LE2C
LOMBARDY ENERGY CLEANTECH CLUSTER

WEBINAR

MICROPLASTICHE E NORMATIVA EUROPEA:
STATO ATTUALE E FUTURI SVILUPPI

PRESENTAZIONE DEL LAVORO DEL GRUPPO MICROINQUINANTI EMERGENTI E MICROPLASTICHE DEL CLUSTER LE2C

PRESENTATION OF THE WORK OF THE EMERGING MICROPOLLUTANTS AND MICROPLASTICS GROUP OF THE LE2C CLUSTER

GIANNI TARTARI

CO-ORDINATORE AREA WATER ENERGY NEXUS DEL CLUSTER LE2C E GIÀ DIRIGENTE DI RICERCA CNR

enterprise europe network

MARTEDÌ 29 OTTOBRE 2024

LE2C FROM 2009 TO TODAY

2009 Lombardy Energy Cleantech Cluster is established with 8 companies from energy sector

2014 Becomes a «***Recognised Association***» by the Regione Lombardia and one of the 9 Tecnology Clusters in Lombardy

2015 First Italian cluster to obtain the **Gold Label** from ESCA, certifying the excellence of its work

2020 LE2C **Strategic plan 2021-2027** and open VAT number

Today LE2C is a partner of **6 European projects, 2 national projects** and **2 regional projects**

LE2C supports growth, innovation and competitiveness of the production system in Lombardy in the **Energy** and **Environment** sectors

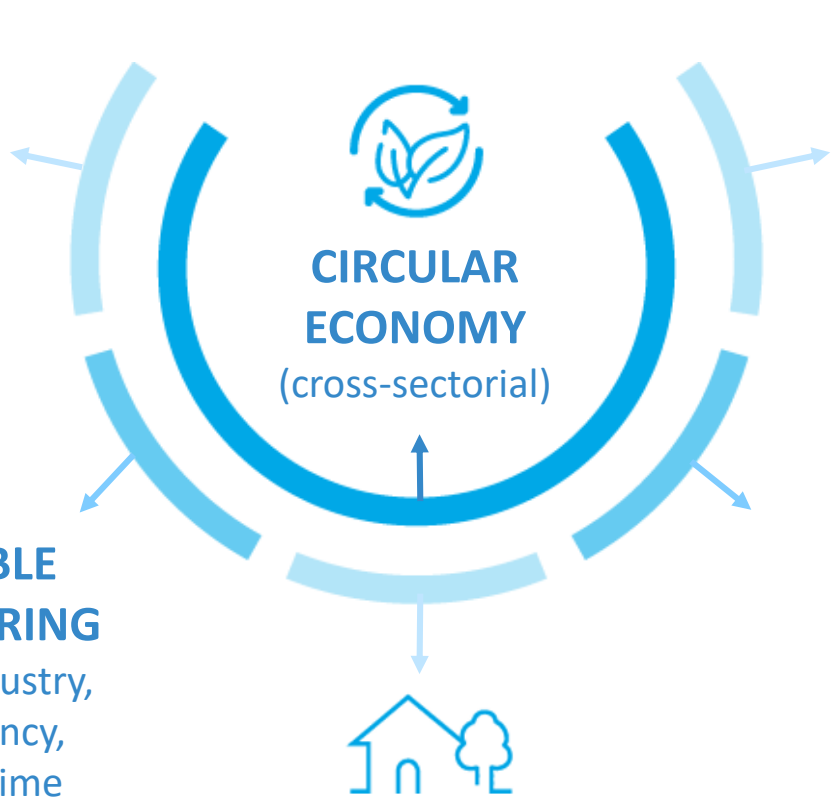
6 THEMATIC AREAS

LE2C LOMBARDY ENERGY CLEANTECH CLUSTER

153
MEMBERS

- **116** Companies
- **11** Research Centres
- **26** Other entities

LE2C has identified **6 Thematic Areas** where research centers and companies work together to **foster innovation, technology transfer and create business opportunities**.



WATER ENERGY NEXUS
Water, environment and energy

CIRCULAR ECONOMY
(cross-sectorial)

CLEAN AIR
Air quality

SUSTAINABLE MANUFACTURING
Sustainable industry, energy efficiency, extended lifetime

SMART ENERGY SYSTEMS
Energy generation and distribution

GREEN BUILDING
Sustainable buildings, NZEB, feasibility of refurbishment works

Each area has at least one contact person from industry and one from research.

EMERGING ISSUES IN WATER ANALYSIS: 1998-2024

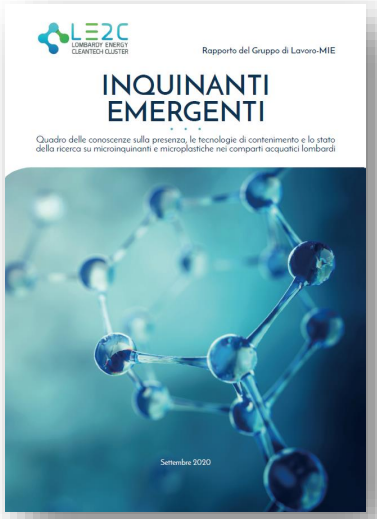
LE2C LOMBARDY ENERGY CLEANTECH CLUSTER

Reviews by Susan D. Richardson, with the collaboration of Thomas A. Ternes and Susana Y. Kimura

Selected issues in biannual "Review contents" of Analytical Chemistry	Water analysis		Water analysis: Emerging contaminats and current issues										
	1999	2001	2003	2005	2007	2009	2011	2014	2016	2018	2020	2022	2024
Nutrients	●												
Inorganic Pollutants		●											
Surfactants		●											
Disinfectants, Disinfection (drinking waters)		●	●	●	●	●	●	●	●	●	●	●	●
Pesticides		●											
Pesticides Degradation/Transformation products				●	●	●	●	●					
Pharmaceuticals, Hormones, Endocrine Disrupting Compounds		●	●	●	●	●							
Pharmaceuticals and Hormones							●	●	●	●	●	●	●
Perfluorinated Compounds				●	●	●	●	●	●	●	●	●	●
Brominated and Emerging Flame Retardants				●	●	●	●	●	●	●	●	●	●
Musks						●	●	●					
Sunscreens				●	●	●	●	●	●	●	●	●	●
Algal Toxins		●	●	●	●	●	●	●	●	●	●	●	●
Nanomaterials						●	●	●	●	●	●	●	
Microplastics											●	●	●
SARS-CoV-2												●	

Review carried out for 25 years by the same person (+collaborators)

CHAPTERS OF 1ST REPORT OF GDL MIE 2020



Chapter 1

Data of **micropollutants** in Lombardy's water bodies carried out by ARPAL, SII Companies and Research Institutes (2009-2019)

Chapter 3

Microplastics in water bodies: available knowledge, need for research and treatment technologies

Questionnaire sent to SII

Report

«Emerging pollutants»

Questionnaire sent to SII

Treatment technologies: efficiency in containing emerging micropollutants and research needs

Chapter 2

Reviewed publications

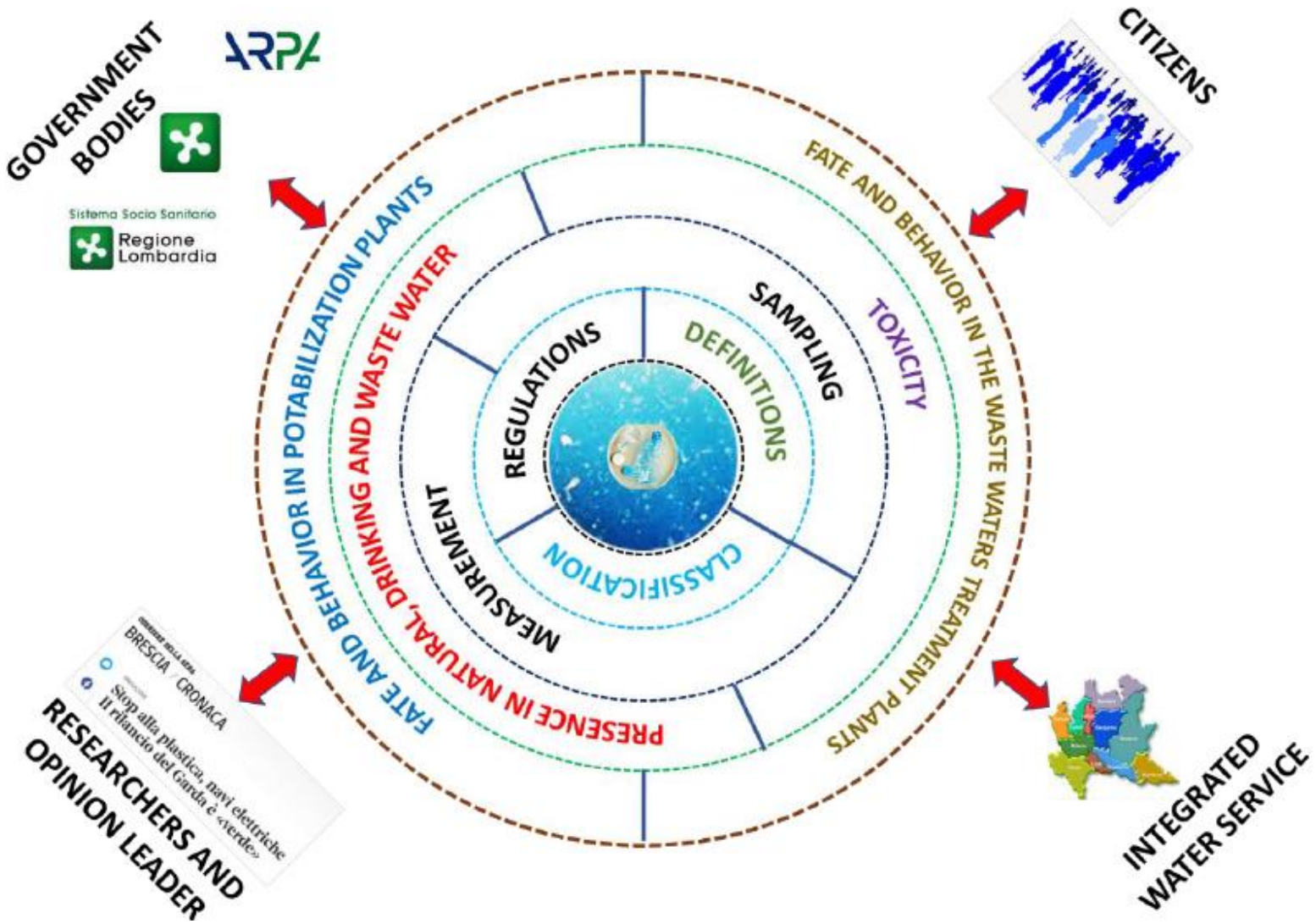
Appendix 1

STAKEHOLDERS INVOLVED AND TARGET TOPICS

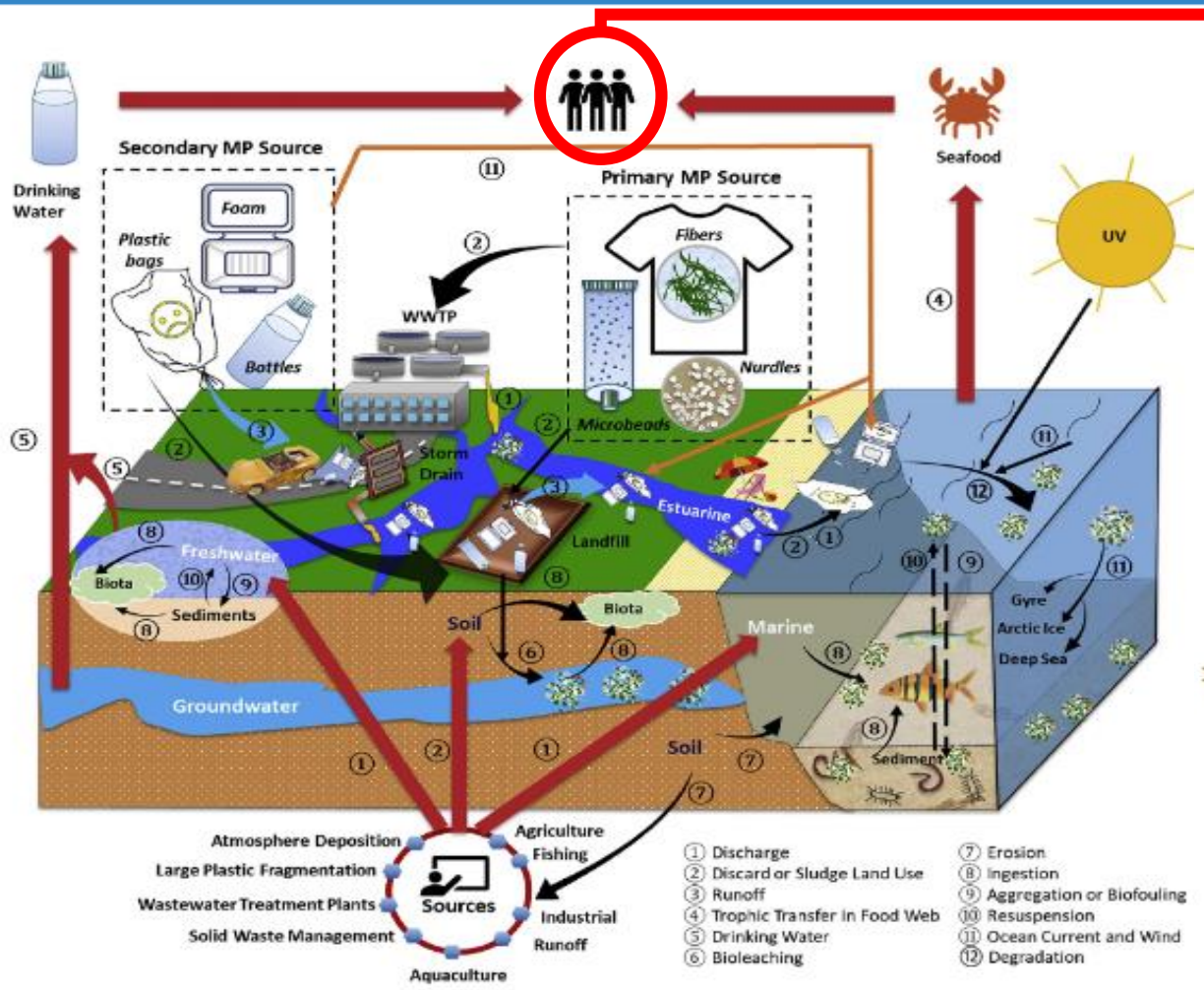
LE2C LOMBARDY ENERGY CLEANTECH CLUSTER

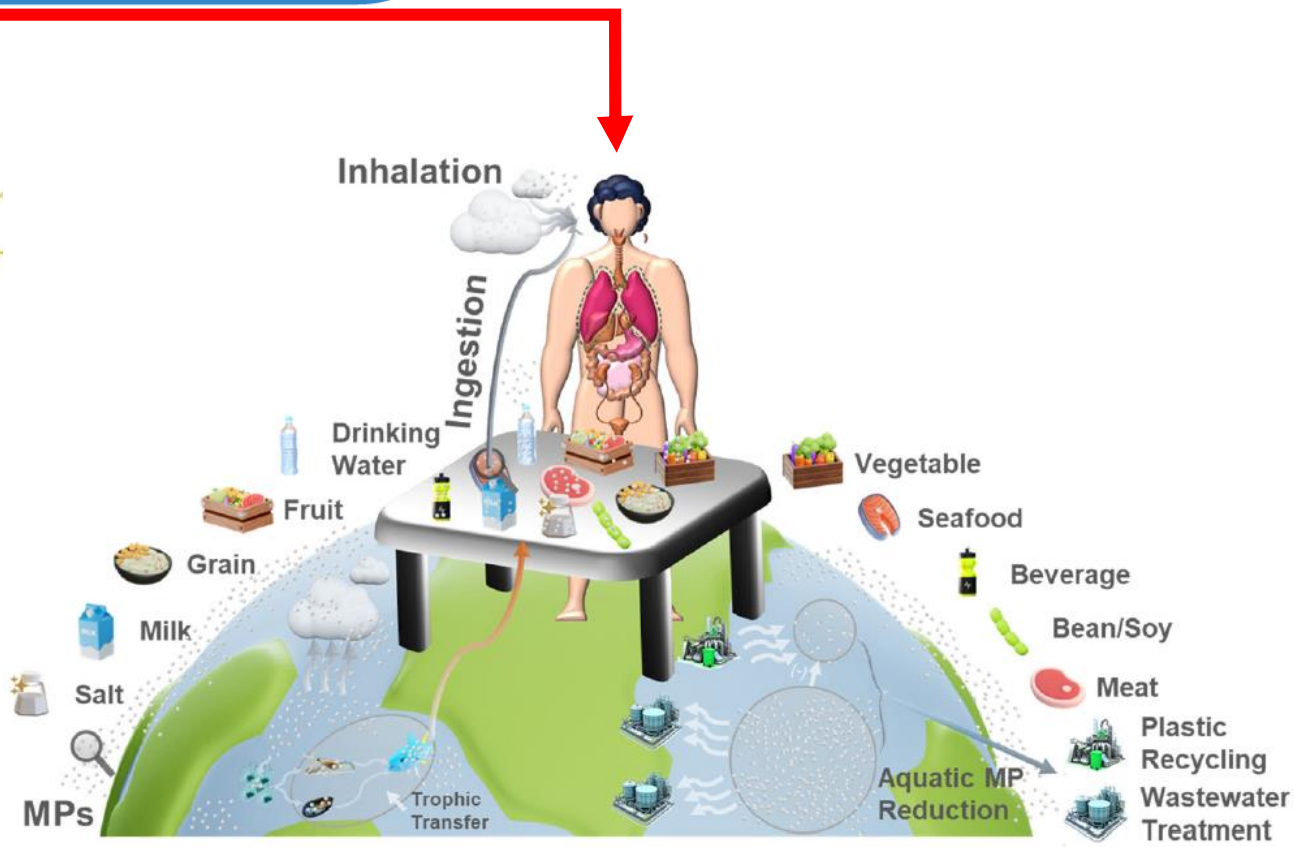
Microplastics in the aquatic compartment are on the attention of many stakeholders

*



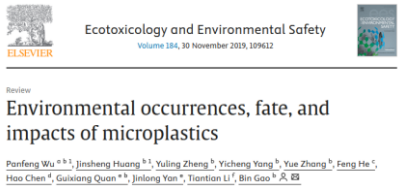
PLASTIC FATE: ENVIRONMENT & HUMAN





MPs: 1 µm – 1 (5) mm

Before 2020

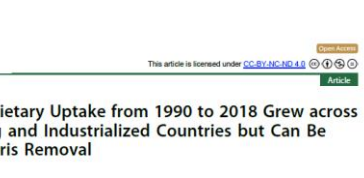

Ecotoxicology and Environmental Safety
Volume 184, 30 November 2019, 109612

Review

Environmental occurrences, fate, and impacts of microplastics

Panfeng Wu [a b 1], Jinsheng Huang [b 1], Yuling Zheng [b], Yicheng Yang [b], Yue Zhang [b], Feng He [c], Hao Chen [d], Guixiang Quan [a b], Jinlong Yan [a], Tiantian Li [f], Bin Gao [b]

After 2020


Environmental Science & Technology

This article is licensed under CC-BY-NC-ND 4.0

Article

Microplastic Human Dietary Uptake from 1990 to 2018 Grew across 109 Major Developing and Industrialized Countries but Can Be Halved by Plastic Debris Removal

Xiang Zhao and Fengqi You*

PRESENCE IN THE ENVIRONMENT

Aquatic compartment	Italy/Europe	World
Rivers (MPs/m^3)	1- 300	$< 1 – 1{,}6 \cdot 10^6$
Lakes (MPs/km^2)	$(< 1 – 5{,}5) \cdot 10^4$	$(2 – 19) \cdot 10^4$
Oceans (MPs/km^2)	$(< 1 – 25)$ Until $1{,}3 \cdot 10^5$ in Mediterranean sea	$1{,}7 \cdot 10^6$ Japanese sea
Sediments (MP/kg_{SS})	185 - 2.175	178 - 980

Uncertainties and goals

- **research** and **innovative products**;
- sampling and analysis **methods** (size ranges…);
- **units of measurement** (volumes / surfaces / weights);
- extent of **environmental contamination**
- **legislation** and **regulation**;
- coordinated and innovative **management** and **treatment**
- **socio-economic aspects** / **education**;
- etc.

GDL-MIE | PHASE 2

3 Technical Working Sub-groups

Monitoring and Analytical Techniques

Analyzing guidelines and protocols for **emerging micropollutants (EMPs) and microplastics (MPs)**.
Comparing criteria for the **optimal execution of analyses on wastewater and drinking water** treatment systems.
Assessing analytical sensitivities in relation to **matrix types** and the challenges associated with **pollutant identification.**

Technologies for Wastewater and Drinking Water

Evaluating the fate and removal of EMPs and **MPs** in wastewater treatment plants and water for human consumption, including treatment residues, with the aim of **promoting knowledge in the field for the improvement of existing facilities and the implementation and planning of new interventions**.

Environmental and Human Risk

Identifying **actions aimed at understanding the environmental fate of EMPs and MPs** and their **ecotoxicological** and **human health effects**.

SECOND REPORT

"Emerging Pollutants and Microplastics – Strategies looking to the risk"

INDEX OF THE 2ND VOLUME: MIE & MPS

- *Preface*
- **Summary of the Report**
- **Premise**
- **Introduction**

1. Monitoring and Analytical Techniques

1. Perfluorates in the environment
2. Antibiotics and antibiotic resistance
3. Fragrances in the aquatic environment
4. 1.3 Fragrances in the aquatic environment

2. Environmental and human risk

- FIRST PART - Exposure, effects and risk assessment of MIEs and MPs
- SECOND PART - Toxicity assays for wastewater and water for human consumption
- PART THREE - Evaluation of assay results, regulations and criteria

3. Wastewater and drinking water technologies.

1. Treatment processes for removal of emerging micropollutants (MIEs) and microplastics (MPs)
2. Required removal efficiencies and criteria for setting up treatment chains for MIEs
3. Risk analysis as a decision support tool in ONE-HEALTH perspective
4. Case studies from companies

- **Conclusions and perspectives in the management of micropollutants and microplastics**
- **Appendices**
- **Bibliography**

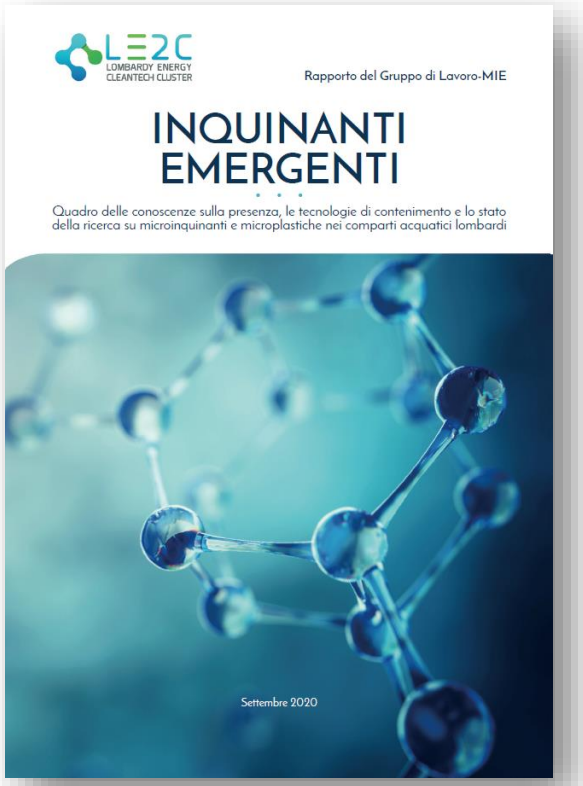
STRATEGIC THINKING FRAMEWORK

To address the problem of EMPs and MPs, it is necessary to operate by interacting between **companies** (water service managers and technology suppliers), **public bodies** (planning and control), **academia** and **citizens** to identify sustainable solutions.

The challenges of removing EMPs and MPs will have to be addressed, planned and managed in a **system logic** with the adoption of **integrated solutions**, considering the interests of the actors in order to guarantee:

- protection of human health;
- environmental preservation;
- sustainability linked with economic development;
- optimizing and preserve the use of the natural and economic resources of the territory.

MIE REPORTS AVAILABLE (& NEXT)



IN PROGRESS

THANK YOU!

LE2C
LOMBARDY ENERGY CLEANTECH CLUSTER

Regione Lombardia
Tecnologici Lombardi

Info & Contacts
LE2C | Via Pantano, 9 - 20122 Milano (M3 Missori)
tel. +39.02.58370816 - info@energycluster.it
www.energycluster.it

Follow us
@LE2Cluster