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National Baseline Assessment Report of Wastewater Treatment Infrastructure in Ukraine

Executive Summary



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Executive Summary

This report presents a baseline assessment of the wastewater treatment sector in Ukraine, developed under Output 2.3 of the EU4Green Recovery East (EU4GRE) Programme. The assessment aims to establish an understanding of the current status of wastewater generation, treatment infrastructure, operational performance, regulatory framework and institutional capacity of the sector. It further seeks to identify opportunities for improving wastewater treatment performance, enhancing energy efficiency in wastewater treatment plants (WWTPs) and exploring the potential for process optimisation, energy recovery and by-product valorisation where technically and economically feasible.

The preparation of this baseline assessment was significantly constrained by the limited availability of reliable and comprehensive operational data at the level of individual WWTPs, as well as by the absence of a centralised online information system containing key information on individual systems. Although aggregate information is available at national and regional scales, it is primarily focussed on hydraulic data (expressed in m³) and only to a limited extent on pollution and treatment performance. Detailed facility-level data regarding treatment performance, influent and effluent quality, sludge generation and energy consumption are not systematically collected or centrally stored. The absence of information on wastewater management in rural areas is also hindering the development of a complete nationwide picture of the wastewater situation. Consequently, the assessment relied on fragmented datasets obtained from national reports, river basin management plans (RBMPs), project documentation, stakeholder consultations and direct engagement with water utilities and sector organisations. The findings and proposed measures presented in this report should therefore be interpreted within the context of these data limitations and should be regarded as indicative rather than definitive conclusions.

The assessment indicates that Ukraine possesses a large but ageing wastewater infrastructure network characterised by substantial regional disparities in operational performance and service coverage. As of 2023, approximately 52% of the population was connected to sewer networks and around 33% to centralised wastewater treatment facilities. Urban–rural disparities remain significant, with approximately 73% of the urban population connected to sewer systems compared with only around 3% of the rural population. Approximately 15 million people currently lack access to centralised wastewater treatment services. In many rural and peri-urban areas, wastewater is managed through decentralised and frequently unregulated systems such as cesspools, settling tanks and unlined lagoons, many of which pose risks to groundwater and surface water quality, and consequently to public health in those regions.

As of 2023, approximately 41.5% of the centralised sewer network is reported to be dilapidated or damaged, while maintenance and replacement rates remain critically low. Several regions, including Donetsk, Zaporizhzhia, Kharkiv and Kherson oblasts, report particularly severe degradation of sewerage infrastructure. Ukraine currently has 717 centralised WWTPs, excluding the territories temporarily occupied by the Russian Federation and areas affected by ongoing or recent hostilities. The sector is dominated by small- and medium-scale facilities, with approximately 90% of WWTPs serving between 1,000 and 150,000 population equivalents. Approximately 397 WWTPs are reported to require rehabilitation or upgrading, including 82 plants requiring tertiary treatment processes for nutrient removal to align with European Union standards. In 2023, only 17 facilities underwent partial or full reconstruction.

The analysis indicates that biological treatment remains the dominant treatment approach throughout the country, with approximately 93% of collected wastewater undergoing some form of biological treatment. The assessment also highlights substantial gaps in sludge management practices across the sector. National statistics on sludge generation are not systematically collected and most WWTPs lack modern sludge treatment infrastructure.

Ukraine has made substantial progress in establishing the legal and institutional framework for EU approximation, but the texts are numerous and the absence of a single wastewater framework code or law covering the full spectrum of obligations limits the integrated vision needed at national level and by individual actors involved in the system to understand their roles and responsibilities. The adoption of river basin management plans for all nine basin districts in late 2024 represents a major milestone, quantifying a six-year investment need of €7.7 billion and providing a geographic framework for implementation of urban wastewater management. The entry into force of the Law on Integrated Prevention and Control of Industrial Pollution in August 2025 introduces a modern, Best Available Techniques (BAT)-based permitting regime that will progressively consolidate fragmented authorisation systems targeting pollution from large economic activities, whose wastewater is partly collected and treated with urban wastewater. It is also necessary to further develop and clarify key regulatory definitions, including the term used for UWWTD sensitive areas, currently referred to in the legal framework as 'vulnerable zones', as well as the exact definition of population equivalent and the pollution parameters used for organic pollution, nutrients and other relevant pollutants.

Furthermore, significant gaps remain between current national regulations and the requirements of the recast Urban Wastewater Treatment Directive (EU) 2024/3019. Ukraine's framework lacks harmonised agglomeration mapping for agglomerations above 1,000 population equivalent, formal procedures for designating quaternary treatment standards and extended producer responsibility (EPR) mechanisms for micropollutants, mandatory energy efficiency pathways towards energy-neutral operations by 2045 and comprehensive stormwater and combined sewer overflow management requirements.

Similarly, while basic frameworks exist for water reuse and sludge management through ministerial orders and national standards, these instruments predate EU Regulation 2020/741 on water reuse and do not incorporate reclaimed water quality classes, validation procedures, minimum monitoring frequencies, operator-level risk management plans or systematic surveillance of emerging contaminants such as PFAS and microplastics.

Within the EU4GRE programme, emphasis is placed on improving the operational and energy performance of wastewater treatment facilities, including the promotion of energy-efficiency measures and the exploration of energy recovery opportunities from sewage sludge. Due to the absence of centralised plant-level data on electricity consumption and sludge production, the initial evaluation focused on 50 WWTPs for which at least partial operational information was available. The selection process considered several criteria, including data availability, geographic accessibility, treatment capacity, ongoing donor activities, planned infrastructure expansion, modernisation priorities and the willingness of utility management to engage in programme activities.

Following a criteria-based evaluation process and consultations with national stakeholders, three pilot sites were selected for further feasibility studies under the EU4GRE programme: Drohobych WWTP, Kremenchuk WWTP and Pustomyty WWTP. These facilities were selected because they represent different operational scales and contextual conditions within Ukraine's wastewater

sector, while also demonstrating a clear interest in modernisation and operational improvement initiatives.

Drohobych WWTP was selected due to its comparatively large treatment capacity and documented plans for replacement of energy-intensive equipment, while Kremenchuk WWTP demonstrated strong institutional engagement and identified priorities related to energy-efficiency measures and sludge treatment improvements. Pustomyty WWTP was included to provide representation of smaller-scale treatment facilities within the pilot programme, thereby enabling the evaluation of approaches applicable to small municipal WWTPs, which constitute a significant share of Ukraine's wastewater infrastructure but are frequently underrepresented in modernisation initiatives.

In parallel with modernisation of centralised infrastructure, the assessment recognises the importance of decentralised and nature-based solutions for smaller communities and rural areas. Constructed wetlands, lagoon systems and other nature-based approaches may provide technically appropriate and lower-cost alternatives for wastewater treatment where centralised sewerage systems are not economically feasible. In addition, the gradual introduction of separate sewer systems and decentralised stormwater management measures, including infiltration systems and green infrastructure, could reduce hydraulic loads on wastewater treatment facilities and nearby surface and groundwater bodies, while generating broader environmental and climate resilience benefits.

The EU4Green Recovery East programme's support for pilot interventions at three pilot WWTPs, combined with broader capacity-building activities, including the organisation of workshops and information events, assessment of existing or needed training programmes for plant operators and related activities, as well as support for alignment with the EU acquis and OECD support on water pricing, provides a practical pathway for demonstrating feasible improvements in treatment efficiency, energy optimisation and resource recovery. However, success will ultimately depend on establishing the comprehensive facility-level data systems that monitor status and progress related to implemented measures and underpin all other improvements, securing sustained financing through national and international sources, building institutional capacity for modern regulatory implementation and maintaining momentum despite the extraordinary circumstances and impacts of the ongoing Russian war of aggression.

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About EU4Green Recovery East

The [EU4Green Recovery East programme](#) is a regional programme supporting the EU's Eastern Partnership countries on their path towards a greener, more resilient, and competitive economy. With an EU-contribution of EUR 21.3 million (2025-2028), it builds on the results of a decade of EU support for better water management and green economy adoption and focuses on five key components: circular economy, water resources, legal approximation with EU environmental

acquis, environmental data, and cross-border environmental cooperation. The programme is implemented by five partners: Expertise France with the French International Office for Water (OiEau), OECD, UNECE, UNIDO, and the Environment Agency Austria (UBA), as the consortium coordinator.