a major asset to meet some of the major challenges facing society, such as water management and increasingly frequent droughts”.

PRESIDENT OF THE CSIC

Accelerating global change, both in the natural environment and in the social, cultural and political spheres, is highlighting the growing need for coordination between public and private agents in the field of R&D&I.

In this sense, the Spanish National Research Council (CSIC) is fully involved in generating knowledge of excellence that can offer as much data as possible of all kinds, so we can tackle the numerous challenges we all face.

Therefore, as the main public research body in Spain, the CSIC considers the Cetaqua Foundation a major asset in meeting some of the major challenges facing our society, such as water management and increasingly frequent droughts, all of which are closely linked to the already palpable consequences of climate change.

From the moment it was first created, the alliance of the three organisations that make up Cetaqua has shown how important institutional union is to developing quality research with a direct impact on the quality of water resources and, therefore, on nature itself, not to mention the lives of citizens: Cetaqua is the clearest example of how vital it is to develop intelligent mechanisms that create knowledge of excellence and ensure it reaches society as quickly as possible.

As president of the CSIC, I am proud of the fact that our organisation actively participates in an institution such as Cetaqua, which has managed to bring together the best organisations to achieve the best possible results for greater global well-being.

DR DANIEL CRESPO

“The debate on how to manage this strategic and scarce resource is becoming ever stronger, and newly emerging scenarios call for knowledge-intensive solutions”.

RECTOR OF THE UPC

Efficient water management has become essential at a time when the effects of climate change are already perceptible in our daily lives. As I write these lines, our country is experiencing one of the most serious periods of drought in recent decades. In this context, the debate on how to manage this strategic and scarce resource is becoming ever stronger, and newly emerging scenarios call for knowledge-intensive solutions.

Given this situation, Cetaqua provides a stronghold and assurance for the resilience of our society and offers a firm commitment to the future. Thanks to intensive application of knowledge, we can manage this future, based on the logic of the circular economy and assuring its availability as our fundamental pillars. Thanks to collaborative research, in partnership with key industry players, and the drive for innovation, we are getting ever closer to offering optimal solutions to face the future with confidence.

Cetaqua carried out numerous activities during 2022, all of which are included in this report. The creation of biofactories to obtain high value-added bioproducts from wastewater treatment plant sludge and urban biowaste is a clear example of a technological application for the circular economy.

But in terms of quantities of the resource, I would also like to highlight research into the availability of what we term reclaimed water and its importance to proper aquifer management and preservation. Just as important as ensuring availability at source, Cetaqua’s activity has an impact on optimising network management. The line of work in modelling, network prediction and energy optimisation is a major engineering challenge. And in this field, artificial intelligence applications that analyse resource availability, water demand and distribution in water stress contexts have already become a reality.

Water treatment and distribution infrastructures are also “critical infrastructures” to which research resources must be allocated. As such, they have advanced automation systems with a high level of digitisation: robotics, artificial intelligence, big data analysis and micro- and nano-sensing, areas in which UPC has well-grounded experience.

These and many other advanced technologies, explained in the pages of this report, highlight the technological commitment and cutting-edge research in global and holistic management of a scarce and precious resource such as water, of which we at the UPC are proud to be a part.

02 CETAQUA PARTNERSHIP MODEL

PARTNERSHIP, OUR MODEL FÓR GENERATING VALUE

WE ARE CETAQUA

Public-private partnership model

The result of a unique, pioneering public-private partnership model for research and innovation.

The alliance with the public and private sectors began in 2007 with our sponsors Aigües de Barcelona, the Universitat Politècnica de Catalunya-BarcelonaTech (UPC) and the CSIC, with the aim of ensuring sustainability and efficiency in the water cycle, while taking into account local needs.

The success of this model has led to us replicating it in other Cetaqua centres in Galicia, Andalusia and Chile. Independent institutions that share the same strategy and structure and work in partnership with one another.

Recognition as a Technology Innovation Support Centre (CAIT)

UNE 16602 Certification R&D&I management systems

VISION

An international benchmark in the application of scientific knowledge to water and the environment.

MISION

We provide technologies and solutions that reach the market with value-added results, to achieve a sustainable, safe and accessible water cycle.

VALUES

Customer focus, contributing value, proactivity, teamwork, business vision, professionalism, resilience, efficiency.

THE BOARD OF TRUSTEES

Our main governing body

Its members are the people who created the Foundation and it has the function of:

- Defining strategy, plans and annual budgets.
- Approving the lines of research and key activities.
- Overseeing economic management.

The public-private company Aigües de Barcelona, Empresa Metropolitana de Gestión del Ciclo Integral del Agua. It manages services related to the complete water cycle and supplies more than 3 million people in Barcelona and its metropolitan area. With more than 150 years of experience in water resource management, it is a key part of development and progress in the city and its surroundings.

Universitat Politècnica de Catalunya-BarcelonaTech (UPC) is a public higher education and research institution, specialising in the fields of engineering, architecture and science. The highly creative context and the UPC's commitment to the environment, research, teaching and knowledge transfer is the basis for the university's essential role in the transformation of society.

The CSIC is the largest public research institution in Spain and a leading one in the European Research Area. It falls under the authority of the Secretariat General for Research in the Ministry of Science and Innovation and aims to develop and promote research for scientific and technological progress. To this end, it is open to collaboration with Spanish and foreign institutions.

CHAIR
CIRIL ROZMAN
AGBAR

VICE-CHAIR
DANIEL CRESPO
UPC

MEMBER
ELOISA DEL PINO
CSIC

MEMBER
MANUEL CERMERÓN
AGBAR

SECRETARY
FERNANDO TALLARICO
AGBAR

We welcome Eloisa del Pino, president of the CSIC, as a member of the board of Cetaqua Barcelona since June 2022. We thank Rosina López-Alonso Fandiño for her work and collaboration over the last few years.

THE SCIENTI-FIC-TECHNI-CAL COUNCIL

Our research strategy consultant

The Board of Trustees is in charge of appointing the Scientific-Technical Council (CCT), which is renewed periodically and is responsible for:

___ Providing guidance with regard to research policies and propose new lines of research and technological development.

___ Providing technical advice with regard to the research programmes to be carried out and guidance with regard to funding possibilities.

___ Assessing proposed business needs.

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MEMBER
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AGBAR

03 OUR RESEARCH

R&D&I SOLUTIONS

R&D&I SOLUTIONS

We work to ensure sustainability and efficiency in the water cycle

We identify and define challenges whose solutions can generate value for society, the environment, the water sector and the different productive sectors, and we turn them into lines of research.

Through digitisation and circularity, we develop sustainable and digital solutions to meet the challenges posed by climate change.

Our goal is to achieve European recovery and a sustainable future in all areas: technical, economic, social and environmental.

Work areas

- BIOFACTORY AND RESOURCE RECOVERY
- CRITICAL INFRASTRUCTURE MANAGEMENT AND RESILIENCE
- ENVIRONMENTAL, ECONOMIC AND SOCIAL SUSTAINABILITY
- WATER 4.0
- WATER RESOURCE MANAGEMENT

BIOFACTORY AND RESOURCE RECOVERY

Solutions to transform treatment plants into biofactories: efficient facilities for water, energy and materials

Challenges

We are working toward a paradigm shift, applying the concept of the circular economy to water treatment, developing processes and technologies that transform treatment plants into biofactories.

The objective is to maximise the value of resources by promoting an energy-neutral model that contributes to zero waste and includes the elimination of emerging pollutants and microplastics, among others.

In doing so, we promote the recovery and reuse of resources during processes such as reclaimed water production and the treatment of urban and industrial wastewater and other waste flows.

Priority lines of research

_____ Effective and efficient treatments for urban and industrial wastewater and the production of drinking and reclaimed water.

_____Treatments for emerging pollutants and microplastics.

_____ Recovery of energy resources and materials from urban and industrial waste flows.

"We work towards the circular and digital transformation of treatment plants to maximise the value of resources and achieve carbon neutrality".

CELIA CASTRO, HEAD OF BIOFACTORY AND RESOURCE RECOVERY

SEMPRE-BIO

Demonstration of new, novel and cost-effective biomethane production solutions and pathways

SEMPRE-BIO is a European project funded by the Horizon Europe programme, arising out of the need for European Union independence from Russian natural gas imports (REPowerEU).

The aim is to diversify biomethane production technologies and reduce production costs. The consortium, consisting of 16 European partners from 6 different countries, will research and implement technologies for the production of green H2, biological methanation of biogas and syngas, cryogenics and the recovery and conversion of biogenic CO_2.

The biomethane produced will be used in three different ways: for public transport (bio-CNG), for injection into the natural gas grid and for heavy transport (bio-LNG).

A business plan for the operation and replication of the processes will also be drawn up, with an estimated decarbonisation potential of over 200 million tonnes of CO_2 equivalent per year.

"Cetaqua heads SEMPRE-BIO, a leading European Commission R&D&I project in the framework of REPowerEU focusing exclusively on European production of affordable biomethane to achieve energy independence".

ORIOL CASAL VALLS, SEMPRE-BIO PROJECT MANAGER

Project
SEMPRE-BIO: SEcuring doMestic PRoduction of cost-Effective BIOmethane

Duration
November 2022 – April 2026

Coordinator
Cetaqua Barcelona

Partners
Aigües de Barcelona, CRYO INOX S.L., DBFZ Deutsches Biomasseforschungszentrum Gemeinnützige GMBH, Danmarks Tekniske Universitet, Inveniam Group, Propuls, Sintef, Terrawat, TMB, Universiteit GENT, Universitat de Vic, BIOGAS-E, Innolab, Naturgy, NV De Zwanebloem

More information

CRITICAL INFRASTRUCTURE MANAGEMENT AND RESILIENCE

Solutions for urban water cycle infrastructure management and optimisation in the face of natural or intentional events

Challenges

Natural events (caused by climate change or infrastructure deterioration) and intentional events can affect urban water cycle infrastructures.

We develop resilient systems and solutions focused on crisis event management in order to minimise risks and optimise asset management. We work on methodologies that predict, detect and manage critical situations, as well as investment planning systems, aimed at reducing future impacts and protecting both people and the environment.

Priority lines of research

— Advanced control of water quality and its impact on consumers and the environment.

— Process monitoring, automation and control.

— Smart and resilient operations and asset management.

"We are working to promote automated, optimised and efficient infrastructure management to minimise risks and anticipate possible crises".

SUSANA GONZÁLEZ, HEAD OF CRITICAL INFRASTRUCTURE AND RESILIENCE MANAGEMENT

Development and implementation of a protocol for effective investigation of environmental violations

Environmental violations, such as discharging substances into the air, water and soil, as well as trafficking in hazardous waste and materials, have an enormous impact on the climate, human health and the environment.

The EMERITUS project started in 2022 with the aim of laying the foundations for a new generation of technological tools, orchestrated through a platform at the service of law enforcement authorities and border guards, to improve detection and evidence-gathering capabilities for waste-related environmental crime.

Specifically, Cetaqua will develop solutions for the detection of discharges into bodies of water.

The development will provide a system based on commercial sensors and image analysis to allow early detection of discharges and estimate both their origin and the time they will take to reach a possible protected area.

The case study will be conducted in the final stretch of the Guadalhorce River in Málaga, working together with the local police.

"EMERITUS aims to create a single point-of-entry platform for law enforcement and border guards to enhance investigative evidence collection capabilities for environmental waste crimes".

MIQUEL SÀRRIAS, EMERITUS PROJECT MANAGER

Project
EMERITUS - Environmental crimes' intelligence and investigation protocol based on multiple data resources

Partners
June 2022 – December 2025

Socios
GMV Aerospace and Defence SA, GMV Innovating Solutions S.R.L., Geoville Informationssysteme und Datenverarbeitung GmbH, Aerorum Espana S.L., INESC TEC - Instituto de Engenhariade Sistemas e Computadores, Tecnologia e Ciencia, Politecnico Di Torino, Cetaqua, Fondazione Safe, Crime and Tech SRL, Air and Space Evidence Ltd, Zabala Brussels, Zabala Innovation Consulting, S.A., CIFAL Málaga Association, Kentro Meleton Asfaleias, Comune Di Torino, Ministero della Difesa, Hellenic Police, Inspectoratul General al PoliÐiei, Inspectoratul General Al Politei de Frontiera, Garda Nationala de Mediu, Málaga City Council, Inspectorate of Environmental Protection

More information emeritus

ENVIRONMENTAL, ECONOMIC AND SOCIAL SUSTAINABILITY

Solutions that ensure sustainable development and citizens' well-being

Challenges

The context of the climate emergency forces us to focus on the circular economy, a requirement for reducing pressure on resources, lengthening the life cycle and contributing to waste recovery and recycling.

To this end, we develop methodologies, tools, strategies, plans and management models that, when applied to regions and companies, ensure sustainable development: environmentally aware, economically viable and focused on benefits to society.

Priority lines of research

____ Design and implementation of circular economy models in companies and regions.

____ Management of environmental and socioeconomic impacts and risks.

____ Demand management and water economics.

____ Assessment of benefits associated with biodiversity and the natural environment.

"Achieving a green, fair and sustainable transition requires considering, listening to and understanding society and designing technological solutions according to its needs".

YAGO LORENZO, HEAD OF ENVIRONMENTAL, ECONOMIC AND SOCIAL SUSTAINABILITY

NATCAP AGBAR

Application of the natural capital protocol for the Agbar Group

This project aims to assess the natural capital of Agbar Group's key nature-based facilities. The assessment will provide a basis for replication at other Group facilities.

Natural capital assessment is the process of measuring and assessing an organisation's relevant (material) impacts and dependencies. The approach goes beyond traditional reporting, by applying a mix of sustainability techniques, socio-economic assessment and ecosystem service accounting to quantify the most relevant impacts for the organisation.

The approach broadens the organisation's vision and highlights the Group's contributions to the environment and society, as well as the risks associated with its core services.

For example, it demonstrates the value of the organisation's efforts to promote nature-based measures rather than grey infrastructure, through new metrics different from the classic water hydraulic and economic-financial ones.

"The natural capital protocol allows organisations to visualise their actual interaction with the environment in the form of indicators, considering aspects that are increasingly relevant to society".

MARÍA GUERRERO, NATCAP
CETAQUA PROJECT MANAGER

Project
NatCap Agbar - Implementation of the natural capital protocol for the Agbar Group

Duration
May 2022 – December 2022

Partners
Agbar

Artificial intelligence for the water cycle and sustainability

Challenges

Artificial intelligence and next-generation digital technologies are completely transforming the management of natural resources.

Acquiring, processing and correctly analysing large volumes of data help find new answers to major challenges in the water cycle and improve the efficiency and sustainability of production and environmental processes.

We use artificial intelligence and state-of-the-art software architectures to develop digital services that improve decision making in multiple operating environments: from monitoring and predicting events affecting water quality, to optimising network efficiency and asset life cycle.

Priority lines of research

___ Machine learning for characterising and predicting events related to water quality and network operation.

___ Deep learning and computer vision applications for the complete water cycle and environmental management.

___ Satellite image processing and generation of advanced environmental indicators.

"We use data, algorithms and our immense, accumulated multidisciplinary expertise to develop forward-looking solutions for present-day needs: artificial intelligence for water, from water".

RAFAEL GIMÉNEZ, HEAD OF WATER 4.0

Water data management ecosystem

The European WATERVERSE project started in 2022 with the main aim of designing and implementing a data space for the water sector. A technological infrastructure that facilitates sharing quality data among the different stakeholders in the water cycle. This will improve data usability and the interoperability of intensive processes, thus reducing the barrier to entry into the data spaces.

The water operator Hidralia is also part of the consortium and will host the Spanish case study.

WATERVERSE thus takes a holistic approach to water, combining the competencies of 17 partners from 10 European countries, including research organisations, water utilities, technology providers and innovation companies.

WATERVERSE will be demonstrated in six countries (Cyprus, Spain, Germany, the Netherlands, Finland and the United Kingdom), establishing clear and measurable indicators to assess data equity in water-related spaces and ensuring the viability and sustainability of the ecosystem, as well as its replicability, scalability and business applicability.

Cetaqua will play a prominent role in the consortium as the coordinator of one of the work packages, focusing on the design of the platform.

"Cooperation between countries makes it possible to collect, share and analyse accurate and up-to-date data on the state of water, thus facilitating informed decision-making and the implementation of appropriate public policies for its management".

SERGI BAENA, WATERVERSE PROJECT MANAGER

Project
WATERVERSE

Duration
May 2022 – September 2025

Coordinator
CERTH

Partners
Engineering, Eurecat, KWR, VTT, University of Exeter, EGM, Phoebe, FIWARE, PWN, SWW, Hidralia, Keypro, WBL, HST, WE, Cetaqua

More information

WATER RESOURCE MANAGEMENT

Advanced solutions for integrated water resource management

Challenges

We use artificial intelligence to estimate available water resources (conventional and alternative), water demand (agricultural, urban and industrial) and the impacts (environmental, economic and social) of different water allocation scenarios in situations of high water stress. We have incorporated new data science technologies (artificial intelligence) and automatic processing of satellite images (remote sensing).

In addition, we are committed to managed aquifer refill as a high-value measure to improve the quantitative and chemical status of groundwater bodies.

Priority lines of research

___ Climate services and joint use of water resources.

___ Advanced techniques for characterising groundwater bodies.

___ Managed aquifer refill as a nature-based solution.

___ Promoting water reclamation and simulating the cost of non-reuse.

___ Application of data analytics at the basin scale (predicting hydrometeorological processes).

___ Living labs for smart basins: raising awareness of safe water reuse in water-stressed areas.

"Integrated water resource management must be a fundamental part of the digital transformation. Here, not only artificial intelligence-based algorithms, but also the implementation of governance models play a crucial role, enabling effective involvement of end users in decision-making".

MANUEL ARGAMASILLA, HEAD OF WATER RESOURCES MANAGEMENT

Water management solutions for sustainable agriculture through a collaborative online platform

The PRIMA MAGO project provides innovative solutions in the field of agricultural water management (irrigation, reuse and adaptation to climate change) in the Mediterranean region, with a special focus on the challenge posed by climate change.

MAGO aims to establish a connection between research results, real market needs and end users in the field of food safety and water management in the Mediterranean. For this reason, in 2022 we worked on developing different digital applications (APIs and web apps, among others) through a WEMED collaborative platform with web applications for agriculture in the Mediterranean region.

Thanks to this initiative, over 10 applications have been developed in real environments, specifically in four case studies: Tunisia, Spain, France and Lebanon.

In the Spanish case study, three tools for reclaimed water management, one solution for water quality management in irrigation ponds and one solution for agricultural land assessment were implemented.

In addition, MAGO will modernise services to users, by incorporating the latest data and technology (satellite data, use of open-data, etc.).

"In the MAGO project we combine participatory processes, new technologies and web developments to provide innovative tools for water managers".

LAURENT POUGET, MAGO PROJECT MANAGER

Project
PRIMA MAGO

Duration
February 2021 – April 2024

Coordinator
Cetaqua Barcelona

Partners
AB, CSIC-IDAEA, AMB, INRAE, LISODE, UTH, AUB, MMA, INRGREF, EZZARYA

More information

INNOVATION IN AIGÜES DE BARCELONA

Consolidating the metropolitan area of Barcelona as a top-level knowledge centre

Aigües de Barcelona | INNovació

We are the vehicle that allows Aigües de Barcelona to provide a large part of the research and innovation required to guide complete water cycle processes towards the circular economy, as well as to meet the needs of water users with an eye to the future.

We develop solutions that are directly applied to Aigües de Barcelona infrastructures. In addition, thanks to European project case studies we carry out at its facilities and the organisation of events involving partners and other European bodies, we have helped position the Barcelona Metropolitan Area (AMB) as a European knowledge hub in the field of water.

Some examples of projects in direct collaboration with Aigües de Barcelona:

Biofactory and resource recovery – LIFE Nimbus: Circular economy to promote sustainable transport

Critical infrastructure management and resilience — RE-AL: Strategy for real-time algae monitoring and removal

Environmental, economic and social sustainability — VulnerABility: Social innovation for swift, early detection of vulnerable individuals and groups

Water 4.0 — AB Twins: Digital twins for water network operation

Water resource management — QUEEN: Study on the effects of direct refill in the vicinity of well P18

BIOFACTORY AND RESOURCE RECOVERY

Circular economy to promote sustainable transport

LIFE Nimbus is a European project, co-funded by the LIFE programme, which aims to promote the circular economy by generating biomethane from sewage sludge and power-to-gas technologies, using it as a sustainable fuel for urban public transport.

Thanks to the LIFE Nimbus project, the biological methanation of 4 Nm^3/h of biogas to biomethane will be achieved for a TMB bus to travel 48,000 km/year with renewable fuel.

This will result in a reduction of over 85% of the carbon footprint associated with the bus thanks to the use of biomethane. In addition, the energy obtained from the biogas is up to 70% higher when using biological methanation.

Project
LIFE Nimbus. Non-IMpact BUS:
Circular economy for sustainable transport

Duration
September 2020 – November 2023

Coordinator
Cetaqua Barcelona

Partners
Aigües de Barcelona, Transports Metropolitans de Barcelona (TMB), Universitat Autònoma de Barcelona (UAB)

More information NIMBUS

CRITICAL INFRASTRUCTURE MANAGEMENT AND RESILIENCE

Strategy for real-time algae monitoring and removal

The effects of climate change, such as rising temperatures of water bodies and drought, have led to an increase in the presence of algae in drinking water treatment plant (DWTP) catchment. This poses a risk to DWTP operation, since algae proliferate rapidly, causing problems of odour and colouring, among others.

In the case of the Sant Joan Despí (SJD) DWTP, a rise in algae concentration in the Llobregat river has been observed in recent years. This has an impact on the process, mainly in the operation of sand filters.

The recommended process for eliminating algae in DWTPs is physicochemical treatment using precipitating agents.

As part of the RE-AL project, we are working to develop an analytical model using data from the SJD DWTP that provides operating personnel with guidelines for regulating coagulant dosage, to ensure algae are eliminated and the turbidity target is obtained, optimising the consumption of chemicals (oxidants and PAX-18) at all times.

Project
RE-AL: Real-time control for algae elimination

Duration
May 2022 – October 2023

Coordinator
Cetaqua Barcelona

ENVIRONMENTAL, ECONOMIC AND SOCIAL SUSTAINABILITY

Social innovation for swift, early detection of vulnerable individuals and groups

The VulnerABility project aims to use digitisation and innovation to facilitate the rapid detection of people and groups at risk of water poverty based on a population vulnerability study.

A social innovation project that contributes to progress towards a fairer and more equal society, through the geolocation of possible situations of vulnerability among customers, based on a population segmentation methodology covering the 23 municipalities in which Aigües de Barcelona operates. During the project, Cetaqua was responsible for developing a tool to reinforce information on subsidies and support schemes for groups at risk of water poverty and to focus Aigües de Barcelona's social action projects on areas where the most vulnerable situations are found.

The study results provide a value-added element to decision-making on social action strategies, as they help detect clients at risk of vulnerability in advance and provide a wealth of new information that broadens the scope of social programmes.

In addition, in 2022, VulnerABility received the SERES award in the category of Corporate Innovation and Social Commitment.

Project
VulnerABility: Social innovation for swift, early detection of vulnerable individuals and groups

Duration
April 2021 – January 2022

Coordinator
Cetaqua Barcelona

WATER RESOURCE MANAGEMENT

Study on the effects of direct refill in the vicinity of well P18

Direct aquifer refill has proven to be an effective tool for increasing groundwater storage and improving water security in areas prone to water scarcity.

Based on this premise, the QUEEN project seeks to optimise the operation of the dual refill wells Aigües de Barcelona is currently managing as part of the drinking water supply strategy.

Currently, well P18 is refilling the Baix Llobregat aquifer with pre-treated water from the Llobregat River. This project studies both the impact of refill on the quality of refilled water and the aquifer, and the optimisation of operating parameters to reduce phenomena such as clogging in wells.

QUEEN will have a positive impact, as it will improve the use of water resources and optimise the Baix Llobregat aquifer exploitation model.

It will also develop operational guidelines and an efficient managed aquifer refill (MAR) operating system, in terms of both operations and maintenance, which can be used to configure existing refill wells and, if necessary, expand the refill system with new wells.

Project
QUEEN: Study of the effects of direct refilling with sand-filtered water in the area of well P18

Duration
December 2021 – June 2023

Coordinator
Cetaqua Barcelona

WATER 4.0

Digital twins for water network operation

The AB Twins project consists of creating a digital twin for a number of Aigües de Barcelona pumping stations, with an integrated model to display real-time information on the operating status of the pumps in the water distribution network.

Based on operational data from Aigües de Barcelona, a set of metrics, such as pump efficiency and criticality, have been defined to quantify the state of pump operation. In doing so, a number of markers have also been defined to trigger operation alarms should the critical value of any of the pumps exceed the markers set by the platform users.

The data displayed in the digital twin are updated daily from a nightly batch process that reads pump operational data which, using the algorithm that calculates efficiency and criticality, are displayed on the front-end by means of an API hosted in the cloud, which connects the database where the metrics are stored with the web platform used at Aigües de Barcelona.

Currently, all back-end processes have been transferred and operations managers use the digital twin to regularly check the status of the pumps. This means that Aigües de Barcelona can anticipate possible incidents and establish where an intervention should be carried out, thereby reducing corrective maintenance costs and extending the service life of water pumps and equipment, while strengthening continuity in the supply service.

AB Twins will continue through the Lab Digital Twins project, which will look to add new assets to the platform and make improvements to the existing algorithms.

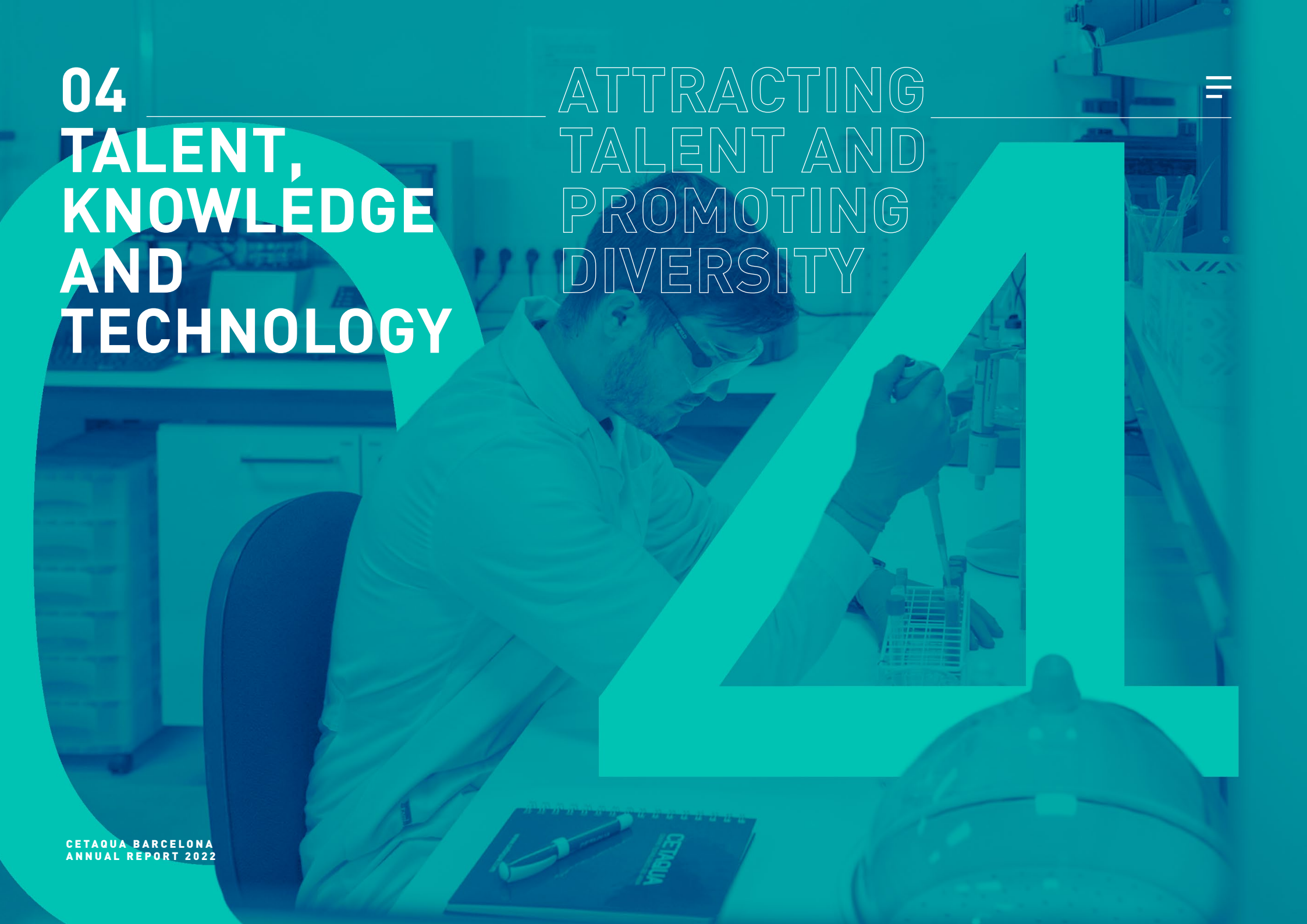
Project
AB Twins: Digital twins for water network operation

Duration
November 2020 – March 2022

Coordinator
Cetaqua Barcelona

04 TALENT, KNOWLEDGE AND TECHNOLOGY

ATTRACTING TALENT AND PROMOTING DIVERSITY



ATTRACTING TALENT

People, the heart of our value proposition

R&D&I needs robust, relevant and value-added results, but none of this is possible without people. This is why we place people at the centre in our value proposition. We build relationships that enable centres, teams and professionals to share common visions and objectives. All this by promoting inclusive environments based on respect, diversity and equal opportunities as fundamental pillars for the development of society.

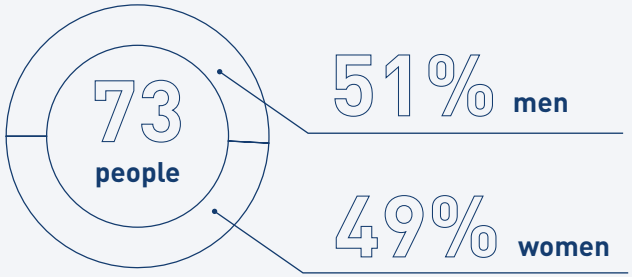
We are committed to quality education

We are committed to talent and specialised training. We aim to provide opportunities for those who are studying for their doctorate or have already obtained it, and we encourage collaboration with local universities through the figure of the technical scientific advisor (ACT). We believe that knowledge transfer is the key to generating impact and solving the most complex challenges.

We strengthen innovation through talent and collaboration

As a benchmark technology centre in Europe, innovation is in our blood. We have a highly qualified scientific ecosystem with first-hand knowledge of society's R&D&I needs, capable of generating innovative solutions.

Through a collaborative ideation space, based on Agile methodologies, we enable talent to go the extra mile by driving the team's ideas and promoting their materialisation in ready-to-implement projects.

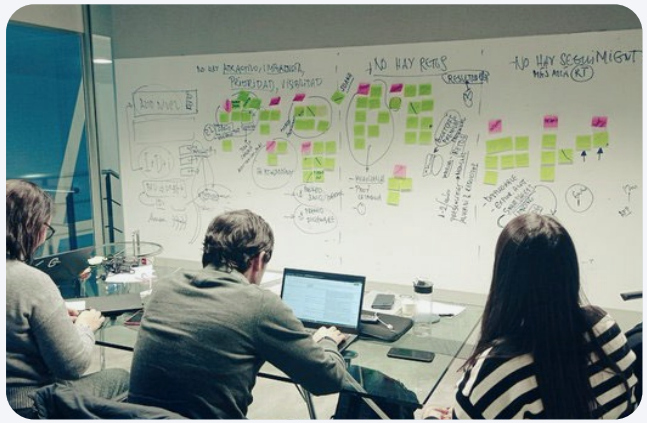


18
PhDs

1
doctoral students

3
scientific and technical advisors

- Universitat de Barcelona — Dr Montserrat Termes
- Universitat Politècnica de Catalunya BarcelonaTech — Dr José Luis Cortina
- CSIC — Dr Gabriela Cembrano



OUR SOLUTIONS

We encourage research results to be put into practice and contribute to the ecological transition

Solutions for productive sectors

Improving water quality and generating efficiency in production process-associated treatments.

___ Technical support to find solutions for discharge control, water reuse and improving processes and treatments.

___ Product or process environmental impact studies, management plans for their reduction: water footprint, carbon footprint, life cycle analysis (LCA), eco-efficiency studies, environmental product declarations (EPD).

Solutions for water operators

Accompanying wastewater treatment plants in the process of becoming biofactories. In doing this, we promote the circular economy in water cycle management, encouraging reuse, energy self-sufficiency and waste recovery.

___ Technical support to find solutions for zero discharge, water reclamation and improving process efficiency in sludge treatment and biogas production.

___ Water and carbon footprint calculation and management (defining corporate strategy and establishing reduction plans).

___ Definition of operator climate neutrality plans and support in their implementation.

___ Social innovation applied to the water sector.

Solutions for government authorities

Offering circularity diagnostics and action plans to clear the path towards ecological transition.

___ Territorial analysis of circular economy opportunities (water, waste and energy).

___ Strategic decarbonisation plans and the design of strategies for aligning with and achieving the Sustainable Development Goals.

___ Environmental, economic and social impact assessment.

___ Calculation of municipal/regional water and carbon footprints.

___ Prioritising climate change adaptation measures to increase effectiveness in public investment.

"To do this, we follow a process that includes an experimental stage, real environment demonstration and inclusion among operators, digital products or service portfolio, after verifying feasibility and the results".

MARINA ARNALDOS, DIRECTOR OF GROWTH AND SOLUTIONS

EXPERIMENTAL PLATFORMS

Spaces where innovation and technology come to life to turn projects into transformative realities

Treatability laboratory

Agbar

Through which we offer solutions for improving water quality and efficiency in industrial water treatment.

Pilot plants

Digitised pilot plant at the Murcia East WWTP, managed by EMUASA, as part of the LIFE Enrich project.

View 360º plant

REGREEN pilot plant, a project in conjunction with Aigües de Barcelona and municipalities in the metropolitan area of Barcelona.

05 WE BRING KNOWLEDGE CLOSER TO SOCIETY THROUGH RESULTS TRANSFER

RESULTS TRANSFER

We bring knowledge closer to society

Generated knowledge must have a real impact and add value. Therefore, we share the results of our research through the most effective and appropriate channels for each type of message.

Organisation

We organise events and scientific webinars to share the progress and results of the projects we coordinate or participate in. In these projects, we bring together professionals and stakeholders from different sectors, including academia, public institutions and companies, with the aim of creating an ecosystem that accelerates knowledge transfer, generates debate and fosters partnerships.

Participation

In addition, we actively participate in congresses, conferences and seminars to share the progress in our research with our counterparts in the water and environment sector, as well as with audiences interested in our areas of work.

Publishing

We also publish our results in prestigious peer-reviewed journals and specialised journals.

In doing so, we position ourselves as a leader in the field of science and technology among the international scientific community and demonstrate our experience in our main lines of research.

08 scientific publications

06 technical publications

12 webinars organised

1.020 attendees

31 active participations in congresses

PARTICIPATION

In national and international congresses, conferences and workshops with papers, presentations and posters

12th Micropol & Ecohazard Conference. Santiago de Compostela 6–10 June 2022

Together with other Spanish research centres invited to Micropol, our technical manager, Carlos Echevarría, presented the hybrid and pressure-driven sorption technique in membrane technologies for the advanced removal of micropollutants, along with its technical-economic analysis.

"It is at these events that R&D&I, industry and administration have to align. I think it is a very interesting international forum in which to share visions of the problems of emerging contaminants and to understand and learn how other countries with similar or different challenges are solving them".

CARLOS ECHEVARRÍA, AREA MANAGER AT CETAQUA

IWA World Water Congress & Exhibition 2022. Copenhagen. 14 September.

Among these participations, we highlight three contributions at the congress organised by the International Water Association (IWA), where sustainable water management was addressed and new smart ways of achieving liveable cities were explored, with digitisation as the main theme.

___ "Microbiological dynamics and risk assessment of drinking water and reclaimed water processes" Susana González

___ "Evolution of alternative fertilizers: from resource recovery in WWTPs to biorefineries (WRRFs) producing smart biofertilizers" Álvaro Mayor

___ "A study on buyers' ambiental technology demands" Albert Serra

In addition, Gavà Circular, the public-private partnership project between Aigües de Barcelona, Gavà City Council and Cetaqua, was given the gold award in the Governance, Institutions and Social Enterprise category of the IWA Project Innovation Awards.

"We trust it will provide a benchmark for more institutions to collaborate in implementing circularity solutions and thus generate much more sustainable economic cycles".

CARLOS MONTERO, GENERAL MANAGER OF CETAQUA

PROMOTING SCIENTIFIC CAREERS

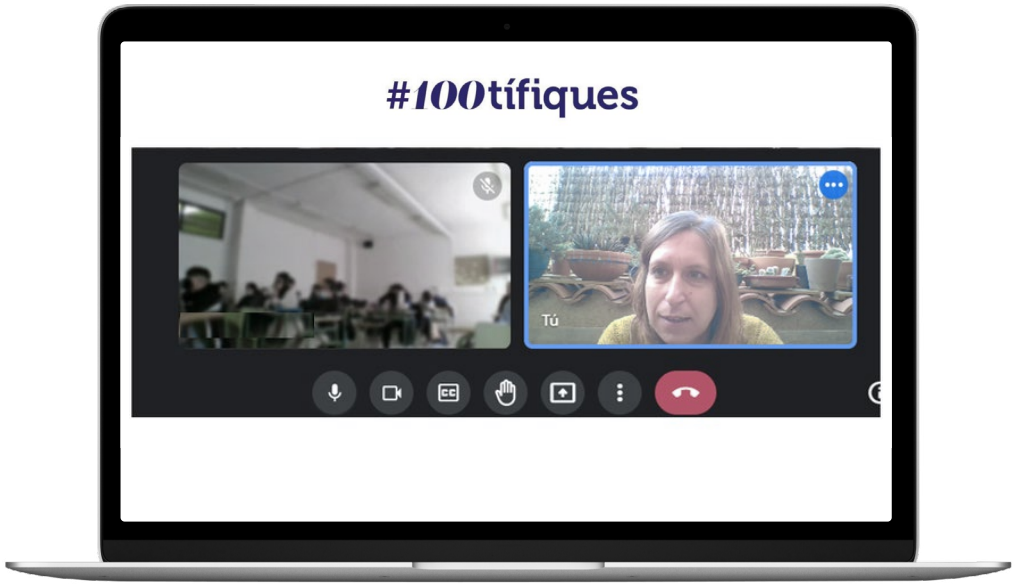
Promoting STEM education

The term STEM education refers to the areas of science, technology, engineering and mathematics. We promote it by encouraging dialogue between the Cetaqua team and the younger generations.

Once again, we participated in 100tífiques, an initiative organised by the Catalan Foundation for Research and Innovation (FCRI) and the Barcelona Institute of Science and Technology, in conjunction with the Generalitat de Catalunya Ministry of Education.

The main aim is to foster interest in scientific and technical careers in children, especially girls.

In 2022, three of our researchers shared their experiences in schools in the metropolitan area of Barcelona in order to convey their passion for the scientific world and inspire new generations to pursue careers in this field. Because science does not understand gender.



PUBLISHING IN JOURNALS

Knowledge transfer through technical and scientific publications

Our contribution to the collective construction of scientific knowledge was reflected in the publication of eight articles in peer-reviewed scientific journals and 6 technical articles in specialised media, related to the fields of water, environment, chemical engineering, health and energy.

Of particular note were publications in high-impact journals such as *Water Research*, *Journal of Hydrology* and *Journal of Environmental Management*, and in the specialised journals TecnoAqua and *RETEMA*, among others.

← **Assessing wastewater-based epidemiology for the prediction of SARS-CoV-2 incidence in Catalonia**

Bernat Joseph Duran, Albert Serra Compte, Miquel Sàrrias, Susana González, Daniel López, Clara Prats, Martí Català, Enric Alvarez Lacalle, Sergio Alonso, Marina Arnaldos (2022).

Scientific Reports, 12(1), 15073.

DOI: 10.1038/s41598-022-18518-9

← **Visión por computador: inteligencia artificial aplicada para cambiar las reglas del ciclo del agua.**

Rafael Giménez & Luis Tuzón (2022).

RETEMA, issue 242, online journal. Pages 102-108.

06 ALLIANCES TO ACHIEVE OBJECTIVES

TURNING STRATEGY INTO RESULTS

PARTNERSHIP NETWORK

At Cetaqua, we have created a collaborative innovation ecosystem with universities, other research centres, companies, public institutions and associations.

This approach has made us a leader in obtaining European R&D&I funds.

2022 in figures

28 **publicly funded projects**

25 **of which are part of European Commission programmes**

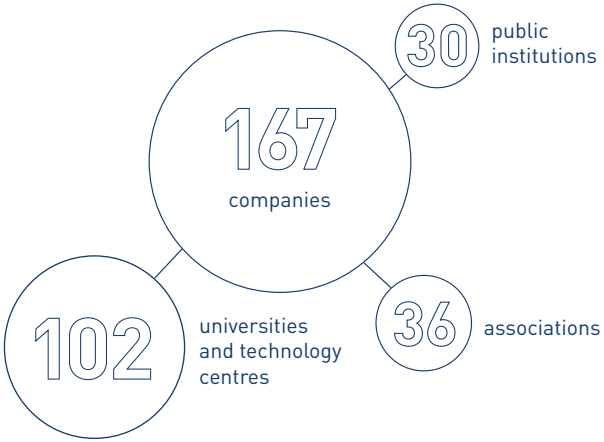
In the latest Horizon Europe and LIFE programme applications, our success rates have been 38% and 67%, respectively, exceeding the European average of 13% and 18%.

"We firmly believe that R&D&I projects must have a real and measurable impact on society. Therefore, in addition to scientific and technical quality, we focus on the implementation and transferability of our projects. We are committed to demonstrating the added value we provide and ensuring our results are translated into specific solutions to European water challenges.

This strategic orientation has seen us achieve high success rates in competitive public funding calls and establish our reputation as leaders in the field of European water innovation".

JOANA TOBELLA, TECHNICAL DIRECTOR OF PROJECTS

COLLABO-RATION NETWORK



Scientific rigour in universities and research centres

Networking with prestigious institutions ensures the scientific soundness of our solutions.

Solutions applied to the real economy

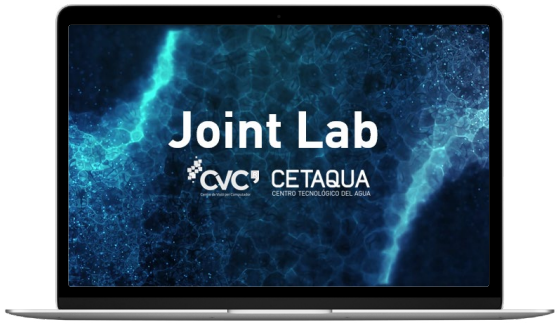
The vision of companies from different sectors (water, energy, waste, agriculture, etc.) helps us to detect opportunities and convert them into viable and sustainable solutions (both for regions and organisations) in social, economic and environmental terms, adapting them to the current and future needs of society.

The value of public-private partnerships

By continuously involving public bodies we guarantee our solutions meet real challenges in society, ensuring they can be implemented in current and future regional contexts and regulatory frameworks.

The influence and positioning of associations

Participation in national and international associations puts us in contact with new trends and potential collaborations, as well as promoting knowledge exchange.



In 2022, a joint lab has been created together with the Computer Vision Center (CVC), with whom a collaboration agreement has been established for research and development projects focusing on the application of computer vision to water management and the environment.

Doing so facilitates the transition from individual project-based collaboration to joint creation of a computer vision research programme. This allows us to identify needs, develop state-of-the-art solutions and transfer knowledge for application to water cycle management.

"This open innovation initiative seeks to increase the speed of digitisation in the water and environment sector. Artificial intelligence, and in particular computer vision, has shown enormous potential to offer practical, efficient solutions with enormous power to transform operations. We want help make the water cycle a key vector in the digital and ecological transformation of our environment".

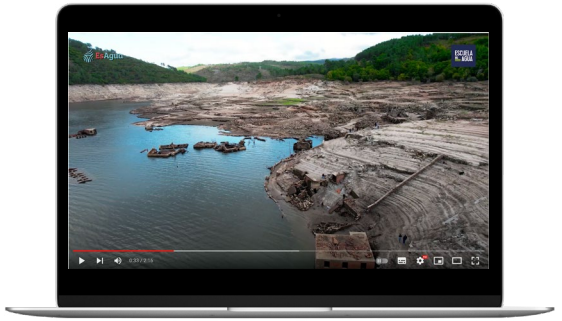
CARLOS MONTERO, GENERAL MANAGER OF CETAQUA

Pioneering network in water footprint in Spain

The EsAgua network is one of our leading initiatives in the field of sustainable development and the protection of water resources.

Responsible water use is no longer an option. In 2022, the EsAgua network brought together 50 pioneering companies in their commitment to sustainable water use and the water footprint. The EsAgua network companies receive support in their water footprint reduction goals and share a space to disseminate the responsible use of freshwater in the business environment and society as a whole.

Through the EsAgua network, we help disseminate content and events such as the meeting "Water and sustainability in the agri-food sector", where companies such as Damm, Grupo Paloma and The Natural Fruit share their experience in calculating and reducing the water footprint for food production.



Watch

EsAgua is currently promoted by the Water Footprint Network and DNV GL and has 50 Spanish companies that are pioneers in their commitment to the sustainable use of water.

Promoted by

07 APPENDICES

2022 ANNUAL ACCOUNTS

Income statement

Project income	**4,006**
Private funding	1,939
Public funding	2,067
Other income	2,684
Total revenues	**6,690**

Project costs	5,683
Structural costs	1,007
Total costs	**6,690**

Balance

Total assets	**13,892**
Non-current assets	206
Current assets	13,686

Total equity + liabilities	**13,892**
Equity	9,607
Non-current liabilities	0
Current liabilities	4,285

*Results in €M.

PRESENTATIONS

Congresses and conferences 2022

Mayor, Á. (2022, 25 January). Presentation of odour projects carried out in the Besòs River with Aigües de Barcelona. Scientific Conference on Eliminating Odours in WWTPs.

Romero, A. L. (2022, 24 February). Presentation of the LIFE Enrich project. Water Innovation Day.

Ruiz, M. (2022, 24 February). Innovation for water reuse and resource recovery. Sustainability in the food sector. Technologies for environmental impact reduction, energy efficiency and use of by-products.

Ruiz Mateo, M. (2022, 7 April). GUARDIAN Project: the biggest fire-fighting infrastructure in Europe. Fire-fighting infrastructure inaugural conference.

Flores, L. (2022, 28 April). Sustainability Partners: analysis of territorial or organisational production process, identifying opportunities for the Circular Economy to create values in the areas of: water, energy, waste. IAmbient Meetings.

Mayor, Á. (2022, 25 May). Assessment of nitrogen recovery from urban wastewater for use in producing fertilisers. Technical Conference on Training in the Water Sector.

Casal, O. (2022, 1 June). From treatment plants to biofactories: biofuel from wastewater. Science Festival.

Vargiu, E. (2022, 1 June). Digital Water Systems and Interoperability WG (H2020). Data Week 2022.

Giménez, R. (2022, 1 June). Artificial Intelligence (AI). dealing with the construction of Data Spaces as a key element to face future challenges. Data Week 2022.

Echevarría, C. (2022, 7 June). Hybrid Sorption And Pressure-Driven Membrane Technologies For Organic Micropollutants Removal In Advanced Water Reclamation: A Techno-Economic Assessment. 12th Micropol & Ecohazard Conference 2022.

Pastor, C. (2022, 15 June). An innovative turnkey solution to process spent caustic created in the Oil&Gas industry at low cost and the meets wastewater regulations. 9th. International Conference on Sustainable Solid Waste Management.

Pastor, C. (2022, 15 June). Turning wastewater treatment plants into biorefineries: global value chain from bioresources to valuable products. 9th. International Conference on Sustainable Solid Waste Management.

Flores, L. (2022, 16 June). The public-private partnership in the circular economy. 2nd International Meeting on Sustainability in Cities and Tourism 5.0.

Pastur, M., Mena, E., Lefevre, B., **Cortina, J. L.**, López, J., **Castro, C., & Tobella, J.** (2022, 21 June). An innovative reclaimed water treatment for the valorization of nutrients and salts. IAHR Congress.

Díaz, M. Á., Espinosa, S., Aguilera, D., **González, S., Argamasilla, M.**, & Piñero, A. (2022, 21 June). Corrosion risk assessment methodology by desalinated water supply in drinking water networks. IAHR Congress.

Saenger, V., Garcia, L., Díaz, M. Á., Genzer, M., Montes, S., & **González, S.** (2022, 21 June). A reliable real-time virtual Trihalomethane sensor solution for drinking water facilities. IAHR Congress.

PRESENTATIONS

Congresses and conferences 2022

Pastor, C., González, S., & Alsedà, A. (2022, 22 June). Treatment systems. Suggereix Closing Event: Development of tools to support the implementation and management of reuse.

Noriega, G., **Mayor, Á.**, González, A., Sánchez, A., Rodríguez, L., & **Castro, C.** (2022, 8 September). Production of Smart Biofertilizers from recovered nutrients: a step forward to turn WWTPs into bio-factories. Va de Agro.

Serra, A. (2022, 12 September). A study on buyers' ambiental technology demands. IWA World Water Congress 2022.

Mayor, Á. (2022, 14 September). Evolution of alternative fertilizers: from resource recovery in WWTPs to biorefineries (WRRFs) producing smart biofertilizers. IWA World Water Congress 2022.

González, S. (2022, 14 September). Microbiological dynamics and risk assessment of drinking water and reclaimed water processes. IWA World Water Congress 2022.

Casal, O. (2022, 5 October). LIFE Nimbus Biological methanation of WWTP biogas with bioH2 for sustainable mobility. 15th International Bioenergy Congress.

Membrive, A., & Guerrero, M. (2022, 13 October). Natural Capital assessment of three case studies from a water sector company to improve business decision-making and communication. 4th ESP Europe Conference.

Vargiu, E. (2022, 19 October). Experience and knowledge in public programs. WPE 2022.

Lincon, E. (2022, 20 October). REECOVERY project. Mining and Minerals Hall (MMH).

Vargiu, E. (2022, 22 November). A Data-Driven Approach to Boost Water Reuse: LIFE WARRIOR. Big Data Forum.

Romero, A. (2022, 17 November). Advanced water reclamation process for nutrient and brine valorisation in Murcia. IWAYWP (IWA Young Water Professionals).

Giménez, R. (2022, 9 November). Application of artificial intelligence to the sea water cycle within the AI4ALL programme. AI4ALL.

Guerrero, M. (2022, 8 November). Liveable cities: applied methodology to rank cities using open data. Urban Transitions 2022.

Casal, O. (2022, 28 November). LIFE Nimbus project. CONAMA, 16o Congreso Nacional Del Medio Ambiente.

Santos, E., Quina, A., & Flores, L. (2022, 15 December). B-Water Smart: oportunidades y retos de la agricultura. 3a COP B-Water Smart.

SCIENTIFIC PUBLICATIONS 2022

Gibert, O., Sánchez, D., **Cortina, J.L.** (2022). Removal of nitrate and pesticides from groundwater by nano zero-valent iron injection pulses under biostimulation and bioaugmentation scenarios in continuous-flow packed soil columns. Journal of Environmental Management. 321.

Hermassi, M., Granados, M., Valderrama, C., Skoglund, N., Ayora, C., **Cortina, J.L.** Impact of functional group types in ion exchange resins on rare earth element recovery from treated acid mine waters. *Journal of Cleaner Production*, 379 (2).

Echevarría, C., Pastur, M., Valderrama, C., **Cortina, J.L.**, Vega, A., Mesa, C., Aceves, M. (2022). Techno-economic assessment of decentralized polishing schemes for municipal water reclamation and reuse in the industrial sector in costal semiarid regions: The case of Barcelona (Spain). *Science of The Total Environment*. 815.

Hurtado, I., **Pouget, L.**, Fernández, S., & Cascales, P. (2022). Monitoring and forecasting cyanobacteria risk for a drinking water plant in Spain. *Water Supply*, 22(7), 6296–6307.

Trapiello, C., Romero, L., **Messenger, J.**, Puig, V., **Cembrano, G., Joseph, B., Sarrias, M.**, Minoves, M. (2022). Automatic Network Response Methodology for Failure Recovery or Bursts in Drinking Water Networks. *Journal of water resources planning and management*. 149(1).

Mayor, A., Beltrán, E., **Cortina, J.L.**, Valderrama, C. (2022). Nitrogen flow analysis in Spain: Perspectives to increase sustainability. *Science of the total environment*. 858 (3).

Duran, B., Serra, A., Sàrrias, M., Gonzalez, S., López, D., Prats, C., Català, M., Alvarez, E., Alonso, S., & **Arnaldos, M.** (2022). Assessing wastewater-based epidemiology for the prediction of SARS-CoV-2 incidence in Catalonia. *Scientific Reports*, 12(1), 15073.

Tapia, P., Montenegro, M., Reig, M., Vecino, X., Saurina, J., Granados, M., & **Cortina, J.L.** (2022). Integration of membrane processes for the recovery and separation of polyphenols from winery and olive mill wastes using green solvent-based processing. *Journal of Environmental Management*, 307(114555), 1–12.

TECHNICAL PUBLICATIONS 2022

SUGGEREIX: Aportando conocimiento y soluciones en el campo de la regeneración de agua. (2022). *FuturEnviro*, 81–83.

Aigües de Barcelona and Cetaqua Technical Department. (2022). Incrementando la protección de las infraestructuras críticas de la red de abastecimiento: el caso de Aigües de Barcelona. *Tecnoaqua*.

Giménez, R., & Tuzón, L. (2022). Visión por computador: inteligencia artificial aplicada para cambiar las reglas del ciclo del agua. *RETEMA*, 102–108.

Serra, A.; Álvarez, C.; Joseph Duran, B.; González, S.; Boleda, R. (2022). Evaluación del potencial analítico de la espectroscopia de flurorescencia en potabilización y regeneración. *Tecnoaqua*, 70-74.

Serra, A.; Saenger, V.; Joseph Duran, B.; González, S.; Valero, F.; Emiliano, P.; García, V.; Pérez, I.; Paraira, M. (2022). Predicción online de mezclas de aguas de diferentes orígenes en redes de distribución de agua de consumo. 36th AEAS Congress.

Vilaró, C.; Galofré, B.; **Puigdomènech; C.; González**, S.; Vinyoles, J. (2022). Advances in microbiological risk management in reclaimed water. SSP. REGIREU Project. 36th AEAS Congress.

PROJECTS 2022

Water 4.0

Total budget: €7,877,945
Cetaqua budget: €1,510,569

Acronym	TITLE	Start date	End date	Type of funding	Cetaqua's role
AB Twins	Digital twins for water network operation. Pilot benchmark model development and definition	1/1/2021	31/12/2022	Private	Coordinator
Citysight	Study to estimate the floating population in the city of Benidorm based on wastewater analysis	15/3/2022	1/8/2022	Private	Coordinator
Deep Plant	Rapid detection of process alerts in water plants with computer vision	17/9/2021	30/11/2022	Private	Coordinator
lonPlant phase 2	lonPlant phase 2: process monitoring in WWTPs with computer vision	1/9/2021	30/6/2022	Private	Coordinator
Customer Lab	Digital laboratory for analytical use and exploitation of remote meter reading data	13/12/2021	31/3/2023	Private	Coordinator
Computer Vision Lab	Digital laboratory for computer vision applications to water cycle operation	29/11/2022	1/3/2024	Private	Coordinator
Digital Twins Lab	Water cycle digital twins digital construction lab	23/11/2022	29/2/2024	Private	Coordinator
MANTRA	Analytical exploitation of data in the management of production budgets	30/11/2021	13/5/2022	Private	Coordinator
Metropolis	"A smart metering platform for water utilities"	1/9/2022	1/9/2025	Public	Partner
Sensight+	Characterisation of water consumption patterns for population groups at health risk	5/10/2022	4/11/2024	Private	Coordinator
Waterverse	Water data management ecosystem for water data spaces	1/5/2022	1/10/2025	Public	Partner
WQeMS	Copernicus Assisted Lake Water Quality Emergency Monitoring Service	1/10/2020	30/11/2023	Public	Partner

PROJECTS 2022

Biofactory and resource recovery

Total budget: €71,098,329
Cetaqua budget: €12,127,628

Acronym	TITLE	Start date	End date	Type of funding	Cetaqua's role
BIDEN	Recovery of brines using bipolar electrodialysis membranes	10/2/2022	16/12/2022	Private	Coordinator
B-Water Smart	Accelerating water intelligence in coastal Europe	1/4/2020	31/8/2024	Public	Partner
COMPACT	Piloting of compact membrane treatment technology for Besòs and Llobregat river water treatment and reclamation	1/9/2021	31/3/2023	Private	Coordinator
EPC-EqTech	Innovative, low-cost solution for processing spent caustic soda created in the oil and gas industry that complies with wastewater regulations	1/1/2021	31/1/2024	Public	Coordinator
ESPREM	Plant pilot assessment of osmosis technologies for brine water recovery from the Sant Joan Despí DWTP	15/7/2021	1/3/2023	Private	Coordinator
FLEXENERGY	Energy demand flexibility study at Aigües de Barcelona	19/5/2022	21/11/2022	Private	Coordinator
GUARDIAN	Green urban actions for resilient fire defence	14/1/2019	27/5/2022	Public	Partner
LIFE CONQUER	DIVIDE & CONQUER: Closing the water, nutrient and resource management cycle for irrigation activities	1/11/2020	30/4/2024	Public	Coordinator
LIFE CYCLOPS	Polyphenol recovery from waste	12/9/2022	30/6/2026	Public	Coordinator
LIFE NIMBUS	Zero impact bus: Demonstration of a biological methanation plant for sustainable urban transport	1/9/2020	31/1/2024	Public	Coordinator
LIFEREMINE - WATER	New water solutions for the mining industry: towards minimal liquid discharge and by-product recovery	1/10/2018	31/1/2024	Public	Coordinator
LIFE WARRIOR	Innovative and cost-effective approach to water reuse under the new European regulatory framework for agricultural irrigation	3/10/2022	1/4/2026	Public	Coordinator

PROJECTS 2022

Biofactory and resource recovery

Mataró Reuse	Pilot reuse plant at the Mataró WWTP	15/12/2022	28/6/2024	Private	Coordinator
RECOPPs WWTP	Recovery of value-added raw materials from primary copper production	16/5/2022	31/3/2024	Public	Partner
REDUCAP	GHG capture in the urban water cycle	1/10/2021	18/2/2022	Private	Coordinator
REECOVERY	Recovery of acid water from mines as a resource for the sustainable supply of raw and critical materials	19/11/2021	31/1/2025	Public	Partner
REGREEN	Demonstration of the feasibility of using reclaimed water for hydroponic agriculture at the world level	25/11/2021	28/2/2023	Private	Coordinator
RESiLEX	Improving resilience in the silicon industry by using the European matrix	1/6/2022	30/6/2026	Public	Partner
RO-Star	Study of the adaptation of treatment stages at the Estrelles DWTP	18/11/2022	31/10/2023	Private	Coordinator
SEMPRE-BIO	Ensuring cost-effective domestic biomethane production	1/11/2022	30/4/2026	Public	Coordinator
ULTRAREUSE	Reuse of ultrafiltration membranes from the Sant Joan Despí DWTP at the Baix Llobregat water reuse plant	30/11/2021	31/7/2022	Private	Coordinator
WalNUT	Closing wastewater cycles for nutrient recovery	1/9/2021	30/4/2026	Public	Third party

PROJECTS 2022

Critical infrastructure management and resilience

Total budget: €21,525,982
Cetaqua budget: €3,476,113

Acronym	Title	Start date	End date	Type of funding	Cetaqua's role
CITY SENTINEL VSENSE	City Sentinel: viral, variant and socioeconomic surveillance	5/7/2021	4/7/2022	Public	Coordinator
EMERITUS	Multiple data source-based environmental crime intelligence and investigation protocol	1/6/2022	31/12/2025	Public	Partner
LIFE MATRIX	Safe water reuse in managed aquifer refilling: innovative solution combining physical, digital and governance aspects	1/10/2021	31/10/2024	Public	Partner
LIFE proETV	Promotion and implementation of ETV as a voluntary EU scheme to verify the performance of environmental technologies	1/9/2020	31/12/2023	Public	Partner
LIFE RUBIES	Real-time monitoring of urban sanitation and drainage systems for the protection of receiving waters	1/10/2021	30/6/2025	Public	Partner
PathoCERT	Pathogen contamination emergency response technologies	1/9/2020	31/3/2024	Public	Partner
SUGGEREIX	Development of tools to support reuse implementation and management	28/1/2020	31/7/2022	Public	Partner

PROJECTS 2022

Environmental, economic and social sustainability

Total budget: €988,768
Cetaqua budget: €542,929

Acronym	Title	Start date	End date	Type of funding	Cetaqua's role
A-ZEPA	Analysis of management plans and indicators for SPAs (ZEPAs, in Spanish) and protected areas	21/3/2022	30/10/2022	Public	Coordinator
CIRPOL	New circular business models based on replacing synthetic antioxidant additives with polyphenols obtained sustainably from agri-food by-products	1/6/2022	28/7/2023	Public	Partner
MAGNUM	BIM platform for digital management of water footprint in tourism (Magnum)	1/9/2022	30/4/2026	Public	Partner
NITROUS	Real-time monitoring and management of N2O generation in bioreactors	2/5/2022	30/6/2023	Private	Coordinator
OBSERVE	Aigües de Barcelona's Health Observatory	27/10/2022	30/4/2024	Private	Coordinator

PROJECTS 2022

Water resource management

Total budget: €8,761,929
Cetaqua budget: €1,559,335

Acronym	Title	Start date	End date	Type of funding	Cetaqua's role
AI4Llobregat	Prediction of reservoir volumes in the headwaters of the Ter and Llobregat rivers	29/11/2022	28/2/2023	Private	Coordinator
AQUA SOST 4.0	Digital basin management service using state-of-the-art technology	4/10/2022	31/8/2023	Private	Partner
GOTHAM	Governance tool for the sustainable allocation of water resources in the Mediterranean through stakeholder collaboration.	1/10/2021	31/10/2024	Public	Partner
Towards a paradigm shift in groundwater management	1/1/2020	31/7/2023	Public	Third party	Partner
LOGIC	Model aggregation platform for the integrated management of quality and status data on bodies of surface water	1/6/2020	1/9/2023	Public	Partner
MAGO	Mediterranean water management solutions for sustainable agriculture delivered by a collaborative online platform	1/2/2021	1/9/2024	Public	Coordinator

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Companies

WE ARE CARBON NEUTRAL

In our commitment to the environment and sustainable development, since 2015 we have been calculating, reducing and offsetting CO2 emissions, making us a carbon neutral centre.

We have ISO 14064:2012 Organisational Carbon Footprint certification and have also registered with the Spanish Ministry for the Ecological Transition and the Demographic Challenge's National Carbon Footprint, Compensation and CO2 Absorption Projects Register.

In addition, since 2019 we have also calculated our WFN and ISO water footprints using the Water Footprint Network methodology in the Water Footprint Manual (2011) and ISO 14046:2014, respectively.

Download the 2021 environmental footprint executive summary

Water footprint technical report

Carbon footprint technical report

Download the compensation project sheets

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