Water & Energy: A Complex Nexus

Event Report

EUROPEAN ASSOCIATION OF PUBLIC WATER OPERATORS

EXECUTIVE SUMMARY

The European Commission recently proposed a revision of the Urban Wastewater Treatment Directive, which raises the level of ambition for water operators to become key players of the energy transition. This proposal is expected to curb pollution such as that caused by microplastics and to reduce greenhouse gas emissions by 46% by 2040.

Public water operators welcomed this ambitious proposal at a public seminar organised by Aqua Publica Europea on 17 November 2022, but stressed the significant investment and operating costs that it implies and called for flexibility mechanisms and financial support in the form of EU funding to face these costs in an inflationary environment.

They also supported new requirements on quaternary treatment but cautioned that they would only be viable if accompanied by an Extended Producer Responsibility scheme as proposed by the Commission and suggested that the scope of this scheme could be broaden to pollutants such as pesticides and phytosanitary products.

Two operators presented a pilot project to recover heat from wastewater to heat or cool buildings and a strategy to reach energy neutrality by 2030. Discussions then continued with other stakeholders on the need for consistent policies to foster integrated energy-water projects at local level and on the role that regulators could play to stimulate fruitful synergies between the water and energy sectors.

BACKGROUND

The dramatic drought that affected a large part of Europe last summer proved once again that energy security and the sustainable management of water resources are two intertwined challenges. At the same time, water resources management, and in particular wastewater management, can be the source of innovative ways to meet collective energy needs in a sustainable way.

The European Commission's proposal for a revision of the Urban Wastewater Treatment Directive (UWWTD) raises the level of ambition for water operators to become key players of the energy transition. While water operators will need to increase their efforts and develop new solutions to support the transition, an appropriate institutional and regulatory framework is needed to seize the full potential of the water-energy nexus.

Starting with a discussion on the content of the Commission's proposal, the seminar "Water and Energy: A Complex Nexus" explored both the concrete solutions and the institutional conditions that can maximise the contribution of wastewater management to Europe's energy needs and provided a platform for water experts and representatives from the energy sector, regulators and public authorities to better understand how to turn the current (multiple) crises into opportunities for a more sustainable society.

OPENING

BERNARD VAN NUFFEL

President of Aqua Publica Europea and Vivaqua

In his introductory remarks, **Bernard Van Nuffel**, President of Aqua Publica Europea and Vivaqua (Brussels' water operator), welcomed the European Commission's recent adoption of a proposal to revise the UWWTD, which will significantly impact the work of water operators. He outlined the role that Aqua Publica Europea already played in the proposal's consultation process and thanked the Commission for its participatory approach.

Van Nuffel then zoomed in on the proposal's objective of energy neutrality for the wastewater sector by 2040. *"It is an important challenge that needs to be tackled to protect the environment but also to save critical energy just as we go through an energy crisis,"* he said before wishing fruitful discussions to representatives from the European Commission, public water operators, water regulators and local energy companies in the audience.

SESSION I: THE PROPOSAL FOR THE REVISION OF THE UWWTD: HOW WILL THE MISSION OF WATER OPERATORS EVOLVE IN THE COMING YEARS?

MICHEL SPONAR

Deputy Head of Unit for Marine Environment & Clean Water Services at the European Commission

The first session kicked off with a presentation by **Michel Sponar**, Deputy Head of Unit for Marine Environment & Clean Water Services at the European Commission's Directorate General for the Environment, who provided a summary overview of the UWWTD proposal starting with a short review of the existing Directive.

The current Directive has delivered on its objectives, Sponar said, citing improved water quality in Europe's rivers and seas as a concrete example of its positive impact. But there is room for improvement. *"Wastewater treatment plants (WWTPs) today have standards that were designed 30 years ago,"* he said before describing challenges such as remaining pollution, eutrophication, energy use and sludge management, governance issues and the lack of coherence with other pieces of water legislation.

Rainwater was identified as a source of pollution bound to become increasingly problematic in the future due to climate change. Sponar then listed micropollutants as well as phosphorus and nitrogen as important pollutants coming from WWTPs before pointing out other challenges such as compliance issues in a small number of countries, avoidable greenhouse gas emissions from WWTPs and barriers to sludge reuse in agriculture in some Member States.

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Sponar then moved on to present the Commission's flagship proposals to improve water quality, reach the objectives of the European Green Deal in terms of governance and circular economy and to improve the governance of the water sector:

- **Small agglomerations:** The Commission proposes to lower the treatment threshold to smaller agglomerations of 1000 p.e. with an obligation of connection where a collective system exists whilst better controlling individual systems with European standards.
- **Rainwater:** The Commission proposes to introduce integrated management plans based on in-depth monitoring of rainwater with measures based on a hierarchy of actions starting with preventive mechanisms and an indicative target of maximum load coming from rainwater (obligation of actions without obligation of results).
- **Nutrients:** The Commission proposes to make nitrogen and phosphorus treatment mandatory for large facilities and in areas sensitive to eutrophication and to introduce new standards for nitrogen and phosphorus while recognising that new infrastructure might be needed.
- **Micropollutants:** The Commission proposes to reduce 6 pollutants by 80% in large facilities and following a risk-based approach in medium-sized facilities (based on Switzerland's legislation).
- **Energy & climate:** The Commission proposes to reach energy neutrality (different from climate neutrality) for the sector at a national level by 2040 (with interim targets) while monitoring greenhouse gas emissions.
- **Circular economy:** The Commission proposes that competent authorities inform water operators about permits given to industries connected to collecting systems and improve pollution monitoring to increase sludge quality and enhance water reuse.
- **Governance:** The Commission proposes to increase transparency, introduce monitoring and reporting obligations, improve access to sanitation and to track Covid and antimicrobial resistance (AMR) in wastewater while improving cooperation between health and water authorities.

The proposal is expected to curb pollution such as that caused by microplastics and reduce greenhouse gas emissions by 46%, at a total cost of €3.8 bn per year by 2040. These costs would be covered by increased water tariffs (average increase of 2.3% by 2040), public budget and an extended producer responsibility (EPR) scheme for micropollutant removal, which would target the pharmaceutical and cosmetic sectors responsible for 90% of wastewater toxicity, Sponar said.

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ARMANDO QUAZZO

CEO of SMAT and Coordinator of APE's Working Group on the UWWTD

"The UWWTD proposal presents truly ambitious and at the same time necessary objectives to achieve a higher level of environmental protection," said **Armando Quazzo**, CEO of SMAT (Turin's water operator) and Coordinator of APE's UWWTD Working Group, who moderated the session. But these objectives imply significant investment and operating costs and, in the current economic climate, which is seeing an explosion of costs from energy to raw materials, it will be essential to introduce flexibility mechanisms.

The inclusion of financing mechanisms other than tariffs and at the same time correlated to the polluter-pays principle is very much welcomed, he said. Public water operators are ready to be active participants in this plan as long as the principle of cost redistribution generated by quaternary treatment obligation is maintained.

Quazzo then discussed the indicative objective to reduce stormwater overflow, noting that investments needed are directly connected to urban planning in which water operators often play a marginal role. He also warned that the rapid adoption of measures can favour grey infrastructure, which is expensive and much more likely to negatively impact the environment than medium and long term planning, and suggested linking the implementation of solutions to the achievement of the objectives set out in the Water Framework Directive.

On the topic of energy, Quazzo cautioned that energy neutrality is currently only possible for a limited number of water operators through expensive technologies and is not equally applicable to rural and urban contexts. He therefore advocated for considering local contexts and environmental needs on the ground in the transition to more environmentally friendly systems.

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JOSEPH HERMAL
Director General of SDEA

Joseph Hermal, Director General of SDEA (Alsace's water operator), highlighted a series of positive developments in the UWWTD proposal such as clarifications on definitions and individual systems, the implementation of the polluter-pays principle, the authorisation regime for non-domestic discharges and improved access to information largely in line with the Drinking Water Directive.

He suggested, however, to broaden the scope of the EPR scheme to pesticides, phytosanitary products and residues from the automotive industry. *"It might also be interesting to consider an intermediary authorisation regime for small and medium-sized enterprises (SMEs), which should also be considered in the context of discharge control,"* he said.

On technical aspects, he asked that the final text clarify that dry weather be the reference period for both stormwater overflows and the annual collected urban wastewater load with regard to the indicative target of 1% for stormwater overflows. He also called on the co-legislators to let water operators choose between concentration and reduction-based objectives for nitrogen and phosphorus removal to prevent disproportionate costs and unnecessary energy consumption. Finally, he called for an extension of the 2035/2040 deadline for the stormwater overflow target to make it possible to implement nature-based solutions rather than grey ones.

On financing aspects, Hermal supported the new requirement on quaternary treatment but stressed that it would only be viable if accompanied by an EPR scheme. He also called for European funds to support the development of renewable energy for WTTPs as well as targeted financial support to reach other objectives set in the UWWTD proposal.

On sludge-related aspects, he stressed the need to further support local sludge use in agriculture and biogas production with other stakeholders, as well as to ensure coherence with the circular economy objectives.

RENATA TOMUSIAK
President of the Warsaw Municipal Water Supply and Sewerage Company (MPiWK)

Renata Tomusiak, President of MPiWK (Warsaw's water operator), expressed concerns about the requirement to connect households to collecting systems where they exist in Poland's countryside due to expected high costs in contrast to large cities. According to her, another challenge would be to carry out dynamic analysis of the flows of urban runoff and urban wastewater in case of rainfall based on water quality models, as current models are quantitative. There will therefore be a need to invest in state-of-the-art measuring infrastructure to create such reports, she said.

The new requirements for nitrogen and phosphorus are manageable for large agglomerations in Poland, but the 80% reduction target for the six defined pollutants is difficult to achieve at this stage and would require significant investment, Tomusiak continued. By testing various technologies (excluding membranes), the Warsaw operator was able to reach a 70% reduction in diclofenac and a 12-30% reduction in other substances.

"The Commission proposal makes sense in view of climate change and the current geopolitical conditions, but I would like to emphasise investment aspects because without financial resources and the support from EU funds the conditions of the new Directive might be difficult to implement," she said.

She was also concerned about the 2035 deadline to upgrade plants to quaternary treatment and about monitoring microplastics in wastewater in the absence of standardised measuring method and reference values. But the biggest challenge would be reaching energy neutrality, she concluded, especially in agglomerations of between 10 000 and 20 000 p.e.

ANDREA GUERRINI

President of the European Association of Water Regulators (WAREG)

"This Directive is going to transform the water sector into a sector, which is much more environmentally sustainable," said **Andrea Guerrini**, President of the European Association of Water Regulators (WAREG), which brings together national and regional public authorities with supervising and/or regulatory responsibilities in the drinking water and wastewater sectors.

Guerrini first welcomed the objective of energy neutrality in the UWWTD proposal, which will bring the water and energy sectors closer together, but he cautioned that the estimated cost calculated by the Commission should be revised upwards.

He then outlined the role that regulators could play to support the implementation of the Directive. With regard to new collection and treatment requirements, he suggested that economic regulators could add a carrot-and-stick incentive-based approach to the Directive's command-and-control method. Regulators could also help identify who will define the amount of costs to be charged to producers in the framework of the EPR scheme and who will decline the national target for energy neutrality at local and utility level, he concluded.

"European funds will obviously remain available," Sponar said in response to the panel. The cost assessment was carried out before the energy crisis. If it had to be done now, the benefits from energy savings would be much higher. The success lies in a combination of measures: energy efficiency, renewables and biogas where it makes sense, he said.

The proposal puts forward global reduction targets or individual limit values for nitrogen and phosphorus removal, Sponar continued. With regard to extending the EPR scheme to other sectors, he replied that the Commission had to start somewhere, adding that microplastics could have been another candidate. *"Quaternary treatment wouldn't be needed without pharmaceuticals or cosmetics on the market,"* he said. *"The costs can be clearly attributed to these two sectors."*

The requirements on energy neutrality are challenging, Sponar recognised while pointing out that the Directive was aimed at the next 20-25 years and needed to set clear objectives. On rainwater, he concluded, the 1% target is an indicative target as it was challenging to set a compulsory target at European level at this stage. Water operators need to define local objectives and compare them with this indicative target. The Commission is not pushing for grey infrastructure, he said, but to optimise existing infrastructure and to improve rainwater management.

SESSION II - WASTEWATER AND ENERGY: WHAT SYNERGIES?

The UWWTD proposal sets very ambitious targets concerning energy neutrality, but beyond this proposal, *"increasing efficiency is an environmental imperative, an economic urgency and a political necessity,"* stated **Milo Fiasconaro**, Executive Director of Aqua Publica Europea, who moderated the second session before introducing two presentations from water operators on energy recovery and efficiency.

OLIVIER BROERS

Director of Studies and Investment at Vivaqua

Olivier Broers, Director of Studies and Investment at Vivaqua (Brussels' water operator), explained how heat from wastewater is being reused to heat or cool buildings in Brussels based on the riothermy principle. Vivaqua is installing low-cost health exchangers (where heat recovery happens) where appropriate in the sewage system to provide over time an air-conditioning system to appropriately isolated buildings. The technology has been pilot tested in Uccle municipality's administrative headquarters with the aim of covering 25% of the building's energy needs.

GUDRUN WINKLER

Senior Advisor at Hamburg Wasser

Gudrun Winkler, Senior Advisor at Hamburg Wasser (Hamburg's water operator), presented the water operator's path to energy neutrality. To reach this objective by 2030, Hamburg Wasser built an incineration plant to provide heat for the WWTP, three wind turbines and solar panels. It also launched biogas production and purchased green electricity. Winkler also presented an innovative cover for their sludge digester tank, which prevents emissions of about 10 000 tons of CO_2e per year. Hamburg Wasser is now 77.3% energy self-sufficient and has reduced carbon emissions down to 4000 tons at its WWTP.

SESSION II - WASTEWATER AND ENERGY: WHAT SYNERGIES?

GERT DE BLOCK

Secretary General of the European Federation of Local Energy Companies (CEDEC)

The panel discussion was opened by **Gert De Block**, Secretary General of the European Federation of Local Energy Companies (CEDEC), who advocated for an integrated energy approach, notably between energy and water, making the most optimal use of local natural resources and by-products. *"The energy transition is a difficult puzzle – we will need all pieces of this puzzle to realise it cost-efficiently,"* he said.

De Block highlighted the need for a coherent legislative framework at EU level. He mentioned the Energy Efficiency Directive proposal, which would impose higher obligation on energy savings for public entities and companies subject to public procurement, as well as higher renovation rate for public buildings owned by public bodies, and advocated for an economically reasonable and technically feasible approach.

He also mentioned the Renewable Energy Directive proposal, which includes provisions related to energy products coming from wastewater. He expressed concerns about provisions that would prevent hydrogen generation in the water sector from being recognised as renewable energy, called for targets on biomethane and advocated for waste heat, synthetic gases and energy from waste and wastewater to be considered at the same level as photovoltaics and wind.

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De Block concluded with remarks on the gas package. He criticised the Commission's proposal to exclude hydrogen production at local level and warned against considerations to decommission gas distribution grids to replace gas heating with heat pumps and electric heating, which he described as technically impossible in most cases and negative for hydrogen or biomethane production projects.

JON RATHJEN

Deputy Director for Water Policy & DECC Operations at the Scottish Government

"If you want to get to net zero and beyond energy neutrality, you need to do the whole business," said **Jon Rathjen**, Deputy Director for Water Policy & DECC Operations at the Scottish Government, calling for a holistic approach to reaching net zero and beyond. He gave the examples of heat from sewers, hydrogen for heavy vehicles, methane capture and energy efficiency through a digital approach.

But there is also a need to offset emissions, said Rathjen, who mentioned Scotland's plan to plant 3 000 hectares of new woodland. There are opportunities that go beyond complying with EU directives, he said. Processing emissions, pumping efficiency of equipment, shifting away from pouring more concrete, using low-carbon building techniques and thinking of every new project from a low-carbon perspective are milestones in this journey, he concluded.

SESSION II - WASTEWATER AND ENERGY: WHAT SYNERGIES?

ANDREA GUERRINI
President of the European Association of Water Regulators (WAREG)

"Regulators have tools that help reach compliance with EU objectives," said **Andrea Guerrini**, President of the European Association of Water Regulators (WAREG), who provided data from the European Environmental Agency (EEA) showing that compliance with EU targets is faster in countries that have a national or regional regulatory authority.

Guerrini concluded his remarks with successful examples of the carrot-and-stick approach to improve alignment of water utilities with EU regulation in Italy and Bulgaria and called for such a system to be widened to energy efficiency. He gave the example of Italy where there are economic incentives for operators that use renewables to produce electrical energy.

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