WPE Post-event Report

RESURGENCE – CORNERSTONE – R3VOLUTION
iWAYS – BOOST-IN

Innovation in industrial water for a Water-Smart Society and Economy

3 Dec 2025 #2

Introduction

As part of RESURGENCE's clustering events focused on **Circularity in Industrial Water**, this second meeting followed the first online webinar with an in-person session in Brussels, delivered in the Water Projects Europe format as a side event of the **Water Knowledge Europe Winter Edition 2025**. Held in presence, the session gathered around 100 participants**.** With industrial water circularity gaining urgency across Europe's value chains, the event built on this common thread through a session titled **"Innovation in industrial water for a Water-Smart Society & Economy"**.

The session convened stakeholders to explore how circular approaches to industrial water can strengthen **resilience, competitiveness and sustainability** across European value chains. Against the backdrop of increasing water scarcity, pollution pressures and competition for resources, the event positioned industrial water management beyond a linear input-output logic, highlighting circularity as a practical pathway for reducing impacts while securing operational continuity. The discussions also reflected the growing policy momentum around circular industrial water use, anchored in the **EU Zero Pollution agenda** and the **Water Resilience Strategy**, and emphasised that progress depends not only on technology, but on systemic transformation and collaboration across sectors. At the same time, the event was marked by the concern that every additional administrative or technical burden (e.g., reporting, stricter limits, water use quota, ...) will further impair the global competitiveness of European industry.

The programme showcased case studies and demo cases from RESURGENCE, CORNERSTONE and R3VOLUTION—three Horizon Europe projects developed under the **Processes4Planet partnership (A.SPIRE)**—each demonstrating solutions for **water reuse, energy and resource recovery, and pollution reduction** through pilots in strategic industrial sectors. The event also featured iWAYS as a mature reference from SPIRE and BOOST-IN as an additional perspective on circular-economy impact.

CONTEXT

Against this backdrop, the session explored how cutting-edge innovations can unlock smarter water reuse, energy recovery, feedstock reclamation, and digital optimisation across diverse industrial contexts. At the heart of the discussion were the three sister projects, each offering a complementary approach to industrial circularity:

CORNERSTONE Integrates innovative technologies into existing industrial wastewater systems to recover water, energy, and solutes, advancing practical solutions for circularity across multiple sectors.

R3VOLUTION Deploys breakthrough membrane-based technologies and AI-driven tools to achieve over 90% water reuse, alongside effective solute and heat recovery—a step-change in industrial water management.

RESURGENCE Implements advanced technologies to enable water reuse, energy recovery, and feedstock valorisation, building seeds for circularity that connect industries, urban systems, and value chains.

iWAYS Develops and demonstrates integrated circular water solutions for industry, combining advanced treatment, resource recovery and digital tools to improve efficiency, reduce emissions and support compliance across real industrial sites.

BOOST-IN Builds a European innovation ecosystem for industrial water circularity, supporting innovators through visibility and matchmaking tools (including the Marketplace), and engaging Regions of Opportunity via co-creation, capacity building and replication pathways.

About A.SPIRE

A.SPIRE is the European association managing the Processes4Planet (P4P) public–private partnership with the European Commission. It represents ten process industry sectors, including chemicals, steel, minerals, food, paper, ceramics, and water, accounting for around 20% of EU manufacturing. It funds and coordinates research, innovation, and demonstration projects that bridge technology development with large-scale industrial deployment.

Agenda

Opening & Keynote

Driving Industrial Water Transformation

- Welcome Address – Durk Krol, Water Europe
- Keynote Speech – Heleen Nieuwenhuis

Session 1

RESURGENCE– Reuse, Resource, Recovery

- Project overview: revolutionize industrial water management
- Optimising Industrial water recovery: digital process assistant (DPA) and membrane-based solutions
- Scaling impact: demonstration sites and industrial replicability

Session 2

CORNERSTONE – Integrated solutions for water, energy and solute recovery in industry

- Project overview: circularity in wastewater treatment
- Building the CORNERSTONE: technological integration and digital tools for a cross-sectoral shift
- Implementing circular solutions in industrial wastewater: challenges and opportunities

Session 3

R3VOLUTION – Embracing Circularity in Industrial Water Use

- Project Overview: Industrial Water-Energy-Feedstock Circularity
- Innovative Technologies & Case Studies

Session 4

GUEST PROJECTS PRESENTATION

- iWAYS: Matteo Venturelli, UNIMORE
- BOOST-IN: Thomas Track, DECHEMA

PANEL Session

Shared vision: enabling circular industry through efficient water management

- Industry needs and policy levers
- Projects collaborative roadmap and replication potential
- Q&A

Closing remarks and takeaways

Keynote

Heleen Nieuwenhuis (Nalco Water)

Heleen is Marketing Director Total Water Management at Nalco Water, an Ecolab company. Active in the water sector for nearly 30 years, she combines a strong background in chemistry (PhD) with extensive experience in innovation. In her current role, Heleen focuses on industrial water circularity, with a particular emphasis on market adoption and business models. She is also a member of Water Europe's Water-Smart Industries Community of Practice.

In the opening keynote, Heleen Nieuwenhuis framed **water resilience for industry as a business issue**, positioning water as a strategic resource that directly affects business continuity, competitiveness and regulatory compliance. Heleen highlighted the need for European industries to prioritise water resilience, framing water as a strategic resource affecting business continuity, competitiveness and regulatory compliance.

Building on the core message that **water is an essential resource**, she underlined the need for Europe to strengthen water security and preparedness for water-related disasters. Referring to figures cited in her intervention, she noted that by 2030 global water demand is expected to exceed available resources by 40%, reinforcing the urgency to safeguard both availability and quality. In this context, Heleen referred to the European Commission's Water Resilience Strategy as a driver to improve water management while strengthening Europe's competitiveness and innovation capacity.

To accelerate uptake of water-smart technologies, the Heleen stressed that **innovation programmes need to integrate the business-case perspective and viable business models**, recalling that "*innovation ≠ invention*" and that innovation is an economic concept rather than a purely technological one (Figure 1). The keynote concluded with a call for collaboration, clearer data and practical solutions, supported by appropriate financial incentives to secure industrial operations and help build a stronger, more competitive Europe.

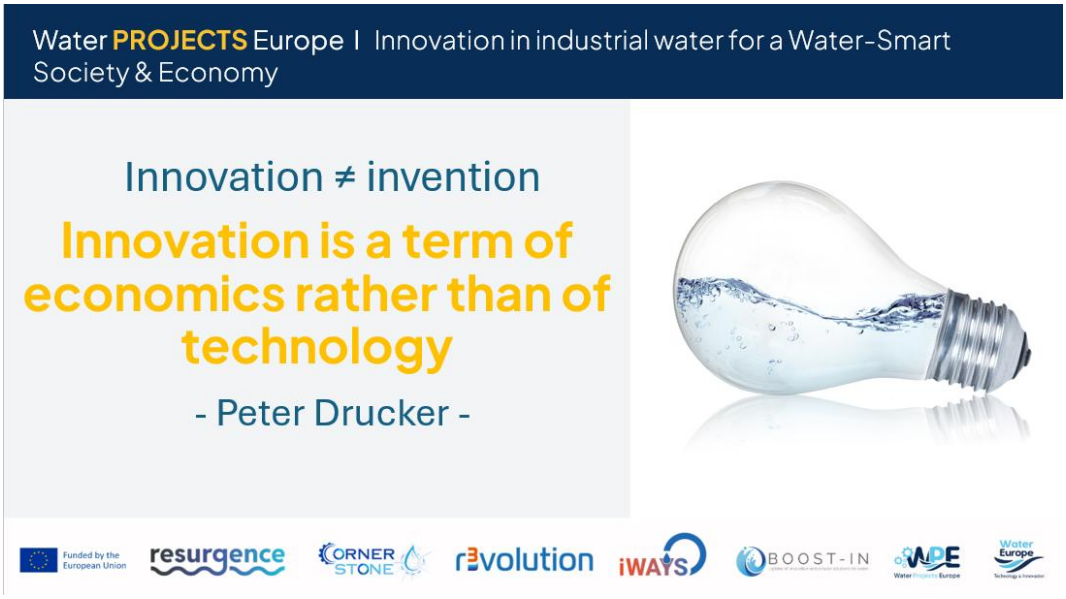

Figure 1 Quotation from Peter Drucker highlighting the difference between innovation and invention

Main Session

RESURGENCE

Xuefei Yang (KWR)

Project Coordinator of RESURGENCE, with expertise in integrated water management, innovation coordination, and stakeholder engagement. She connects advanced technical solutions with governance, business models, and industrial–urban collaboration to drive a sustainable and competitive circular economy in Europe's process industries.

Xuefei Yang provided a comprehensive introduction to **RESURGENCE**, a Horizon Europe project that aims to transform EU process industries into fully integrated Wastewater Resource Recovery Facilities. Her intervention highlighted how RESURGENCE addresses three key EU 2050 goals—climate neutrality, circularity, and industrial competitiveness—through an ambitious combination of advanced water-treatment technologies, resource valorisation strategies, and digitalisation tools. She introduced the project's unifying concept, the "Seeds of Hubs for Circularity", nicely illustrated in Figure 2, explaining how each case study serves as a seed that demonstrates circular solutions capable of evolving into fully operational industrial–urban circular ecosystems.

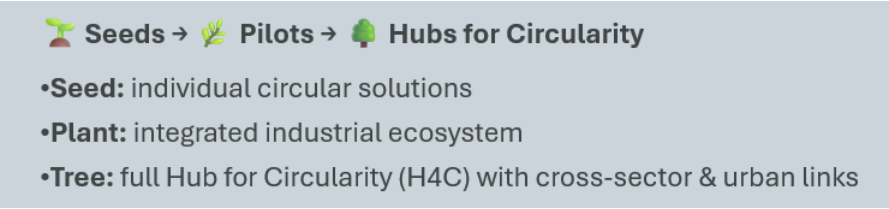

Figure 2 RESURGENCE concept and methodology for Seeds of Hubs for Circularity

Xuefei provided the strategic narrative and technical context for the full RESURGENCE case study portfolio focusing on three case studies that showcase RESURGENCE's cross-sectoral approach. Figure 3 shows altogether the 4 case studies of the project. For the pulp and paper sector (Navigator), she detailed the challenges of alkaline bleaching effluent and the opportunities for achieving up to 95% water recovery, resource extraction (lignin, cellulose, PHA, biochar), and heat recovery. For the steel sector (CELSA), she presented solutions for recovering critical raw materials from cooling circuits, reducing chemical use, improving corrosion management, and stabilising operations through real-time sensor monitoring. Finally, she explained the unique urban–industrial symbiosis case (AQUALIA), where regenerated urban wastewater and energy carriers (biogas, H_2, RED energy) are used to supply industrial facilities, demonstrating large-scale circularity at territorial level.

Figure 3 Overview of RESURGENCE 4 case studies

Dilara Bakan

Dilara is a chemical engineer and started working at Organik Kimya as a production engineer.She is currently serving as a Project Leader at Organik Kimya, overseeing the execution of various investment projects. She serves as the technical project responsible on behalf of Organik Kimya within the scope of the RESURGENCE Project

Dilara Bakan presented the **RESURGENCE** chemical industry case study led by Organik Kimya, a major producer of specialty chemicals for coatings, adhesives, textiles, and pressure-sensitive applications. Her intervention explained the complexity of chemical-sector wastewater, characterised by very high COD, suspended solids, latex and acrylic polymer residues, and considerable variability due to batch-based operations. She described the limitations of the current treatment systems—sedimentation, ultrafiltration, MBR, and RO—which face operational instability, severe membrane fouling, low recovery efficiencies, and high sludge generation. These inefficiencies result in elevated operational costs, significant freshwater dependency, frequent membrane replacement, and the loss of high-value polymers.

Dilara then outlined how RESURGENCE provides a pathway to overcome these challenges through the development and demonstration of advanced membrane technologies for polymer recovery and high-level water reuse (up to 95%). She also discussed the integration of advanced oxidation processes for persistent pollutant removal and the deployment of high-performance sensors and predictive digital models to stabilise the treatment process and optimise dosing and cleaning cycles. Her presentation emphasised the expected environmental and economic benefits, including reduced waste generation, improved circularity, lower sludge disposal, and enhanced product-quality consistency. This case study demonstrates how cutting-edge R&D can modernise wastewater management in the chemical sector and serve as a replicable model for European industries.

CORNERSTONE

Cejna Anna Quist-Jensen

Cejna is an Associate Professor at Aalborg University, Denmark. She earned her Ph.D. degree in 2016 from the Institute on Membrane Technology and University of Calabria, Italy. Her research focuses on novel membrane technologies for water and wastewater treatment, including resource recovery, membrane distillation, membrane-assisted crystallization, and 3D-printed membranes. She currently coordinates two Horizon Europe projects: CORNERSTONE (2024–2027) – addressing water, energy, and resource recovery from industrial waste streams; and BeyondBattRec (2024–2028) – focusing on sustainable battery recycling. In addition, she contributes to several national and international projects on water and wastewater treatment. Cejna also serves as Vice-Chair of the Steering Group for the AAU Water Initiative at Aalborg University (www.water.aau.dk).

Industrial water use accounts for nearly half of all withdrawals in Europe, creating significant stress on freshwater ecosystems and energy systems. Addressing these challenges requires adaptable solutions that can be deployed across diverse industrial contexts while delivering high resource efficiency and low environmental impact. In her intervention, Cejna introduced **CORNERSTONE** as a Horizon Europe project coordinated by Aalborg University and implemented by 16 partners from 8 countries over 48 months, starting January 2024. She framed the project's overall objective as enabling a long-term circular economy in EU industry by recycling and reusing resources from industrial water and wastewater streams, supported by a portfolio of six treatment modules and three demonstration case studies, summarised in Figure 4.

Figure 4 CORNERSTONE Case Studies

Cejna then focused on the **pulp & paper case study** (Essity), presenting how CORNERSTONE combines energy recovery (non-clogging heat exchanger) with water recovery (nanofiltration; membrane distillation) and solute recovery (bipolar electrodialysis; membrane crystallisation). The intervention highlighted the role of process integration, where recovered heat supports thermally driven steps and treatment trains enable both high-quality water recovery and the production of valuable outputs (e.g., NaOH and HCl) from salt streams. Finally, she pointed to the project's transversal strategy, including smart monitoring and sensors, digital twins, sustainability assessment across environmental, social and economic dimensions, and decision support tools for digitally enabled industrial water and resource stewardship.

Pavel Ivashechkin (BFI)

Pavel is Deputy Head of the "Resource Technology Liquid Media" department at BFI applied research institute, where he has been working for 18 years, coordinating projects on process water treatment and waste heat recovery for the steel industry. He holds a Civil Engineering degree from the Belarusian National Technical University in Minsk and obtained his PhD in municipal wastewater treatment from RWTH Aachen University, Germany, in 2007.

In his intervention, Pavel Ivashechkin presented the **CORNERSTONE steel industry use case**, focusing on hydrogen-based direct reduction and the opportunity to recover heat from gas-scrubbing process waters. He explained that higher gas temperatures in H_2-based direct reduction can increase process-water temperatures up to ~85°C, creating a relevant source of waste heat that can be valorised for blowdown water reclamation via membrane distillation, with reuse options including freshwater substitution and potential integration with hydrogen production pathways.

He outlined the overall logic of the solution, depicted in Figure 5, connecting waste-heat recovery with membrane distillation to enable blowdown water recovery and reuse. The intervention also acknowledged practical implementation constraints, noting that gas-scrubbing waters can pose operational challenges for standard heat exchangers. Within CORNERSTONE, this was addressed through a dedicated heat-exchanger concept designed to better handle such conditions and support stable operation.

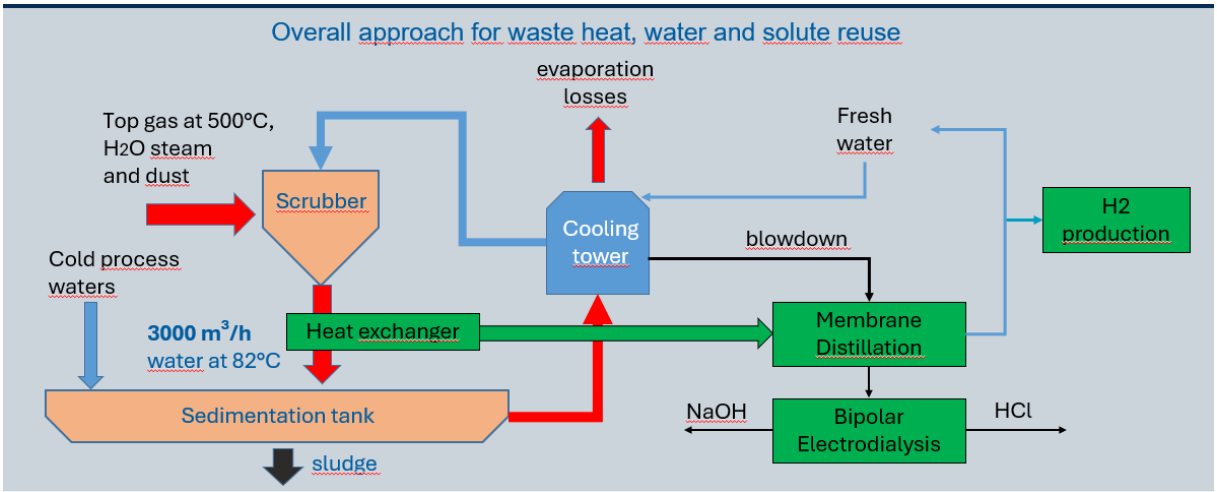

Figure 5 Overall approach for waste heat, water and solute reuse

Christoph Blöcher

Christoph holds a diploma in Environmental Engineering from Technical University of Berlin and obtained a PhD from Saarland University (membrane bioreactors). He had various positions in the chemical industry at Bayer Technology Services, Currenta and now Covestro, being always linked to water. He developed and implemented wet oxidation processes, consulted globally sites and plants, and was plant manager water supply for a chemical parc. He is now Head of Infrastructure Processes, HyCO and Materials / Corrosion in the Process Technology organization of Covestro, supporting sites and plants in troubleshooting, projects and the transition to circularity and climate neutrality. The chemical industry case study in the Cornerstone project aims at exactly this and is managed by his group for Covestro. Christoph is chair of the Dechema specialist section "Industrial Water", which German expert group connects process industry and universities.

In his intervention, Christoph Blöcher presented the **CORNERSTONE chemical-industry case study** (see Figure 6), highlighting the need to develop alternative treatment routes for complex industrial waste and wastewater that recover value and energy, instead of relying on energy-intensive treatment solutions. The case study reflects Covestro's strategic approach to turning waste and wastewater from energy consumers into energy producers while reducing operational costs. Using mapping tools, expert review and selection criteria (e.g. TOC, scale and multi-site relevance), Covestro prioritised five wastewater streams with an estimated energy potential of 1–100 GWh/year, in collaboration with TU Darmstadt and Veolia Biothane, covering both current production streams and future streams from circularity projects.

Following batch testing with Automatic Methane Potential Test System (AMPTS), two technology modules, Anaerobic Membrane BioReactor (AnMBR) and Expanded Granular Sludge Bed (EGSB) are tested in continuous operation. Pre-treatment technologies are applied depending on the waste(water) stream. The initiative exceeded initial expectations, identifying more promising streams than anticipated and developing two technology modules instead of one. In the next project phase, continuous operation will be extended to other streams. However, regulatory requirements for sample shipment emerged as the primary challenge, causing delays of up to several months and significantly impacting project efficiency and innovation potential.

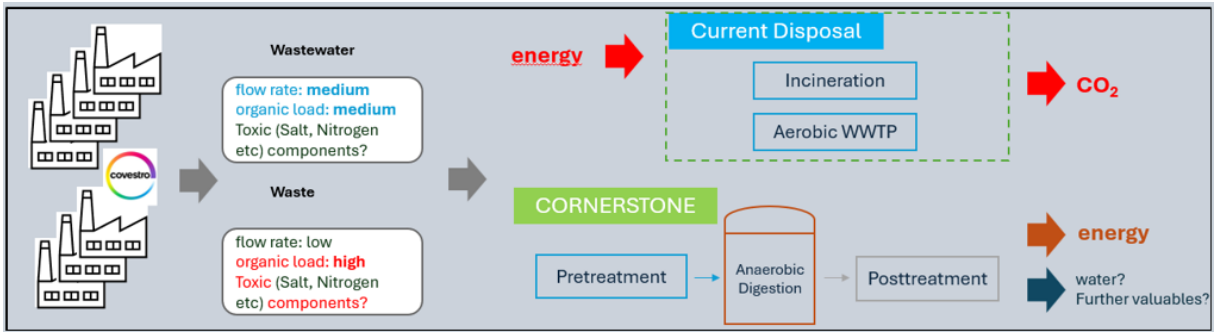

Figure 6 Developing alternative treatment routes for waste and wastewater to gain energy instead of spending energy and reduce costs

R3VOLUTION

Lidia Fernández-Rojo

Dr. Lidia Fernandez-Rojo is an environmental scientist with a PhD in Water Sciences and Environmental Engineering (University of Montpellier, 2017). She has worked in leading research institutions in France and Spain, developing innovative solutions for water reuse, wastewater treatment, and resource recovery. She has participated in several European and national projects and published 13 peer-reviewed articles. She currently works as a senior project manager at Cetaqua, focusing on industrial wastewater treatment and recovery of critical raw materials. Project Coordinator of R3VOLUTION.

In her intervention, Lidia Fernández-Rojo presented **R3VOLUTION** as a Horizon Europe project advancing a smart, circular and integrated approach to maximise process water reuse and resource recovery in industry. She framed the work against the structural pressures of water scarcity and water stress in Europe, and the growing need for industries to reduce freshwater abstraction while managing complex effluents and rising operational costs. Within this context, she positioned water reuse and Zero Liquid Discharge as a pathway that can deliver environmental compliance, water savings and resource recovery—while acknowledging the implementation challenges linked to energy demand and cost. She then outlined the project's scope and ambition, highlighting the consortium scale and the core objective to design and demonstrate membrane-based treatment trains that enable water reuse, solute recovery and heat reuse, supported by digital tools for decision support, risk management and process optimisation, and validated across multiple industrial settings through physical and virtual demo-cases.

Lidia walked the audience through the project's four demonstration sites, explaining how the R3VOLUTION toolbox will be demonstrated in real industrial settings to support water reuse, solute recovery and heat reuse, while ensuring the removal of hazardous substances. She introduced the four industrial contexts covered by the project—spanning **bio-based chemical industry, petrochemical industry, pulp & paper, and steel** and summarised in Figure 7—as the backbone for testing and validating the approach across different wastewater profiles and operational conditions. She also clarified the project's combined validation logic, referring to physical demo-cases supported by virtual replication through the R3VOLUTION digital toolbox (incl. a digital twin).

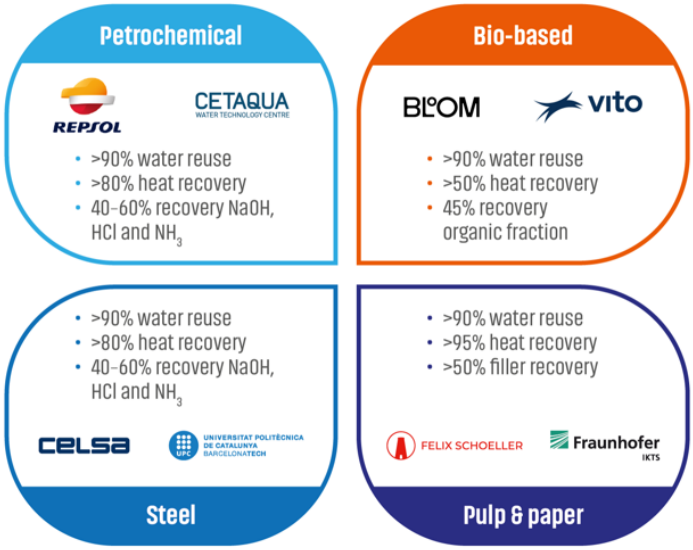

Figure 7 R3VOLUTION Demonstration Sites

iWAYS

Matteo Venturelli

Matteo Venturelli is a Tenure-Track Researcher (RTT) in Energy Systems (ING-IND/09) at the University of Modena and Reggio Emilia (UNIMORE), where he focuses on numerical and experimental research applied to energy-intensive industrial processes. He holds a PhD in Industrial Innovation Engineering, and his work centers on developing advanced numerical models to evaluate and improve the energy efficiency and environmental footprint of complex systems. The activity is embedded in major European projects and supported by collaborations with international research groups. Matteo is part of the coordination team of the iWAYs project (PI of the project: Prof Luca Montorsi).

The iWAYS project (Innovative WAter recoverY Solutions), recently concluded, was invited to the event as a mature reference project. It developed advanced technologies to recover water, heat, and—in some cases—valuable materials from industrial exhaust streams, with the goal of reducing resource consumption and improving overall energy efficiency. The project also tackled key environmental challenges by helping industries minimize harmful emissions. Central to iWAYS was the use of innovative Heat Pipe Condensing Economisers made from new materials and designed to operate under extreme and highly corrosive conditions, alongside innovative water recovery technologies. These breakthroughs enabled the creation of robust, high-performance heat exchangers capable of handling particle-laden exhausts, setting iWAYS apart from existing solutions and paving the way for cleaner, more sustainable industrial processes. The presentation summarised the main keypoints of the project and the results achieved.

Building on this overview, Matteo Venturelli outlined iWAYS' implementation logic around three technology pillars—exhaust condensation, water treatment, and a decision-support system supported by smart monitoring—with applications across **ceramic, chemical and steel contexts**. He then focused on the Heat Pipe Condensing Economiser as the project's core technology, designed to recover heat while simultaneously condensing water vapour from hot, humid exhaust gases. Figure 8 presents the economiser's structure and working principle. At a high level, he explained that sealed heat pipes containing a small amount of working fluid operate in a continuous evaporation–condensation cycle, transferring heat to a cooler section where it can be captured. The condensed water can then be treated and reused within the industrial process.

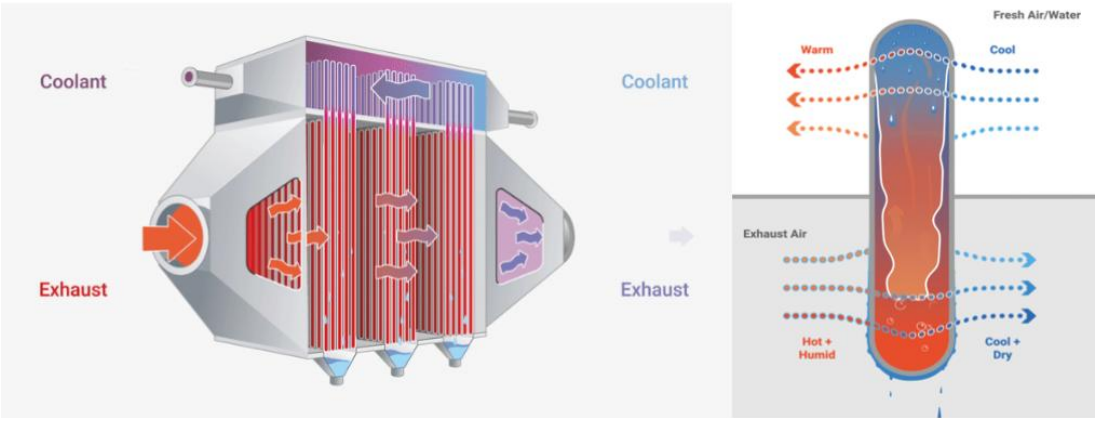

Figure 8 The Heat Pipe Condensing Economiser is iWAYS core technology

BOOST-IN

Thomas Track

Thomas has a background in water resources management. Since more than 30 years his focus is on water circularity, industrial water management and water resource management. Water for Hydrogen production and power to X processes as well as water related circularity products are actual topics in his portfolio. Thomas is strongly integrated into the water community at national and international level through innovation transfer projects, expert networks, specialist committees and expert activities. Actually, he is e.g. member of Water Europe's core group for the "Water in Industry Community of Practice"

Thomas Track presented **"BOOST-IN – Uptake of innovative and circular solutions for water"**, positioning the project as a Horizon Europe CSA that supports the market uptake of **Water & Circular Economy Solutions (WACES)** by tackling key non-technical barriers. He explained that BOOST-IN follows a structured pathway from identifying needs and gaps to delivering actionable guidance for stakeholders involved in circular water products and solutions. Figure 9 illustrates the concept idea.

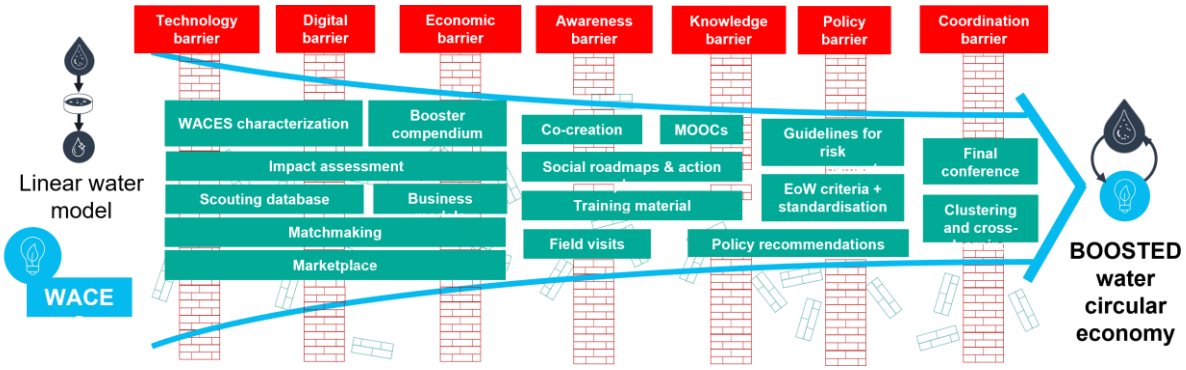

Figure 9 BOOST-IN focuses on barriers for the market uptake of WACES

Facing water scarcity and quality issues in Europe, BOOST-IN seeks to advance technological innovations, enact governance reforms, encourage mindset shifts, and restructure organisations to tackle challenges related to water resources. The project uses lessons from past European research and innovation projects to support replication in specific regions and across Europe, aiming to make policies and markets more supportive. To effectively implement and scale circular economy practices, especially in the water and wastewater sector, Key Performance Indicators (KPIs) and **certification schemes** can play a crucial role. KPIs help monitor progress, ensure transparency, and assess environmental, economic and social impacts; without robust metrics, it remains difficult to verify whether CE initiatives are truly sustainable or only incremental. Likewise, certification builds trust, facilitates market access, supports compliance with EU regulatory frameworks, helps distinguish verified circular products from greenwashing, and can support harmonisation across EU Member States.

BOOST-IN addresses these needs by supporting the development and market uptake of CE products derived from technical solutions in the water sector, promoting WACES that recover water, materials and energy and thereby help close the water cycle. These efforts are implemented at both EU and regional levels, particularly in Regions of Opportunity (ROp), to promote knowledge exchange, build capacity, encourage entrepreneurship, and support policy development. To advance this work, BOOST-IN is running a **CEN Workshop** developing a roadmap on the evaluation of product quality criteria for water-related circular economy products—defining product types, related KPIs, and methods of proof that can support product certification.

Panel session

Imad Ahmed[1]

Dr Imad Ahmed PhD FRSC FIMMM CChem. Imad is the Head of Innovation at the Water Research Centre (WRc, UK). He leads WRc's applied research and innovation strategy, working with clients and partners to translate priority challenges into deployable solutions across water resilience, climate adaptation and circularity. He founded and leads WRc's Ventures Innovation Programme, strengthening the pathway from research to market-ready services, tools and ventures. Alongside his role at WRc, Imad is Founder and Chair of Nanolyse Technologies, an Oxford-based cleantech company developing advanced materials and monitoring technologies for water and environmental applications, spanning field-based sensing and data-driven approaches. He is a Fellow of the Royal Society of Chemistry and a Fellow of the Institute of Materials, Minerals & Mining, and a Visiting Professor at the University of Oxford.

Thanks to a well-structured and engaging run of show, the panel "Innovation in Industrial Water for a Water-Smart Society & Economy" offered a lively and substantive discussion. Moderated by Imad Ahmed, the session effectively guided panellists through the topic, ensuring a coherent flow across collaboration, policy enablers and scaling pathways. The debate underscored the need to strengthen cross-sector partnerships, align innovation with EU frameworks and funding instruments, and support deployment at scale through validation, investment and market uptake. The Q&A brought additional practical insights, confirmed shared priorities for impact and replication, and at the same time revealed the necessity to keep or even foster global competitiveness . Figure 10 shows the panel session.

Figure 10 Panellists during the run of show

1 https://orcid.org/my-orcid?orcid=0000-0003-3868-2919
https://www.linkedin.com/in/imad-ahmed-ntec/

Takeaways and Closing Remarks

Main outcomes: The WPE edition on 'Circularity in Industrial Water' featured five leading Horizon Europe and SPIRE projects - RESURGENCE, Cornerstone, R3VOLUTION, BOOST-IN, and iWAYS to highlight how circular approaches in industrial water management can strengthen Europe's resilience, competitiveness, and sustainability. Across the discussion, a number of consistent messages emerged.

- First, industrial water is now firmly recognised as strategic infrastructure. The framing of water as an economic resilience issue — not simply an environmental obligation — resonated throughout the session. Industrial continuity, energy integration, raw material recovery and digital optimisation are no longer separate agendas; they are increasingly interconnected through water systems. This shift in perception marks a significant evolution in how water is positioned within European industrial strategy.

- Second, the technology base is advancing rapidly and credibly. The projects showcased integrated modular treatment systems, advanced membranes, electrochemical recovery processes, anaerobic solutions and AI-driven decision support tools operating in real industrial environments. These are not conceptual pilots, but validated applications embedded in steel, chemicals, pulp and paper and urban-industrial interfaces. High levels of water reuse, energy recovery and resource valorisation are technically achievable.

- Third, the panel was equally clear that the central challenge is no longer proof of concept. The more pressing issue is sustained deployment. Industry adoption hinges on reliability, clarity of return on investment, regulatory predictability and integration into existing assets. Once funding cycles end, momentum can falter unless ownership, business models and performance metrics are embedded within operational structures. The transition from demonstration to mainstream practice remains Europe's key scaling hurdle.

- Fourth, Policy alignment is strong, but implementation must accelerate and at the same time does not impair global competitiveness. The Green Deal, Zero Pollution ambition and Water Resilience Strategy provide clear direction, and Horizon Europe continues to mobilise significant resources. Yet participants highlighted practical constraints such as additional costs, permitting complexity, regulatory fragmentation and limited incentives for retrofitting existing plants. Greater coherence between funding instruments, regulatory frameworks and industrial investment cycles will be essential if scaling is to match ambition.

- Fifth, the importance of durable collaboration structures also emerged as a decisive theme. Communities of Practice, regional ecosystems and cross-sector platforms are critical in sustaining knowledge exchange beyond individual projects. Without these mechanisms, Europe risks repeating pilots rather than consolidating progress. With them, there is a pathway to structured replication and impact at scale.

The closing reflections reinforced three key takeaways.

1. Industrial water must be treated as a strategic lever for resilience and competitiveness, not a secondary compliance function.
2. Europe does not lack innovation capability; it must now focus on integration, replication and business model alignment.
3. And finally, scaling circular industrial water systems will require coordinated action across industry, policy and innovation ecosystems, combining regulatory clarity, investment confidence and long-term collaboration.

The discussion concluded with a shared sense of direction. The foundations for a Water-Smart Society and Economy are in place. The task ahead is disciplined execution, moving decisively from demonstration to deployment, and ensuring that proven solutions become standard industrial practice across Europe.