H2OforAll: Insights and achievements of the project

safe CREW

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Funded by the European Union

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Innovative Integrated Tools and Technologies to Protect and Treat Drinking Water from Disinfection Byproducts (DBPs)

Funded by the European Union

Under the Grant Agreement: GA101081963

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Innovative Integrated Tools and Technologies to Protect and Treat Drinking Water from DBPs

24th October 2025

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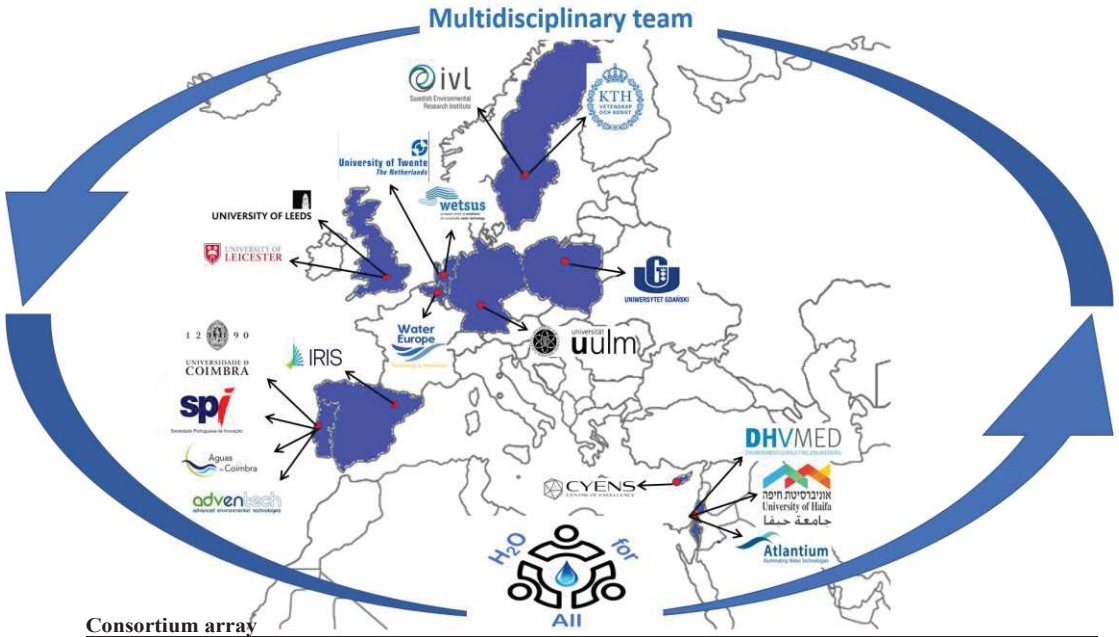
Context

- ❑ Water disinfection processes are crucial to provide safe drinking water and avoid diseases
- ❑ The increasing contamination of water sources imposes heavier loads of disinfection agents
- ❑ Disinfection byproducts (DBPs) are produced from the reaction of chlorine disinfectant with organic matter in water
- ❑ DBPs have a serious impact on the environment and human health (not yet fully understood)
- ❑ DBPs are not easy to monitor due to their very low concentration and physicochemical properties
- ❑ There is the need for establishing regulatory values for this kind of pollutants

Water Quality for Public Health requires integrated actions of water protection and new solutions for disinfection

H2OforAll Overall Goals:

Understanding & monitoring disinfection by-products (DBPs) and their spread through drinking water distribution systems.
Breakthrough water treatments to remove DBPs or avoid their formation during water disinfection processes will be developed, paying attention to their life cycle analysis, costs and risks. Establishing preventive measures for water protection engaging public and stakeholders.



Consortium array

Universities	Non-Governmental Organizations	SMEs	Large Company	Public Company
44%	22%	22%	6%	6%

2 Technology Readiness Level (TRL) 6

Coordinator: University of Coimbra

18 partners from 10 countries

4 MEur of investment to raise knowledge on DBPs effects and drinking water quality, and develop smart advanced solutions for its monitoring, control and treatment, during 36 months

Pilot site: Águas de Coimbra

⇨ drinking water supply to about 85 000 clients (end-users) in the region of Coimbra (PT)

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WP 2

DBPs Sensing, Analysis and Monitoring

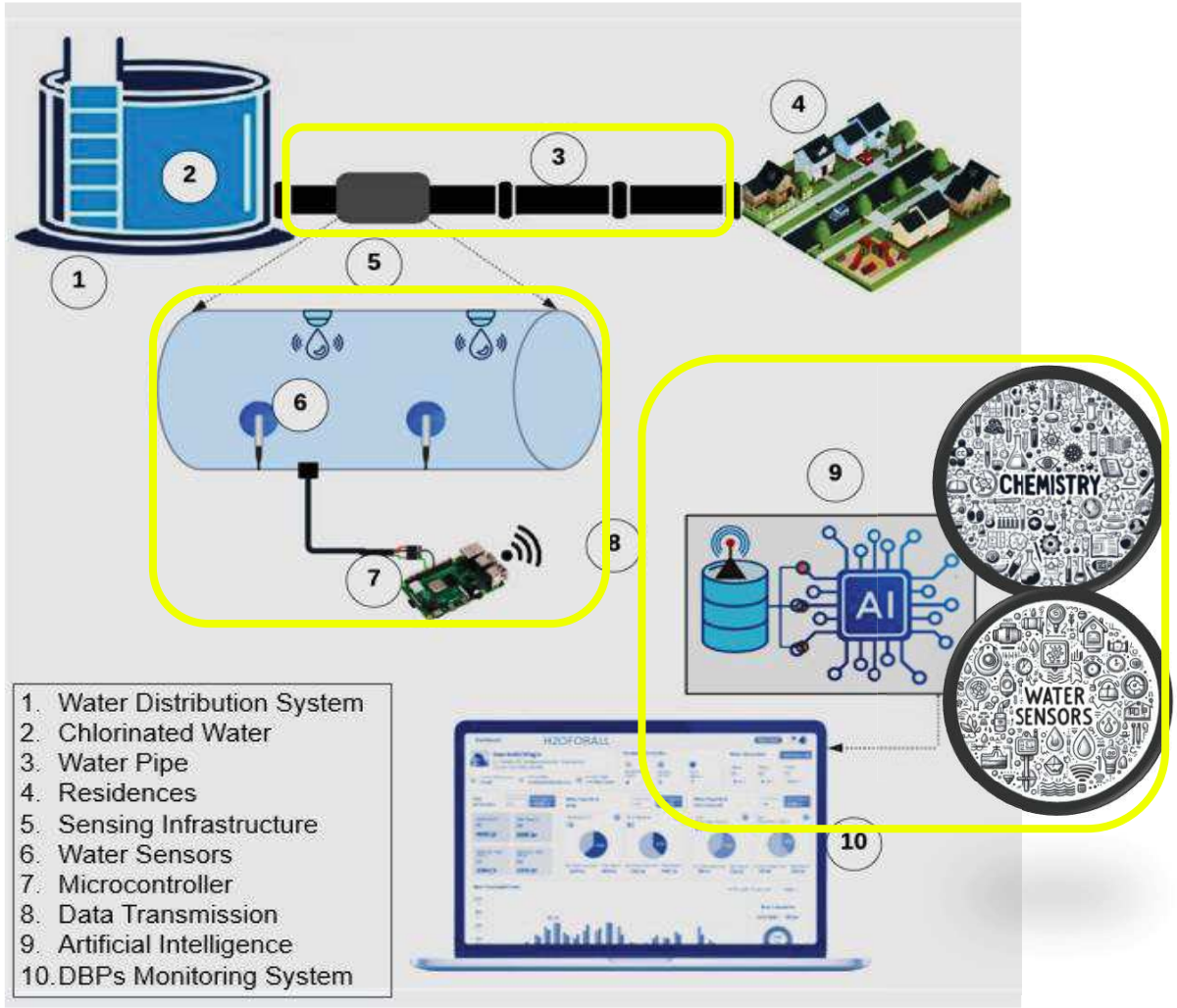
Research Question

How can auxiliary sensing reliably detect and monitor Disinfection By-Products in the chlorinated drinking water distribution systems using probabilistic models?

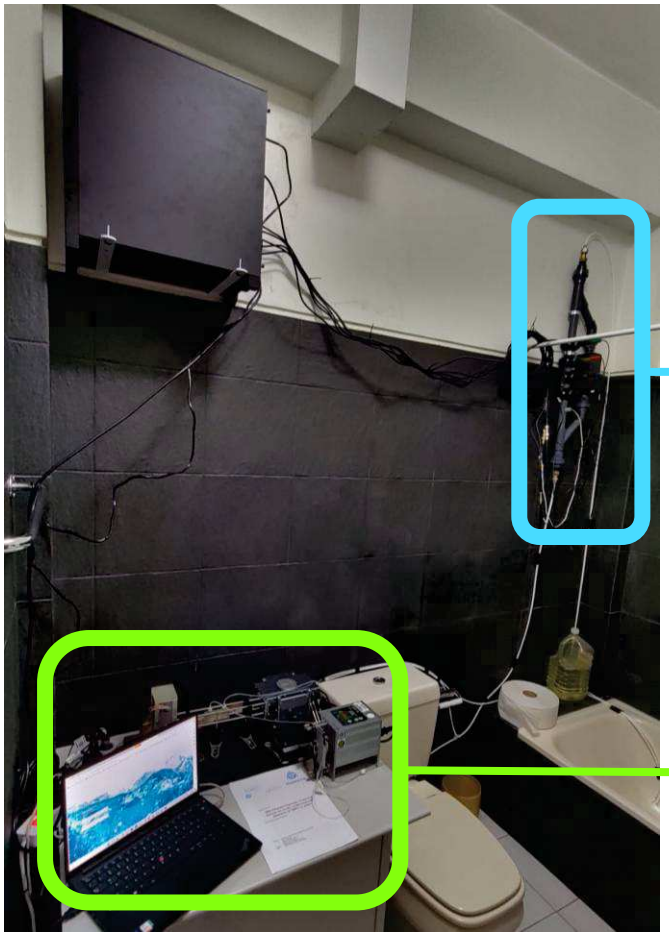
Phase 1
Rate of change of WQP influencing the formation of DBPs

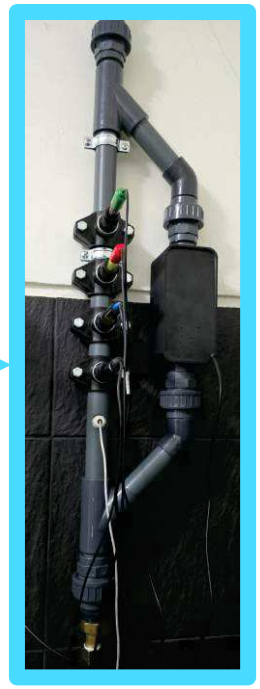
Phase 2
Probabilistic model to detect the concentration of DBPs

Phase 3
Strategic placement of the sensing device

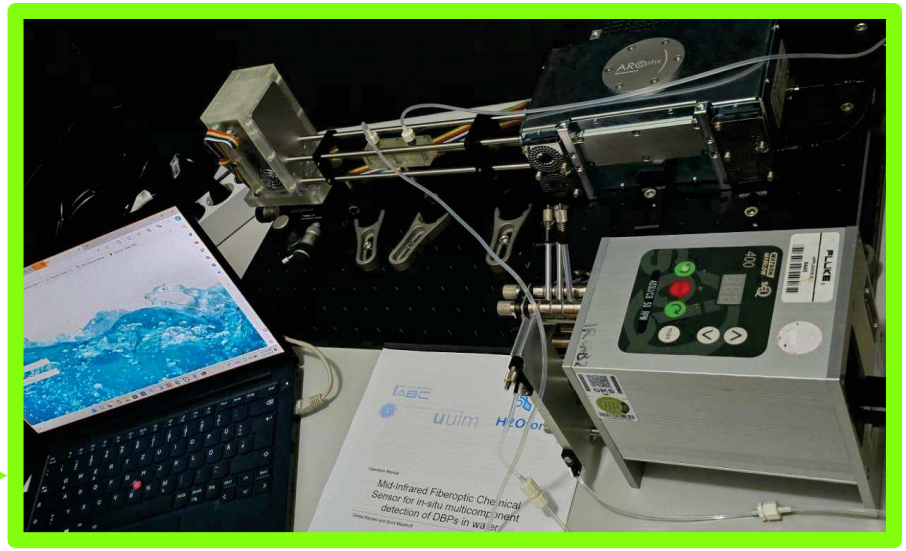


Device Deployment (Location: Coimbra, Portugal) – Data Collection





Water Quality Parameters data from auxiliary sensor (WETSUS & UT)



DBPs concentration data from IR-ATR (UULM)

WP 3 Environmental Impact and Risk Assessment of DBP

Screening and toxicity assessment analysis of DBPs via Multi Criterion Decision Making (MCDM) Techniques

Name of the Disinfection Byproduct	Value [Ci*] Original Score ToxPi	Original Ranking ToxPi	Value [Ci*]+10%	Ranking +10%	Ranking difference +10 %	Value [Ci*]-10%	Ranking -10%	Ranking difference -10 %
2,2-Dibromoacetamide (DBAcAm)	0.705188714	52	0.04330541	44	8	0.04290272	46	6
2,2-Dichloroacetamide (DCAcAm)	0.72507497	62	0.045863203	51	11	0.044572394	53	9
2,2,2-Trichloroacetamide (TCAcAm)	0.968764207	94	0.068208097	92	2	0.06812872	95	-1
Chloroacetamide	0.454405453	26	0.032018124	24	2	0.031912074	26	0
Bromoacetamide	0.794039028	56	0.048498875	54	2	0.04831618	57	-1
Iodoacetamide	0.785415764	59	0.049320654	57	2	0.049067205	59	0
Bromochloroacetamide	0.60765366	61	0.05151386	58	3	0.051334753	61	0
Dibromoacetamide	0.794039028	56	0.048498875	54	2	0.04831618	57	-1
Bromoiodoacetamide	0.729303851	55	0.047242938	53	2	0.0470641	56	-1
Bromodichloracetamide	0.817221626	75	0.0604196	73	2	0.060312854	77	-2
Dibromochloroacetamide	0.978222312	98	0.06963173	95	3	0.069548229	98	0
Tribromoacetamide	0.933239192	96	0.069162218	93	3	0.069086269	96	0
Diiodoacetamide	0.452082431	30	0.032653987	26	4	0.032400539	28	2
Chloroiodoacetamide	0.716760615	83	0.061457468	78	5	0.061220409	81	2
Trichloronitromethane Chloropicrin (TCNM)	0.611804788	67	0.058062069	65	2	0.058062015	68	-1
Bromonitromethane (BNM)	0.668969977	65	0.055731788	62	3	0.055578551	65	0
2,2-Dichloroacetonitrile (DCAN)	0.939459408	106	0.082861597	103	3	0.082810232	107	-1
2,2-Dibromoacetonitrile (DBAN)	0.991688534	111	0.089668163	108	3	0.089545831	111	0
2,2,2-Trichloroacetonitrile (TCAN)	0.938978034	102	0.074829159	100	2	0.07482877	103	-1
Chloroacetonitrile	0.773637912	97	0.069783577	96	1	0.069776347	99	-2
Bromoacetonitrile	0.659699269	66	0.057141361	63	3	0.057020635	66	0
Iodoacetonitrile	0.693903252	77	0.060476915	74	3	0.060295934	76	1
Dichloroacetonitrile	0.732733242	70	0.058571853	67	3	0.058478443	70	0
Bromochloroacetonitrile	0.458733945	25	0.031234199	21	4	0.031090925	23	2
Dibromoacetonitrile	0.730558857	85	0.063555195	83	2	0.063432863	85	0
Trichloroacetonitrile	0.821974514	90	0.066982252	90	0	0.066981863	93	-3
Bromodichloroacetonitrile	0.428126505	22	0.030674672	20	2	0.030491977	21	1

TOXPI Datasheet | TOXPI Sens+10 | TOXPI Sens-10 | Ranking+-10% | TOPSIS vs ToxPi

ToxPi Ranking Vs Sensitivity Analysis +10%/-10% Ranking

Preventative Measures to Protect Drinking Water
Structure of the Review

- Legal framework (EU and National)
- Management of drinking water (at national level)
- Preventative measures (e.g. risk Management)
- Context of climate change

Report on Prevention Measures – D3.3

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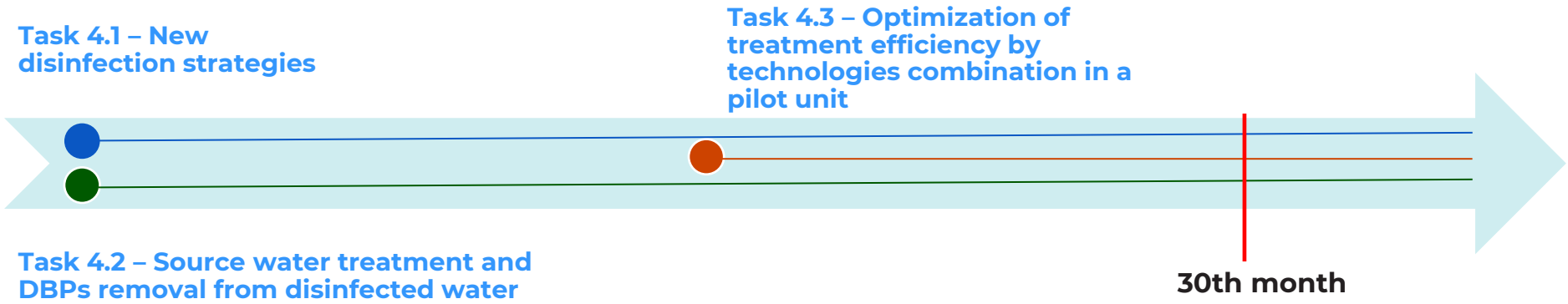
WP 4

Advanced and Cost-Effective Treatment Technologies for Drinking Water

Objectives

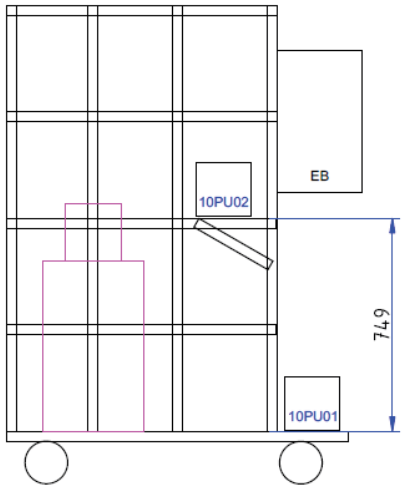
- Development of advanced and cost-effective alternative disinfection processes to prevent/minimize DBPs production.
- Development of several cost-effective DBPs' treatment technologies for drinking water.
- Assembly of an integrated DBPs' treatment pilot unit for drinking water (reducing DBPs level in drinking water below WHO Guideline Values).



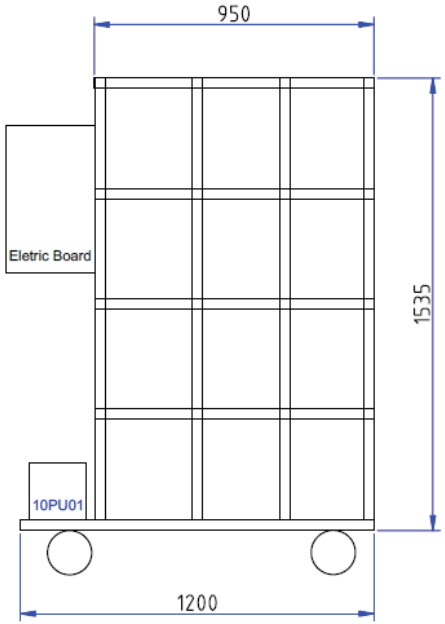
Task 4.3 – Optimization of treatment efficiency by technologies combination in a pilot unit [M18-M36]

Pilot Unit Construction

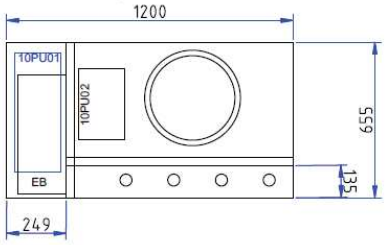
Back view



Front view



Top View



WP 5

LCA/LCC

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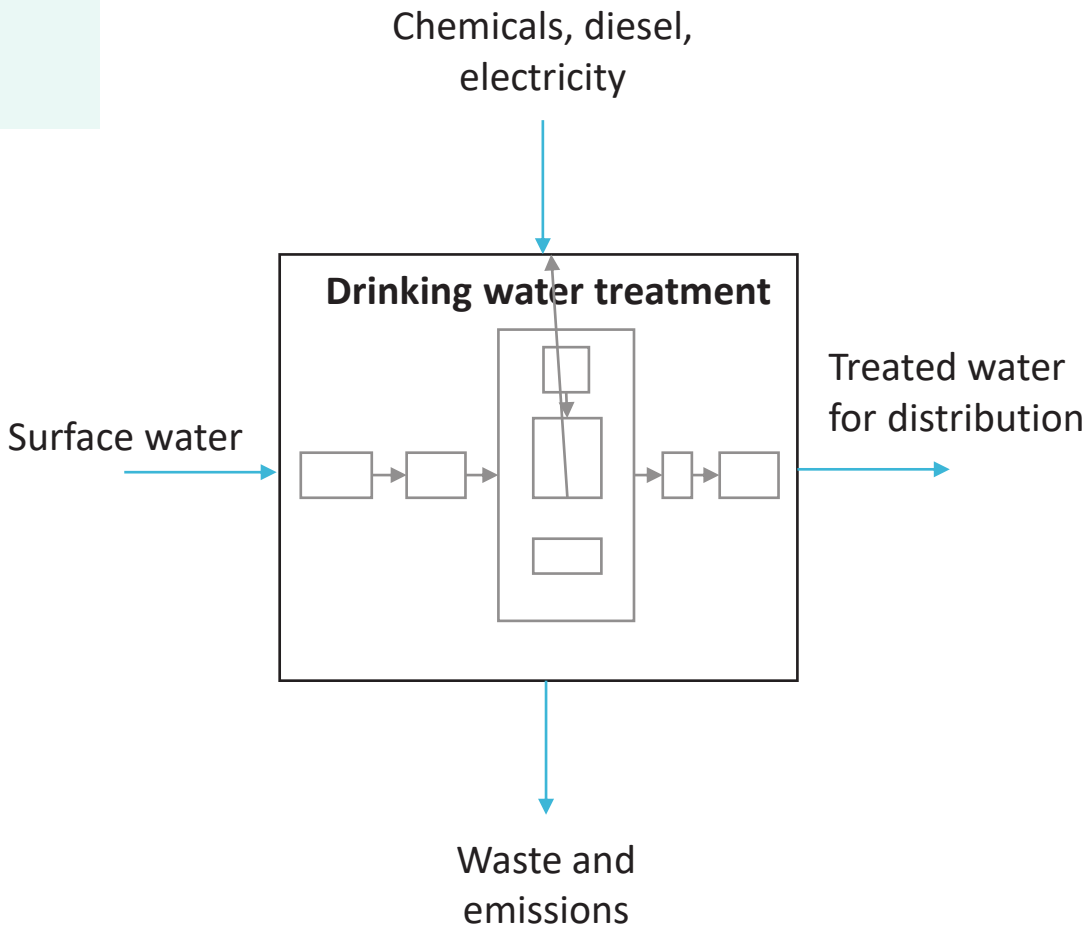

WP 6

Guidance on Measures, Policy and Public Engagement

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Task 6.2: Recommendations on Prevention Measures for Safety Planning

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OBJECTIVES

- **O6.3:** To **select optimal preventions methods** for safety planning.
- **O6.4:** Create **informed recommendation on prevention measures** for safety planning of water quality.
- **O6.5: Organize workshops and online consultations** with multiple stakeholders to assess safety planning recommendations.

TASK 6.2:

- Recommendations on prevention measures for safety planning. *[M13-M36, **DHV,** Water Europe, Universidade de Coimbra, University of Haifa, University of Leeds]*

Activities:

- Content development based on preventative measures report (D3.3)
- Stakeholder mapping
- Workshop organisation

Task 6.3 – Policy Recommendations

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OBJECTIVES

- **O6.6:** To **inform EU policy makers** on sister project findings, preventive measures for safety planning and all technical project outputs.

TASKS:

- **6.3:** EU Policy Recommendations.
  *[M13-M36, **Water Europe,** DHV, University of Leeds]*

ACTIVITIES:

Water Europe (supported by **DHV**) leads discussion group in the policy advisory working group (PAWG) of the ZeroPollutionWater Cluster

KPI: draft 3 policy briefs.

ZeroPollution4Water CLUSTER

QR code to joint policy brief

Impact targets:
- Industry
- Research
- Policy
- Citizen


Motor Cross Team

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THANK YOU
FOR YOUR ATTENTION

Contact us:

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https://h2oforall.eu/

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