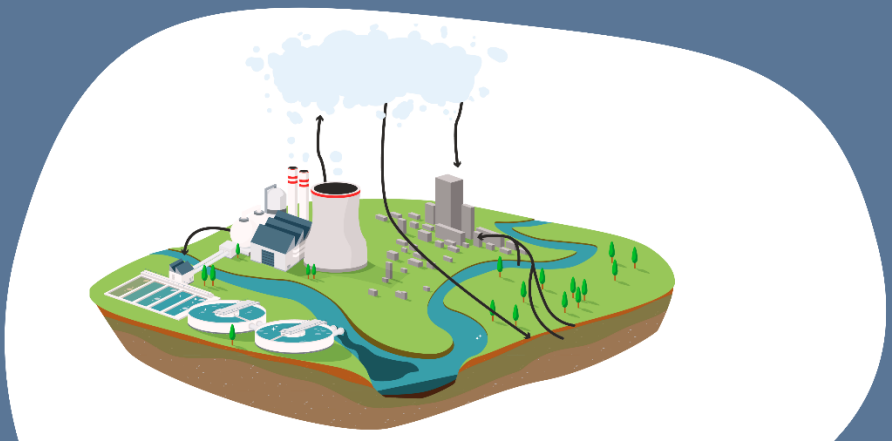
REPORT
20.10.2025

Key learnings
and reflections

Visible Solutions for Invisible Threats
Tackling Contaminants of Emerging Concern Together



REPORT VISIBLE SOLUTIONS FOR INVISIBLE THREATS:
Key learnings and reflections

October 20th 2025
Science Park University of Antwerp, Niel

Introduction
How can we make invisible threats visible when it comes to emerging contaminants? That question brought researchers, policymakers and industry together on 20 October at the Science Park University of Antwerp for *Visible Solutions for Invisible Threats*. Co-organised by POM Antwerp and the University of Antwerp, the event focused on turning scientific insight into practical solutions for cleaner water, healthier soil and more resilient economic and ecological ecosystems.

Experts discussed how science, policy and business can move from reactive measures to proactive, preventive action. The key learnings that follow show how collaboration and innovation can lead to more sustainable management of contaminants.

A shared responsibility
Miranda Coppens, Managing Director of POM Antwerp, opened the day by highlighting the importance of collaboration across sectors. The Science Park symbolises the link between knowledge and application, a place where innovation becomes a shared effort.

Prof. Dr. Ronny Blust of the University of Antwerp set the tone in his keynote, insisting that tackling emerging contaminants demands systemic change, scientific courage and long-term cooperation between academia, government and industry. He called for solutions that go beyond pollution control to support a circular economy that safeguards both people and planet.

In his closing reflections, Prof. Dr. Steven Van Passel, Vice-Rector Valorisation and Sustainability at the University of Antwerp, reinforced this message, noting that managing contaminants of emerging concern is as much an economic and social challenge as an environmental one.

From a reactive to a proactive stance

A clear message ran through every discussion: environmental management must move from treating pollution's symptoms to preventing its causes. Emerging contaminants such as PFAS, pharmaceuticals and microplastics often go unnoticed until they enter ecosystems. By the time remediation begins, damage is widespread and costly to reverse.

Speakers noted that current systems still act after harm is done. Environmental Quality Standards (EQS) and regulations are essential but often too general to reflect site-specific realities. A more adaptive, science-based framework is needed, one that recognises early signals and enables faster, local responses.

Prevention should start at the source. Identifying potential contaminants during product design or industrial processes reduces the need for complex downstream treatment. This requires closer cooperation between regulators, researchers and companies to ensure that new materials are evaluated not only for performance and cost but also for persistence, mobility and toxicity.

Proactive management also depends on forward thinking, anticipating risks before they become major challenges. Experts highlighted the value of predictive tools, continuous monitoring and early-warning systems. Data-driven decision-making enables timely action before pollutants accumulate, rather than reacting once environmental thresholds are exceeded.

Smart and circular water solutions

Industrial water management already shows how proactive strategies can work in practice. Companies such as Sodecon and Inopsys presented modular, mobile treatment systems that target specific contaminants on site, combining advanced adsorbents to purify water efficiently and recover valuable materials. Mobile technologies enable rapid and scalable removal of contaminants and are suitable for temporary or remote remediation sites. Modular design enables filters to be regenerated and reused, reducing waste and improving sustainability. This approach allows industries to tailor solutions to their pollutants while lowering both impact and cost.

At VITO's Water Experience Container, participants discovered how smart water systems and digital monitoring help make industrial parks more resilient. The interactive setup illustrated how circular technology and collaboration can reduce risks, such as drought and flooding, optimise resources and improve resilience across industrial sites.

Experts agreed that the future lies in smart integration rather than single solutions. Combining oxidation, adsorption, membrane filtration and biological treatment in flexible systems allows adaptation to each process. This reduces environmental impact and turns waste into value.
Such innovation aligns with European goals under the Green Deal and the Zero Pollution Action Plan, which promote circular chemistry and sustainable production. The challenge is to scale up promising technologies from research to real-world use while keeping them practical and affordable.

Evidence-based approaches

Discussions underlined the need for regulation that reflects science and context. Environmental standards are vital but only truly effective when adapted to local conditions.

Speakers from ARCHE Consulting and partner institutions showed that traditional EQS values, though conservative, can overestimate risk in some settings and underestimate it in others. A more balanced approach involves site-specific assessment combining chemical, biological and ecological indicators.

Tools such as effect-based monitoring and mixing-zone modelling bridge the gap between laboratory tests and field observations. They help regulators and companies determine whether measured concentrations correspond to real ecological harm. Factors such as bioavailability and local water chemistry can be integrated for more accurate and transparent decisions.

Emerging technologies like environmental DNA (eDNA) metabarcoding also represent the next generation of environmental management. By analysing DNA fragments in water or sediment, scientists can detect entire biological communities, including rare or overlooked species. Combined with bioassays, eDNA offers early-warning insights into ecosystem change and helps identify pollution hotspots before damage becomes visible.

The shift towards evidence-based, locally adapted assessment will make environmental regulation not only stricter but also fairer and more effective.

The power of data

Another key theme was the power of data in managing water and soil quality. From lab to field, new tools are giving experts real-time insight into environmental dynamics.

At iFLUX, visitors saw how advanced sensors and digital networks make groundwater monitoring faster and more precise. By measuring flow, contamination and flux in real time, these technologies provide clear data to support quick, informed decisions.

The Schone Waterlopen door O3G consortium showed how combining ozonation and activated carbon removes pharmaceutical residues and other persistent pollutants. Smart monitoring tools such as UV-based surrogate measurements enable continuous control, helping operators optimise efficiency and reduce costs.

These innovations show that sustainability depends not only on technology but also on the information it generates. The more data are shared across sectors, the stronger collective understanding becomes.

Transparency is equally important. Citizens and communities have a right to know how water quality is managed and what progress is being made. Open communication builds trust and strengthens shared responsibility for environmental health.

Working together for impact

Throughout the event, collaboration emerged as both a recurring theme and a necessary condition for success. Managing contaminants of emerging concern requires action across borders, sectors and disciplines. No single actor can address the problem alone.

The Science Park University of Antwerp embodies this collaborative spirit. By bringing together innovative companies, researchers and policymakers in one place, it serves as a

bridge between science and practice. It is not only a business site but a living laboratory where new technologies can be tested and refined before wider application.

POM Antwerp and the University of Antwerp reaffirmed their commitment to continue supporting innovation in this field. They will work to connect partners, facilitate pilot projects and make the Science Park a testing ground for solutions that combine scientific excellence with real-world relevance.

The event highlighted the power of shared purpose. Whether in wastewater treatment, regulation, or environmental monitoring, progress happens fastest when researchers and businesses co-create solutions with policymakers and the community.

Call to action

The learnings from *Visible Solutions for Invisible Threats* point clearly towards a shared responsibility. Emerging contaminants challenge us to rethink how we value resources, design systems and make decisions.

- **Collaboration** is the foundation. Strong partnerships between academia, industry and government must continue to drive the transition to a cleaner, more resilient environment.
- **Prevention** should be prioritised. A proactive, source-oriented approach reduces long-term costs and environmental damage.
- **Circularity** must guide innovation. Reuse, recovery and efficient use of materials are key to sustainable growth.
- **Tailored and site-specific solutions** ensure effectiveness and fairness. Environmental challenges differ across locations and sectors, and so must our responses.
- **Transparent communication** builds trust. Sharing data and engaging with the public makes environmental progress more inclusive and lasting.

You can count on us

POM Antwerp and the University of Antwerp will continue to foster collaboration at the intersection of research and enterprise. The Science Park will remain a meeting point for knowledge exchange, a testing ground for innovation and a partner in bringing sustainable ideas to scale.

The organisers invite participants and stakeholders to stay connected and explore opportunities for further cooperation or follow-up initiatives. For more information, please contact Sara Landuydt, Project Manager Innovation & Entrepreneurship at POM Antwerp (Sara.Landuydt@pomantwerpen.be).

Report prepared by POM Antwerp, November 2025.

Would you like to review the full program for the day? You can view it here.

Some photos capturing the atmosphere of the day, the full photo album is available here:

ORGANISED BY:

Science Park University of Antwerp | POM Antwerp | The province of Antwerp | University of Antwerp

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