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## 22<sup>nd</sup> EURO-INBO INTERNATIONAL CONFERENCE



2015 | 2025

**UTILITALIA**  
FEDERAZIONE UTILITIES  
acqua | ambiente | energia



Towards the good ecological status of waters: fighting emerging pollutants with innovative solutions

Filippo Brandolini – President of Utilitalia

# Who we are

Utilitalia represents approximately 400 companies operating in the public utility sectors of water, environment, and energy (gas and electricity). Guided by its founding principles, the Federation's mission is to enhance the unique characteristics of its member companies by continuously integrating diverse perspectives.

The widespread presence of these companies across the national territory is a strategic asset that underpins Utilitalia's operational model. Through this approach, Utilitalia drives the industrial evolution of public services, promoting efficient and innovative solutions that support the achievement of national and European objectives in sustainability and energy efficiency

**104.169**

**workers**



**86% water sector  
54% environmental  
sector  
35% gas sector  
17% energy sector**

**Percentage of  
population served by  
members**



**400**  
**companies**



**68,8 mld €**

**value of  
production**



**3,3 mld €**

**profits**



## Challenges in the Wastewater sector

**Climate change** (heavy rainfall become more frequent and intense)

Integrated urban wastewater management plans to fight storm water overflow

**Micropollutants** (microplastics, pharma, endocrine disruptors, PFAS) in wastewater

Quaternary treatments mandatory within 2045 (80% pharma and cosmetics removal) and EPR for pharmaceutical and cosmetic companies

**Green transition**  
(European Green Deal)

Energy neutrality for plants and networks, treated wastewater reuse, resources recovery from sludge



In 2024, Utilitalia, in collaboration with CNR-IRSA, conducted a project focused on monitoring emerging pollutants in wastewater discharges. To assess the impact of seasonality and temperature on the micropollutant removal process, two monitoring campaigns were conducted: the first between February and March 2023; the second between June and July 2023.

- ➔ **Sample made by 22 companies, for a total of 55 wastewater treatment plants (the majority of which are located in the Veneto region)**
- ➔ **Total load exceeds 22.8 million P.E.**
- ➔ **2 monitoring campaigns (winter and summer)**



*Territorial distribution of companies and plants involved*

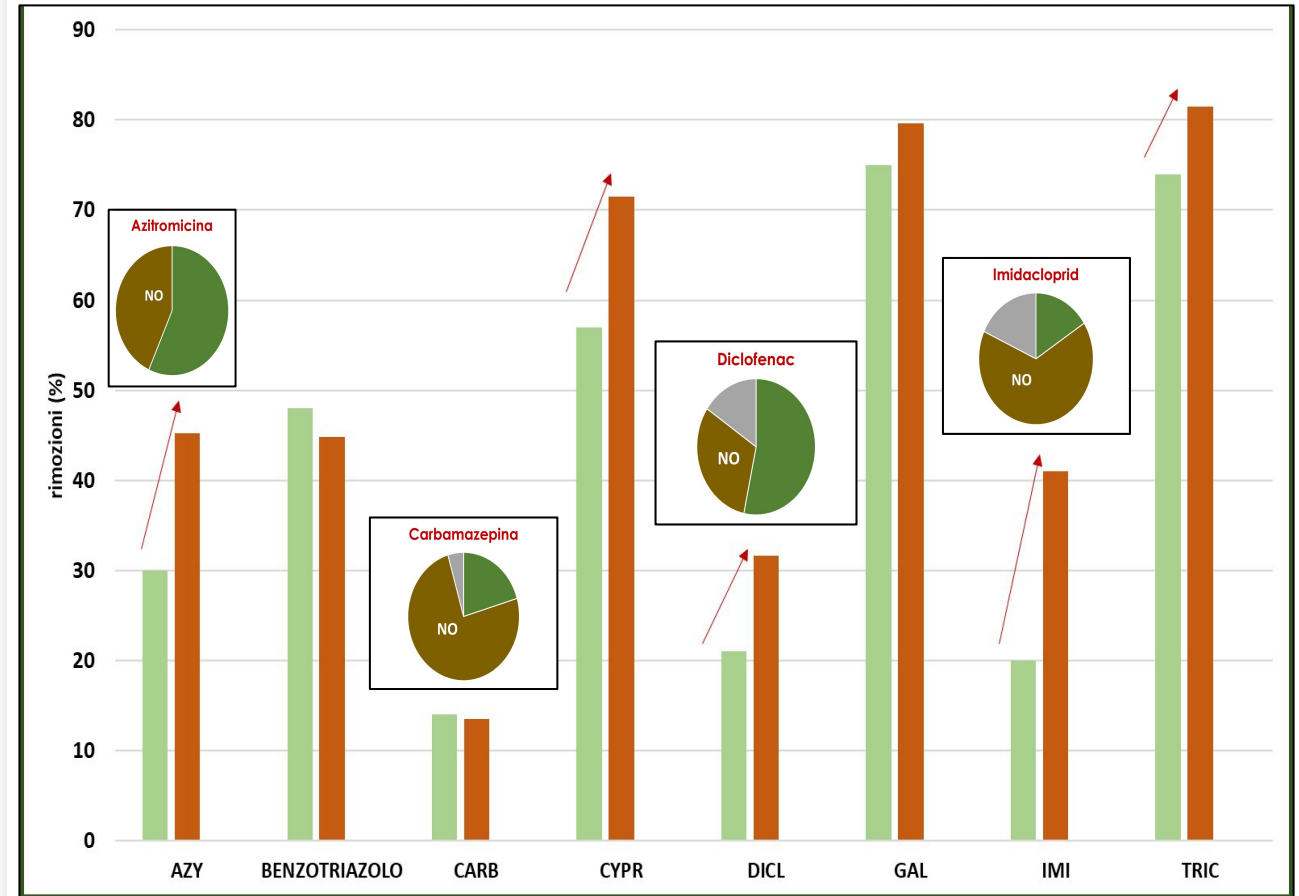
## MATERIALS

### 10 micropollutants monitored:

- **pharmaceuticals:** azithromycin (antibiotic), ciprofloxacin (antibiotic), carbamazepine (antidepressant), diclofenac (pain reliever), triclosan (disinfectant);
- **personal care products:** galaxolide (fragrances);
- **chemicals for household use:** benzotriazole (dishwashing detergents);
- **substances used in agriculture:** imidacloprid (insecticide).

## RESULTS

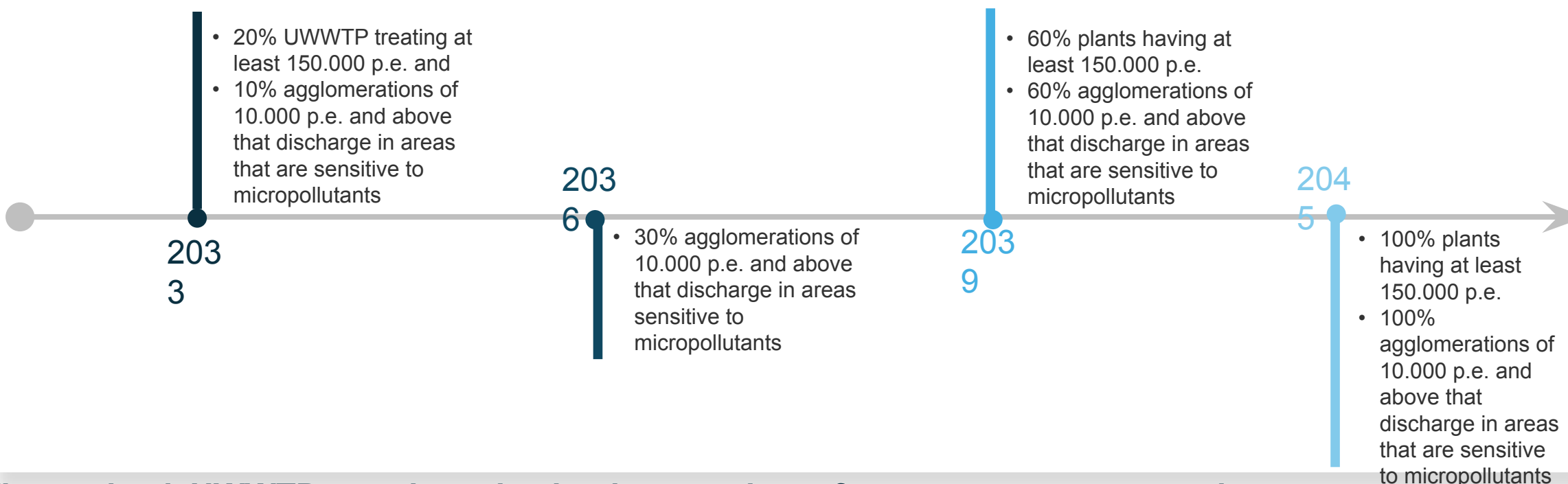
Certain pollutants, particularly pharmaceutical compounds, are often resistant to conventional treatment methods. To achieve up to 80% removal, it is essential to **implement quaternary treatment** processes in conjunction with **Extended Producer Responsibility (EPR)** systems.



The histograms show the comparison of removal medians between the winter campaign and the summer campaign. The pie charts show the detail of the distribution of systems in relation to the removal of certain pollutants (azithromycin, carbamazepine, diclofenac, imidacloprid): in green the fraction of systems that have removed, in brown the fraction of systems that are unable to remove, in gray the fraction of systems where the concentration was not detectable.

Data based on “State of wastewater treatment in Italy” (Italian Ministry of Environment, 2024):

- UWWTP  $\geq 150.000$  P.e.=112;
- UWWTP  $\geq 10.000$  e  $< 150.000$  a.e.=1210 (of which those discharging in sensitive areas to be defined).



The revised UWWTD requires the implementation of quaternary treatment in wastewater treatment plants with a load of 150 000 p.e. and above, as well as in agglomerations with more than 10,000 p.e. that discharge into areas sensitive to micropollutants. The objective is to achieve an 80% removal rate of pharmaceutical and cosmetic substances.



The **most effective solutions** for micropollutants removal are **adsorption on activated carbon, oxidation by ozonation and separation by nanofiltration membranes and/or reverse osmosis**. For the adaptation of existing large plants (>150,000 PE), the **expected investment estimate is between 645 million and 1.5 billion** euros as the sum of the required investment and operating costs, depending on the technology used (Ozone (O<sub>3</sub>); Granular activated carbon biofilter (GAC); Ultrafiltration (UF); Ozone + Granular activated carbon biofilter (O<sub>3</sub> + GAC); Ultrafiltration + Granular activated carbon biofilter (UF + GAC)). The following table shows, for each technological option considered, the estimated total adaptation costs, expressed both in terms of CAPEX + OPEX and as separate values of CAPEX and OPEX.

TRATTAMENTI QUATERNARI E FILIERE	TRATTAMENTI PRESENTI IN EEA 2021	CAPEX+OPEX MEDIO FILIERA [€/a]	CAPEX+OPEX [€/AE/a]	CAPEX MEDIO [€/a]	CAPEX MEDIO TOTALE [€]	OPEX MEDIO [€/a]
O <sub>3</sub>	O <sub>3</sub> +FS	69.316.040	1,8	41.929.790	644.563.648	27.386.249
GAC	FS	141.955.168	3,7	76.041.231	1.168.940.096	65.913.937
O <sub>3</sub> + GAC	O <sub>3</sub> + FS	170.937.874	4,4	101.025.312	1.553.006.665	69.912.562
UF + GAC	MF	16.532.568	8,2	86.545.415	1.330.415.160	229.987.152

Fonte: Blue Book 2025 (elaborazione ENEA)

# Thanks.

