



Water Department



Canary Islands Institute of Technology (ITC)



Technology and Innovation for a Sustainable Development

itc INSTITUTO TECNOLÓGICO
DE CANARIAS





Water

Researching to improve water management and a sustainable water use

Background

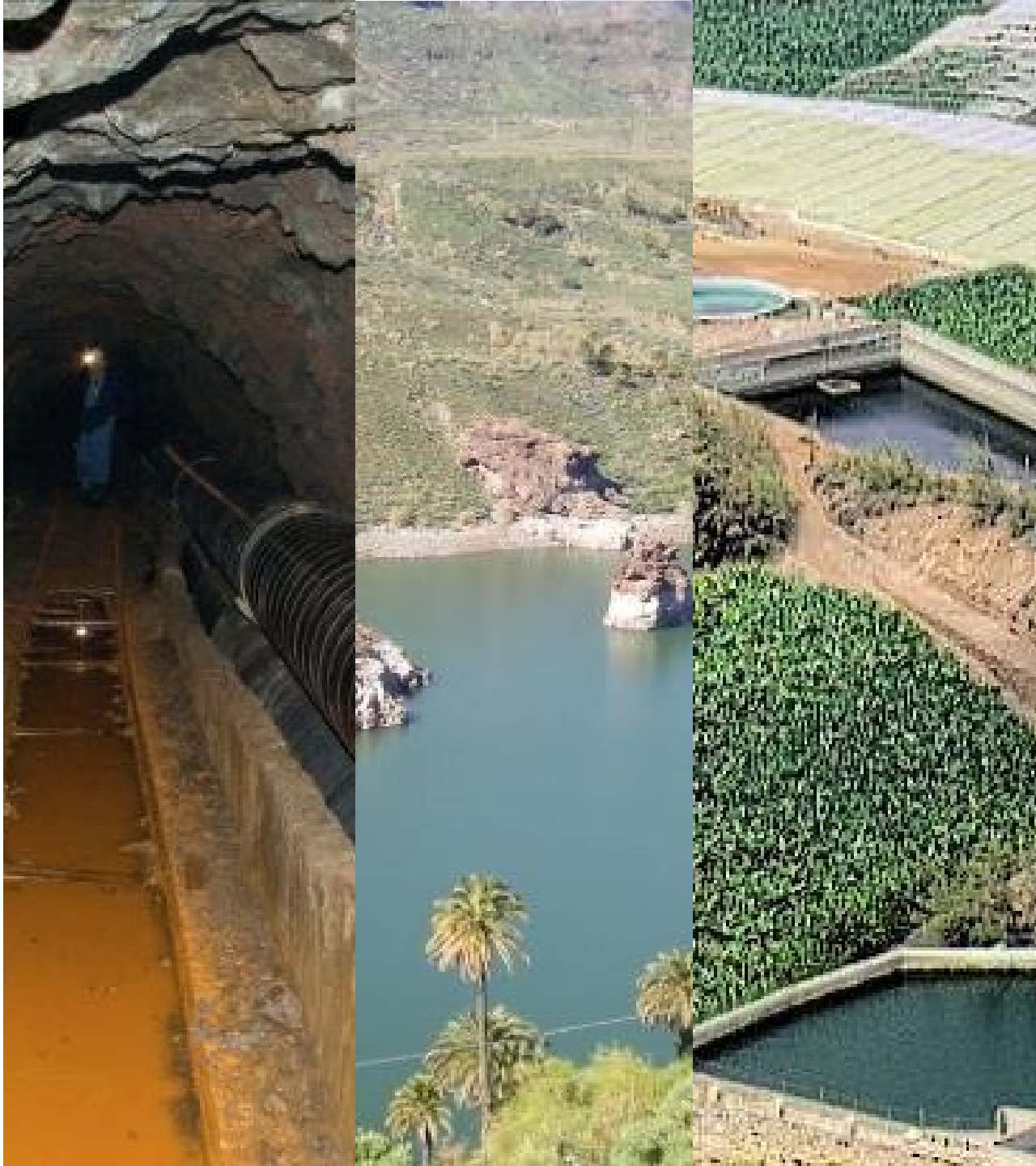
Water Singularities of the **Canary Islands**



- **Structural water deficit** due to low rainfall, high soil permeability and aquifer overexploitation
- **Need to look for alternative (industrial) water production systems (e.g. desalination):** technology based and with high energy consumption



- **Isolated and fragmented territory:** ideal for small to medium size technologies
- Vulnerable ecosystems and high natural protection: **water quality preservation**
- Need to **increase energy efficiency** of the water cycle and to **reduce its energy dependence**





Participation in more than 100 initiatives
(R&D&I projects + technological and consultancy services)



Established in 2003

WATER Department



+ 10 highly qualified engineers and scientists specialized in water quality, water & energy environmental management, engineering of water technologies/systems



Long record experience in international cooperation projects (focus: West Africa and insular regions)



Technological Activity

- Renewable energy driven and energy efficient desalination systems
- Decentralized wastewater treatment
- Monitoring and improvement of water quality



Budget 2021: € 1 M (82% external financing)



Milestones



1996 Off-Grid Wind Desalination

First European Project at ITC premises to demonstrate the feasibility of stand-alone, wind powered desalination technologies (SDAWES)



2000 Waste Water Treatment

First non conventional, natural, low energy waste water treatment systems integrated in natural spaces of the Canary Islands



2003 Creation of the Water Department

Which was previously part of ITC's Renewable Energy and Water Centre



2004 DESSOL International Patent

International patent of a reverse osmosis desalination plant coupled to a photovoltaic system (later transferred to a Canary Company)

2018 Creation of the Platform DESAL+ LIVING LAB

A joint public-private initiative open to R&D&I in desalination technologies



2011 Design of protocols for sanitary quality evaluation of beach sands

Pioneers in the design of protocols for monitoring the sanitary quality of beach sands



2009 Design and Installation of Santa Lucía natural waste water treatment plant

Support in the design and implementation of the biggest non conventional 0-energy wastewater treatment plant of the Canary Islands



2006 First stand-alone PV powered desalination plant of Africa

The system, based on the DESSOL patent and installed at the desert village of Ksar Guilène (Tunis) has been producing water uninterruptibly since its commissioning



WATER DESALINATION

with high energy efficiency and powered by renewable energies



Design, test and studies of desalination plants with high energy efficiency criteria



Development and test of demonstrative projects that combine high efficiency, innovative technologies and direct use/coupling of renewable energies (solar thermal and PV, wind energy, wave energy)



Audits and technical inspections/verifications for the public sector; planning consultancy



Drinking water supply to remote areas by means of renewable energy driven desalination and water treatment systems

Lines of Work/Research



WASTEWATER TREATMENT AND REGENERATION

with low energy or zero energy costs



Development of sustainable solutions to wastewater treatment and reuse in isolated/remote/decentralized communities



Collaboration with the public sector in the knowledge and implementation of non-conventional, natural, low energy wastewater treatment processes and technologies



Circular Economy – regeneration of treated effluents



Assessment on good practices, awareness raising, capacity building and best use of regenerated waters

Lines of Work/Research



Monitoring and Improvement of WATER QUALITY



Control and evaluation of the physico-chemical and microbiological quality of all types of water (drinking water, desalinated water, treated wastewater, regenerated wastewater, coastal and bath waters, brines, etc.)



Studies on priority and emergent contaminants in waters



Efficiency evaluation of water treatment technologies

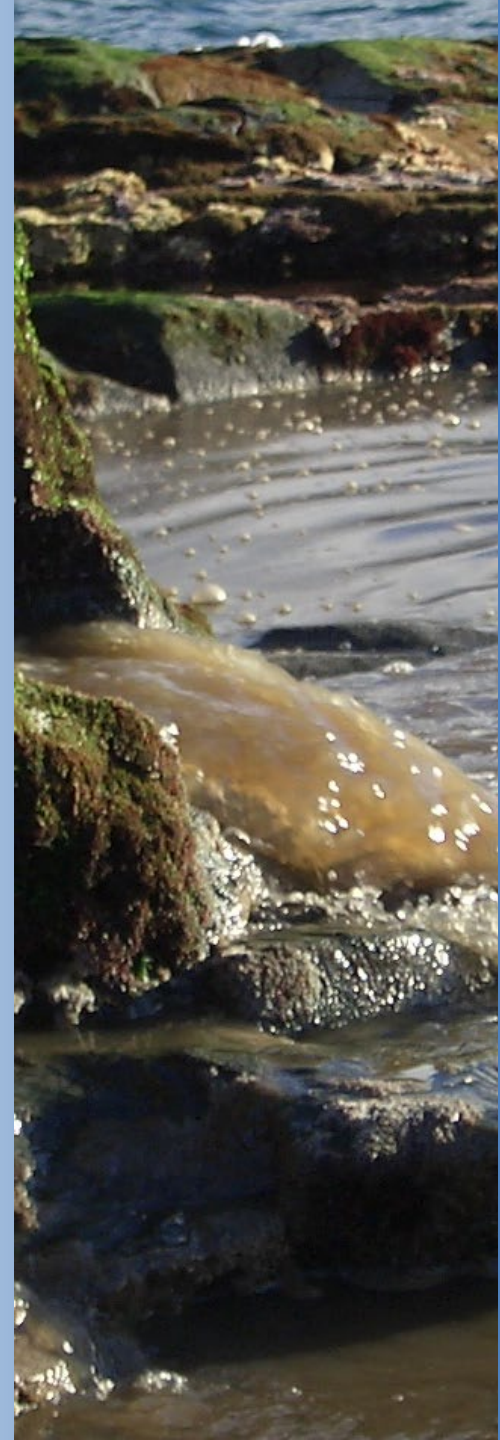


Risk analysis and search for solutions in case of spills/discharges (desalination, wastewater treatment, industrial activities)



Support to public institutions in the regularization of land-sea discharges

Lines of Work/Research





**Experimental platform
for testing water
treatment
technologies**



**Fully equipped water
analysis laboratory for
the correct physico-
chemical and
microbiological
characterization of
waters and for the
detection of emerging
pollutants**



**Advanced analytical
equipment for field /
on site works**

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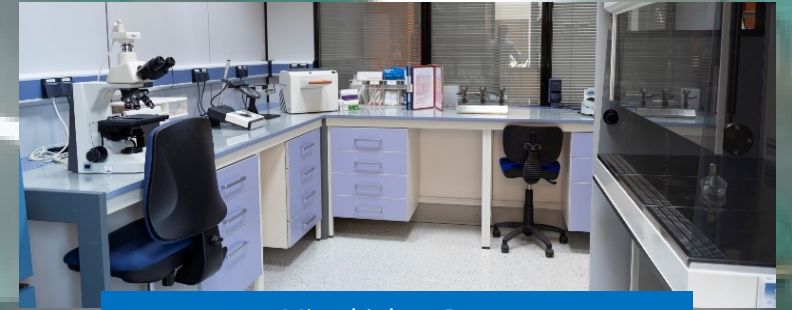
**Pozo Izquierdo Facilities
(Gran Canaria)**



**Technological
Infraestructure**



Ionic Chromatograph



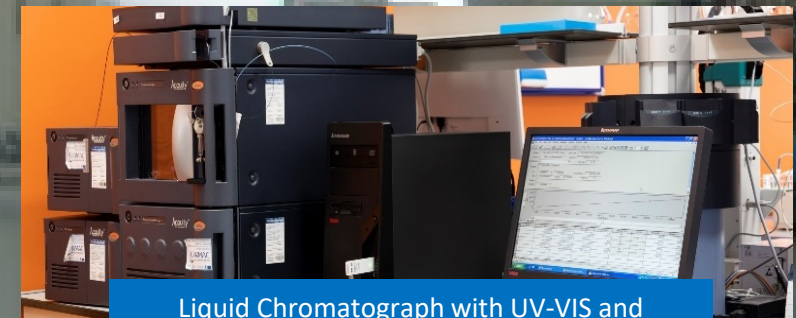
Microbiology Room



Optical emission spectrometer with inductively coupled plasma



Gas Chromatograph with triple quadrupole mass detector



Liquid Chromatograph with UV-VIS and fluorescence detectors

Equipment



Support in the design and execution of services and R&D&I studies in water technologies, water quality and water governance, as well as verification of obtained results



Technical consultancy in water technologies, water quality and water governance, water related circular and blue economies, relationship water – climate change



Test and/or verification works in water treatment plants (desalination systems, wastewater treatment systems, tertiary systems), with the aim of validating technologies and evaluating realized projects



Advice and validation of water quality (coastal waters, brine, desalinated water, drinking water, regenerated water) in the R&D&I field



Production of training and awareness raising material; know-how and technology transfer to less developed regions/countries

Our SERVICES

11 published
books; **21**
chapters in
technical books

81 participations
in international
congresses

4 patents

15 international
cooperation
projects/services

12 Canary Islands
Government
orders

... a trajectory

83 European
Projects / R&D&I
Contracts

85 conferences,
seminars and
organized courses

10 technological
transfer
agreements with
companies

25 digital
publications /
teaching material

+ **1000** trained
people

+**150** advised
companies

47 high impact
publications in
scientific journals



Water
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... currently

1 H2020 project
10 INTERREG MAC projects
2 INTERREG ATLANTIC projects



2 technology transfers to companies
€ 1,5 M budget (85% external financing)



1 Canary Island Government service
2 consulting services
1 cooperation Service in Cape Verde

International Cooperation

Direct actions in 4 West African countries and more than a dozen collaborations at international level



TUNISIA: Drinking water supply to the village of Ksar Ghilène (2004-2009)



MAURITANIA: Installation and management of 4 desalination plants at National Park Banc d'Arguin (PNBA) (1996-2009)

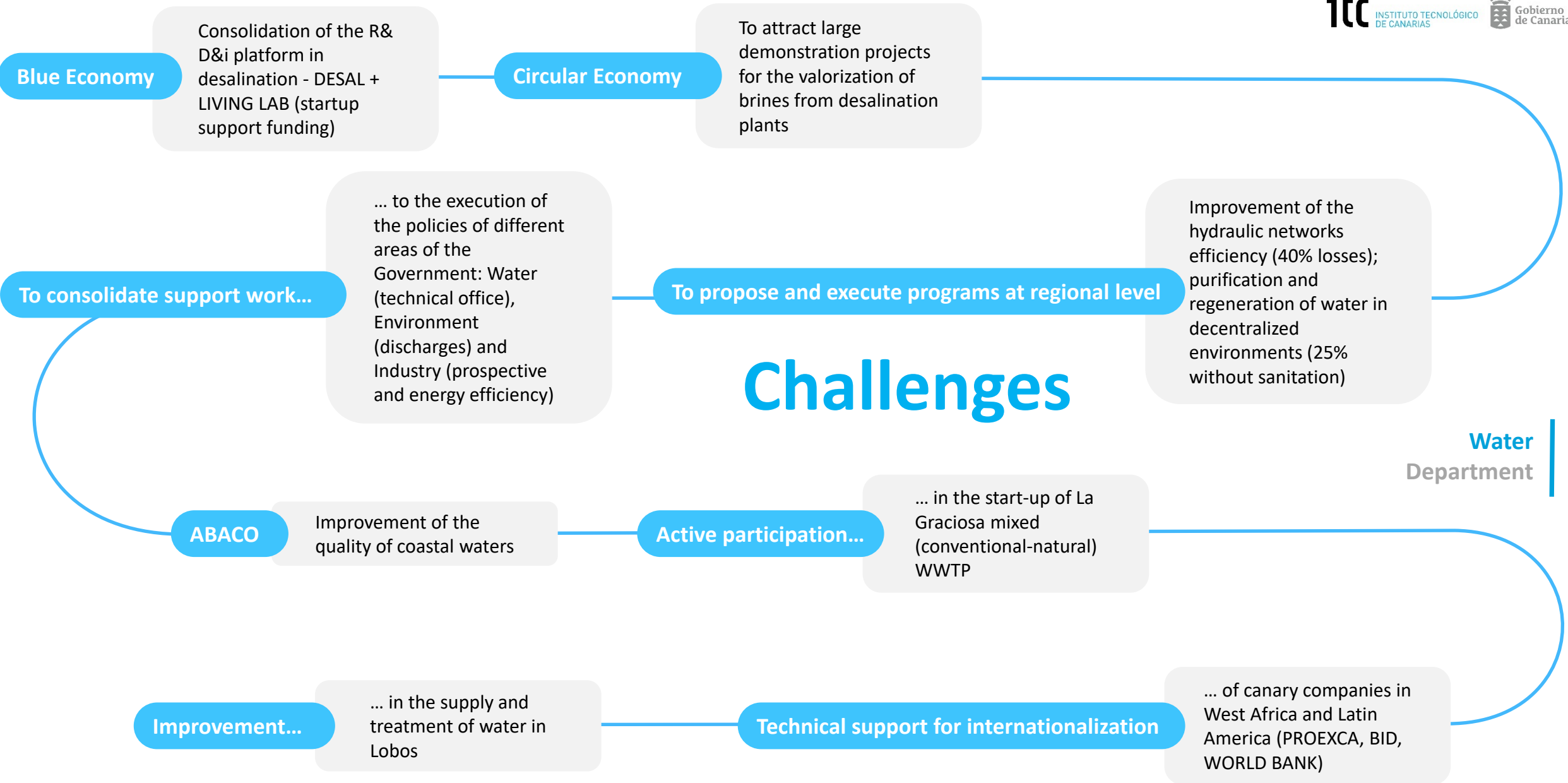


MOROCCO: European Projects ADIRA (2004–2010); OMARCOST, TAKATONA



CAPE VERDE: Hydraulic Planning ((2008-2010), ISLHÁGUA project (2011-2013), ADAPTares Project (2017-2019)

Challenges



Blue Economy

Consolidation of the R&D&i platform in desalination - DESAL + LIVING LAB (startup support funding)

Circular Economy

To attract large demonstration projects for the valorization of brines from desalination plants

To consolidate support work...

... to the execution of the policies of different areas of the Government: Water (technical office), Environment (discharges) and Industry (prospective and energy efficiency)

To propose and execute programs at regional level

Improvement of the hydraulic networks efficiency (40% losses); purification and regeneration of water in decentralized environments (25% without sanitation)

Water Department

ABACO

Improvement of the quality of coastal waters

Active participation...

... in the start-up of La Graciosa mixed (conventional-natural) WWTP

Improvement...

... in the supply and treatment of water in Lobos

Technical support for internationalization

... of canary companies in West Africa and Latin America (PROEXCA, BID, WORLD BANK)



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Water Department



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