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EU4GREEN RECOVERY EAST

NATIONAL BASELINE ASSESSMENT REPORT OF WASTEWATER TREATMENT INFRASTRUCTURE

Ukraine

Source: www.cambi.com/blog/wastewater-treatment

EU4Green Recovery East – Recovery through a Circular Economy and Pollution Reduction in the Eastern Partnership countries

(700002623)

Implementing partners:

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ABOUT THIS REPORT

Authors(s)

Arsha James, UNIDO

Benoit Wuatelet, UNIDO

Jean Marc Berland, OiEau

Xavier Goossens, OiEau

Benoît Fribourg-blanc, OiEau

Nataliia Zakorchevna, Country Representative (Ukraine) for EU4GRE Programme

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Imprint

Owner and editor: EU4Green Recovery East consortium partners.

United Nations Industrial Development Organization (UNIDO)

Vienna International Centre

Wagramerstr. 5, P.O. Box 300,

A-1400 Vienna, Austria

Office International de l'Eau (OiEau)

21/23 rue de Madrid

75008 Paris, FRANCE

December 2025

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Executive Summary

Ukraine operates 717 centralized wastewater treatment plants serving a population of approximately 41 million people across 25 administrative regions. In 2023, these facilities collected and treated 1,136.29 million m³ of wastewater, with 99.2% undergoing some form of treatment and 93.4% receiving biological treatment. Despite this high treatment rate, the sector faces substantial challenges. More than half of all treatment plants (55.4%) require reconstruction or modernization, and 41.5% of the 35,279 km sewer network is classified as dilapidated or damaged.

Significant disparities exist in service coverage between urban and rural populations. While 77% of urban residents have access to centralized wastewater treatment services, coverage in rural areas stands at only 3.6%, leaving approximately 15 million people without adequate sanitation infrastructure. Most WWTPs were constructed decades ago and now operate well below their combined design capacity of 3,998.78 million m³/year, with actual treatment volumes representing only about one-third of available capacity.

The wastewater sector consumed approximately 763 million kWh of electricity in 2023, with specific energy consumption averaging 0.67 kWh per cubic metre of wastewater treated. Sludge management represents both a critical challenge and an untapped opportunity. While national-level sludge generation was estimated at approximately 338,000 tons per year in 2023, total accumulated volumes stored at treatment facilities may range between 50 and 80 million cubic metres. Most facilities rely on basic dewatering and land storage without valorization, despite the substantial potential for energy recovery through anaerobic digestion and biogas generation.

A fundamental challenge identified during this assessment is the absence of operational data at individual WWTP level. While Ukraine maintains robust reporting systems at national and regional scales, the granular facility-specific information critical for evidence-based planning is not systematically retained in accessible databases. For this report, only basic operational information could be compiled for 51 WWTPs out of the national inventory of 717 facilities. Even within this limited sample, treatment capacity data were available for all 51 plants, but treatment performance status was documented for only 28 facilities (55%), and modernization plans for 29 facilities (57%). Critically, no information could be obtained on facility-specific energy consumption profiles, detailed water quality parameters, or sludge production characteristics for any individual plant.

Ukraine has made substantial progress in establishing the legal and institutional framework for EU approximation. 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. The entry into force of the Law on Integrated Prevention and Control of Industrial Pollution in August 2025 introduces a modern, Best Available Techniques-based permitting regime that will progressively consolidate fragmented authorization systems.

However, significant gaps remain between current national regulations and the requirements of the recast Urban Wastewater Treatment Directive (EU) 2024/3019. Ukraine's framework lacks harmonized agglomeration mapping from 1,000 population equivalent, formal procedures for designating sensitive areas requiring tertiary treatment, quaternary treatment standards and extended producer responsibility mechanisms for micropollutants, mandatory energy efficiency

pathways toward 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.

Through systematic application of selection criteria accounting for data availability, geographic considerations, ongoing projects, capacity expansion plans, and treatment capacity, **three pilot** WWTPs were identified for feasibility studies on energy efficiency and resource recovery: **Drogobych** WWTP (100,000 m³/day design capacity), **Kremenchuk** WWTP (48,000 m³/day design capacity), and **Pustomyty** WWTP (2,200 m³/day design capacity). The feasibility studies at these sites will evaluate multiple options for energy efficiency and by-product valorization which could be transferrable to other WWTPs across the country.

The EU4Green Recovery East programme's support for pilot interventions at three representative WWTPs, combined with broader capacity building and regulatory assistance, provides a practical pathway for demonstrating feasible improvements in energy efficiency and resource recovery. However, success will ultimately depend on establishing the comprehensive facility-level data systems that underpin all other improvements, securing sustained financing through blended national and international sources, building institutional capacity for modern regulatory implementation, and maintaining momentum despite the extraordinary circumstances of ongoing conflict.