



LAYMAN'S REPORT

Efficient integration of discharges
from small food industries into
urban sanitation systems

INTRODUCTION

The Water Framework Directive (WFD) and other water-related directives have contributed to strengthening the protection of European Union waters. However, due to decades of degradation and the persistence of inefficient management, there is still a long way to ensure the quality of EU waters. At present, the provision of this vital resource cannot be guaranteed at 100%, and there are factors that suggest that, in 2030, the demand for water could be 40% higher than the available supply.

The urban wastewater treatment Directive (91/271 / EEC), which entered into force in 1991, is one of the most important European environmental laws that has brought more benefits to member countries. In Spain, approximately the 15% of urban wastewater treatment plants (WWTP) are still struggling to achieve the compliance of this directive.

The WWTP of Ondarroa usually complies with the regulations. Nevertheless, during periods of high industrial activity or when spring tides, the sanitation network has difficulties in carrying out the adequate treatment of the wastewater.

Among the aspects that affect the water quality, the industrial sectors have a significant environmental impact mainly caused by high water consumption, waste and wastewater generation.

Specifically, **tuna canning industry** is one of the most important food sectors on the coast of the Cantabrian Sea. Particularly, the Basque Country tuna canneries are characterized by maintaining an artisanal style from fishing to processing, through small businesses, familiar in many cases, whose main objective is to obtain a high-quality products.

However, some of the main challenges facing that sector are the rise in raw material prices, the increasingly restrictive environmental regulations and the higher sustainability standards demanded by society. In this context, discharges are **one of the most significant environmental aspects** of these activities due to the coastal location and the water bodies where treated waters are discharged.

In the case of the VERTALIM project, environmental aspects are especially relevant because the sanitation systems are located in specially **protected environmentally** sensitive areas such as the Artibai Basin (Special Conservation Area ES2130011) belonging to the Natura 2000 Network or near a coastal bathing area, such as the case of the estuary of the Artibai river (Directive 2006/7 / EC on the quality of bathing water).

With this framework, the LIFE VERTALIM project was born to:

- In order to **reduce the environmental impact** associated with canned fish products, since the production until the return of treated water to the water bodies following the criteria established in the WFD.
- Make a positive contribution to those sanitation facilities and assist their operators in the implementation and assurance of the Directive on the treatment of urban wastewater (91/271 / EEC).

OBJECTIVES



The main objectives set by the VERTICALIM LIFE project were:



Provide **innovative solutions** to minimize the canning industry effluents at the origin, through eco-efficient production and the 3 Barriers System.



Reduce pressure on water sanitation infrastructures.



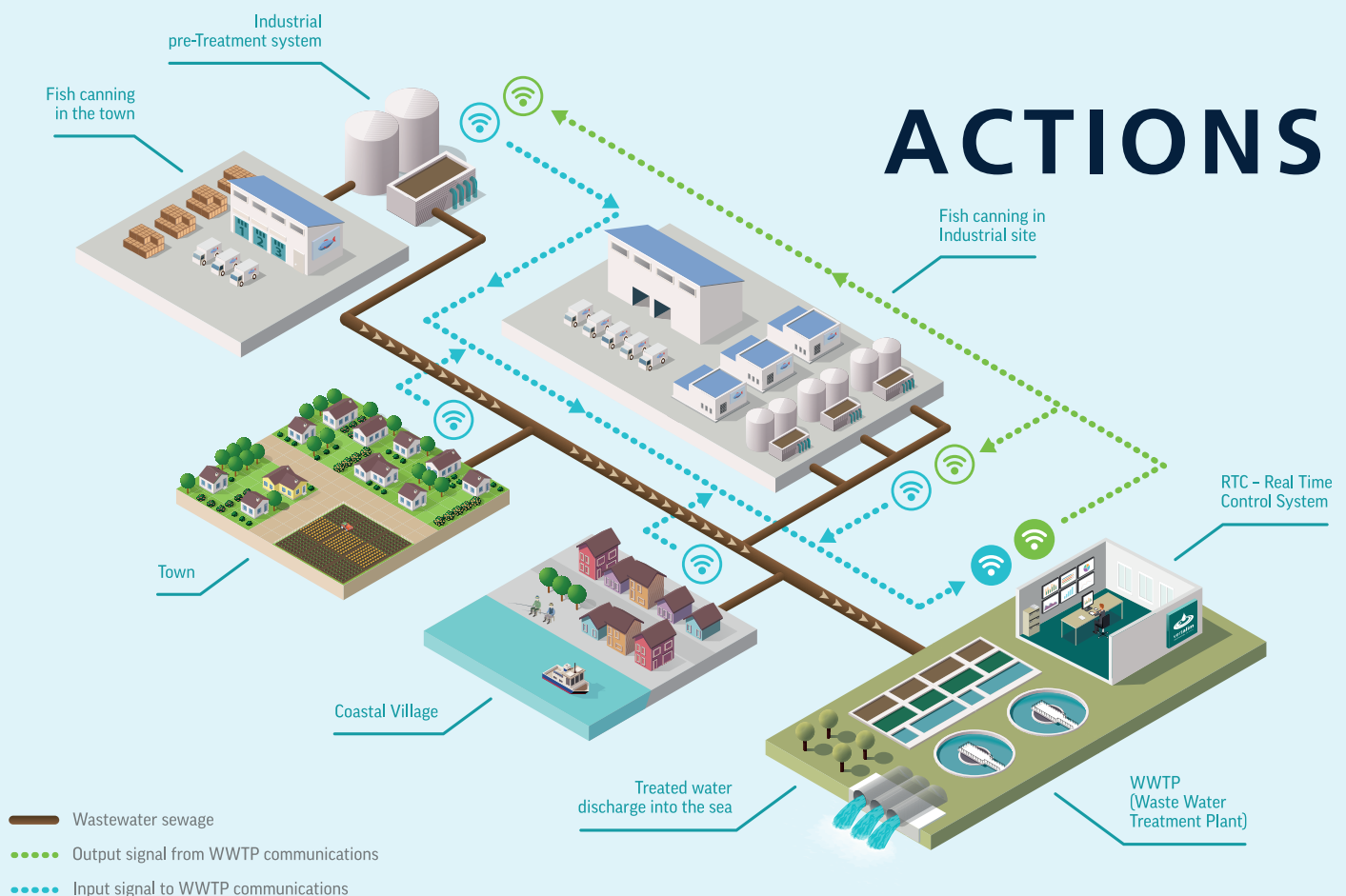
Reduce the environmental impact on the affected water bodies, ensuring the discharges are properly treated before returning to the natural environment.



Provide a tool based on the digitalization of the sanitation network for Water Entities, improving the intervention capacity and the effectiveness of the wastewater treatment facilities and the collector network.



Create a **dialogue framework** that integrates all the agents involved in the problem to solve it in an active and collaborative way.



ACTIONS

The main tasks developed in the LIFE VERTICALIM project have been:

1 MINIMIZATION OF EFFLUETS AT THE ORIGIN

- ◆ **Identify inefficiencies at source** to reduce water consumption, and the volume and pollution of the industrial effluents.
- ◆ **Apply the 3 barriers system** for the canneries effluent reduction at the origin.

2 SANITATION NETWORK SYSTEM DIGITALIZATION

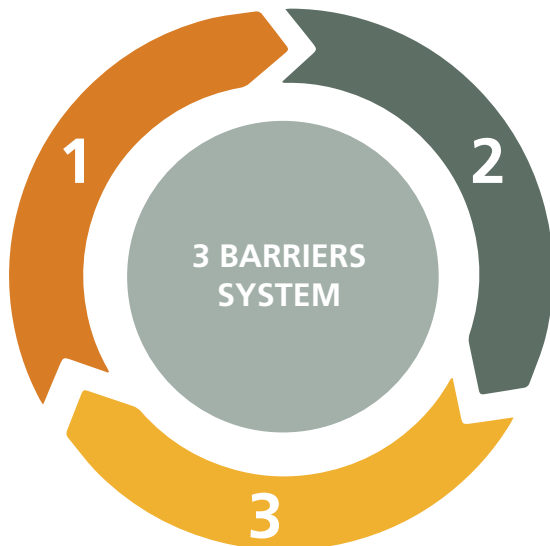
- ◆ **Characterization** of the sanitation network system (collectors and WWTP).
- ◆ **Digitalization of the sanitation network system:** Online instrumentation, Communications by GPRS and software.
- ◆ **Validate and demonstrate the LIFE VERTICALIM solution** in real conditions in the Artibai area.
- ◆ Track the **recovery of the ARTIBAI water bodies** from the industrial effluents.

3 GUARANTEE THE PROJECT REPLICATION AND TRANSFERABILITY

- ◆ **To constitute an external panel**, composed by the main stakeholders from food sector and the integral water cycle to validate the actions and results of the project. Representatives from the food sector, water management entities, administrations and scientific agents participated in the table.
- ◆ **Disseminate and communicate the project results** through the presence and participation in international congresses, technical-scientific conferences and three External Panel meetings.

PROJECT RESULTS

3 BARRIER SYSTEM



1st BARRIER



Water saving and avoid material losses.

2nd BARRIER



Retention and valorization of solids and fats.

3rd BARRIER



Intelligent management of partial discharges.

The **3 barriers system** is a methodology based on productive efficiency strategies to achieve the reduction of emissions at source in the food industry in general. This methodology is carried out by applying improvement actions to minimize the consumption of natural resources such as raw materials and water and reduction of the wastewater pollution, so that they are returned to nature in good condition.

Direct benefits of the application of the 3 barriers system:

Reduction
20-40%
water consumption

Decrease
30-45%
pollution load

Recovery:
50%
by-products

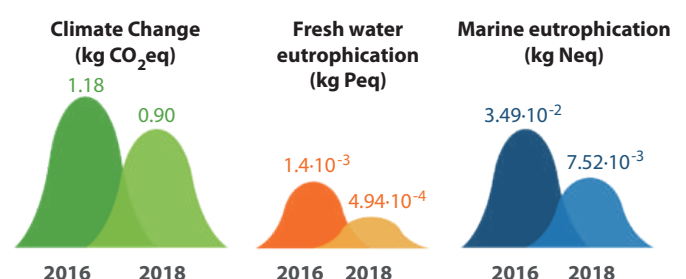
Reduction
25-35%
effluent volume

ENVIRONMENTAL IMPROVEMENTS

During the performance of the project, the physical-chemical state of the surface waters of the Artibai Basin have been monitored to follow the river recovery and to verify the impact of the activities of the project. In this context, different campaigns have been carried out in 8 sampling stations along the area: river affected by industrial discharges, the estuary and the WWTP disposal area at sea, which they have in common receiving spills of anthropic origin, including those from canning companies.

An improvement in surface water quality along the course of the Artibai River has been observed for 3

years. At the same time, no greater impact in the sewage disposal area at sea has been found, despite larger volume and pollutant load in the receiving wastewaters in the WWTP.



DIGITALIZATION OF THE SANITATION NETWORK FOR CONTROL AND DECISION ASSISTANCE

A simulation platform has been developed based on the basic construction and design information of the Galtzuaran WWTP (Ondarroa) and the network of collectors. The platform has been built based on commercial software that reproduces the real system in order to:

- **Analyse the existing problem** in the Artibai area and the effect of canneries effluents integration into the sanitation system.

- **Explore different strategies** in the management of pumping system and wastewater treatment to improve the sanitation network current performance.



Digitization consists of:

1. Real Time Control System (RTC):

Sensors and analysers that send the relevant parameters to the control station. This information allows to receive data on the wastewater composition, the behaviour of the pumping stations and the WWTP in real time.

2. Management and decisión software:

It allows to improve the WWTP performance and foreseen its behaviour taking into account external factors such as weather, tidal height and saline infiltration in the system.

3. Early detection devices:

Alarm system by sending SMS to report incidents to the WWTP technicians and even to the personnel responsible of canneries discharges to provide solutions and promote the commitment and awareness of the industrial users.

Digitalization has allowed to detect the following **improvements that have been implemented** throughout the project:

◆ INTEGRATED MANAGEMENT OF INDUSTRIAL AND URBAN EFFLUENTS

Effluents with high conductivity to minimize the impact on the WWTP of Galtzuaran through a sequential discharge protocol of canning companies.

◆ PUMPING STATIONS MANAGEMENT PERFORMANCE

to minimize the water relief to the entrance of the WWTP in situations of high cannery production and spring tides with infiltration of saline water in coastal collectors.

The implementation of these actions during the project demonstration period has meant:

Up to
50%
reduction

of pumped saline water from seawater infiltration in the coastal area (Muelle and Ensanche pumping stations).

20%
Reduction

in the relieved water flow corresponding to the first half of the year.

Both events represent a significant reduction in the overall impact on the sanitation system.

BENEFITS AND TARGETED SECTORS

FOOD INDUSTRIES



WATER MANAGEMENT BODIES



ADMINISTRATIONS



FOOD INDUSTRIES:

- Identification of the **causes and origins** related to main environmental impacts.
- Orientation for future **improvement actions** to reduce environmental impacts.
- Increase of the productive efficiency of the food industries.
- **Safe integration of industrial discharges** into the urban sanitation network, with previous treatment at the company before discharge to collector.
- The **corporate image** improvement in the administration and society.
- **Relationship improvements** with the main stakeholders (customers, suppliers, regulatory agencies, media)
- Facilitates the environmental management and **compliance with current regulations**.

WATER MANAGEMENT BODIES:

- Identification of the problems associated with **global sanitation management**.
- Methodology development for **integrated management** of sanitation systems.
- Strategies for **dialogue and co-responsibility** with companies for their safe integration in sanitation network.
- Tools for decision making and problem solving quickly and easily, thanks to the **global vision** of all sanitation facilities.

ADMINISTRATIONS:

- **Compliance with current regulations** in especially sensitive areas: protected areas, bathing areas, etc.
- **Development of solutions** to the demands of citizens, local entities, large administrations, companies and water services.

IMPACT

The results have been widely disseminated in various events at local, national and international levels:



CONGRESS

Oral presentations: EU Water innovation conference 2019, CEST 2019, HERAKLION 2019, CONAMA Local 19, EWaS 2018, UDM 2018, YWP 2017, Eureau 2017.

Posters: WATERMATEX 2019, CONAMA 2018, iWATER 2016.



WORKSHOPS

Organization of a workshop for the canning industry 2019, celebration of the 25th anniversary of the LIFE program, 2017.

Assistance with conference presentation: Food4Life 2019 Platform, META 2019, Meeting between environmental managers of the food industry, 2017.



EXTERNAL PANEL MEETINGS

3 Contrast tables for presentation and validation of the results (Mach 2017, April 2019 y December 2019).



COLLABORATIONS

Contact and sending information (project brochures, newsletters) to **more than 100 organizations and companies**.



MEDIA

20 media appearances, including press, radio and television programs.

Scientific Article in WATER (Water 2019, 11, 223; doi: 10.3390/w11020223) and **Technical Articles** in specialized journals (FUTURENVIRO and RETEMA).

PROJECT COORDINATOR



Bilbao Bizkaia Ur Partzuergoa
Consortio de Aguas Bilbao Bizkaia

TECHNICAL COORDINATOR



PARTNERS



Duration:

01/07/2016 - 30/12/2019

Total budget:

1.958.998 € (56,02% UE Co-financed)

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