A Fresh Dive into Water Recycling

It is astonishing, really, that recycling swimming-pool water has never been systematically tested before. In this sense, the pilot in Braniewo – set up by the local municipal administration in cooperation with the Gdańsk University of Technology – is a true pioneering achievement, with encouraging results.

Perhaps it takes first-hand experience with prolonged drought and water scarcity for our attention to turn to all the obvious sources for water recycling. When the grass on the car park in front of the public swimming-pool is already turning brown and the neighbouring sports field has to be watered constantly just to remain playable, while inside people are splashing around in thousands of hectolitres of valuable drinking water, one thing becomes clear: in times of climate change, swimming in a man-made pool could become as much of a "nice-to-have" as playing football on green turf. Unless, that is, we embed it sensibly in a circular water-management approach in which, after appropriate treatment, it can become a valuable resource – whether for irrigating green spaces, cleaning the municipal sewer network, or watering the adjacent sports field. In any case, for the future. Because the people of Braniewo, in Poland's north, will continue to enjoy going for a swim.

Swimming pool in Braniewo

The Discovery of a Resource

Swimming pools use large amounts of drinking water every day, which is regularly replaced or discharged during backwashing of the filters. Just as regularly, tanker trucks could pull up here to draw off this water – once treated – from a newly created reservoir and recycle it for various uses. What began as a thought experiment has, within a few years, become an ambitious real-world laboratory for water recycling. It took an almost Herculean technical, political and legal effort to create the necessary preconditions. In doing so, Braniewo is breaking new

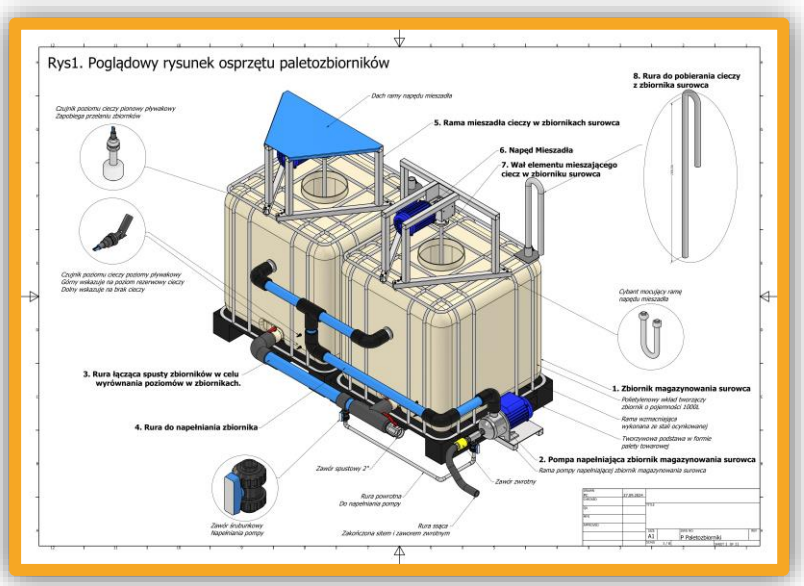
ground at the European level as well. Even in the context of the EU Water Reuse Regulation, the reuse of swimming-pool water is still uncharted territory.

Because the basic idea sounded so compellingly simple, it was all the more surprising that, in fact, no information on similar test projects could be found anywhere. Apparently, no one had ever tried it. Yet, so the assumption went, public acceptance of recycled swimming-pool water as a resource for irrigating sports grounds and green spaces should be comparatively high. “People often struggle to accept treated wastewater. But water they use themselves when swimming seems less alien to them,” says Krzysztof Czerwionka, who oversees the project technically and conceptually on behalf of the Gdańsk University of Technology. In this respect, such a project could be an important door-opener for a more comprehensive water-recycling strategy that taps into additional sources. In effect, a first step in familiarising the general public with the idea.

Part of a Comprehensive Concept that Also Includes Knowledge Sharing

The project team, however, soon realised just how challenging the task would be. What seemed simple at first proved riddled with pitfalls and stumbling blocks: chlorine in the water, limited space for tanks, uncertain volumes, and a thicket of regulations. Every step raised new questions and challenges. Sub-projects, such as blending the end product with rainwater, were tested and then dropped. What had looked like a straight path turned into a winding process of trial and error.

Once a feasible setup had been defined, the team first tested the treatment process under laboratory conditions at Gdańsk University of Technology. The principle was straightforward: backwash water from the filtration system is collected, temporarily stored, filtered and disinfected using UV light. A dual monitoring system, manual and automated, ensured water-quality control.



Design of sewage container for swimming pool water

Shortly after the initial lab trials, work began to install the pre-tested recycling

system on a larger scale next to the filtration plant in the basement of the indoor pool. “To get the equipment into the room, we even had to enlarge the building’s gate,” recalls Jerzy Butkiewicz, the municipal official responsible for water in the Braniewo city administration. On site, he had to coordinate planning, administration, technicians, and construction firms – also a challenging task. The partner institutions followed different procedures, language barriers complicated coordination, and everything had to run alongside day-to-day operations: pushing tenders through, finding contractors, convincing the authorities. Butkiewicz became the pilot’s quiet hero, keeping things moving despite all setbacks.

In the end, the team delivered a small but fully functional system: dechlorination tanks, UV filtration, and a loop that converts utility water into a usable resource. The treated water is collected and stored in a new reservoir under the car park.

A visit to Braniewo. Even outside the indoor pool, it becomes clear that this pilot measure is part of a broader concept for modern water management in which education and knowledge sharing play an important role. The partners, the Gdańsk University of Technology and the municipality of Braniewo, have also created a rain garden on what was once a fully sealed car park, likewise within the WaterMan framework. It uses the site’s natural slope to channel rainwater from the asphalt into planted swales and hold it there longer. This allows the greenery to thrive, cools the surrounding area on hot summer days, and eases pressure on the flood-prone Pasłęka River during heavy rain. Information boards explain these links and also introduce the pioneering pool-water recycling pilot to pool visitors and school classes. Technically, the two initiatives are separate, they operate as distinct water cycles. And yet, attention is channeled here: from the visible rain garden to a facility hidden in the pool’s plant room and beneath the car park’s asphalt.

The Real Potential Could Be Unlocked in New Pool Developments

Czerwionka is visibly proud of what has been achieved. With the system now commissioned, Braniewo can recover up to 50 percent of the water generated during backwashing. Across the entire pool operation, that translates into savings of about 15 percent of the drinking water that previously went unused down the drain.

However, the environmental engineer is now also aware of the pilot’s limitations. “What we can already say is this: when retrofitting such a system into an existing pool infrastructure, you have to make many compromises.” In the conversion of an existing building, potentials remain untapped that could be realised if water recycling was taken into account right from the planning and construction of such

a facility. In that case, the system could be scaled up and recycle substantially larger volumes of water every day.

In addition to backwash water, the large volumes of shower water generated in a swimming pool every day could also be treated using the same recycling process. In the existing piping system, however, shower wastewater is mixed with wastewater from the toilets. “So the lines would have to be separated; rebuilding that in an existing facility is too complex,” explains Czerwionka. Even so, being able to highlight these opportunities to municipalities planning a new pool is a valuable outcome in itself. The pilot may not be a grand slam yet, but it already offers a concrete example of how innovation can take shape under difficult conditions. And in the Baltic Sea Region, grand slams are not necessarily required: often a few small measures, taken together, are enough to ensure local supply security. There are, after all, plenty of public pools in the region.

Krzysztof Czerwionka
Gdańsk University of Technology

But why focus only on filter backwash, why not recycle the actual pool water as well? That’s where things get more complex, Czerwionka explains. Pool water isn’t ordinary wastewater: higher levels of chlorine, direct contact with bathers, and strict hygiene requirements make such an undertaking far more demanding. Backwash water, by contrast, is produced regularly, is easy to define as a process stream, and can be treated efficiently in a closed loop.

Not Only Technology – Trust Also Has to Be Built, Patiently

What’s also not always easy is convincing people and organisations to use recycled water. Right next to the pool is the football pitch of the local sports club. It would be the obvious choice to water this turf in summer with treated swimming-pool water in future. But the supplier of the newly laid turf has raised objections, says Czerwionka. The company offers a three-year guarantee for the quality of its grass only when drinking-water quality is used for irrigation. A test run will therefore

only be possible later. Not only technology, but trust, too, has to be built – drop by drop.

Jerzy Butkiewicz, who now wants to put the recycled water into circulation within the municipality, also had to adjust his expectations a little at first. The initial application, flushing water for municipal sewer cleaning, was deliberately chosen to be manageable. If operations remain stable and there are more precise insights about the water quality that can be maintained over time, further uses will be considered: alongside other municipal tasks such as watering green spaces, also private uses, for example by allotment gardeners. “We are planning a simple draw-off system for small users,” Butkiewicz explains. “This will give citizens direct access and bring the topic into everyday life.”

A Big Long-Term Perspective

Even if the tap can’t be turned fully on right away, the solution, Czerwionka argues, has strong long-term potential, especially compared with other water sources. “Rainwater is often only seasonally available. Pool water, by contrast, is generated continuously and its quality can be closely monitored.” And the system’s educational value should go beyond information boards in the car park: school classes visiting the pool will gain hands-on insights into sustainable water strategies and be able to tour the installation.

This makes the issue tangible and strengthens understanding of the basics: in times of climate change, the Baltic Sea Region will also face phases of drought and drinking-water shortages. That is why we need to build small recycling loops into the large natural water cycle – loops that make water available again more quickly for various uses, in different, fit-for-purpose quality levels.

From Unknown Terrain to Fertile Ground

A small loop like this now runs in the basement of Braniewo’s indoor pool. Getting there meant venturing into unknown territory and learning by trial and error. The result is impressive. “Pilot measures like this require patience, pragmatism and commitment,” says Butkiewicz. “But they show that sustainable change can start small and grow from there.” Demo visits will help stakeholders across the region to experience this first-hand. What was once unfamiliar ground is now fertile soil for new ideas and projects – freshly watered with recycled filter backwash.

About the WaterMan project

WaterMan promotes a region specific approach to water recycling, which intends to use the alternation of too much and too little water that has become typical in the Baltic Sea Region to make the local water supply more resilient, and supports municipalities & water companies in adapting their strategies.

More information: *https://www.eurobalt.org/WaterRecyclingToolbox/*
http://interreg-baltic.eu/project/waterman

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